

**T.C.  
MARMARA ÜNİVERSİTESİ  
AVRUPA BİRLİĞİ ENSTİTÜSÜ**

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ULUSLARARASI İLİŞKİLER ANABİLİM DALI**

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CONSUMPTION AND PRODUCTION POLICIES AND THEIR  
REFLECTIONS ON TURKEY**

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**Şermin Işıl YÜCEL**

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**Danışman: Yrd. Doç. Dr. Rana İZCİ**

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ONAY SAYFASI

Enstitümüz AB Siyaseti ve Uluslararası İlişkiler Anabilim Dalı Yüksek Lisans öğrencisi Şermin Işıl YÜCEL'in "EU'S TRANSITION TO LOW CARBON SOCIETY: SUSTAINABLE CONSUMPTION AND PRODUCTION POLICIES AND THEIR REFLECTIONS TO TURKEY" konulu tez çalışması 17 Haziran 2010 tarihinde yapılan tez savunma sınavında aşağıda isimleri yazılı jüri üyeleri tarafından oybirliği/ oyçokluğu ile başarılı bulunmuştur.

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## ÖZET

En önemli küresel sorunlardan biri haline gelen çevre kirliliği yaşam kalitesini düşürmekte ve sağlık sorunlarına yol açmaktadır. Çevresel sorunlardan sadece bir tanesi olan çevre kirliliğinin etkileri kirliliğin ortaya çıktığı yer ile sınırlı kalmamakta ve kirlilikle birlikte daha da kötüleşen çevresel sorunları, bizi dünya üzerindeki medeniyetimizi sorgulamaya zorlamaktadır. Bu noktada, küresel iklim değişikliği insan aktivitelerinin hayatı destekleyen sistemleri nasıl değiştirdiğini ve bu sistemlere nasıl zarar verdiğini gösteren en güzel örnektir. Her ne kadar iklim değişikliği doğal bir olay olsa da, insan aktiviteleri bu sürece doğal etkilerden çok fazla bir boyutta etki eder hale gelmiştir. Bu faaliyetler ekolojik sistemlere geri dönülemez zararlar vermekte ve bu durum herkes için belirsiz bir sosyo-ekonomik gelecek yaratmakta, hatta insanoğlunun bu dünyadaki varlığını tehdit etmektedir. Bu nedenle ekolojik ayak izinin azaltılması yönünde özellikle gelişmiş ülkelere büyük sorumluluklar düşmektedir. Günümüzde ekolojik ayak izinin azaltılması yönünde ortaya atılan çözüm önerilerinden birisi de düşük karbon toplumuna geçiştir. Avrupa Birliği de düşük karbon toplumuna geçiş aşamasında kendine yeni hedefler koymakta ve çeşitli politikalar oluşturmaktadır. Avrupa Birliği'ne aday bir ülke olarak Türkiye de bu süreçten etkilenmektedir.

Bu tezde de Avrupa Birliği'nin düşük karbon toplumuna geçiş süreci ve Türkiye'nin bu süreçteki durumu özellikle yenilenebilir enerji kaynaklarına yoğunlaşan bir bakışla incelenmeye çalışılmaktadır. Düşük karbon toplumuna geçiş dünyadaki ekolojik sistemlere kalıcı zararlar veren insanoğlunun bu çıkmazdan kurtulması için şu an için tek alternatif olarak görünmektedir. Türkiye'de de bu yönde çalışmaların başlaması ve gelecek için bir program belirlenmesi hem sürdürülebilir kalkınma hedeflerine ulaşmada hem de Avrupa Birliği ile olan ilişkilerde önemli katkılarda bulunacaktır.

## **ABSTRACT**

Environmental pollution, which is one of the biggest global problems in the world, decreases the quality of life and causes health problems all over the world. Environmental pollution is not limited with the place where it originates and exacerbate the other environmental problems. Nevertheless, pollution is only one of the environmental challenges that force us to question the civilisation on earth. At this point, global climate change is the best example that shows how human activities change and damage the life supporting systems. Although climate change is a natural phenomenon, unsustainable human activities have been altering the natural course of the phenomenon and causing irreversible damages to all ecological systems all around the world which in turn paves the way for an unsustainable socio-economic future for everyone and even threaten human well-being and survival on earth. Thus developed countries have big responsibilities to decrease the ecological footprint. Nowadays low-carbon society appears as one of the solutions offered to decrease the ecological footprint. Therefore European Union put new targets with regard to its possible transition to low carbon society and forms new policies. As a candidate country, Turkey is also being affected from this process.

This thesis, therefore, tries to analyse the transition process of European Union to low carbon society and its effects on Turkey with a specific focus on renewable energy sources in Turkey. Today transition to low-carbon society seems to be the only alternative for humanity that gives permanent damages to ecological systems. Initiating the research and devising a long term program in this direction for Turkey, will certainly contribute to Turkey's sustainable development aims and relations with the European Union.

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## LIST OF ABBREVIATIONS

|                |  |
|----------------|--|
| <b>BTYK</b>    | THE SUPREME COUNCIL OF SCIENCE   |
| <b>CAP</b>     | COMMON AGRICULTURAL POLICY   |
| <b>CFP</b>     | COMMON FISHERIES POLICY  |
| <b>CCS</b>     | CARBON CAPTURE AND STORAGE   |
| <b>DTI</b>     | DANISH TECHNOLOGY INSTITUTE  |
| <b>EEA</b>     | EUROPEAN ENVIRONMENT AGENCY  |
| <b>EECCA</b>   | EASTERN EUROPE, CAUCASUS AND CENTRAL ASIA                                |
| <b>ELCD</b>    | THE EUROPEAN REFERANCE LIFE CYCLE DATA SYSTEM                            |
| <b>EMAS</b>    | COMMUNITY’S ECO-MANAGEMENT AND AUDIT SCHEME                              |
| <b>EU</b>      | EUROPEAN UNION   |
| <b>GHG</b>     | GREENHOUSE GASES   |
| <b>IPP</b>     | INTEGRATED PRODUCT POLICY  |
| <b>LCS</b>     | LOW CARBON SOCIETY   |
| <b>NSDS</b>    | NATIONAL STRATEGIES FOR DEVELOPMENT STATISTICS                           |
| <b>PPC</b>     | POLLUTION PREVENTION AND CONTROL   |
| <b>SCP</b>     | SUSTAINABLE CONSUMPTION AND PRODUCTION                                   |
| <b>SEE</b>     | SOUTH EASTERN EUROPE   |
| <b>SET</b>     | STRATEGIC ENERGY TECHNOLOGY PLAN   |
| <b>TTGV</b>    | TURKISH TECHNOLOGY DEVELOPMENT FOUNDATION                                |
| <b>TTKTTE</b>  | TEXTILE TANING AND CONFECTION CLEANER PRODUCTION<br>INSTITUE             |
| <b>TUBITAK</b> | TECHNOLOGY and SCIENTIFIC and TECHNOLGICAL RESEARCH<br>COUNCIL of TURKEY |
| <b>SMEs</b>    | SMALL AND MEDIUM SIZE ENTERPRISES  |
| <b>SBA</b>     | SUSTAINABLE BUSINESS ASSOCIATES  |
| <b>IPPC</b>    | IMPLEMENTATION OF THE INTEGRATED POLLUTION<br>PREVENTION AND CONTROL     |
| <b>DELTA</b>   | DEVELOPING ENVIRONMENTAL LEADERSHIP TOWARD<br>ACTION.                    |
| <b>TOE</b>     | TONNES OF OIL EQUIVALENT   |





## INTRODUCTION

Environmental pollution became one of the most important problems all around the world. It certainly decreases the quality of life and causes health problems. Moreover its effects are not limited with the place where it originates. As everybody agrees pollution knows no man-made boundaries. Nevertheless, pollution is only one of the environmental challenges that contemporary life styles and attitude towards the environment engender. There are some other environmental challenges that force us to question the civilisation on earth. Global climate change, for instance, shows how human activities change and damage the life supporting systems. Although climate change is a natural phenomenon, unsustainable human activities have been altering the natural course of the phenomenon and causing irreversible damages to all ecological systems all around the world which in turn paves the way for an unsustainable socio-economic future for everyone and even threaten human well-being and survival on earth.

Despite this correlation, environment and development are, most of the times regarded in a conflictual relationship. For most part of the human history, development is held equal to the economic growth and its effects on environment are ignored and tried to be solved through *ad hoc* approaches, measures and policies. This however only ends up with unprecedented environmental challenges. There are also different environmental concerns in the world. Moreover there are sharp differences between developing and developed country environmental priorities. While developed countries stress very much upon the environmental pollution, developing countries focus on their development and growth related priorities. Furthermore developing countries argue that they have the right to pollute in order to reach their development goals as the today's developed countries did in the past.

At this point it is possible to claim that developed countries have a great responsibility to promote sustainable life styles, production and consumption patterns all around the world. Clean production, sustainable consumption and low carbon society are the most pronounced solutions to halt this worldwide environmental change. However, it requires a transformation of energy structures which cannot be achieved without efficient cooperation among developed countries and between developed and developing

countries. All in all these efforts need first of all a reconsideration of the link between environmental concerns and development priorities. It is noteworthy to underline the fact that environmental protection is one of the main challenges for today and the future and that environmental change has been challenging the existing social, economic and legal structures all around the world. The resources in the planet are limited while there is an increasing pollution problem and waste volume is rising. Environmental protection and sustainable development should be also supported by trade and international investments.

European Union also has to face this challenge. Particularly for the last two decades, ensuring economic growth and environmental protection simultaneously is regarded as one of the aims of the European Union. Besides, the European Union tries to claim an environmental actorness and even leadership role. However the EU is also being accused as having a big ecological footprint. Therefore along with its efforts and commitment to combat climate change, achieving Sustainable Consumption and Production (SCP) appears as one of the aims and a challenge for the European Union for a sustainable future. Therefore energy policies seem at the centre of all debates. To illustrate within the framework of Strategic Energy Technology Plan (SET Plan) Towards a Low Carbon future of European Commission, energy technologies are dealt in such a way to address the climate change, security of energy supply and worldwide competitiveness of European companies. At this point debates on low carbon society seems to take the centre stage. Although it is hard to define what low carbon society is it is clear that how energy resources are used has profound implications for the definition. In order to face the contemporary challenges of energy-environment link, transition to a low carbon society seems as a precondition to ensure a sustainable future.

This thesis, thus, argues that during the period of EU's transition to low carbon society, achieving sustainable consumption and production is a very essential step. Due to its status as an EU candidate country, Turkey has to comply with all these new initiatives. However both low carbon society and economy are new concepts. Therefore this study also claims that sustainable energy production and consumption in Turkey constitute the essential step towards establishing an understanding and implementation of Low Carbon Future. Therefore although EU SCP is not limited with energy policies, Turkey's position towards SCP should be first evaluated in response to the renewable energy debates.

According to the Sixth Community Environment Action Programme of the EU, environmental protection has many levels such as, integration of environmental protection, promoting clean technologies, enhanced dialogue between national administrations, civil society activities of environmental NGOs, the importance of sectoral approaches such as, climate change, nature and biodiversity, waste management, natural resources. SCP is a very important part of this process concerning promoting renewable energies as well as adapting SCP policy making and measures. Focusing on renewable energies in Turkey, thus, would also demonstrate the possibility of challenging the deep-rooted fossil fuel based perceptions of development.

This thesis has three parts; the first chapter aims to explain what the low carbon society is and what European Union's strategy is about the transition to a low-carbon society regarding especially The Sixth Environment Action Programme of the EU of 2002 and Strategic Energy Technology Plan Towards a Low Carbon Future of 2007 as well as Climate and Energy Package. Although it is hard to define precisely low carbon society is, renewable energies, energy efficiency and sustainable consumption and production constitute the three pillar structure of the low carbon future.

The second chapter focuses on sustainable consumption and production policies of the European Union through the sectoral approaches; waste management, climate change, nature and biodiversity, natural resources and environment and health quality. These sectoral approaches are essential steps for the low-carbon society. However a specific focus on energy is necessary to highlight the link between the choice of energy and projections for future. Therefore current situation and EU perspective on renewable energy will also be examined with special reference to sustainable consumption and production.

Subsequently the third chapter questions the current situation of sustainable consumption and production in Turkey. It can be claimed that specific focus on renewable energy is a necessary step to understand the necessity and significance of sustainable consumption and production in Turkey. Because of rapid and unplanned industrialization, urban sprawl and environmental pollution, as well as foreign dependence in industrial inputs, sustainable consumption and production activities are very limited and are practised with little knowledge in Turkey. Yet it seems that understanding the potential of renewable energy is likely to boost the demand for

sustainable consumption and production in Turkey. All in all as being an EU candidate country, Turkey's position in environmental protection and sustainable consumption and production process is both a challenge and opportunity both for Turkey and the pan-European area.

This thesis is a descriptive study and therefore to analyse and answer aforementioned questions, a literature review on low carbon society, sustainable consumption and production is conducted with special reference to the official documents of European Union. Last but not least this limited (in scope and time) study is a humble attempt to draw attention to the overall sustainability concerns and opportunities and to provide a general framework for studies on low carbon society in Turkey.

## I. LOW CARBON SOCIETY AND EUROPE

With the industrialization period which had begun for two hundred and fifty years ago, everything changed on earth once again as in the case of agricultural revolution about 10,000 years ago. Industrial revolution has brought profound changes in our lives by challenging the socio-economic relations and technological basis and the use of energy forever. Apparently many things that were previously deemed impossible became possible through using fossil fuels in the production process. In the end, people have started to search for the possibility of the never-ending growth which however depends on finite resources of earth. Apparently current life styles depend strictly on the production and consumption of fossil fuels.

The birth of the Industrial Revolution was all about fossil fuel, and so, in many ways, was everything that followed. We've have learned an enormous amount in the last two centuries-our body of scientific knowledge has doubled so many times no one can count-but coal and oil and natural gas are still at the bottom of it all...Every action of a modern life burns fossil fuel; viewed in one way, modern Western human beings are flesh-colored devices for combusting coal and gas and oil<sup>1</sup>.

Modernity and globalisation also have affected the mobility patterns and worldwide "car-led" development has become principal source of environmental change<sup>2</sup>. As many environmentalists argue with this dependency our social and economic values and needs have changed in such a way to challenge the ecological integrity of the earth to a great extent. These challenges are not only about locally confined damages but global ones. To illustrate, global climate change challenges not only the human survival and ecosystems but also the existing life styles which entirely depend on the use of fossil fuels. There are many scientific researches on the global climate change which particularly demonstrate how our dependency on fossil fuels and high resource economies and habits damage the ecological integrity of the earth. Among all Intergovernmental Panel on Climate Change (IPCC) underlines the human impact on the climate change and points out the danger arising from this inauspicious relation. In its fourth Assessment Report (FAR) it was stated that anthropocentric causes dominated

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<sup>1</sup> McKibben, Bill (2007) *Deep Economy, Economics as if the World Mattered*, Oneworld Publications, Oxford, p.15

<sup>2</sup> Paterson, Matthew (2007) *Automobile Politics: Ecology and Cultural Political Economy*, Cambridge University Press, Cambridge, p.9

the climate change (IPCC, 2007). Greenhouse gas emissions resulting from different economic activities such as transport, energy supply, industry, agriculture as well as from land management are on the rise since the industrial revolution. Carbon dioxide among all is regarded as most important greenhouse gas (IPCC, 2007, 36). Therefore current phase of the civilization is sometimes referred as carbon age. Dependency on fossil fuels seems the main reasons for all those problems. Hence a transition to new production, consumption and life style patterns which does not depend heavily on fossil fuels is essential given the unprecedented consequences of the carbon age. Briefly, besides in addition to resource based production patterns, the current situation of being ‘locked-in’ to carbon intensive consumption practices” also requires de-carbonisation of the society<sup>3</sup>.

In this regard low carbon society and economy appears as the framework to accomplish such a transition. Although it is widely recognized that there are many sectors with significant potentials to reduce carbon emissions, a shift towards a low carbon future would not seem to come easily. Thus it is also very difficult to define the low carbon society since there is not any agreed definition of low carbon society. Yet there are certain features. Among all attempts to define low carbon society, description of Japanese Ministry of Environment provides the most comprehensive one. In the report of Japanese Ministry of Environment puts forward steps of building a low carbon society. According to this document, the principles for a low carbon society are;

- Carbon minimization in all sectors: to minimize the carbon dioxide emission in all sectors,
- To have a simpler life style: to change the consumption society to a quality of life society,
- Coexistence with nature: to maintain and restore natural environment<sup>4</sup>.

