

LIFE05-TCY/TR00164

Promoting Climate Change Policies in Turkey

Harmonization of Turkey with ECCP measures



Technical Report

exergia

July 2007



(LIFE05 TCY/TR000164)

**PROMOTING CLIMATE CHANGE POLICIES
IN TURKEY**

**Harmonization of Turkey with
ECCP measures**

Prepared by:

EXERGIA S.A.

Technical Report

Version 2.1

July 2007

TABLE OF CONTENTS

INTRODUCTION	4
1 GENERAL INFORMATION	6
1.1 History of ECCP	6
1.2 Launching ECCP	7
2 PRESENTATION OF ECCP 1	9
2.1 ECCP 1 - First Period (2000-2001)	9
2.1.1 Flexible Mechanisms WG	10
2.1.2 Energy Supply WG	12
2.1.3 Energy Consumption WG	13
2.1.4 Transport WG	17
2.1.5 Industry WG	19
2.1.6 Research WG	21
2.1.7 ECCP 1- First Period –Proposed Measures	21
2.2 ECCP-1-First Period (2002-2003)	22
2.2.1 Agriculture WG	24
2.2.2 Forest-related sinks WG	26
3 ECCP 2 (2005-TODAY)	28
3.1 Aviation WG	29
3.2 CO ₂ and cars WG	31
3.2.1 Existing Strategy	32
3.3 Carbon Capture and Geological Storage (CCS) WG	33
3.4 Adaptation WG	35
3.4.1 Building national strategies for adaptation (country reports)	35
3.4.2 Impacts on water cycle and water resources management and prediction of extreme events	36
3.4.3 Agriculture and Forestry	36
3.4.4 Biodiversity	37
3.4.5 Human Health	37
3.4.6 Regional planning, Energy and Public Infrastructure	37
3.4.7 Marine resources and coastal zones and tourism	38
3.4.8 Energy planning and construction	38
3.4.9 Role of insurance industry	38

3.4.10	Development cooperation	39
3.5	EU emission trading scheme review	39
4	INTERRELATION OF ECCP WITH THE TURKISH MEASURES.....	42
4.1	General Framework of Coordination with the ECCP	42
4.2	Proposed Specific Measures for ECCP harmonization	43
4.2.1	Aviation sector.....	44
4.2.2	Car production sector	44
4.2.3	Biofuels	45
4.2.4	Energy efficiency in buildings and public procurement	45
4.2.5	Agriculture and organic farming	46
4.2.6	ETS and Renewable Electricity	46
5	REFERENCES.....	48

INTRODUCTION

This report has been prepared in the framework of the project “Promoting Climate Change Policies in Turkey” that is financially supported by the LIFE Programme of the European Union under the LIFE05-TCY/TR/000164 contract. The leading institution of this project is the Regional Environmental Centre (REC), Country Office in Turkey and partners are the Ministry of Environment and Forestry (MoEF) of Turkey and the Greek consulting company EXERGIA S.A. who is the main responsible for this report.

In this report the issue of the European Climate Change Programme (ECCP) is analysed in terms of its EU and international dimension, its achievements and forthcoming development perspectives and required improvements to be established. Furthermore, the current Turkish reality regarding the country’s position and policy in the framework of the ECCP components is presented in brief. Finally areas for convergence and adaptation of Turkish policy to the ECCP provisions and policies are also justified and proposed under criteria of EU harmonisation and more general economic criteria.

Furthermore, it is worth considering that this report was prepared not only as a general information document on current situation and past developments of ECCP and the relevant EU policies, but also as a basis for discussion during the relevant workshops of stakeholders. Therefore some issues regarding the interests of the business community were illustrated more. We consider that the work on ECCP is incorporated in the following Tasks of the proposal:

- ◆ Task 2.3 “Evaluation of the Effectiveness of Past Actions and Measures”, that considers all relevant measures implemented in Turkey and in reference to the ECCP implementation actions and scheduled measures;
- ◆ Task 2.4 “Review of International Developments Related to Climate Change”, because of its EU dimension that is the most significant part of the international policies on Climate Change influencing relevant Turkish strategies;
- ◆ Task 3.3 “Build Capacity within the Administration”, because of ECCP information dissemination among the stakeholders through the relevant workshops, including also the administration.