According to the article which was written by The National Institute for Environmental Studies of Japan, for UK Energy Research Center, A low-carbon society should

- take actions that are compatible with the principles of sustainable development, ensuring that the development needs of all groups within society are met,
- make an equitable contribution towards the global effort to stabilize the atmospheric concentration of CO<sub>2</sub> and other greenhouse gases at a level that will avoid dangerous

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<sup>3</sup> Mander Sarah, Bows Alice, Anderson Kevin, Shackley Simon, Agnolucci Paulo and Paul Ekins (2007) “Uncertainty and the Tyndall decarbonisation scenarios” *Global Environmental Change* 17 (2007), p.25

<sup>4</sup> The Ministry of Environment, Japan (2007) Building A Low Carbon Society, Retrieved: May 26, 2009 from <http://www.env.go.jp/earth/info/pc071211/en.pdf>

- climate change, through deep cuts in global emissions,
- demonstrate a high level of energy efficiency and use low-carbon energy sources and production technologies,
- adopt patterns of consumption and behaviour that are consistent with low levels of greenhouse gas emissions<sup>5</sup>.

Through these principles and definitions, some examples of what can be done for a low carbon society in the future can be listed as such; concerning the transportation environmentally friendly transportation can be demanded more by the people. Air-pollution that cars caused will decrease and there will be more single-seated vehicles. With the intelligent transportation system there will be less traffic accidents. Public transportation will be connected low carbon distribution systems will be formed. In the energy issue, natural energies will become more common in homes and offices. Energy-efficiency devices will widespread. Low-carbon oriented products and new technologies in global level will be introduced to the public. The promotion of low-carbon society is also important by developing low-carbon products and low-carbon towns.

However, this warnings seem ineffective if the individual states would not plan integrate such considerations into their energy plans. Therefore examples such as the Energy White Paper (2003) of UK; ‘Our energy future creating a low carbon economy’<sup>6</sup> are important attempts to initiate changes in socio-economic structures. All in all decarbonisation should be the main aim in low carbon society (LCS) transition process and this is an option that humanity has no other alternative solution. It is widely argued that decarbonisation can be achieved by three sets of technologies; nuclear, capture sequestration on coal and gas fired plants and renewables<sup>7</sup>. For example, it is estimated that 20-30% of total emission reduction can be achieved in 2050 with the use of Carbon Capture and Storage (CCS) technologies.<sup>8</sup> The EU supports the CCS research funding

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<sup>5</sup> Skea, Jim and Nishioka Shuzo (2008), ”Policies and Practices for a Low Carbon Society” *Climate Policy* 8 (2008) p.7

<sup>6</sup> Department of Trade and Industry (2009) Our Energy future-creating a low carbon economy, (2003), Energy White Paper. Retrieved: March, 10, 2009 from <http://www.berr.gov.uk/files/file10719.pdf>

<sup>7</sup> Hourcade, Jean Charles and Renoud Crassous “Low Carbon Societies: A challenging transition for an attractive future”, *Climate Policy* 8(2008); 607-612.

<sup>8</sup> (Ibid)



and clean coal projects. The aim of the EU is to reach the zero emission power generation by 2020.<sup>9</sup>

Through the transition process to LCS, The European Union Environment Liability Directive, which came into force on 30 April 2004<sup>10</sup> is an important step. The Directive aimed to prevent environmental damage in water, protected species, natural habitats and land.<sup>11</sup> Member States were given the deadline of 30 April 2007 to transpose this Directive into national legislation, but most of them could not achieve to meet the deadline. According to the ‘polluter pays’ principle of the Directive, there are operators for certain listed activities, such as, Pollution Prevention and Control (PPC), permitted installations, some waste management activities, licensed discharges to surface water and groundwater. The operators will be responsible for damage to protected species and natural habitats if this damage is caused by because of their faults. If an operator causes environmental damage they have to inform regulatory authorities and implement the needed measures.

There are two main documents in which traces of low carbon projections of the EU can be traced. These documents are Strategic Energy Technology Plan towards a Low Carbon future and the Sixth Environmental Action Programme. While the first document puts a specific focus on low carbon society, the second one is important in building carbon society due its specific emphasis on climate change, natural resources and waste.

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<sup>9</sup> Foreign Policy (2009), Laying the Groundwork for the Low Carbon Economy, Nov/Dec 2009; 175; ABI/INFORM Global pg E6, p.2.

<sup>10</sup> Willis Limited (2007), The European Union Environmental Liability Directive, Environmental Willis April 2007, p.1. Retrieved: May 12, 2009 from [http://www.fao.org/fileadmin/user\\_upload/rome2007/docs/Policies%20and%20practices%20for%20a%20low-carbon%20society.pdf](http://www.fao.org/fileadmin/user_upload/rome2007/docs/Policies%20and%20practices%20for%20a%20low-carbon%20society.pdf)

<sup>11</sup> (Ibid)

## **1.1. Strategic Energy Technology Plan towards a Low Carbon Future and Climate and Energy Package**

In the 70's and 80's Europe had energy supplies which was easy to reach and there was no carbon limitations. However, this situation led increase in innovation and investment in energy technologies in 80's which was four times of the current investment level<sup>12</sup>. Therefore in its climate and energy package, the EU tries to put measures into action to achieve low carbon economy and to increase energy security at the same time. This package which was accepted by European Parliament and Council in December 2008 and became effective in June 2009 have constituted the legal frame to accomplish EU's climate change goals by 2020: 20% reduction in greenhouse gas emissions and 20% share of renewable energy in total energy consumption (The Council of the European Union, 2009). In its seminal communication (COM 2008(30 Final) the European Commission underlines the necessity to reduce greenhouse gas emissions to achieve a prosperous Europe through updating EU emissions trading system, increasing the potential renewable energies, finding new ways to reduce GHG emissions (such as transport, agriculture and buildings) as well as increasing and enhancing energy efficiency.

Therefore Strategic Energy Technology Plan (SET Plan) Towards a Low Carbon Future also stresses the importance of achieving low carbon economy pointing out that the EU climate and energy targets are complementary once again. In the framework of SET Plan of European Commission, energy technology is very important in order to fight with climate change, security of energy supply and competitiveness of European companies is achieved. European Union (EU) energy technology challenges for the next ten years for 2010 are<sup>13</sup>;

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<sup>12</sup> European Commission (2007 a), Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, A European Strategic Energy Technology Plan (SET Plan), "Towards a Low Carbon Future" 2007, Brussels, 22.11.2007. COM 2007 Final Retrieved: March, 10, 2009 from [http://europa.eu/legislation\\_summaries/energy/european\\_energy\\_policy/127079\\_en.htm](http://europa.eu/legislation_summaries/energy/european_energy_policy/127079_en.htm)

<sup>13</sup> (Ibid)

- To make alternative bio fuels competitive with fossil fuels; with respect to sustainable production,
- To make better energy technologies for commercial area for, CO<sub>2</sub> capture, transport, storage with respect to system efficiency,
- To reduce costs and to increase the performance of existing technologies and to make second-generation bio fuels, capture, transport and storage of carbon, integration of renewable energy sources into the electricity network and energy efficiency in construction, transport and industry are involved in the process, in a short period of time.
- In the long run, to support development of a new generation of low carbon technologies by focusing on the competitiveness of new technologies relating to renewable energies, energy storage, sustainability of fission energy, fusion energy, and the development of Trans-European Energy networks.

It is important to recall that the economic growth and prosperity heavily depend on fossil fuels and thus restructuring energy systems is essential for the EU to overcome external energy supply distortions, to provide energy security and to halt climate change as a leading environmental actor. In the context of SET plan there are several proposals defining the course of action for a low carbon future. These are can be summarized as

<sup>14</sup>,

- There is a proposal of a new governance method for energy technologies and it is based on a joint strategic planning.
- Jointly decided actions are planned to be more effective.
- By this way, The Commission will be more effective on creating industrial initiatives for Europe, such as; solar energy, wind energy, bio-energy, capture, transport and storage of CO<sub>2</sub>, the electricity network and nuclear fission. These initiatives will be able to be made by partnerships between public and private or by the joint programs between Member States. Also The Commission plans to European energy research alliance in order to create better coordination of programming, research activities and universities. And there is a plan to create Trans-European energy networks and systems.
- There is an important aim to increase human and financial resources, due to the need of increasing investments in research activities and innovation. Within three years it is planned to increase efforts in European Union for this aim.

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<sup>14</sup> European Commission (2007a).

Lastly, there is an aim of increasing cooperation to promote marketing, development and accessibility of low carbon technologies worldwide. There's is a need of cooperative action in European Union Member States especially on this subject. This cooperation will create more awareness long-term innovative researches. This cooperation may include networking research centres, demonstration projects, and better use of Kyoto Protocol mechanism. Since the SET plan is regarded as the "technology pillar of the EU's climate and energy policy" several initiatives are at the core of this plan to provide necessary finance for long-term investments such as European Industrial initiative for the development of clean and efficient energy technologies<sup>15</sup>. However SET plan also includes several measures to achieve large scale CO2 reduction through energy efficiency by transforming buildings, transport systems and energy networks into sustainable models. Creating research alliances is therefore essential to widen the scope of these activities in the EU. Both SET Plan and Climate and Energy Package of the EU denote that low carbon future is now integral part of the EU policy making and strategies and that increasing energy efficiency and promoting renewable energies are prerequisites to the success. Given the competitiveness aims of the EU, low carbon economy also seems an important opportunity to ensure energy security.

## **1.2. The Sixth Environment Action Programme of the EU**

Environmental Action Programmes are important multiannual documents which shape EU's environmental policy and put the priority areas for action. Particularly with the Fifth Environmental Action Plan, the EU has specific themes for environmental actions. The sixth environmental action plan is very important in the sense that it prescribes four main areas and seven thematic strategies. Decision (No: 1600/2002/EC) of the European Parliament and of the Council of 22 July 2002 lays down essential features of the Sixth Community Environment Action Programme of the European Union.<sup>16</sup>

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<sup>15</sup> European Commission (2007a),

<sup>16</sup> Official Journal of the European Communities (2002), Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002, laying down the Sixth Community Environment Action Programme. Retrieved: March 11, 2009 from <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:242:0001:0015:EN:PDF>

With regard to its content and aims, the Sixth Environment Action Programme can be considered as the initial steps to build a more sustainable Europe. The Sixth Community Environment Action Programme can be considered as the continued effort of the environmental objectives of the Community. Therefore, it clearly states that a clean and healthy environment is needed for the prosperity of the society and also in global level. Precautionary principle is essential for health and the environment. Sustainable development indeed requires prudent use of natural resources and the protection of global eco-system<sup>17</sup>.

The Sixth Action Programme mainly aims to protect environment and human health by making improvement in environment and the quality of life concerning the Sustainable Development Strategy. The programme respects the diversity conditions in different regions of Europe regarding the balance between environmental pressures and economic growth. The aims and objective of the Programme also contains the sustainable development in candidate countries. Legislation is essential for the full implementation regarding the environmental challenges. Human activity is one of the main reasons of climate change problem and some measures can be implemented to reduce the emission of greenhouse gases with no reduction of growth levels and prosperity.

All these points match the second and third features of the low carbon society definition of Japanese Minister; to have a simpler life style: to change the consumption society to a quality of life society, and coexistence with nature: to maintain and restore natural environment. Apart from emphasis on the features that build low carbon society, the Sixth Environmental Action Programme also contains elements of sustainable consumption and production. To illustrate, one of the themes of the Sixth Environment Action Programme is about sustainable production and consumption, as stated in Article 1:

better resources efficiency and resource and waste management to bring about more sustainable production and consumption patterns thereby decoupling the use of resources and the generation of waste from the rate of economic growth

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<sup>17</sup> (Ibid)

and aiming to ensure that the consumption of renewable and non-renewable resources does not exceed the carrying capacity of the environment<sup>18</sup>

The EU also underlines the necessity of promotion of sustainable development in the Candidate Countries. In Article 2, it is explicitly stated as such,

The Programme shall promote the adoption of policies and approaches that contribute to the achievement of sustainable development in the countries which are candidates for accession (Candidate Countries') building on the transposition and implementation of the acquis. The enlargement process should sustain and protect the environmental assets of the Candidate Countries such as wealth of biodiversity, and should maintain and strengthen sustainable production and consumption and land use patterns and environmentally sound transport structures.<sup>19</sup>

These aims however need to be supported through different considerations and policy priorities in all EU policy areas<sup>20</sup>. Integration of environmental protection requirements into Community Programmes including those related to development of infrastructure necessitate the following actions to be put into practice,

- Promotion of transfer of clean technologies to the Candidate countries,
- Extended dialogue and exchange of experience with the national local administrations in the Candidate Countries on sustainable development and preservation for their environmental assets,
- Cooperation with civil society, environmental non-governmental organisations (NGOs) and business in the Candidate Countries to help raise public awareness and participation;
- Encouraging international financing institutions and the private sector to support the implementation of and compliance with the environmental acquis in the Candidate Countries and pay due attention to integrating environmental concerns into the activities of economic sector.<sup>21</sup>

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<sup>18</sup> (Ibid, p.3)

<sup>19</sup> (Ibid, p.4)

<sup>20</sup> (Ibid)

<sup>21</sup> (Ibid, p.4)

Above mentioned points highlights three important requirements for sustainable EU within its close neighbourhood. These can be listed as integrating the environmental concerns in to all policy areas, clean technology transfer and extending dialogue with candidate countries through participation of civil society, and private sector to the implementation of policies which enhance sustainable development practices in Candidate Countries. The significance of increasing stakeholder participation is strongly emphasised particularly in the 5. Clause of Article 2 as such:

Improving collaboration and partnership with enterprises and their representative bodies and involving the social partners, consumers and their organisations, as appropriate, with a view to improving the environmental performance of enterprises and aiming sustainable production patterns.<sup>22</sup>

Nevertheless improving cooperation with and between stakeholders is not an easy task. This requires the following actions:

- Promoting an integrated product policy approach throughout the Programme that will encourage the taking into account of environmental requirements through the life-cycle of products , and more widespread application of environmentally friendly processes and products.
- Encouraging wider uptake of the Community's Eco-management and Audit Scheme (EMAS) and developing initiatives to encourage companies to publish rigorous and independently verified environmental or sustainable development performance reports
- Establishing a compliance assistance programme, with specific help for small and medium enterprises.
- simulating product innovation with the aim of greening the market including through improved dissemination of results of the LIFE programme.
- Encouraging voluntary commitments or agreements to achieve clear environmental objectives, including setting out procedures in the event of non-compliance.<sup>23</sup>

In article 6 of the programme, concerning the objectives and priority areas for action on nature and biodiversity, it is stated that, “developing measures to enhance sustainable use, sustainable production and sustainable investments in relation to biodiversity”<sup>24</sup> is one of the priority actions. This priority indicates the significance of making

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<sup>22</sup> (Ibid)

<sup>23</sup> (Ibid, p.5)

<sup>24</sup> (Ibid, p.9)

investments to environmental friendly technologies, projects and sustainable development strategies for the economy.

To sum up, the Programme explains that the prudent use of natural resources and protection of eco-system is essential to ensure sustainable development and this aim should be implemented through a Sustainable Development Strategy. This objective also includes Candidate Countries actions and plans. Economic globalisation is very dependent to the environmental protection which can be achieved by good governance. Therefore it is important for the EU to diffuse its policy priorities and strategies into Candidate countries first and then to act as a global actor to promote low carbon society requirements and sustainable production and Consumption practices and strategies.

Sustainable Production and Consumption is mentioned in Article 1, 2 and 6 in the Programme and it is explained as one of the scopes of the Programme. In this programme, it can be observed that the Community thinks sustainable production and consumption is one of the key points for better use of natural resources and better waste management with creating balance between economic growth and consumption of renewable and non-renewable resources.

The Community explains clearly in the Sixth Environmental Action Programme that there is a need for putting forward new policies for sustainable development which also includes Candidate Countries that Candidate Countries also should achieve a sustainable production and consumption. For the Candidate Countries, this will be achieved through following actions:<sup>25</sup>

- Integration of environmental protection,
- Promoting Clean Technologies,
- Enhanced dialogue between national administrations,
- Civil Society activities of Environmental NGOs
- Activities of International financial institutions and private sectors to implement the environmental acquires,

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<sup>25</sup> (Ibid, p.4)



The programme also puts forward that, the role of enterprises and their representative bodies, social partners, consumers and their organisations and through following points they can participate in the process;

- Producing environmental friendly products
- Encouraging to publish sustainable development performance reports,
- Supporting small and medium enterprises with assistance programs,
- Supporting innovation for green market,
- Encouraging voluntary activities and agreements.

And lastly it is stated in the Programme that sustainable production and sustainable investments is essential for nature and biodiversity. These aspects explain a road map for EU countries and Candidate countries to achieve environmental protection and sustainable production and consumption and it proves how the Community gives importance to this issue explaining certain aspects related to *acquis*.

### **1.3. On the Road to Sustainable Europe**

The Sixth Community Action Programme put forward main four issues, climate change, nature and biodiversity, health and quality of life, natural resources and waste. All these for issues have specific objectives, aims and principles. The Midterm Review of the Programme by the Commission (2007) addresses three important aspects:

- 1- What is the extend of the Union meet achieved the commitments of the Programme
- 2- Whether the Programme was sufficient considering the environmental challenges or not,
- 3- Considering the changes since 2002, is there a need for new aspects especially related to the revised European Sustainable Development Strategy,

According to the review report, European Union made essential effort to improve environmental policies and quality of life. In the areas, greenhouse gas emissions, wetland conservation, sustainable forest practices and waste management.

Unfortunately, although these improvements, it seems that European Union is still far away from the way of sustainable development. There is a need for better environmental policies to increase competitiveness, creating jobs and economic growth. Reducing pollution is an important issue for more efficient production and energy efficiency which will make EU less bounded to the suppliers outside. Increasing environmental standards of the EU will increase Europe's prosperity which also individual companies will benefit. The review focuses on specific points in each area:

*-Climate Change:* The understanding of the importance of the climate change has improved since the 6<sup>th</sup> Action Programme. In the houses there is a need for cutting EU emissions of greenhouse gases to reach a low carbon economy. Concerning the Kyoto Protocol EU made commitment for reduction but there is a need for more efforts in all sectors, such as; agriculture, transport, energy and industry. EU should concentrate on technological researches such as carbon sequestration and storage to improve using renewable energies, also the use of bio-fuels. And EU should be ready for adoption to extreme weather events in the future.<sup>26</sup>

*-Nature and Biodiversity:* EU has the aim of reducing global biodiversity loss. In May 2006, the Commission published a strategy on this issue and in this strategy it was stated that there was a need for full implementation of existing legislation. EU should stop the deforestation to prevent biodiversity loss.<sup>27</sup>

*-Environment, Health and Quality of Life:* Regulation on Registration, Evaluation and Authorisation of Chemicals (2006), The Water Framework Directive (2000) and the proposal for a framework directive on pesticides initiatives are important for this title. Water Framework Directive must be improved and need support from national authorities. Also the REACH regulation will create better identification of chemicals and risk management measures.<sup>28</sup>

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<sup>26</sup> European Commission (2007b), Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions on the Mid-term Review of the Sixth Community Environment Action Programme. Retrieved: May 16, 2009 from <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0225:FIN:EN:PDF>

<sup>27</sup> (Ibid)

<sup>28</sup> (Ibid)

*-Natural Resources and Waste:* The Thematic Strategy on Waste Prevention and Recycling put forward the waste management policy of the EU. The Strategy explains the importance of life-cycle thinking to implement “waste-hierarchy”. EU aims economic growth with sustainable use of natural resources with this Strategy.<sup>29</sup>

The Review also explains following the importance of following subjects for perspectives for better policy making:

1. Enhanced international cooperation: In the next years the Commission will concentrate on promoting sustainable development in global level and making environmental protection issue one of the centre points in external relations of EU and Common Foreign and Security Policy, more effective environmental diplomacy, promoting environmental policies, encouraging Member States to develop environmental strategies, creating more improved environmental governance.
2. Better regulation principles in environmental policy making: This aspect will be achieved by using the market to deliver environmental results, simplification, codification and reduction of administration burden, working closely with stakeholders, promoting good regulatory practices, simplified and improved environmental information.
3. Promotion of policy integration: The Commission will make more integration on environmental policy with the other policies such as agriculture, research etc. And create a strategic framework.
4. Improved implementation and enforcement: The Commission will encourage better implementation of environmental legislation of the EU using a variety of instruments which are legal and non-legal together.

As a result the Review document shows us that the environmental policy is one of the main issues for the EU. There have been major achievements such as better waste management and reduction of harmful emission gases. But the EU should take more

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<sup>29</sup> (Ibid)

steps to achieve sustainable environmental development improving the enforcement of EU legislation. The review report also states that Europe's environment will be the "heart" of European project.<sup>30</sup>

Given the fact that household consumption is on the rise all around Europe and that private transport, housing and food constitute the major consumption categories, energy efficiency and waste management strategies become more and more important to achieve a sustainable Europe. Life-cycle chain of products is a valuable tool to evaluate the impacts of production and consumption<sup>31</sup>. This (life-cycle) perspective calls attention to the human impact on environment and is an essential component of Sustainable Consumption and Production. For a sustainable pan-European environment this perspective might create opportunities to achieve energy efficiency and reduce waste, lessening the pressure on environment.

The EU Sustainable Development Strategy (renewed in 2006) also supports the 6<sup>th</sup> Environmental Action Plan through the objectives it set out. These objectives can be listed as climate change and clean energy, sustainable transport, sustainable consumption and production, conservation and management of natural resources, public health, social inclusion, demography and migration and finally global poverty and sustainable development strategies<sup>32</sup>. This broad range of issues denotes the necessity of a general framework to achieve sustainability both in Europe and in the world. In the 2009 review of the EU SDS mainstreaming sustainable development into a wide range of policy areas is also regarded as essential for the fight against climate change and promoting low-carbon economy. Although there are still certain doubts about the efficiency of the EU sustainable development practices, aforementioned considerations offer opportunities for the transition to a sustainable energy structure and hence a low carbon economy.

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<sup>30</sup> (Ibid, p.17.)

<sup>31</sup> European Environment Agency (2007c), *Sustainable Consumption and Production in South East Europe and Eastern Europe, Caucasus and Central Asia*. EEA Report 3/2007. Retrieved: July 17, 2009 from [http://www.eea.europa.eu/publications/eea\\_report\\_2007\\_3/00\\_TOC\\_Executive\\_summary\\_and\\_Acknowledgements.pdf](http://www.eea.europa.eu/publications/eea_report_2007_3/00_TOC_Executive_summary_and_Acknowledgements.pdf)

<sup>32</sup> Council of the European Union (2006) Review of the EU Sustainable Development Strategy, (EU SDS)- Renewed Strategy, 10917/06, Brussels, 26 June 2006 Retrieved: May 26, 2009 from <http://register.consilium.europa.eu/pdf/en/06/st10/st10917.en06.pdf>

## **II. SUSTAINABLE CONSUMPTION AND PRODUCTION**

Since the Industrial Revolution, the importance of economic growth has become an inevitable reality. This economic growth was achieved by rapid technological progress and also use of non-renewable resources. As a result, this caused many environmental damages and loss. Thus increasing epidemic illnesses, forest fires, floods, reduced and failed harvests, melting icecaps, struggles for clean drinking water, shelter and food became major problems and have increased the disparity between the rich and poor.

The world population has risen to 6.7 billion people. According to the recent estimations, 1 billion of them are wealthy people while 1-2 billion live in developing economies and 3-4 billion people try to live with only a few dollars a day<sup>33</sup>. If fast developing countries follow the same economic growth policies with the Western consumption, there will be need for 5 planets to supply resources.<sup>34</sup> Concerning these realities it is easier to understand why sustainable consumption and production (SCP) is a very important issue to stop this rapid decrease in resources and environmental pollution.

It is argued that within the context of climate change and current financial crises, sustainable consumption and production by offering green jobs, encouraging energy and resource efficiency and increasing quality of life would likely to provide necessary background for a transition to low-carbon future. Although sustainable production is a long pronounced concept and a process, sustainable consumption is relatively a new concept and processes. Even some experts argue that sustainable consumption has

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<sup>33</sup> Fedrigo, D. And Arnold Tukker (2009), *Blueprint for European Sustainable Consumption and Production: Finding the path of transition to a sustainable society*, Sustainable Consumption and Research Exchange European Environmental Bureau (EEB), EEB publication number 2009/07, p.6.

<sup>34</sup> (Ibid, p.7.)

“emerged out of radical challenges to the basic logic of capitalism” and therefore it has a great potential to pursue worldwide sustainability<sup>35</sup>.

Sustainable consumption and production was first put on the global policy agenda at the 1992 United Nations Conference on Environment and Development in Rio de Janeiro. Globally, the political framework for action on SCP is based on the Johannesburg Commitment made at the 2002 United Nations World Summit for Sustainable Development and the Marrakech Process launched in 2003. The EU Sustainable Development Strategy, revised in 2006, identified sustainable consumption and production among its seven key challenges, and the EU is currently developing an Action Plan on Sustainable Consumption and Production. The importance of SCP was also recognised within the Environment-for-Europe process.<sup>36</sup>

Sustainable use of resources needs consideration of their availability, the security of their supply, and safeguarding productive capacities of ecosystems. At the same time, it is important to maintain the ability of the environment to act as a 'sink' to absorb emissions and pollutants. Increasing sustainability in production will require improvement in production efficiency, innovative technical and managerial approaches and better environmental monitoring and control.<sup>37</sup>

The need for sustainable management of resources, whilst delinking environmental impacts from economic growth and increasing eco-efficiency of production, has become much more prominent on the EU policy agenda. As far as the EU is concerned, this is not a radical step, but part of an ongoing process of policy development. Policy has been evolving from a focus on the end-of-pipe technologies during the 1980s, through

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<sup>35</sup> Paterson Matthew (2008) “Sustainable Consumption? Legitimation, regulation and environmental governance” in (eds) Jacob Park, Ken Conca and Matthias Finger, *The Crisis of Global Environmental Governance*, Routledge, Oxon, p. 110

<sup>36</sup> European Environment Agency (2008a), Time to step up efforts towards sustainable consumption and production, says a new report. Retrieved: May 20, 2009 from <http://www.eea.europa.eu/highlights/time-to-step-up-efforts-towards-sustainable-consumption-and-production-says-a-new-report>

<sup>37</sup> (Ibid)

more preventive environmental strategies in the 1990s, to the recent drive to reduce impacts during the entire life-cycle of products and services.<sup>38</sup>

Production processes in SCP are, efficient use of water, raw material and energy, non-use of toxic and dangerous raw materials and decreasing the quantity and toxicity of all water and emission. Concerning the products, SCP is to analyze environmental effects of the raw material use from the cradle to the grave production, usage and remove process and new product designs based on the lifetime of the product.<sup>39</sup>

The European Commission-funded Environmental Impact of Products (EIPRO) project undertaken by the Joint Research Centre has identified those goods and services which have the greatest environmental impact when viewed across their full life cycle and summed up across total consumption for the EU-25<sup>40</sup>. The review of recent European studies (7) identified the following consumption categories as having the highest overall life-cycle impacts:

- food and beverages;
- private transport;
- housing, including heating and hot water, electrical appliances and structural work.

Sustainable consumption and production is at the core of sustainable development, encompassing the three dimensions — economic, social and environmental that can be seen in the context of the European Union’s Lisbon Strategy of Economic and Social Renewal (2000) (1) and Sustainable Development Strategy (Gothenburg, 2001) (2), which provide the broad framework for promoting sustainable consumption and production in the EU. In June 2000, the European Commission launched its Social

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<sup>38</sup> European Environment Agency (2007a), Europe’s Environment, the Fourth Assessment, Retrieved: March 20, 2009 from [http://www.eea.europa.eu/publications/state\\_of\\_environment\\_report\\_2007\\_1/Belgrade\\_EN\\_all\\_chapters\\_incl\\_cover.pdf](http://www.eea.europa.eu/publications/state_of_environment_report_2007_1/Belgrade_EN_all_chapters_incl_cover.pdf)

<sup>39</sup> Kıran Cılız, N., Üretim Sektöründe Temiz Üretim, Boğaziçi Üniversitesi Çevre Bilimleri Enstitüsü. Retrieved: November, 20, 2009 from <http://www.iso.org.tr/tr/Documents/Cevre/NILGUN%20KIRAN%20CILIZ.pdf>

<sup>40</sup> (Ibid)

Policy Agenda for the period 2000–05 (3). The agenda provides the roadmap for employment and social policy.<sup>41</sup>

At Lisbon, EU leaders stated their objective of making the EU the world's 'most competitive and dynamic knowledge-based economy' by 2010. The European Commission has set up a High-Level Group on the Lisbon Strategy<sup>42</sup>. The Group is to look into ways of injecting fresh stimulus into the Lisbon Strategy, in particular by improving delivery of the objectives set and by involving Member States and stakeholders more closely. It will also be assessing the instruments and methods used so far. The work of the Group will help the Commission in preparing proposals for the mid-term review of the Lisbon Strategy at the European Council in March 2005.<sup>43</sup>

The adoption of the EU Sustainable Development Strategy in 2001 added a third, environmental pillar to the Lisbon Strategy. The need to pursue, in a balanced way, economic growth, social improvements and environmental protection was translated into detailed objectives and actions<sup>44</sup>. The Strategy identifies six key areas: climate change, health, natural resources, poverty and exclusion, ageing and demography, land use and mobility. The commitments made by the EU at international for, notably at the WSSD but also in Doha and Monterrey, have complemented the Strategy with an external dimension. As agreed in Gothenburg, the EU Sustainable Development Strategy will undergo a thorough review at the start of each new Commission. Based on the assessment of progress made and current trends, the review will provide political guidance for the further implementation of the Strategy. In July 2004, the Commission launched a public consultation to gather the views of citizens and stakeholders to prepare for the review (4). One of the issues to be addressed is strengthening coherence between our internal and external policies and commitments.<sup>45</sup>

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<sup>41</sup> European Commission (2004), *Sustainable Consumption and Production*, Luxembourg: Office for Official Publications of the European Communities. Retrieved: March 20, 2009 from [http://ec.europa.eu/environment/wssd/documents/scp\\_eu.pdf](http://ec.europa.eu/environment/wssd/documents/scp_eu.pdf)

<sup>42</sup> (Ibid)

<sup>43</sup> (Ibid)

<sup>44</sup> (Ibid)

<sup>45</sup> (Ibid)



Production-initiated and consumption-driven policies constitute the basis of sustainable production and consumption policies. Integrated product policy for instance emphasizes the role of producers and especially the industry sector though it also includes many elements for the responsibility of consumers.

## 2.1. Integrated Product Policy (IPP)

Existing environmental product-related policies have generally focused on sources of pollution. Integrated Product Policy (IPP) is supplementing this approach by focusing on products and how they contribute to environmental deprivation at the many different stages of their life cycles. IPP aims to create enhanced coherence in the application of various product policies by reducing the environmental impacts of products. (A Commission Communication on integrated product policy was adopted in June 2003.)<sup>46</sup> Also, IPP aims to reduce the environmental impact of consumption. Environmental performance can be a factor giving companies or their products a competitive edge; it attempts to create the right framework conditions for a market that favours environmentally friendly products.

IPP is based on four principles:<sup>47</sup>

- Life-cycle thinking; which means that when pollution-reduction measures are identified, consideration is given to the whole of a product's life-cycle, from cradle to grave.
- Flexibility about the type of policy measure to be used working with the market where possible. Many different policy measures influence the environmental impacts of products but with so many different products it makes no sense to prefer any one type of instrument;
- Full stakeholder involvement. The environmental impacts of products are affected by the actions of many different stakeholders, such as designers, industry, marketing people, retailers and consumers. Reducing these impacts requires all stakeholders to take action in their sphere of influence;
- Not setting final targets to be reached but rather creating a philosophy of continuous improvement. By this way every product generation should be more environmentally friendly than the others.

The Commission will implement IPP through a two-pronged approach:

- Improving the tools that already exist to make them more product-focused. These tools, known as the IPP toolbox, can be used on many different products. IPP will also improve coordination between the different instruments to better exploit their synergies;

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<sup>46</sup> European Commission (2003), Questions and Answers on Integrated Product Policy (IPP), Europe Press Rereleases. Retrieved: from May 10, 2009 from <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/03/136&format=HTML&aged=0&language=EN&guiLanguage=en>, p.1

<sup>47</sup> (Ibid, p.1)

- Taking action to improve the environmental performance of products that have the greatest potential for improvement. This includes the following concrete actions:
  - In June 2004, the launching of two pilot projects on mobile phones and wooden garden furniture on the basis of stakeholder suggestions to the Commission;
  - In 2005, on the basis of stakeholder dialogue, the publication of a practical handbook on best practice with life-cycle assessment, LCA;
  - In 2005, a discussion document on the need for product design obligations on producers; in 2005, the Commission will decide whether to take any Community action to stimulate the development of Environmental Product Declarations;
  - In 2006, the development of a Commission action programme for greening its procurement; in 2007, the identification of a first set of products with the greatest potential for environmental improvement and the beginning of action to tackle them.