The structure and the level of included information of this report aims in principle at covering the needs of experts, officials and

businessmen who had not, till the issuing of the report, certain substantial familiarity with the ECCP activity. Therefore, the report was disseminated to all interested experts, officials and business people who are or will be involved in activities influenced by the provisions of the ECCP.

1 GENERAL INFORMATION

This report presents the European Climate Change Programme. The report consists of two main parts in accordance with the structure of the ECCP and a third part connecting Turkey with ECCP.

In the first part of the report, a short background of the main drivers leading to the ECCP will be presented. Additionally, the first European Climate Change Programme (ECCP 1, 2000-2003) will be described in the first part of the report. The second European Climate Change Programme (ECCP 2, 2005-today) is presented in the second part as long with a short description of current status of ECCP and research.

In the last part of the report, in a separate chapter, it will be presented the interrelation of ECCP with Turkish measures. This part will have two sections. The first section will describe the general framework of co-ordination with ECCP and the second section will present specific proposed measures for Turkey.

The first ECCP has two distinguished periods. Phase one is from 2000-2001 and phase two is from 2002-2003.

1.1 HISTORY OF ECCP

This section will present a short history of initiatives before ECCP in order to set the framework under which ECCP has been launched.

In order to implement the Kyoto protocol signed in 1997, in which most of the Annex 1¹ countries were assigned legally binding emissions targets to be achieved by 2008-2012; European Union has taken many climate change-related initiatives. The initiatives following were the steps before ECCP towards CO₂ emission reduction.

- ◆ In 1997 European Commission published a *White Paper* laying down a community Strategy and Action plan. The *White Paper* confirmed a target of 12% of gross inland consumption from renewable energy sources in European Union by 2010, of which electricity would represent 22.1%.

¹ Member Countries of Organisation for Economic Co-operation and Development (OECD countries) and countries with Economies in Transition (EITs)

- ◆ The Directive 2001/77/EC on the promotion of electricity from renewable energy followed up the *White Paper*. Member States are required to promote electricity produced from non-fossil fuels renewable energy sources (such as wind, solar, geothermal, wave, tidal, hydroelectric, biomass, landfill gas, sewage treatment gas, and biogas energies). The overall target in European level is 21% in the share of EU gross electricity consumption to be reached by 2010.
- ◆ In 1999, three Voluntary Commitments have been concluded with the European Commission and the European, Japanese and Korean automobile industries respectively. The three Commitments contain the same quantified CO₂ emission objective for the average of new passenger cars sold in the European Union, i.e. 140 gCO₂/km (to be achieved by 2008 by ACEA² and by 2009 by JAMA³ and by KAMA⁴). In other words the fleet of new passenger cars put on the market in 2008/2009 will consume on average about 5.8 litre petrol/100 km or 5.25 litre diesel/100 km.

1.2 LAUNCHING ECCP

Soon it was obvious that these initiatives weren't enough and both Member States and European Commission needed further reinforcement in order to achieve Kyoto targets. Therefore, it was necessary to determine which areas were of high priority regarding CO₂ emissions, and to investigate in depth actions and policy measures for cost-effective reduction of green-house emissions. In respect to that, European Commission launched in 2000 the European Climate Change Programme (ECCP). Its mission has been to drive forward EU efforts to meet Kyoto targets. The goal was to identify and develop all the necessary elements of an EU strategy to implement the Kyoto protocol. The result from the ECCP would eventually mobilize new proposals and legislation from the Commission in order to tackle the climate change.

² European car manufacturers in ACEA: BMW AG, DaimlerChrysler AG, Fiat S.p.A., Ford of Europe Inc., General Motors Europe AG, Porsche AG, PSA Peugeot Citroën, Renault SA, Volkswagen AG, AB Volvo

³ Japanese car manufacturers in JAMA: Daihatsu, Fuji Heavy Industries (Subaru), Honda, Isuzu, Mazda, Nissan, Mitsubishi, Suzuki, Toyota

⁴ Korean car manufacturers in KAMA: Daewoo Motor Co. Ltd., Hyundai Motor Company, KIA Motors Corporation

The scope of ECCP is to involve all relevant stakeholders in a consultative process where information from national experts, industry, NGOs will be combined and translate into coherent policy measures. This multi-stakeholder approach enables the ECCP to draw on a broad spectrum of expertise.