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At this point, the task for achieving sustainability lies in the hands of producers. In other words through product side initiatives and better products leaner and cleaner production is aimed to be achieved. Nevertheless encouraging consumers to buy these products constitutes the other pillar in the search for sustainable future.

## **2.2. European Sustainable Consumption and Production Policies**

The role of consumers in the policies aiming to achieve sustainability is gradually increasing. Consumer oriented actions are getting much importance to prevent waste, to promote energy efficiency and to encourage new initiatives in the labour markets. It can be argued that the large disparity in per capita income and resource use have inspired the early proponents of sustainable consumption<sup>49</sup>. Today with the term ecological footprint many environmentalists still try to challenge the consumption patterns of the affluent (Western and North) countries and call people to rethink their consumption needs and habits. Contemporary attempts to restructure consumption basically ask the question whether consumers can “buy less and less materially intensive products”.<sup>50</sup>

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<sup>48</sup> (Ibid, p.3)

<sup>49</sup> Cohen, Maruei J. (2010) The international political economy of (un)sustainable consumption and the global financial collapse” *Environmental Politics*, vol. 19. No.1 February 2010; 107-126.

<sup>50</sup> Jackson, Tim (2007) “Sustainable Consumption” in Giles Atkinson, Simon Dietz and Eric Neumayer (eds) *Handbook of Sustainable Development*, Edward Elgar, Cheltenham, p.258

Some experts think that it is possible to trace the roots of concerns for consumption in the international agenda as early as to “1949 when newly-formed UN held an international Scientific Conference on the Conservation and Use of Resources”<sup>51</sup>. The role and interest of the UN with regard to sustainable consumption could also be seen at the UN Conference on the Human Environment in 1972<sup>52</sup>.

Decoupling economic consumption from material resource consumption is the main idea behind sustainable production and consumption. And at the 1992 UN Conference on Environment and Development Sustainable Consumption and Production was regarded as an important topic to be dealt within the search for sustainability. This growing interest has reached its peak at the Johannesburg Summit (UN Conference on Sustainable Development) and 3<sup>rd</sup> chapter of the Johannesburg Implementation Plan was directed to the Changing Unsustainable Patterns of Consumption and Production. All these events paved the way for Marrakesh process.

On July 16, 2008 as part of the Marrakesh process the European Commission declared EU’s Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan. The Plan aims to help achieve European objectives and face with the challenges as, increasing research to reduce costs and increase the performance of existing technologies, and encouraging the commercial implementation of these technologies, in short term. In the long term it is aimed to support development of a new generation of low carbon technologies.

The core of the Plan was explained as:

The core of the Action Plan is a dynamic framework to improve the energy and environmental performance of products and foster their uptake by consumers. This includes setting ambitious standards throughout the Internal Market, ensuring that products are improved using a systematic approach to incentives and procurement, and reinforcing information to consumers through a more coherent and simplified labelling framework, so that demand can underpin this policy. The approach will address products that have significant potential for reducing environmental impacts.<sup>53</sup>

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<sup>51</sup> (Ibid, p.255)

<sup>52</sup> (Ibid)

<sup>53</sup> European Commission (2008a), Communication from the Commission, to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions on the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan. Retrieved: May 15, 2009 from <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52008DC0397:EN:NOT p.2>

There are two levels of implementing measures to create a long-term perspective for the future of regulatory environment aiming improvement of products and technology.

- 1- Minimum Requirements will be provided for the product on the Internal Market, concerning the global standards and EU standards together.
- 2- Advanced Benchmarks will be made for a high level of environmental performance.

Related to these implementing measures there are policies that aim to improve the energy and environmental performance of products. For example, according to The Ecodesign Directive, energy-using products were supported. The new policy comprises the following subjects:<sup>54</sup>

- 1- Directive on the Ecodesign will be extended covering all energy-related products.
- 2- Minimum requirements will be determined.
- 3- Benchmarks will be identified to make markets be aware of which products are performing well enough.
- 4- There will be reviews in periodic times to determine the long term aims concerning the technological changes.
- 5- “Green” Products will be supported to be consumed and consumers will be made aware of this implementation.
- 6- The policy will provide solutions for environmental challenges and economic gains, such as; there will be more energy consumption in houses with more use of insulation and heat saving.

The Ecodesign Directive puts forward the rules for setting ecodesign requirements for energy-using products. These rules aim to ensure the free movements of products within the internal market. The action has a life-cycle perspective by implementing measures on specific products and their environmental aspects, such as energy consumption, waste generation, water consumption, extension of life-time.

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<sup>54</sup> (Ibid)

The important points are: <sup>55</sup>

- 1- There will be implementation measures for the products with significant environmental impacts, significant potential for improvement and significant volumes of sales and trade. Existing Community legislation or self-regulation will be in concern.
- 2- The products which are not mentioned will be in concern with a new Work Programme.
- 3- The principle of technology neutrality and public consultation will be significant.
- 4- Implementing measures will consider key environmental aspects over the life-cycle of the products. They will in particular take into account energy and resource use of products. Other issues, such as the need to reduce the use of hazardous materials and rare resources will be considered as appropriate.

In the EEA Technical Report on Sustainable Production and Consumption actions, in 2007, solutions for three focus areas, Housing, Food and Drink, were presented:<sup>56</sup>

- a. Spatial planning and land use: On national level, governments should work with stakeholders to put solutions, using coherent policy. On local level, local authorities can make actions on national policies and apply more force on planning to understand the local priorities.
- b. Financial Instruments: To introduce an ecological tax system zero-energy buildings should be given VAT exemption. The funding will be made through sustainable construction and innovation. Banks will provide funds for green loans and there must be voluntary agreements to achieve it. State funding will be provided for social housing. The tools and technique for these instruments are making cost/benefit analysis for zero-energy buildings.

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<sup>55</sup> (Ibid)

<sup>56</sup> European Environment Agency (2008b), *Time for action towards sustainable consumption and production in Europe*, EEA Technical Report 1/2008, Copenhagen, Retrieved: May 12, 2009 from [http://www.eea.europa.eu/publications/technical\\_report\\_2008\\_1](http://www.eea.europa.eu/publications/technical_report_2008_1)

- c. Standards and labelling: The standards must be defined for zero-energy buildings and also waste.
- d. Education: A life-long learning structure should be implemented targeting the stakeholders. The aspects of Sustainable housing should be integrated and some basic training for architects and building companies must be introduced.
- e. The economic Framework: Unhealthy food should be taxed and export subsidies must be phased out. Concerning the trade aspects, new World Trade Organisations rules about sustainability must be negotiated.
- f. Research: The research must be increased focusing on specific issues such as energy supply and storage, alternative materials. Civil Society should be the part of research programming and more funding should be provided for related research. Sustainability scenarios must be put forward. Related research should present sustainability targets. The results of the research should be presented openly and must be understood in an easy way.
- g. The global food chain: Policy making on sustainability should be sector based. Trade rules must include the aspects of sustainable consumption and production. Sustainability targets should be set. The European Reference Life Cycle Data System (ELCD) will be completed. Waste and recycling methodologies should be harmonised.
- h. Labelling of food: An integrated food label must be created with the necessary researches. Information should be provided about the real food origin.
- i. Coordination: Environment, agriculture, health and energy policymakers should work closely and efficiently to gain sustainability. A common strategy must be created and here must be action plans.
- j. The Retail Sector: Researches should be made about the retail structures and market.

These solutions show that the solutions take place in many different levels and policies which requires coordination, research and better understanding in global level to see the problems in a clear way.

The report also makes recommendations for national governments, business and civil society:<sup>57</sup>

1. Creating a National Vision and framework for SCP.

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<sup>57</sup> (Ibid)

2. Making progress towards SCP transparent
3. Making an Environmental Fiscal Reform
4. Be responsible for purchasing
5. Giving education for change

All these features of the EU SCP strategies point out the necessity of voluntary changes in modifying life styles. People can change their unsustainable consumption behaviour based on information and price signals. Yet it is argued that this change can be limited. Therefore new initiatives such as the availability of more sustainable choices should support the price and information of eco friendly products<sup>58</sup>.

### **2.3. Sectoral Approaches**

The main sectoral approaches for environmental protection and maintaining quality of life through sustainable consumption and production are; climate change, nature and biodiversity, environment and health quality, natural resources and waste management issues. These sectors are also important for the creation of a green economy and promoting employment. Moreover analysing sectoral approaches is necessary to understand the link between energy efficiency and sustainable resource use.

#### **2.3.1. Climate Change**

Climate change is caused by greenhouse gas emissions of the energy systems related to fossil fuels, like coal, lignite, oil and gas. The EU also faces with climate change problem and concerning the energy supply of the EU, Energy future is not sustainable.

In 2007, European Spring Council aimed to reduce greenhouse gases at least 20% by 2020 with the new renewable energy resources.<sup>59</sup> In January 23, 2008, European Commission proposed an implementation measures policy package for the EU

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<sup>58</sup> Jackson, Tim (2007), p. 263

<sup>59</sup> Pantelis Capros, Leonidas Mantzos, Vasilis Papandreo, Nikos Tasios, Ger Klaassen (2008), "Energy Systems Analysis of CCS development in Europe". Paper presented at EEM 2008. 5th International Conference on European Electricity Market.



objectives about climate change and renewable energy in 2020. The proposal had three actions:

1. Amendment of Directive 2003/87/EC about creating a trade system <sup>60</sup> to increase greenhouse emissions allowance.
2. Decision of Member States will reduce greenhouse gas emissions as being compatible with the Community's greenhouse gas emissions reduction commitments by 2020. <sup>61</sup>
3. "Directive on the promotion of use of renewable energy resources."<sup>62</sup>

Transport is one of the important reasons for the greenhouse gas emissions.<sup>63</sup> The solution for this problem is clean transport vehicles like clean ships. Also bio fuel use is very beneficial for security of supply. Member States can encourage the use of bio fuels in a sustainable way, like promoting bio fuels made from wastes, residues, cellulosic and ligno cellulosic material, which will give additional benefits.

Support to fossil fuel power plants or other industrial installations equipped with CO<sub>2</sub> capture, can be given by the Member States, but because for the lack of experience it could be difficult to gain such aid. These new technologies are essential when we think the aim of reducing greenhouse gas emission by 2 centigrade and support to construction of industrial scale demonstration plants up to 2015<sup>64</sup>. So, these efforts prove that they are safe and beneficial for environmental protection. In the Presidency Conclusion Report of the Council of the European Union in 2008 it is stated that:

The European Council confirms its determination to honour the ambitious commitments on climate and energy policy which it approved in March 2007 and March 2008. In this connection, it requests the Presidency and the Commission to organise intensive work over the next few weeks in order to enable the European Council in December 2008 to decide on appropriate responses to the challenge of applying that package in a rigorously established cost-effective manner to all sectors of the European economy and all Member States, having regard to each Member States' specific situation. <sup>65</sup>

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<sup>60</sup> (Ibid. p.9)

<sup>61</sup> (Ibid)

<sup>62</sup> (Ibid. p.10)

<sup>63</sup> (Ibid)

<sup>64</sup> (Ibid)

<sup>65</sup> Council of the European Union (2008), Brussels European Council 15-16 October, 2008 Presidency Conclusions. Brussels 16 October 2008 14368/08. Retrieved: December 21, 2009, from [http://www.consilium.europa.eu/ueDocs/cms\\_Data/docs/pressData/en/ec/103441.pdf](http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/103441.pdf), p.6

In the Report it is also stated that energy security is prior to the European Union and the following guidelines this shows us the connection with the climate change issue and energy security:

- (a) finalise the legislative package on the internal market in electricity and gas before the end of the legislative period,
- (b) expedite the implementation of the European Energy Efficiency Action plan and the Strategic Energy Technology Plan,
- (c) pursue with determination the diversification of energy resources, to which the measures in the energy/climate package contribute directly,
- (d) promote improvement in the working of the Market, in particular through greater transparency on flows and stockpiles and through sharing information on long term requirements and resources,
- (e) develop crisis mechanism to deal with temporary disruptions to supplies,
- (f) strengthen and add to critical infrastructure, particularly trans-European energy transport networks and liquefied natural gas terminals. Particular attention will be paid to interconnections and to the connection of the most isolated European countries, to the interface of European networks, with supply infrastructure and to the need to diversify both sources and routes. The European Council supports the Commission initiative of establishing a plan of action to speed up interconnections in the Baltic region,
- (g) develop the Union's energy relations with producer and transit countries with a view to securing stability of supply and diversifying its energy sources and supply routes. In this connection, The European Council welcomes the energy security initiatives taken by several Member States and, in particular, the meeting with the Caspian Sea countries and transit countries which will be organised by the Czech Presidency in the spring of 2009.<sup>66</sup>

In the communication report of the Commission of the European Communities, Europe's Climate Change Opportunities by 2020, it is stated that, in 2007 it had been a turning point for the European Union's climate and energy policy.<sup>67</sup> Europe faced with the challenge of secure, sustainable and competitive energy and European economy became a model for the sustainable development. Public became more sensitive about climate change issue, reducing greenhouse gas emissions and developing renewable energy. The European Council agreed that legally binding roles were very effective.<sup>68</sup> That means governments and private sectors should act together for the aim of low-carbon society and high energy efficiency economy.

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<sup>66</sup> (Ibid, p.7, 8)

<sup>67</sup> (Ibid, p.2)

<sup>68</sup> (Ibid, p.3)

The European Economy faces challenge to adapt to low-emission economy with secure energy supplies. But these challenges can also lead new opportunities such as,

- There is a potential to make climate-friendly policies.
- Europe has the chance to secure competitive economy.
- The low carbon economy will be achieved with social partners.
- Adapting to new technologies for environmental protection and reducing the greenhouse gas emissions will make Europe less dependent to oil and gas. This will lead economical growth and decrease the geopolitical risks.

The report explains the opportunities as;

- Oil and gas imports will go down in 2020.
- Energy security will improve.
- Renewable energy resources will create new jobs and Europe has the chance to be the world leader on renewable energy market.
- With encouraging the low carbon technologies, the climate change can turnover an opportunity.<sup>69</sup>

Importance of transition to low-carbon in developed countries can be explained by the UK example. Since 1990, UK population has increased by 6% and 27% is expected for 2050.<sup>70</sup> GDP has increased by 48% and 170% is expected for 2050.<sup>71</sup> Electricity use has increased by 26% and transport energy use has increased by 11%.<sup>72</sup> Concerning the greenhouse gas emissions (GHG), there is 1.1% decrease per year since 1990 and 3.2% decrease per year is needed till 2050.<sup>73</sup> Climate change, clean transport, economic growth, safety and security are the main priorities for the UK government and it is aimed to supply 15% of the energy from renewable by 2020, which was set by the EU<sup>74</sup>. Emission cuts needs time and improving new technologies and also there is the economic cost for it. Since the current technologies and lifestyles in the UK were

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<sup>69</sup> (Ibid)

<sup>70</sup> Parliamentary Office for Science and Technology (2008), The Transition to A Low Carbon Economy, Postnote, December 2008 Number 318, Retrieved: April 12, 2010 from <http://www.parliament.uk/documents/post/postpn318.pdf> p.1.

<sup>71</sup> (Ibid)

<sup>72</sup> (Ibid)

<sup>73</sup> (Ibid)

<sup>74</sup> (Ibid, p.4)

designed for a high carbon economy UK has to go through a technological transition period.

As understood from this report, by 2050 Europe will look so much different than before and Europe can continue to grow and lead the fighting with climate change. New technologies will be created and there will be new business opportunities with creating new job opportunities.

### **2.3.2. Nature and Biodiversity**

In the European Commission, environment fact sheet of nature and biodiversity document, biodiversity is defined as the diversity of species of genetic variations within species and ecosystems. It provides many benefits such as, important goods and essential services like carbon cycling and storage, clean water, climate migration mitigation of natural hazards.

The sustainable use of biodiversity is essential for sustainable economic growth in Europe. But biodiversity is affected from human activities. Global species extinction rate is increasing. Because of the intensive production systems, construction, increasing hunting, fishing and collecting, pollution and global climate change.<sup>75</sup>

The European Union adapted biodiversity strategy in 1998. After this, 4 biodiversity strategies were adapted in 2001 about the conservation of natural resources, agriculture, fisheries, economic and development cooperation.<sup>76</sup>

Today, biodiversity is one of the four prior subjects of the 6<sup>th</sup> environment action programme for 2001-2012.

In Agriculture area, developments made in the common agricultural policy (CAP), with high-nature-value farmland. In the Common Fisheries Policy (CFP) recovery plans were made for the stocks that are in danger of collapsing and environment-friendly fishing

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<sup>75</sup> European Commission (2007c), Questions and Answers Environmental Liability Directive, MEMO 07/157 Brussels 27 April 2007. Retrieved: December 21, 2009 from <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/07/157&format=HTML>

<sup>76</sup> (Ibid)

methods were promoted<sup>77</sup>. With the 6<sup>th</sup> EU research framework programme (2002-2006), European research on biodiversity is directed to forecasting changes and marine ecosystems.