The role of the Commission in the ECCP follows a complementary dual approach. One hand the Commission is responsible through the Steering Committee for the general co-ordination of the program. One the other hand the Commission acts as a facilitator among different working groups.

2 PRESENTATION OF ECCP 1

As it is mentioned before, the ECCP 1 has two working periods. During the first period a number of technical Working Groups were put in place in order to consider and give recommendations on how to reduce CO₂ emissions leading to an Action Plan for ECCP and one ECCP report incorporating the findings. The findings were summarized in 42 possible measures that potentially could result to 664-765 MtCO₂ equivalent emissions reduction. It is important to note that potential savings estimated in reports refer to EU15.

The main driver for having six different groups covering almost all sectors contributing to CO₂, was that even if every sector should contribute to the objective of the Kyoto Protocol the precise intensity of emissions reduction needs differentiation in the sense of a least-cost perspective.

The section below contains a description of ECCP first period and second period. At the end of the section, the ECCP 1's first period proposals are presented.

2.1 ECCP 1 - FIST PERIOD (2000-2001)

During the first period of ECCP 1, European Commission set up six different technical Working Groups under the co-ordination of the ECCP Steering Committee. As it is already mentioned the groups were set up as to involve all relevant stakeholders from industry, governments and environmental groups. The **main objective** was to investigate in depth cost effective solutions and potential initiatives for reducing green house emissions. Namely, the groups were:

- ◆ Flexible mechanism, which consisted of two sub-groups:
 - Emissions Trading Scheme
 - Clean Development Mechanism/Joint Implementation
- ◆ Energy supply
- ◆ Energy Consumption
- ◆ Transport
- ◆ Industry
- ◆ Research

Each one of the Working Groups (WG) will be presented in the section below, as long with the **objective, overall scope, key recommendations** made by the Working Group and **proposed measures** (when available) for cost-effective CO₂ emissions reduction.

2.1.1 Flexible Mechanisms WG

As it is mentioned before this Working Group had two sub-groups which examined different mechanisms.

Emission Trading Scheme Sub-group

The **objective** of this Working Group was to examine how flexible mechanisms might be further developed within the EU in the context of climate change policy.

The **scope** was to develop an EU-wide framework and design the principles for emissions trading and the necessary regulatory framework which included examination of the methodology for the fixing objectives for companies, assessment of the most appropriate methodology and inter-linkages with existed environmental regulations and policies like IPPC⁵ and LCP⁶ directives.

It is interesting that this Working Group had concentrated on issues and **choices to be made** in order to use flexible mechanisms rather than trying to identify and quantify measures that could be taken.

Therefore, the **conclusions and recommendations** follow a general context and carefully avoid proposing **specific measures** as it was premature at the given point of ECCP. The recommendations covered the type and stringency of targets, the allocation methodologies, the coverage of emission trading scheme, internal market and competition issues and monitoring, reporting, verification and compliance.

Key recommendations for an EU Emissions Trading Scheme were:

- ◆ Targets must be in absolute terms and the role of relative targets should be limited.

⁵Directive 96/61/EC –Integrated Pollution and Prevention Control

⁶ Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from Large Combustion Plants (the LCP Directive)

- ◆ It is possible for Member States to choose their own allocation methodology given that they would not create systematic competitive distortions and that they would be environmentally effective.
- ◆ CO₂ should be the core gas in the ETS but other gases could also be included in the ETS and ETS should be designed to include as many sectors as possible.
- ◆ Allowances allocated free of charge should be no more than the amount of allowances that the entity is likely to need to cover its projected emissions.
- ◆ It should be recognized that the use of the project mechanism should not contravene the Community stated aid and public procurement rules.
- ◆ Creation of a single currency is highly recommended.
- ◆ JI and CDM credits should be recognized.
- ◆ EU should set high standards of monitoring, verification, reporting, and compliance.

Clean Development Mechanism and Joint implementation Sub-group

The **objective** of this Working Group was to examine how the Joint Implementation and Clean Development Mechanism might be further developed within the EU in the context of climate change policy.

The **scope** was to develop an EU-wide framework and design the principles for clean development mechanism and Joint Implementation and to concentrate on issues and **choices to be made** in order to use JI/CDM effectively.

Therefore, the **conclusions and recommendations** follow a general context and **proposed measures** were limited and mostly concentrating in JI/CDM funding. The recommendations covered the guiding principles in JI/CDM implementation, linkages with ETS, capacity building, and financial mechanisms.

Key recommendations for JI/CDM were:

- ◆ State Aid rules may apply to JI/CDM projects benefiting from Member States' resources located inside or outside the Community
- ◆ Best Available Technology (BAT) reference documents should be referred to, for the establishment of the baseline scenario for JI projects taking into account the economic and specific characteristics of the projects.
- ◆ Support to setting up of appropriate enabling environment including supportive policies and legal framework in Candidate Countries.

Proposed measures for JI/CDM were:

- ◆ The establishment of a Community Voluntary Carbon Labeling Scheme in order to reduce transaction costs and to give credibility to JI/CDM.
- ◆ Support to Candidate Countries through the PHARE program for the implementation of the Council Decision 93/389 as amended by Council Decision 99/296, to building up monitoring systems required in Article 5 and 7 of the Kyoto Protocol.
- ◆ Temporary Financial support during the design stages of JI/CDM and complementary funding for JI/CDM investments that have ancillary benefits.

2.1.2 Energy Supply WG

The **objective** of this Working Group was to identify and develop the most important elements in the area of energy supply that were necessary for the implementation of Kyoto Protocol.

The **scope** was to develop an internal electricity and gas markets which would successfully incorporate environmental considerations, to promote the use of renewable electricity and facilitate the decentralization of energy production, to reduce methane emissions in mining and extraction facilities and to explore the possibilities for CO₂ capture and storage. Finally, it aimed to increase CHP and energy efficiency in electricity and gas supply industry.

Key recommendations were:

- ◆ Introduce legislation in order to internalize the external costs of energy production.
- ◆ Promote market based instruments which would provide dynamic incentives for technological change.

- ◆ Promote international co-operation with gas-producers countries.
- ◆ To encourage coal-mining industries and national mining authorities to promote the capture and utilization of CH₄ extracted from operating or abandoned mining activities.

The **proposed measures** were:

- ◆ The launching of an **EU-co-generation initiative** and the adoption of **EU Cogeneration Directive (CHP-E)**, focusing on indicative targets, definition of CHP Quality and CHP Certification.
- ◆ The adoption of a **Directive on full liberalization of electricity and gas markets** by 2005.
- ◆ Establishment of negotiated agreements in the form of long-term commitments for a European Energy Efficiency Best Practice Initiative with industry on the basis of IPPC and LPC Directives.
- ◆ Adoption of a **Directive on the promotion of electricity from renewable energy sources in the internal electricity market (RES-E)**.
- ◆ Proposal on a **Directive on the energy performance of buildings** which will take into account the positive influence of heating and electricity systems based on renewable energy source.
- ◆ Adopt a **Communication on a Directive** on the promotion of biofuels for transport.

The potential savings from the implementation of the Co-generation Directive could potentially amount to 64Mt CO₂ emissions by 2010 and from the liberalization Directive and the negotiated agreements are estimated to 125 Mt CO₂ and in total the potential savings from the proposed measures of this Working Group are estimated in the order of 313 Mt CO₂ emissions reduction by 2010.

2.1.3 Energy Consumption WG

The **objectives** of this Working Group was to facilitate the realization of the CO₂ reduction potential through rational consumption of energy and energy savings, counteract and eventually reverse the trend towards increase of energy consumption. This Working Group also included two sub-groups looking at the energy consumption in **end-use equipment** and **industrial processes**.

The **scope** was to address behavioral consumer's aspects, to aggregate and focus fragmented consumers' demand to best practices, to prescribe the enabling framework for giving consumers and all end-users incentives for energy efficiency.