Some new EU legal instruments cause achievements in following subjects:

-the environmental liability directive (due to be transposed into the national legislation of EU Member States by 30 April 2007), which implements the 'polluter pays' principle and covers damage to species and natural habitats protected under the 1992 habitats and 1979 birds directive.

-the strategic environmental assessment directive (the transposition deadline was 21 July 2004), which provides assessments of the environmental impacts of certain programmes and plans. Which has established a EU framework for the protection of the all water bodies in the EU in order to prevent and reduce pollution promote sustainable water use, protect the aquatic environment, improve the status of aquatic ecosystems and mitigate the effects of floods and droughts; and

-provision for access to environmental information and public participation and access to justice in environmental matters (ratification by the EU of the Aarhus international convention; transposition deadline was 14 February 2005)<sup>78</sup>

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<sup>77</sup> (Ibid)

<sup>78</sup> (Ibid)

### 2.3.3. Environment and Health Quality

Key actions of the Quality of Life Programme of the Commission, Key Action 4- Environment and Health, it is explained that there is a growing concern about the affects of environmental factors to health. For example, cancers are mainly caused by tobacco smoke, sunlight, heavy metals, and carcinogens. Cardiovascular diseases are caused by tobacco smoke, carbon-monoxide, and high cholesterol diet.<sup>79</sup>

Key Action summarizes the facts and figures as,<sup>80</sup>

- 10 million Europeans affected by environmental noise causing even hearing loss.<sup>81</sup>
- 3 million people die in the world prematurely because of the air pollution.<sup>82</sup>
- Allergies and asthma diseases increased dramatically in last 30 years.<sup>83</sup>
- Environmental tobacco smoke increases the risk of lung cancer in non-smokers by 20% to 30%.<sup>84</sup>
- Only in UK, annual cost of asthma is 3.9. Billion Euros.<sup>85</sup>
- Toxicity and ecotoxicity are lacking many of the chemicals in the markets.
- Air pollution is caused by natural sources, agricultural practices but mainly by the industry and traffic.
- The Common air pollutants are metals, gases such as ozone, carbon-monoxide, nitrogen oxides, sulphur dioxide, particular matter, mineral ash, and smoke and engine dust.
- Cities across Europe are in danger of air pollution which may cause many premature deaths.
- Chemicals are entering the environment as a result of human activities, such as acids, heating systems, ozone precursors, and industries.

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<sup>79</sup> European Commission (2000) Improving the quality of life: An Integrated Approach to Life Sciences in Europe, Community Research, Luxembourg: Office for Official Publications of the European Communities. Retrieved: July 15, 2009 from [http://ec.europa.eu/research/quality-of-life/leaflets/pdf/life\\_en.pdf](http://ec.europa.eu/research/quality-of-life/leaflets/pdf/life_en.pdf)

<sup>80</sup> (Ibid)

<sup>81</sup> (Ibid, p.4)

<sup>82</sup> (Ibid)

<sup>83</sup> (Ibid)

<sup>84</sup> (Ibid)

<sup>85</sup> (Ibid)

As a result, it can be said that, while the climate change is causing many damages to environment, the quality of life is decreasing. And as we see, many pollutants in air, water and soil are threatening human health. The sustainable use of energy resources, sustainable consumption and production patterns in European Union will help the Member States to have better health standards for their citizens and making the human environment safer.

#### **2.3.4. Natural Resources**

Thematic Strategy on the sustainable use of natural resources report of the Commission, explains that European economies depend on natural resources, including raw materials such as minerals, biomass and biological resources; environmental media such as air, water and soil; flow resources such as wind, geothermal, tidal and solar energy; and space (land area).<sup>86</sup>

The resources are crucial to the functioning of the economy and to quality of life. Renewable and non-renewable resources are used rapidly and this speed at which renewable resources are eroding the planet's capacity to regenerate the resources. In the past 50 years, humans have changed ecosystems more rapidly comparing any other period of the human history<sup>87</sup>. This is caused by mainly because of rapidly growing demands for food, fresh water, timber, fibre, and fuel.

The EU is dependent on resources coming from outside Europe and the environmental impact of resource use by the EU and other major economies is felt globally. At the same time the growing economies of the developing world such as China, India and Brazil are using natural resources in a great speed.

If the world as a whole followed traditional patterns of consumption, it is estimated that global resource use would quadruple within 20 years. The negative impact on the environment would be substantial. The alternative can be to adopt a coordinated approach, anticipating the need to shift to more sustainable use patterns, which can result in environmental and economic benefits in Europe and globally.<sup>88</sup>

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<sup>86</sup> European Commission (2005), Communication from the Commission to the Council, The European Parliament, The European Economic and Social Committee and the Committee of the Regions Thematic Strategy on the sustainable use of natural resources, Brussels 21.12.2005 COM(2005) 670 final. Retrieved: July 15, 2009 from <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2005:0670:FIN:EN:PDF> p.3.

<sup>87</sup> (Ibid)

<sup>88</sup> (Ibid, p.3)

The most important challenge for policymakers is to ensure growth while at the same time ensuring that the state of the environment gets better. Efficient use of resources contributes to growth and inefficient use of resources and overexploitation of renewable resources cause long term break downs in growth.<sup>89</sup>

The sustainable use of resources, such as, sustainable production and consumption is the key factor for the long-term prosperity for the EU and in global level.

Indeed, the EU Strategy for Growth and Jobs endorsed by the Spring Summit of 2005 gives high priority to more sustainable use of natural resources. It also calls for the EU to take the lead towards more sustainable consumption and production in the global economy. Europe therefore needs a long-term strategy that integrates the environmental impacts of using natural resources, including their external dimension (i.e. impacts outside the EU, including on developing countries) in policymaking. This Thematic Strategy on the sustainable use of natural resources ('the strategy') is a response to that challenge. It has to be seen in context with the recently reviewed Sustainable Development Strategy (SDS) and contributes to it.<sup>90</sup>

If applied, this approach will help to move European economies towards a situation in which growth objectives are met by using natural resources more efficiently, without further eroding the natural resource base.<sup>91</sup>

The strategy shows the importance of integration of environmental concerns into other policies and sets out an analytical framework allowing the environment impact of resource use to be in public policy making level.

### **2.3.5. Waste Management**

The EEA and the European Topic Centre on Resource and Waste Management have developed a model for projection of waste quantities and estimation of greenhouse gas emissions associated with the management of this waste. At present, the model is made for municipal waste. This model can be used to study the likely, future trends in

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<sup>89</sup> (Ibid)

<sup>90</sup> (Ibid, p.3, 4)

<sup>91</sup> (Ibid, p.4)



European resource and waste management and whether the objectives of the Sixth Environmental Action Programme (2002-2012) are likely to be met.

The generation of municipal waste is projected to be 290 million tonnes in the EU-27 in 2010 with a further increase to 336 million tonnes in 2020. More than 80% of this waste will be generated in the EU-15. Waste generation per inhabitant has been on the increase for years and the projection shows that this will continue till 2020. In 1995, the 27 countries that are now the EU-27 generated 460 kg municipal waste per person. This amount rose to 520 kg per person by 2004, and it is estimated that by 2020 this will equal 680 kg per person.<sup>92</sup>

A better waste management can reduce the emissions of greenhouse gases and, if high rates of recycling and energy recovery are achieved, the net greenhouse gas emissions may even become negative.<sup>93</sup>

Municipal waste management is contributing to efforts of meeting the targets of the Kyoto Protocol. This is essential for European Union to have a better waste management. A closer look at the some of the European countries fact sheets about the waste management shows the importance of the roles of the municipalities;

Czech Republic: The waste management plan of Czech Republic, between 2003-2012, is to reduce production of waste, independently from economic growth; maximum use of waste as a replacement for primary natural resources; minimisation of negative impacts on human health; to define certain tools for implementation programmes.

Czech Republic already made an implementation plan for the landfill directives in the year of 2000. Landfill Directive is set to the years of 2010, 2013 and 2020. So, the results of this plan will be seen clearly in these years.<sup>94</sup>

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<sup>92</sup> Skovgaard, M., Hedal, N., Villanueva, A., Moller, F., Larsen, H. (2008), *Municipal Waste Management and Greenhouse Gases*, European Topic Centre on Resource and Waste Management and Risoe National Laboratory, Technical University of Denmark, ETC/RWM Working Paper 2008/1. Retrieved: May 26, 2009 from [http://scp.eionet.europa.eu/publications/wp2008\\_1/wp/wp1\\_2008\\_p5](http://scp.eionet.europa.eu/publications/wp2008_1/wp/wp1_2008_p5).

<sup>93</sup> (Ibid)

<sup>94</sup> European Environmental Agency (2006a), Country Fact Sheet: Czech Republic European Topic Centre on Resource and Waste Management on Resource and Waste Management. Retrieved: July 15, 2009 from [http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc\\_waste/library?l=/country\\_fact\\_sheets/czech\\_republicpdf/EN\\_1.0\\_&a=d](http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc_waste/library?l=/country_fact_sheets/czech_republicpdf/EN_1.0_&a=d)

Austria: According to the Austrian Constitution, waste management was managed by federal and provincial governments. Article 10 of the Constitution is:

Federal tasks concerning legislation and execution are:... Waste management of hazardous waste only insofar as there is the requirement of enacting uniform provision<sup>95</sup>

This article means that municipal waste is under the responsibility of the provinces with the exception of waste related rules which have been issued by the federal government.

<sup>96</sup>

Ireland: The Waste Management Act 1996 to 2005 puts forward the responsibilities and functions related to waste. This Act provides a statutory framework for waste management and requires the Environmental Protection Agency to make a national plan especially concerning hazardous waste. The Act also requires local authorities to make waste management plans.<sup>97</sup>

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<sup>95</sup> European Environmental Agency (2006b), Country Fact Sheet: Austria European Topic Centre on Resource and Waste Management on Resource and Waste Management. Retrieved: July 15, 2009 from [http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc\\_waste/library?l=/country\\_fact\\_sheets/austriapdf/EN\\_1.0\\_&a=d](http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc_waste/library?l=/country_fact_sheets/austriapdf/EN_1.0_&a=d)

<sup>96</sup> (Ibid)

<sup>97</sup> European Environmental Agency (2006c), Country Fact Sheet: Ireland European Topic Centre on Resource and Waste Management on Resource and Waste Management. (2006) . Retrieved: July 15, 2009 from [http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc\\_waste/library?l=/country\\_fact\\_sheets/irelandpdf/EN\\_1.0\\_&a=d](http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc_waste/library?l=/country_fact_sheets/irelandpdf/EN_1.0_&a=d)

## **2.4. Renewable Energy and Sustainable Consumption and Production Strategies in the EU**

The EU is a leader actor in renewable energy in the world <sup>98</sup>. When EU leaders agreed on an integrated approach to climate and energy policy, they indicated their future projections on energy security. The EU sets three main targets to be met by 2020. The increase in the share of renewable is one those targets. Photovoltaic, offshore wind, solar thermal electricity and second generation bio-fuels are key energies for 2020 target. This also creates new opportunities for industry.

Each Member State has to create long term plans and put forward the targets for renewable energy especially for transport, electricity and heating and cooling. In the context of the SET Plan initiatives were developed in cooperation with technology platforms and European industry. In these platforms, industry, research organisations, academia, and stakeholders were brought together to contribute to the research, development and innovation for science and technology. Also a new energy efficiency package was proposed in 2008 for rapid progress toward the 20% energy efficiency target. <sup>99</sup>

Commission's long-term strategy for renewable energy was set out with The Road Map in the European Union (EU). The aim of this strategy is to enable the EU to meet the objectives of increasing security of energy supply and reducing greenhouse gas emissions. Technological developments show that more and better use of renewable energy can be achieved. The progress that has been made in last 10 years proves that reality.

In the Road Map, the Commission proposes setting a mandatory target of 20% for renewable energy's share of energy consumption in the EU by 2020 and a mandatory minimum target of 10% for bio fuels. It also proposes creating a new legislative framework to enhance the promotion and use of renewable energy. <sup>100</sup>

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<sup>98</sup> Foreign Policy (2009)

<sup>99</sup> (Ibid, p.2.)

<sup>100</sup> European Commission (2007d), Communication from the Commission to the Council and the European Parliament, Renewable Energy Road Map, Renewable Energies in the 21st Century: Building A More Sustainable Future. Retrieved: May 16, 2009 from [http://eur-ex.europa.eu/smartapi/cgi/sga\\_doc?smartapi!celexplus!prod!DocNumber&lg=en&type\\_doc=COMfinal&an\\_doc=2006&nu\\_doc=848](http://eur-ex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=COMfinal&an_doc=2006&nu_doc=848)

The role of EU renewable energy industry sector has a leading part in the world. <sup>101</sup>The Road Map promotes this position. The aim of the Road Map is to confirm that EU is a world leader in this sector. There are also challenges for Europe concerning the global competition and the achievements of other important actors.

#### **2.4.1. Renewable Energy and Current Contribution in Energy Production**

In 2005, the breakdown of renewable energy produced in the EU by source was, 66.1% from biomass, 22.2% from hydropower, 5.5% from wind power, 5.5% from geothermal energy and 0.7% from solar power (thermal and photovoltaic).<sup>102</sup>

In 1997, the EU set itself the target as, generating 12% of gross domestic energy consumption from renewable sources by 2010<sup>103</sup>. This target was far away from the reality, despite the considerable progress that has been made. The difficulties encountered in meeting this target can be explained as: <sup>104</sup>

- The high cost of renewable energy owing to the investment required and the fact that externalities have not been taken into account. This situation makes fossil fuels a huge advantage,
- Because of the installation procedures and the decentralised nature of most renewable energy applications Administrative problems occur,
- The opaque and/or discriminatory rules governing grid access,
- There is not enough information for suppliers, customers and installers,
- The fact that the 12% target is expressed as a percentage of primary energy, which puts wind power at a disadvantaged position, considering the sector growth during this period in question<sup>105</sup>.

Also, the progress made by the Member States has been different from each other. There is absence of legally binding rules and the gaps in the Community's legal framework for renewable energy. Member States should change their political priorities

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<sup>101</sup> (Ibid, p.18)

<sup>102</sup> Skoovgard, M., Hedal, N., Villanueave, A., 2008.

<sup>103</sup> (Ibid)

<sup>104</sup> (Ibid)

<sup>105</sup> (Ibid)

for an essential progress; otherwise it is not possible to adapt to renewable energy standards for these states, if they meant to make a real progress.

In accordance with Directive 2001/77/EC, all Member States have adopted national targets for the proportion of electricity consumption from renewable energy sources if all Member States meet their national targets<sup>106</sup>. That means 21% of total electricity consumption in the EU will be produced from renewable energy sources by 2010<sup>107</sup>. Although some Member States are on the way to meet this target it seems that the majority of countries are late to catch this schedule, and as a result, the EU will only produce 19% of its electricity from renewable sources by 2010<sup>108</sup>. So, there should be more additional efforts.

The 5.75% target for the contribution of bio fuels to total fuel consumption by 2010, set on the basis of Directive 2003/30/EC, will probably not be met either unless current policies are strengthened.<sup>109</sup>

Only two Member States met the intermediate target of 2% for the contribution of bio fuels by 2005<sup>110</sup>. In 2005, biodiesel accounted for 81.5% of total bio fuel production in the EU, while bio ethanol accounted for 18.5%.<sup>111</sup>

The Commission is of the opinion on the heating and cooling sector that accounts for 50% of final energy consumption is not enough to increase the potential of renewable energy sources, which contributed less than 10% of the energy used for heating or cooling in 2005<sup>112</sup>. The EU did not adopt any legislation with the direct aim of promoting heating or cooling from renewable sources.

The percentage of renewable energy used in this sector has risen only slowly. Biomass is the principal renewable energy source used for heating. The extent to which other energy sources have been developed varies considerably depending on the type of

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<sup>106</sup> (Ibid, p.6)

<sup>107</sup> (Ibid)

<sup>108</sup> (Ibid)

<sup>109</sup> (Ibid, p.7)

<sup>110</sup> (Ibid)

<sup>111</sup> (Ibid)

<sup>112</sup> (Ibid, p.8)

source and the country in question (for example: geothermal heat in Sweden and Hungary and solar thermal energy in Germany and Greece, among others).<sup>113</sup>

#### **2.4.2. Objectives for the Future**

The Road Map sets an overall mandatory target of 20% for the proportion of renewable energy figuring in gross domestic consumption by 2020<sup>114</sup>. Setting targets at European level will make it possible to ensure that national policies on this issue remain relatively stable.