Since the **buildings** sector accounts for the 40% of all energy consumption, some of the objectives were particularly focused on this area. The **objectives** were to promote best practices such as auditing and the implementation of heating certificates and voluntary agreements for supporting green energy. Promotion of energy efficiency, building and lighting performance as long as with building design and infrastructural planning were also included. The potential savings of the building sector was estimated to be between 220- 247 Mt CO₂.

This Working Group produced two categories of **proposed measures**. **Legislative measures** and **non-legislative measures**.

Legislative proposed measures were:

- ◆ Proposal for a Directive on the **Energy Performance of Buildings** which can realize 35-45 Mt CO₂ /year by 2010. The Directive will set the framework for an integrated methodology for measuring energy performance of buildings. It will also introduce the application of minimum standards to new buildings and it will introduce energy certification for new and existing buildings.
- ◆ Proposal for **Amended Directive (93/76/EEC) to limit carbon dioxide emissions by improving energy efficiency**. This measure can realize 15-20 Mt CO₂ /year by 2010. The Amended Directive is expected to strengthen and clarify the Directive's own implementing requirements with emphasis on metering of consumption and auditing. It will also provide support to the above proposal on the **Energy Performance of Buildings**
- ◆ **Energy-Efficient Public Procurement Initiative and Proposed Directive** which can realize 25-40 Mt CO₂ /year by 2010. The objective of this initiative is to aggregate the very large and important demand for energy-efficient technology that exists within the public sector in order to procure, demonstrate and thus promote increased production volumes and lower cost and prices for new energy-efficient technology in all end-use sectors.

- ◆ **Energy Services Directive Proposal** which may save 40-55 Mt CO₂/year by 2010. The objective of this proposal is to complete the internal market for energy by developing and encouraging the energy efficiency on the demand side, especially as it is provided by utilities and service companies in the form of energy services.
- ◆ **Combine Heat and Power Directive** which can save 65 Mt CO₂/year by 2010. The aim of the Directive is to complement and strengthen existing measures to promote CHP.

Non-legislative proposed measures were:

- ◆ **Audit Schemes, Best Practice Initiatives and Voluntary Agreements** which can save 20-30 Mt CO₂/year by 2010. The use of energy and eco-audit schemes enable the most-cost effective measures to be identified while best-practice and benchmarking illustrate what can be achieved with Best Available Technology (BAT). Finally, Voluntary Agreements are suitably built on the above.
- ◆ **Technology Procurement Initiative** which can save 15-25 Mt CO₂/year by 2010. The aim is to introduce technology with the energy efficiency dimension specified by bringing together interested buyers and developers of this technology.

The total saving potential from the above mentioned measures could be between 150-220 Mt CO₂/ year by 2010.

Subgroup on energy efficiency in End-use Equipment

The **overall objective** of this subgroup was to identify cost-effective CO₂ potential reduction by the rational use of energy and energy efficiency in **end-use equipment** and **industrial processes** by the introduction of active energy services particularly at Small Medium Enterprises (SMEs).

The **first objective** was to determine the consumption for each major end-use equipment for the residential, tertiary, and industry sector. The **second objective** was to develop and maintain a structure environment for ongoing policy measures.

The **key recommendations** for the end-use equipment were:

- ◆ Introduction of the Motor Challenge Programme in order to achieve optimization in motor driven processes which could save up to 30 Mt CO₂/year by 2010.

- ◆ The effective implementation of the Energy Star Programme and Code of Conduct for Digital TV series. This initiative could potentially save up to 13 Mt CO₂/year by 2010.
- ◆ The promotion of guidelines for Member States in order to increase the speed of replacement of old equipment, to accelerate depreciation rules, and introduce low or zero-rate VAT for the most efficient equipment. This could potentially save 25 Mt CO₂/year by 2010.

The **proposed measures for end-use equipment** were:

- ◆ The adoption of a **Framework Directive for Efficiency Requirement of Electrical and Electronic End-use Equipment**.
- ◆ The adoption of a **Directive on the Environmental Impact of Electrical and Electronic Equipment**.
- ◆ The revision of **Energy Labelling Directive (92/75/EC)** which could save 10 Mt CO₂/year by 2010.
- ◆ **Agreement** with the lamp manufacturers in order to substantially increase the sales of Compact Fluorescent Lamps (CFLs) which could save up to 7Mt CO₂/year by 2010.