The Commission wishes to set a minimum target of 10% for bio fuels for 2020<sup>115</sup>. This target will be accompanied by an amendment to Directive 98/70/EC on fuel quality, in order to include the contribution made by bio fuels<sup>116</sup>

The Road Map provides for each Member State to adopt mandatory targets and action plans in line with its potential. These action plans must include specific measures and objectives for the three following sectors: electricity, bio fuels and heating and cooling. This flexible approach will leave Member States enough room for manoeuvre. Suitable legislation will be proposed in 2007.

#### **2.4.3. Policies and Measures**

The Commission will propose measures for Internal Market improvement and removing barriers to developing renewable energy in the electricity sector and the heating and cooling sector. For example, the measures can be reducing the administrative burden, improving transparency and provision of information, and adjusting and increasing the number of installations and interconnection systems.

The Commission will also propose measures to support encourage and promote renewable energy sources, including an incentive support system for bio fuels

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<sup>113</sup> (Ibid)

<sup>114</sup> (Ibid)

<sup>115</sup> (Ibid)

<sup>116</sup> (Ibid)

and the use of public procurement, particularly in the transport sector.<sup>117</sup> The Commission will continue to cooperate closely with those involved in the renewable energy sector (grid authorities, European electricity regulators and the renewable energy industry) to enable better integration of renewable energy sources into the power grid.<sup>118</sup>

The Commission will encourage optimal use of the existing financial instruments, such as the Structural and Cohesion Funds, as well as instruments that focus on supporting research and disseminating technology, such as the next Strategic Energy Technology Plan, the Framework Programme for Research and Technological Development or the Intelligent Energy for Europe Programme. The Commission will also ensure the continued exchange of best practices and the inclusion of the external costs of fossil fuels in their price especially concerning the energy taxes.<sup>119</sup>

Member States and local and regional authorities are encouraged to make maximum use of the instruments available to them and promote the development of renewable energy sources. This will be achieved through administrative simplification and improved planning.

#### **2.4.4. Economic Considerations of the Use of Renewable Energy Sources**

Renewable energy sources produce almost negligible or zero greenhouse gas emissions. Increasing renewable energy's share of the total produced by all available fuels will therefore significantly reduce the EU's greenhouse gas emissions. The Commission estimates that the 20% target will make it possible to cut CO<sub>2</sub> emissions by 600-900 million tonnes per year, generating savings of between 150 billion and 200 billion, if the price of CO<sub>2</sub> rises to 25/tonne.<sup>120</sup>

Developing alternative energy sources to fossil fuels will help guarantee security of energy supply in the EU and reduce the energy bill which results from increases in the price of fossil fuels. Consequently, if the EU meets its 20% target in 2020, it is

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<sup>117</sup> (Ibid, p.10)

<sup>118</sup> (Ibid, p.12)

<sup>119</sup> (Ibid)

<sup>120</sup> (Ibid, p.10)

estimated that savings will be made of over 250 million TOE (tonnes of oil equivalent) per year by 2020, of which 200 million TOE would otherwise be imported.<sup>121</sup>

Furthermore, developing the technologies used in the renewable energy sector will create new business opportunities, particularly for exporting these technologies. It is also expected to have a positive impact on employment and GDP growth.

The cost of renewable energy has been falling steadily for the last 20 years, but remains higher than that of conventional energy sources. This is above all because the external costs of fossil fuels have not been internalised. The average additional cost of meeting the 20% target is estimated at between 10 billion and 18 billion per year, depending on energy prices and the research efforts made<sup>122</sup>

The share of renewable energy sources in primary energy consumption increased slowly in the EU-27 from 4.4 % in 1990 to 6.7 % in 2005. This has helped reduce greenhouse gas emissions. However, rising overall energy consumption in absolute terms has counteracted some of the environmental benefits from the increased use of renewable. The strongest increase came from wind and solar energy. In absolute terms, about 80 % of the increase was accounted for by biomass. Significant growth will be needed to meet the indicative target of a 12 % share of renewables for the EU by 2010. The European Council of 8-9 March 2007 has recently endorsed a binding target of a 20 % share of renewable energies in 'final' energy consumption by 2020. The renewables share in final energy consumption was about 8.5 % in 2005. A new indicator on 'renewable final energy consumption' will be developed during 2008 to address this new target.<sup>123</sup>

The share of energy consumption from renewable energy provides a broad indication of progress towards reducing the environmental impact of energy consumption, although its overall impact has to be seen within the context of the total fuel mix, potential impacts on biodiversity and the extent to which pollution abatement equipment is fitted.

Renewable energy sources are generally considered more environmentally benign, with very low net emissions of CO<sub>2</sub> per unit of energy produced, even allowing for emissions

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<sup>121</sup> (Ibid)

<sup>122</sup> European Environment Agency (2008c), *EN29 Primary Renewable Energy*. Retrieved: May 27, 2009 from [http://www.eea.europa.eu/publications/eea\\_report\\_2008\\_6/EN29-CSI30\\_Primary\\_Renewable\\_Energy.pdf](http://www.eea.europa.eu/publications/eea_report_2008_6/EN29-CSI30_Primary_Renewable_Energy.pdf)

<sup>123</sup> (Ibid)



associated with the construction of the plant<sup>124</sup>. Emissions of other pollutants are also often lower for renewable energy production than for fossil fuel energy production. The exception to this is municipal and solid waste (MSW) incineration which, due to the cost associated with separation, usually involves the combustion of some mixed wastes including materials contaminated with heavy metals. However, emissions from MSW incineration are subject to stringent regulations including tight controls on quantities of cadmium, mercury, and other such substances.<sup>125</sup>

Most renewable (and non-renewable) energy sources have some impact on landscape, noise and ecosystems, although many of these impacts can be minimised through careful site selection. Large hydropower schemes in particular, can have adverse impacts including flooding, disruption of ecosystems and hydrology, and socio-economic impacts if resettlement is required. Some solar photovoltaic schemes require relatively large quantities of heavy metals in their construction and geothermal energy can release pollutant gases carried by its hot fluid if not properly controlled. Some types of biomass and bio fuel crops also have considerable land, water and agricultural input requirements such as fertilisers and pesticides.<sup>126</sup>

Sustainable consumption and production is being addressed in national strategies in an increasing number of cases. A range of examples for dedicated SCP strategies or NSDSs integrating SCP as a key component have been identified in the framework of this study. However, as Member States have not been systematically contacted, there may be additional countries which have national strategies addressing SCP.<sup>127</sup>

As of end August 2007, the following examples had been identified:

| Countries | SCP Strategies  |
|-----------|---|
| Austria   | the NSDS (2002) and its follow-up working programmes take a particular SCP featured approach towards sustainability, with |

<sup>124</sup> (Ibid)

<sup>125</sup> (Ibid)

<sup>126</sup> (Ibid)

<sup>127</sup> European Environment Agency (2007b), *National Sustainable Consumption and Production (SCP) Strategies in the EU*, Retrieved: July 6, 2009 from [http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc\\_waste/library?l=/working\\_papers/national\\_strategies/ EN\\_1.0 &a=d](http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc_waste/library?l=/working_papers/national_strategies/ EN_1.0 &a=d)

|                |   |
|----------------|---|
|                | sustainable products and services as well as consumption and lifestyles amongst the central themes addressed; <sup>128</sup>  |
| Czech Republic | a dedicated SCP framework of programmes was prepared in 2005. The renewed NSDS, which is expected to be launched later in 2007, also identifies SCP amongst the priority fields of action. <sup>129</sup>   |
| Finland        | a proposal for a national SCP programme was finalised in 2005. It was endorsed for implementation by the government by means of approval of the renewed NSDS in 2006, which also addresses SCP and makes a commitment for the implementation of the SCP programme. <sup>130</sup>   |
| France         | the updated NSDS (2006) identifies SCP as one of the key challenges to be tackled by implementation action. <sup>131</sup>  |
| Hungary        | the NSDS (National Sustainable Development Strategy), approved by the government in June 2007 identifies SCP as one of the priority fields of action. Furthermore, a proposal for a national SCP framework of programmes was commissioned by the Ministry of Environment in 2003 and finalised in 2006. It is now being considered for implementation. <sup>132</sup> |
| Malta          | the promotion of SCP is one of the highlighted areas of action under “Sustainable Economic Development” in the NSDS (2007). <sup>133</sup>  |
| Netherlands    | an “Action Programme for Sustainable  |

<sup>128</sup> (Ibid, p.4)

<sup>129</sup> (Ibid)

<sup>130</sup> Ibid)

<sup>131</sup> (Ibid)

<sup>132</sup> Ibid, p.5)

<sup>133</sup> (Ibid)

|                |   |
|----------------|---|
|                | Development” was prepared in 2002-2003 and sustainable consumption and production is amongst the 12 priority <sup>134</sup>   |
| Poland         | a “Strategy of Changing Production and Consumption Patterns” was prepared in 2003. An implementation report, also including recommendations for the preparation of a detailed action plan, is currently being drafted. <sup>135</sup>   |
| United Kingdom | a framework for SCP was prepared by the government in 2003, furthermore SCP is one of four priorities set by the renewed NSDS (2005). <sup>136</sup>  |
| Belgium        | “changing consumption patterns” was already amongst the four priority <sup>137</sup> themes in the first Federal Sustainable Development Plan (2000-2004). By the end of 2007, a federal-level SCP strategy will be prepared, which is also planned to be included in the next Federal Sustainable Development Plan (2009-2012). <sup>138</sup> |
| Greece         | an SCP section, aimed at describing a framework of actions in the subject, is included in the updated NSDS (expected to be finally endorsed by the end of 2007). <sup>139</sup>   |
| Romania        | SCP is planned to be addressed in the 2007 update of the NSDS. <sup>140</sup>   |
| Sweden         | an action plan for sustainable household  |

<sup>134</sup> (Ibid)

<sup>135</sup> (Ibid)

<sup>136</sup> (Ibid)

<sup>137</sup> (Ibid)

<sup>138</sup> (Ibid)

<sup>139</sup> (Ibid)

<sup>140</sup> (Ibid)

|  |  |
|--|--|
|  | <p>consumption was prepared in 2005. It is, however, not endorsed by the new government for implementation. A new document describing current SCP initiatives and additional needs in the country will be published later this year.<sup>141</sup></p> |
|--|--|

Apart from national strategies, other types of approaches to address SCP at the national level are used by some EU Member States. Some countries use mainly bottom-up approaches. These include for example Denmark and Germany, both with a large number of individual pieces of SCP policies and the building of a comprehensive range of national SCP policies. In Germany this approach is additionally supported by a national dialogue process on SCP, which brings together different stakeholders to promote options and solutions towards SCP. Another example for addressing SCP at the national level, which is mainly used in some of the New Member States, is to address SCP in the framework of various EU policies and development instruments.<sup>142</sup>

Lithuania, for example, addresses SCP in its national reform programme; SCP is one of the priority fields of actions in the Environment and Energy Operational Programme of Hungary's National Development Plan; a large scale SCP programme aimed at establishing SCP information centres in the Czech Republic is being implemented with the co-financing of the European Social Fund. Last but not least in Slovenia, the promotion of SCP is one of the strategic guidelines of the National Environmental Action Plan 2005 – 2012 and SCP is planned to be addressed by the National Council for Sustainable Development in 2008.<sup>143</sup>

To date most focus has been on taking responsibility for national production for both domestic use and for export: economy-wide emissions inventories and monitoring schemes generally only consider the production (or territorial) perspective. This is because consumption side responsibility is both more difficult to measure but also more difficult to administer with a much greater

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<sup>141</sup> (Ibid)

<sup>142</sup> (Ibid)

<sup>143</sup> (Ibid, p.6)

number of actors and limited influence of a national government over production taking place in other countries.

As discussed, policy (and monitoring) focus on production can lead to increasing environmental pressures when looking from a global perspective by pushing heavy industry to areas with lower regulation and eco-efficiency. Moreover, such environmental costs are not visible under current production-based monitoring which therefore can give 'false' positives for progress in decoupling. At the other end of the scale, specialisation of an economy in an impact intensive<sup>144</sup>

Industry can potentially lead to global environmental benefits, but it may cause the country to be seen as less sustainable than its neighbouring countries using traditional territorial monitoring mechanisms. Monitoring of the production perspective can work against national specialisation with global benefits.

The current UNFCCC methods for calculating inventories and defining national targets under Kyoto, do at least give allowance for existing specialisation in energy-intensive industries for the export market since targets are relative rather than absolute (i.e. relate to the country's earlier emissions). However, they work against further national specialisation in GHG-intensive branches for export although this might decrease GHG emissions globally. Adjustments are made in national inventories for imports and exports of electricity, but no account is taken of GHG emissions embodied in imports and exports of other goods and services. Over and above climate change agreements and mechanisms, trade and specialisation are also directly relevant in the selection of indicators for sustainable consumption and production (SCP).<sup>145</sup>

SCP requires an integrated approach for policy making. Because there is the need to address both production and consumption issues are taking part in such different sectors as agriculture, energy, transport, development, industry, commerce, and economic and financial affairs. While in Western Europe the SCP has to address high levels of consumption, SCP policy and action in EECCA and SEE countries will need to concentrate more on improving production efficiency with consumption and resource use.

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<sup>144</sup> Watson, D. And Moll, S. (2008), "Environmental benefits and disadvantages of economic specialisation within global markets, and implications for SCP monitoring", Paper for the SCROE Conference, 10-11 March 2008, Brussels, Belgium, European Topic Centre on Resource and Waste Management, Copenhagen. Retrieved: July 17, 2009 from [http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc\\_waste/library?l=/namea\\_report/watson\\_score\\_paperpdf/\\_EN\\_1.0\\_&a=d](http://eea.eionet.europa.eu/Public/irc/eionet-circle/etc_waste/library?l=/namea_report/watson_score_paperpdf/_EN_1.0_&a=d)

<sup>145</sup> (Ibid)

Economic restructuring offers a unique opportunity to 'leapfrog' towards more sustainable production patterns and also to guide consumption patterns towards sustainability before consumption reaches the levels observed in Western Europe.<sup>146</sup>

Social inequalities and lack of access to basic needs are other key focus areas of SCP in SEE and EECCA regions. These may in part be solved through economic growth, but they also require improved distribution of the benefits among the wider population.<sup>147</sup> Despite policy declarations, framework strategies or policies specifically targeting SCP have not yet been developed in EECCA and SEE countries. Possible reasons for this are that SCP has not yet reached a high priority on the political agenda and that there is weak inter-sectoral and interministerial coordination. However, in most of the 18 countries covered in this report there are examples of SCP relevant topics being tackled, albeit in an isolated fashion and lacking any overall coordination.<sup>148</sup>

The challenges for all countries of the EECCA and SEE regions include addressing environmental management in enterprises on a strategic level; improving compliance with relevant legislation; promoting market-based provision of relevant services; ensuring that financing mechanisms exist which favour implementing eco-efficient technologies.<sup>149</sup>

In conclusion, there are numerous opportunities for regional cooperation and the sharing of experience in implementing more sustainable consumption and production. To some degree this is a result of the common language. As the case studies in this report show, the key factor is that many countries face similar problems, which may well have similar solutions.<sup>150</sup> Many successful initiatives have been implemented at local level, especially in such areas as energy efficiency for buildings, the transport sector, and municipal waste management.

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<sup>146</sup> European Environment Agency (2007c), *Sustainable Consumption and Production in South East Europe and Eastern Europe, Caucasus and Central Asia*. EEA Report 3/2007. Retrieved: July 17, 2009 from [http://www.eea.europa.eu/publications/eea\\_report\\_2007\\_3/00\\_TOC\\_Executive\\_summary\\_and\\_Acknowledgements.pdf](http://www.eea.europa.eu/publications/eea_report_2007_3/00_TOC_Executive_summary_and_Acknowledgements.pdf). p.6.

<sup>147</sup> (Ibid)

<sup>148</sup> (Ibid)

<sup>149</sup> (Ibid)

<sup>150</sup> (Ibid)

### III. TURKEY ENERGY POLICY AND SUSTAINABLE CONSUMPTION AND PRODUCTION

Turkey is a candidate country for EU membership since December 1999 Helsinki Summit and accession negotiations finally started in October 2005. Turkey has to make investments for research for environmental protection, technologies and systems and renovate environmental infrastructures such as; water-waste water systems, waste facilities, transport to comply with the EU environmental *acquis*.<sup>151</sup> With the opening of the environmental chapter in Turkey's EU accession talks on December 2009, these issues have gained a new momentum. Certainly the Ministry of Environment and Forestry is the chief actor in this process. However, it is also noteworthy to mention the importance of research institutions in the case of achieving such kind of eco-friendly and eco-innovative goals, particularly the role of Supreme Council of Science (BTYK) and Technology and Scientific and Technological Research Council of Turkey (TUBITAK). These institutions set long-term strategies; they also coordinate and continue on research on science and technology.

BTYK, which was established in 2003 and became fully operational in 2004, works to determine, direct and co-ordinate research and development policies in science and technology to reach the economic development targets, social progress and national security. It is responsible for assisting the Government for long-term science and technology policies, setting research and development targets related to science and technology and to identify the most important research and development areas by preparing related plans and programmes.<sup>152</sup>

TUBITAK was established in 1963. Its task is to organize, coordinate and encourage research in natural sciences. The Council funds research and it develops national science and technology policies and proposes them to the Supreme Council of Science

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<sup>151</sup> Leflaive, X., OECD (2008), "Eco-Innovation Policies in Turkey", Environment Directorate, OECD, Country profiles on policies to support environment friendly innovation, p.6. Retrieved: May 12, 2010 from <http://www.oecd.org/dataoecd/28/34/42878896.pdf>

<sup>152</sup> (Ibid, p.6.)

and Technology. TUBITAK is a governmental institution and it manages the highest share of resources to finance research and innovation projects. Initiatives related to environment are included in these projects.<sup>153</sup> Most of the researches are supported by TUBITAK, and under the coordination of TUBITAK, there are working groups to define technological options on energy efficiency and renewable energy.

Turkey has a large potential on renewable resources such as hydro, solar and geothermal, so, some initiatives set energy efficiency standard for buildings, water resources, electricity production, using efficiency. Low carbon economy and society is an important issue concerning the large potential of Turkey on environmental protection researches and implementing environmental friendly technologies. However, Low Carbon economy and society are rarely pronounced concepts in Turkey. Although Turkey became a party to the Kyoto Protocol on 26 August 2009 and the State Planning Organisation in its 9<sup>th</sup> Development Plan (2007-2013) asks for the preparation of a National Climate Action Plan (and the project on Developing Turkey's National Climate Change Action Plan has already started along with the preparations for Turkey's 2<sup>nd</sup> National Communication to the UNFCCC) the low carbon economy as an objective to be achieved seems still a vague projection for Turkey in near future.

Energy policy, consumer policy, environmental policy and industrial policy might be the first policy areas to search for the traces of sustainable consumption and production in any country. It is therefore the case for Turkey. Both internal dynamics (such as environmental consciousness, consumer rights, competitiveness concerns) and efforts to comply with the EU legislation and standards force Turkey to take urgent steps to achieve certain level of development with regard to sustainable consumption and production.

The European Union is developing a common European energy policy which essentially aims at tackling climate change, limiting the EU's dependence on imported hydrocarbons and ensuring the supply of secure and affordable energy for consumers, while contributing to the competitiveness of its economy. This will require a combination of internal and external policies. Climate change must be addressed

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<sup>153</sup> (Ibid)



globally. External policies will also have to address the EU's increasing dependence on energy imports from sometimes politically unstable regions and supplier countries.

In January 2007 the European Commission presented a comprehensive package including an action plan on European energy policy. The European Council in March adopted a major Action Plan for the period 2007-2009 based on the Commission's communication 'An Energy Policy for Europe'. Moreover Climate and Energy Package brings many challenges and targets for the EU. On the external scene the Commission is also actively promoting an international energy policy that pursues Europe's interests.

Turkey depends on energy imports to an even bigger extent than the EU. Currently, Turkey imports about 70% of its total energy needs. About 25% of its electricity is generated from hydroelectric power plants. This, together with potential for geothermal, wind and solar energy, shows that renewable energy can be an important source of energy for Turkey. At the moment, the largest part of its energy (both gas and oil) comes from Russia, followed by Iran. Turkey is in close geographical proximity to countries possessing more than 70% of proven global gas and oil reserves <sup>154</sup>.

Its geographical location makes Turkey an important potential corridor in particular for gas and oil from Central Asia and other neighbouring countries to the EU. Turkey is already a major transit route for oil from Russia, and Central Asia, to global markets. However, most of it goes via tankers through the Bosphorus Straits which constitutes considerable strains on traffic, and also environmental risks. Since July 2006, the Baku-Tbilisi-Ceyhan (BTC) pipeline is operational, transporting Caspian oil from Azerbaijan to the terminal in Ceyhan from where it is shipped to world markets. The construction of the Samsun-Ceyhan oil by-pass route has started. The pipeline will reduce the increasing pressure of maritime oil transport through the Bosphorus and the Dardanelles straights. It will also increase secure oil supplies for the EU and world markets. <sup>155</sup>

When we look at the years between 1990 and 2005 there were important changes in energy resources structure in Turkey. Use of petroleum was dominant in 1995 (45%)<sup>156</sup>

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<sup>154</sup> European Commission (2007e), EU Energy Policy and Turkey MEMO 07-219 . Retrieved: June 6, 2009 from <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/07/219&format=HTML&aged=0&language=EN>, p.1.

<sup>155</sup> (Ibid)

<sup>156</sup> Ministry of Energy and Natural Resources General Directorate of Energy Affairs, (2006) Workgroup Report on Greenhouse Gas Reduction in Energy Sector, Ankara 2006, p.6

and in 2005 it was still dominant (33%)<sup>157</sup> Despite the increase in bio-fuels, geothermal heat, solar energy and wind energy stayed at the same level, share of in total production increased 14% to 7%.<sup>158</sup>

Concerning sustainable consumption and production, the efficient use of energy and improving new technologies will be the benefit of Turkey in relations with the European Union. Because of the growing population, urbanization and rapid industrialization SCP is very important for the environmental protection and economical structure of Turkey.

### **3.1. Contribution of Renewables and Waste in the Energy Production**

Renewable energy production is the second domestic energy source after coal in Turkey. Hydro, wind, geothermal, biog<sup>159</sup> as biomass and solar are the main renewable energy sources in Turkey. At the moment hydropower and wind potential of Turkey are the sources that draw attention of private sector most. In 2008 the law on the utilisation of renewable energy sources for electricity generation was adopted and a year before Energy efficiency law came into force. These two legislative developments have opened up new opportunities to achieve energy efficiency and sustainable production and consumption in Turkey; and among all solar energy and biomass have increasing potential. Moreover given the increasing consumption levels waste from energy offers great opportunities for lessening the use of fossil fuels and the pressure on environment coming from waste (Agricultural residues, municipal waste, fuel wood and other biological sources are the sources that can be used)<sup>160</sup>.

According to the Progress Report of Turkey, 2009, there is a good progress in Turkey on renewable energy.<sup>161</sup> Regulations were implemented on wind energy and on use of

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<sup>157</sup> (Ibid)

<sup>158</sup> (Ibid)

<sup>159</sup> Kaya Durmuş (2006), “Renewable Energy Policies in Turkey” *Renewable and Sustainable Energy Reviews*, 10 (2006); 152-163

<sup>160</sup> (Ibid)

<sup>161</sup> European Commission (2009), Brussels, 14.10.2009, SEC(2009) 1334, Commission Staff Working Document, Turkey 2009 Progress Report, Communication From the Commission to the European Parliament and the Council, Enlargement Strategies and Main Challenges 2009-2010, COM(2009)533. Retrieved:

geothermal resources. By the end of 2008, 17% of Turkey's electricity was produced from renewable energy sources and the aim is to produce 25% of its electricity from renewable energy sources by the end of 2020. There will be great need for significant efforts to reach this aim concerning the situation that consumption is expected to be doubled.<sup>162</sup>

Although hydro power is seemed as the most important and popular renewable energy source in Turkey, wind energy potential of Turkey is the greatest among European countries. Yet the share of renewable energy sources in total primary energy supply in Turkey is slightly above the world average<sup>163</sup>. The first electricity generation through wind energy was realised in 1986 but only after 1998 the wind power has increasing importance for Turkey<sup>164</sup>. Unquestionably wind power as a clean domestic renewable energy offers good opportunities to fight against the climate change. And Turkey's good potential of wind energy utilisation would probably help increasing the share of renewables in total energy supply and the approximation of the EU targets in this respect as a candidate country. However there are still some legal and economic barriers for the full utilisation of wind energy in Turkey. Besides wind power as other renewable sources depend very much on geographical locations. Therefore, other renewable resources need closer attention as well.

Turkey's demand on energy is rapidly increasing and this situation requires alternative energies in an environment-friendly manner. Renewable energy production reached 11% of the total primary energy supply in 2005.<sup>165</sup> Renewable energy production is taking the second place concerning the total coal production in Turkey's primary energy production. Half of the renewable energy supply consists of biomass such as; wood, animal/vegetable wastes. Also, 7% of energy end supply is produced from renewable

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November 21, 2009 from [http://ec.europa.eu/enlargement/pdf/key\\_documents/2009/tr\\_rapport\\_2009\\_en.pdf](http://ec.europa.eu/enlargement/pdf/key_documents/2009/tr_rapport_2009_en.pdf), p.59.

<sup>162</sup> (Ibid)

<sup>163</sup> Erdogdu, Erkan (2009) "On the Wind Energy in Turkey", *Renewable and Sustainable Energy Reviews*, (13) 2009, p.1365.

<sup>164</sup> (Ibid)

<sup>165</sup> Ministry of Energy and Natural Resources General Directorate of Energy Affairs, (2006) Workgroup Report on Greenhouse Gas Reduction in Energy Sector, p.7.

resources other than hydraulic energy, which is higher than European average. And the remaining part comes from other resources.<sup>166</sup>

Contribution of renewable and waste in energy production can be achieved not only with a certain managements but also with the volunteer actions and principle of responsibility. However, every country uses a different policy to implement their own management of waste. So, it does not mean that these policies will be successful when they are implemented in Turkey. It must be determined that which political instruments should be used according to Turkey's own economic, social and political structure. The effective use of the political instruments can cause limitation or can promote the existing structure to a higher level.

Although there is a growing research and literature on renewable but particularly on wind and hydro energy in Turkey, not much attention has been given to other energy sources. At this point, biodiesel production and solar energy production can be important examples to see Turkey's potential and the capacity for renewable energy and by this means for sustainable production and consumption. There are many conflicting views on the biodiesel production in the world. However given the fact that Turkey is still considered as an agricultural country, the potential contribution of biodiesel in energy supply needs to be questioned. Solar energy has also raised different but still conflicting questions in Turkey. Some argue that it may damage fertile land and too expensive while others argue that Turkey with the average 2640 sunshine hours annually should take this relatively advantageous geographical position to increase its share of renewable in total energy supply<sup>167</sup>.

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<sup>166</sup> (Ibid)

<sup>167</sup> General Directorate of Electrical Power Resources Survey and Development Administration, Solar Energy in Turkey. Retrieved: June 02,2010 from [http://www.eie.gov.tr/english/solar/solarTurkey\\_e.html](http://www.eie.gov.tr/english/solar/solarTurkey_e.html)

### 3.1.1. Biodiesel Production in Turkey

Agriculture and Energy are integrated sectors and Turkey has a very big potential in biodiesel production. Pauls R. Kleindorfer explains the biodiesel production in Turkey by taking attention to following points:<sup>168</sup>

- Biodiesel production in Turkey, until late 2005, was primarily based on imported oils, such as palm oil, soy oil, etc.
- The raw material cost of imported petroleum-based diesel that meets EU standards is 520\$/ton. To this, in Turkey, \$860/ton OTV tax (plus KDV of OTV) is added prior to the addition of about \$155/ton KDV tax and profits of distributing firms which is around 10%.<sup>11</sup>
- Cost of biodiesel as raw product which was produced mostly from imported raw materials including methanol (used in large quantities during the production) is estimated as 720\$/ton. Although this figure is \$200/ton higher than petroleum based raw product cost, it is still considerably less than the fully taxed petroleum based diesel, so that if no OTV tax is paid on it, it is a very desirable commodity for fuel.
- Hence, notwithstanding the available land and agricultural capacity and the cost differences between fully taxed regular diesel and untaxed biodiesel, Turkish farmers do not benefit from this potentially lucrative business, with Turkish biodiesel consumers relying instead primarily on imports.<sup>169</sup>

Turkey's potential for biodiesel production is significant. On agricultural side, it is essential to work with farmers and their associations to determine the important needs for planting, growing and harvesting bio-fuel crops. In business side, the primary factors are the use of appropriate technology with efficient production methods and decreasing the barriers for investment in bio-fuels.

On the governmental policy side, the most important factor is the tax policy for imported vegetable oils and bio-fuels. Governmental support to effective energy and fiscal policies is needed to ensure financial security and environmental sustainability.

The most important need for bio-fuel production in Turkey is, to determine what is the real potential in this area and to determine alternative strategies that can be integrated to

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<sup>168</sup> Kleindorfer, P.R and Ülke G. Öktem (2007), Economic and Business Challenges for Biodiesel Production in Turkey. Retrieved: June 12, 2009 from <http://www.docstoc.com/docs/14910114/Economic-and-Business-Challenges-for-Biodiesel-Production-in>

<sup>169</sup> (Ibid, p.8)

Turkish economy. Also alternative strategies are needed for integration in technology with a sustainable food strategy for Turkey.

### **3.1.2. Solar Energy and Turkey**

The most important energy source is the Sun. Solar energy is a good alternative of oil being a clean energy for the environment and the solar energy on Earth in every year is 160 times more than oil fossil oil energy.<sup>170</sup>

Turkey is one of the lucky countries about the solar energy potential. But there is not enough efficient use of this potential. The most common use of solar energy is hot water heating systems in especially Mediterranean and Aegean Regions. It is estimated that there are more than 100 producer firms and 2000 persons were employed. In this picture Turkey is a country which is an appreciable solar collector producer and user in the world.

The main reasons for that is the lack of coordination between the institutions, and the lack of state aid. But researches and activities about solar energy in Turkey have being made for a very long period of time. The knowledge about using the solar energy is inefficient in Turkey. In Government institutions, universities, related foundations and cooperation are still working for effective use of solar energy in Turkey. There must be an independent high coordination for solar energy and this foundation should bring the related parties together. The long term finance support this can be promoted so, there will be more industrial improvement on solar energy. Also government should support activities to introduce public with the methods of using solar energy and should make needed legal regulations.<sup>171</sup>

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<sup>170</sup> Varınca, K.B. and Gönüllü, M.T. (2006), Türkiye’de Güneş Enerjisi Potansiyeli ve bu Potansiyelin Kullanım Derecesi, Yöntemi ve Yaygınlığı Üzerine Bir Araştırma. Paper presented at UGHEK 2006, Eskişehir, 21-23 June, 2006. Retrieved: June 14, 2009 from <http://www.yildiz.edu.tr/~kvarınca/Dosyalar/Yayinlar/yayin008.pdf>, p.270

<sup>171</sup> (Ibid)

### **3.2. Sustainable Consumption and Production Practices in Turkey**

Sustainable Consumption and Cleaner Production concept does not directly mean the reduction of consumption and production although there are clear connotations for this. For many reasons like industrialization, population increase, urbanization, environmental degradation, dependency of the other countries on a lot of industrial input by using high efficient production technologies and methods, less natural resource and energy usage for the same amount of production and depends on less waste production principle has great importance for Turkey but the works under with Sustainable Consumption and Cleaner Production is known and can be implemented in a limited way.

In Turkey, Cleaner Production is one of the most important issues for TUBITAK. TUBITAK is the highest institute determines the national scientific and technological politics and has the role of Science and Technology High Commission Secretariat.

In the report prepared by Industrial Sub commission in 20th of December 1999, Meeting of Science and Technology High Commission Secretariat a structuring model was offered in order to make the cleaner production widespread around the country

The key point of this structuring model includes;

- institutional infrastructure,
- financing system and
- legal infrastructure

“Cleaner Production Centre” has following duties:

- determines policy and strategies,
- provides test, measurement and licensing,
- advertises on technical and managerial issues,
- provides information services,
- makes education and presentation studies,

- develops technologies and making guiding works on technology transfers are prescribed.<sup>172</sup>

On the other hand, in the report of Energy and Environmental Technology Strategies is prepared within the context of Vision 2023 Project of TUBITAK; following issues were highlighted:

- Cleaner Production Technologies,
- Reducing waste amount
- Recovery of wastes as much as possible
- Avoiding wastes without any damage to environment in most appropriate and economic way<sup>173</sup>

Turkish Technology Development Foundation (TTGV) is building up technological innovation actions but also building up protecting ecological system.

Through TTGV, World Economy Bank and UNIDO, within the context of Removing Ozone Layer Thinner Substances Project support by Montreal Protocols Multilateral Funds, a lot of recycling project were designed and still environment technologies for industries, energy efficiency and renewable energy projects are supported.

Amongst Turkish universities which study on this subject, in the Middle East Technical University Environmental Engineering Department, there is a lecture called Cleaner Production/Pollution Prevention. The lecture covers cleaner production concept, tools and case study samples has been given since 2000.

Also, there are lessons on the subjects of Cleaner Production, Pollution Prevention, Integrated Pollution Prevention and Control are given in 7 universities; the Anadolu University, the Bogaziçi University, the Çankaya University, the Dokuz Eylul

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<sup>172</sup> Turkish Ministry of Environment and Forestry, Sustainable Consumption and Cleaner Production In Turkey Information Note. Retrieved: May 12, 2009 from [www.cevreorman.gov.tr/COB/Files/belgeler7/Temiz\\_Uretim\\_en.doc](http://www.cevreorman.gov.tr/COB/Files/belgeler7/Temiz_Uretim_en.doc)

<sup>173</sup> (Ibid)



University, the Erciyes University, the Istanbul University and the Middle East Technical University

According to the Turkish Council of Higher Education records of, 13 graduate theses on the subjects of Cleaner Production and Pollution Prevention have been completed within different universities; the Bogazici University, the Gebze Institute of Technology, the Dokuz Eylul University, the Istanbul Technical University, Kocaeli University, Mersin University and Uludag University.

By “The Integration of Eco-efficiency to Production Industry Project” being executed by Bogazici University, Environmental Sciences Institute, Cleaner Production Unit; and supported by Environment Platform for Sustainable Development a “Sustainable Development and Clean Production Centre” has been built within the Bogaziçi University in 2007 with the support of Ministry of Environment and Forestry.

A project towards the implementation of clean production/pollution prevention approach at the level of Small and Medium Size Enterprises (SMEs) was executed by Sustainable Business Associates (SBA) and the Chamber of Environment Engineers between the years of 2000-2004. Swiss Agency for Development and Cooperation and TTGV supported this, within the scope of DELTA (Developing Environmental Leadership Toward Action) Programme. In this project education programmes and sample practices were held to SME representatives by the national and international experts in Gebze, Ankara, Eskişehir and Bursa.

The Chamber of Environmental Engineers publishes “Clean Production Diary” since 2003 with the aim of bringing up the terms such as “Clean Production”, “Pollution Prevention”, “Holistic and Preventive Environmental Management” and “Eco-Management” for public; and of having them discussed in different platforms. In this publication, there are activities in these areas executed by the Chamber of Environmental Engineers, the activities and developments related to the issue in our country and in the world, the introduction of domestic and foreign institutes in related areas and the colloquies of experts.

In a workshop entitled “Evaluation of Possibilities of Clean Production in SEKA Balıkesir Wood Pulp and Paper Factory”, the possibilities were searched for that factory. In this scope, a methodology was developed; raw material, energy and water

inputs determined; environmental performance of plant being compared with the other Environmental Performance Indicators in the similar plants in the framework of recommended systems in wood pulp and paper factory. Related literature used; determining applicable waste reduction options after executed mass balance analysis. Determined waste reduction analysis evaluated comparatively to raise the production efficiency of the factory.

In the study entitled “Research of Clean Production Opportunities for a Milk Industry Factory”, clean production opportunities were investigated in pasteurized milk production process in one of the leader milk processing plant. Environmental loads arising from milk production process and waste reduction possibilities were determined by a waste reduction inspection method based on mass balance analysis. After that chosen alternatives were evaluated from the environmental benefits and economically applicable point of view and presented to the factory. The results of the study showed that using or disposal of %50 of process water, %9.3 of waste water, %65.36 of chemicals substances and 181.91 kg/day of discharged COD, 20.7 kg/day of TSS can be prevented and %19.6 of process water can be reused. <sup>174</sup>

In the Ankara Case Study for the Application of the Life Cycle Analysis Method in the Domestic Solid Waste Management, different solid waste management system scenarios developed for the solid waste management in Ankara and compared by using life cycle analysis method and by the IWM-1 Model<sup>175</sup> Solid waste management methods covered by five scenarios includes; handling and transporting of wastes, separating at source, separation plant/transfer stations, incineration, anaerobic treatment and sanitary landfills. The aim of the study is the determination of most appropriate solid waste management for Ankara both from the environmental and economic point of view. <sup>176</sup>

In the scope of the TUBITAK Project called ” Harmonization Studies” with EU IPPC Directive in Textile Industry, BAT Applications pollution prevention studies in a textile plant in Turkey were performed. In the scope of this study, amongst the Best Available Techniques the ones which are parallel with the operation were chosen in the Textile

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<sup>174</sup> (Ibid, p.2)

<sup>175</sup> (Ibid, p.3)

<sup>176</sup> (Ibid)

Sector BAT Reference Document base<sup>177</sup>. Pollution prevention and reduction opportunities chosen as they are related with the existing process in the plant were analysed for process and at the end of the process evaluation, 22 applicable pollution prevention and reduction alternative was determined <sup>178</sup> The alternatives, which were found appropriate economically and practically at the end of the negotiations with the operators, were determined and applied.

Capacity Building Project for the Adoption and Implementation of the Integrated Pollution Prevention and Control (IPPC) Directive in the Turkish legal system and institutional infrastructure was performed between 2003 and 2005. It was applied in the petrochemical industrial sector in Izmir as a pilot Project by Grontmij Water & Reststoffen BV from Holland and our Ministry<sup>179</sup>.

Capacity Building Project in the Environmental Field for Turkey was an EU common fund project performed between 2003 and 2005 by our Ministry<sup>180</sup> Education of authorities on legal, institutional, technical and investment subjects related to facilities in the environmental fuels in Turkey and accelerating the effective application of environmental benefits were aimed with this project<sup>181</sup>.

Environmental Standards in Textile Sector Project is a Project supported by EU, performed by KOSGEB, Izmir Chamber of Industry, Ege Union of Importers and Exporters and targeting materials used in the Turkish textile industry to make appropriate to the EU environmental standards<sup>182</sup>.

A Project called Development of Cleaner Production Technologies Without Deteriorating the Ecological Balance in the International Production of Textile Products was performed by TTKTTE (Textile Tanning and Confection Cleaner Production Institute), TTGV (Turkey Technology Development Foundation), TUBITAK Marmara Research Centre and DTI (Danish Technology Institute)<sup>183</sup>.

National and international financial sources have been investigated for the implementation of the Project proposal called “Capacity Building for Cleaner

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<sup>177</sup> (Ibid)

<sup>178</sup> (Ibid)

<sup>179</sup> (Ibid)

<sup>180</sup> (Ibid)

<sup>181</sup> (Ibid)

<sup>182</sup> (Ibid)

<sup>183</sup> (Ibid)

Production Applications in Turkey”. This proposal was prepared by Middle East Technical University Environmental Engineering Department with the co-ordination of Ministry of Environment and Forestry in the framework of TUBITAK AR-GE Programme<sup>184</sup>.

Concerning the waste management in Turkey, EU standards were published in official gazette numbered 25755, on March 14, 2005<sup>185</sup>. The main aim is in this process to success environment-friendly waste management methods from the production-destruction period of waste. The new Regulation on the Control of the Dangerous Waste was prepared according to the EU directives. But, there are many deficits about industrial waste management. Many facilities cannot work properly because of the huge energy costs. The methods and techniques are insufficient for recycle, that’s why this situation creates big pressure in economic and ecologic level.<sup>186</sup>

Because of the rapid industrialization, rise in population, urbanization, environmental break up, external dependence in industrial inputs and many other reasons SCP is a very important concept for Turkey. Bu the activities, research and implementations on SCP are very limited.

TUBITAK explained following subjects as primarily important for SCP:<sup>187</sup>

- Developing products with intensive knowledge and to become a global design centre,
- To be competitive in agricultural production,
- To develop space and defence technologies,
- To achieve flexible production technologies,
- To gain the ability of making clean production,

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<sup>184</sup> (Ibid)

<sup>185</sup> T.C. Çevre ve Orman Bakanlığı Çevre Yönetimi Genel Müdürlüğü, Atık Yönetimi Eylem Planı (2008-2012), Mayıs 2008, Ankara. Retrieved: November 12, 2009 from <http://www.atikyonetimi.cevreorman.gov.tr/belge/atikeylemlani.pdf>

<sup>186</sup> (Ibid)

<sup>187</sup> (Ibid)

- Promoting modern and safe transport technologies,
- Ensuring food safety,
- To make healthy and modern urbanisation,
- To gain competence in energy technologies,
- To gain competence for conservation of Turkey's natural resources,
- To gain competence in environmental technologies,
- To strengthen the technological infrastructure of the in the process of transit to information society.

Legal, social, technological and economic measures to increase energy efficiency, promote clean production and renewable energy sources constitute the production-led initiatives for the search for sustainability in Turkey. Along with all those developments with regard to production, consumption trends also require special attention in Turkey. A recent survey on consumption behaviour of Europeans can give useful examples for analysing consumer behaviour in Turkey. According to this survey, 83% of Europeans claimed that they considered the environmental impact of products they bought<sup>188</sup>. This survey also demonstrates that visibility of environmental friendly products on market shelves or green corners in the markets are also important factors affecting consumer choices. Consumers in this survey also indicate that higher taxes should be imposed on environmentally damaging products<sup>189</sup>. However it should be kept in mind that consumers in different EU member states had different priorities about their consumption habits. Therefore it is also necessary to make regular consumption surveys in Turkey and integrate these concerns into different sectors of production for restructuring energy-economy link for a sustainable future.

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<sup>188</sup> Eurobarometer (2009) Europeans' attitudes towards the issue of sustainable consumption and production, Summary, Flash EB Series 256. Retrieved May 12, 2010 from [http://ec.europa.eu/environment/eussd/pdf/FL256\\_summary.pdf](http://ec.europa.eu/environment/eussd/pdf/FL256_summary.pdf)

<sup>189</sup> (Ibid)

## CONCLUSION

With the industrialization period which had begun for two hundred and fifty years ago, everything changed. Industrial revolution basically changed the existing socio-economic relations and technological basis and the use of energy forever. With the fossil fuels in the production process people wanted to reach never-ending growth level by using limited resources of earth. Nevertheless intensive resource and energy use constituted the basis of current consumption and production patterns. Today there are various attempts to challenge this deep-rooted socio-economic system of which primary aim is to boost production and consumption. Contemporary environmental degradation also compels humankind to change this counterproductive understanding of growth and development. Put it briefly, environmental challenges particularly the global climate change questions whether we are voluntarily change our life styles or get ready -if we can- to adapt ourselves to world in which unprecedented social, economic and environmental events challenges ever the very survival of humankind on earth. At this point Low Carbon Society (LCS) concept becomes very essential and is regarded as a way out from this global environmental problem and it seems that the humanity has no other alternative solution at the moment.

Low Carbon Society is basically a society which takes actions to implement the principles of sustainable development, which demonstrates a good level of energy efficiency by the use of low carbon sources and which ensures the low level of greenhouse gas emissions. In other words it depends on a low carbon economy. Although there are commonly agreed points on the concept, implementation of the countries to reach a LCS can be different from each other. European Union is an important example in this process by including different levels of environmental principles while trying to create a harmony between its all Member States.

It is necessary to recall that LCS can also provide advantageous positions in terms of competitiveness in this turbulent financial stage of the world economy. It is also clear that current financial crisis demonstrate not only the limits of nature but also limits of the existing understanding of growth and of socio-economic system. In the last decade the European Union have tried to take various steps in decreasing unemployment, creating new jobs, maintaining economic growth at the same time. The main challenge is, however, integrating sustainable consumption and production within this framework. Apparently European Union transition to low carbon society is one of the main elements in this process. Some of these policies are implemented in a successful way. But the capacity of the countries' contribution to new environmental friendly technologies can be limited. The implementations also require efficient cooperation between the institutions of the Member States. The success of the Sustainable Consumption and Production Policies through a future of better environment is mainly related to the legally binding rules for the Member States with promoting new technologies.

As well as Member States, both candidate countries and neighbouring countries are being affected by the Sustainable Consumption and Production Policies of the EU. Certainly any increase in unsustainable consumption and production patterns in those countries could affect the possible progress in the region negatively. Therefore EU's policies and relations with those states particularly on trade and energy security would likely to affect the attitude of those countries. This case is more evident for the candidate countries like Turkey. Due to high conditionality, Turkey has to face many difficulties while complying with the EU *acquis*. Nevertheless Turkey, as being an EU candidate country, has very important potential to contribute to sustainable consumption and production practices in the region. Unquestionably as being a developing country there are financial problems for Turkey to be compatible with the European Union's environmental demands. EU financial support is very important at this point. However, as the financial crises show that Turkey cannot rely on totally foreign financial assistance to achieve a green economy and a low carbon society. In other words Turkey has to find domestic sources to finance its new investments along with EU funds and international financial assistance. At this point a specific focus on renewable energy sources and energy efficiency could be very useful to introduce public with the new technologies for to encourage researches in this field.

Since energy is the primary source for all social and economic activities, it is very important how we produce and consume it. The road to sustainable consumption and production and low carbon society therefore depends to a great extent how the energy is consumed as well as produced. Yet, there are still many controversies in Turkey whether renewable energy sources are costly and inefficient to satisfy Turkey's growing energy demand. Besides many believe that low carbon society seems a distant goal for Turkey. At this point, it is noteworthy to mention that renewable energy sources are domestic sources and even in a short time investments on them can be regarded costly relative to the fossil energy sources, in the long term, these investments are likely to provide new employment opportunities and contribute to the sustainable development of Turkey while increasing the life standards all over the country.

All in all environmental challenges became very important at the global level. The European Union has been trying to become a leading, primary actor in this subject. However Member States' individual efforts are also significant to ensure sustainable consumption and production, to improve the quality of life, stronger institutional capacity can be main solutions. At this point public awareness is very important to strengthen these efforts

In global level, the great challenge for the economies today is to integrate environmental sustainability with economic growth which is also one of the key objectives of the European Union. But, when the demand for energy and resources are increasing, the reality of climate change and other environmental problems are challenging to achieve this aim. There is a need to ensure an energy and resource efficient economy.

Sustainable consumption and production increases the potential of business that will result changing environmental challenges to economic opportunities, which is also good for consumers. This challenge will lead improvement in overall environmental performance of products and increase in the demand for better products and production technologies helping consumers to make better choices. EU's path to LCS clearly brings both challenges and opportunities for Turkey's development priorities and plans.



In order to achieve all these steps, the principle of environmental integration is very important for achieving high level economic and environmental gains. Then again the rapid industrialization, rise in population, urbanization, environmental break up, external dependence in industrial inputs and many other reasons, achieving SCP is a very challenging task for Turkey. But the activities, research and implementations on SCP are very limited. Therefore cooperation between Turkey and European Union at both governmental and non-governmental levels to create a LCS is a prerequisite while increasing public awareness on the issue and fostering stakeholder participation in related policy areas. Apparently Turkey should be ready for the environmental challenges of today and the future. Sustainable consumption and production is an opportunity for European Union to reach the aim of low-carbon society. Yet it also offers great opportunities for Turkey to change its energy and resource use patterns in a sustainable way. This is also a good opportunity to challenge the fossil fuel dependent development in Turkey. At first implementation of sustainable consumption and production might be expensive and limited due to old established social behaviour affecting producer and consumer choices and available technological infrastructure. Nonetheless with regional cooperation and sharing experience, not to focus on only technological development but also increasing efficiency in consumption and production by decreasing the costs. As a result there can be more investments for energy and saving. Energy policies are inevitably one of the most important components of SCP and the path towards Low carbon future. However achievements in other components of SCP and an overall evaluation of environmental policies are also very important to reach SCP targets.

It is certainly possible to talk about improvements in Turkey's environmental policies yet it is still a slow progress. To illustrate, despite the recent developments, there are still big shortfalls in industrial waste management. New technologies and methods are used for only purifying and storage rather than recycle. In Turkey, to create an effective sustainable consumption and production concept and to use of its components in the most efficient way a technical capacity level must be found with the help of corporate recruitment and projects. Therefore encouragement of private sector in environmental friendly production should be accompanied with environmental friendly consumption behaviour which could be achieved through consistent government policies (such as lower taxes for environment friendly

products, support for schemes like eco-label and eco-design) and environmental education. Education on environment must be extended to the all parts of the society to increase awareness on the impact of consumer behaviour. Therefore detailed and extensive research on consumer policies is as necessary as policies related to production in any economic sector to achieve a sustainable future in Turkey. All in all further research should be focused on the meaning and possibility of low carbon future for Turkey.

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