Subgroup on energy efficiency in Industrial Processes

With regard to industrial processes the Sub-group has mainly considered the energy **intensive industrial sectors** (particularly iron and steel, non ferrous metals, building materials, pulp and paper and chemicals) which cover one third of total industry energy consumption. The Sub-group has identified **two saving potential areas**.

1. Energy efficiency in **core-processes**: Saving potential is low because efficiency improvements are linked to new investments for new plants. Apart from that, core processes consume on average 50% of the energy and the saving potential is estimated up to 16Mt CO₂.
2. Energy-efficiency in **non-core processes**. Saving potential is much higher and more specifically in less energy intensive industries.

The **key recommendations** for industrial processes were:

- ◆ Better use of the existing **IPPC Directive** and improvements in **Best Available Technologies reference documents** (BREFs) in order to achieve energy efficiency.
- ◆ Actions to establish support structures for Small Medium Enterprises (SMEs) for energy efficiency and energy services in order to help SMEs to implement actions resulting from audits and Best Practices.

The **proposed measures** were:

- ◆ The implementation of energy audit and management scheme (which would focus in non-core processes). This scheme is considered to be the **highest priority**.
- ◆ Establishment of Long-Term Agreements (LTAs) with energy intensive industry in order to improve energy efficiency and to reduce emissions.

The total saving potential from the above mentioned measures could be up to 125 Mt CO₂/year by 2010.

2.1.4 Transport WG

Consistent trends prevail in transport sector and they determined the topics examined under this Working Group. Transport represents almost 28% of total CO₂ emissions in the EU with the 84% of it from road transport alone. Projections show a 38% increase in freight transport and 24% in passenger transport by 2010. Therefore, this sector constitutes an area of high priority.

The **objective** of this Working Group on Transport was to consider all modes of transport with respect to measures which in addition to a reduction of greenhouse gas emissions could have other beneficial effects (e.g. increase in transport efficiency and reduction of environmental impact on other areas) and **identify cost-effective** packages of the most promising measures with a **time horizon** of the Kyoto commitment period and an **appreciable effect** within a few years. The main gains were to be obtained from improvements in energy intensity and transport management.

The **scope** was to examine improvements in vehicle technology and fuel, in transport infrastructure use and charging, in freight logistics and intermodality, and in awareness raising and behavioral change.

The **key recommendations** for transport sector were:

- ◆ Commission should include air-condition in mandatory car-testing and additionally to set limits for air quality pollutants from motor vehicles which are not yet existing. The potential saving is 2-4Mt CO₂/y.
- ◆ Promotion of technology and infrastructure development for advanced combustion engines, fuel cells and hydrogen technologies.
- ◆ To harmonize and modernize and pool at an EU level, the vehicle registration databases of Member States to include all the vehicle registration and a proper consideration of alternative fuel-vehicles.

The **proposed measures** were:

- ◆ Proposal for an Environmental Agreement with car industry for Light Duty Vehicles. Because of the large expected increase of freight trips, the increased sales of new vehicles and the manufacturers' incentives to produce fuel/CO₂ efficient vehicles, the savings potential may be up to 10 Mt CO₂/year.
- ◆ Introduction of a requirement of less than 10ppm sulphur fuels in ACEA/JAMA/KAMA CO₂ commitments for the new fleet. The potential saving is 0.8-1.5 Mt CO₂/year.
- ◆ A White Paper on the Common Transport Policy which would encourage/facilitate multimodal transport.
- ◆ Launching a new programme to replace the previous PACT programme (European Pilot Action for Combined Transport) in order to promote modal shift.
- ◆ The introduction of a greenhouse gas tax for the whole transport sector or alternatively to introduce a tax on fuel and fuel cycle emissions. In this case a harmonized scheme for all EU countries is considered necessary. The potential saving is 17 Mt CO₂/year.
- ◆ Amendment of the Driving licence Directive 91/439/EEC in order to include an eco-driving course in the driving licence education. The potential saving is 50Mt CO₂ up to 2010.

It is important to point out that **proposed measures and recommendations** from this Working Group are **far from being straightforward**. The final result strongly depends on acceptance and reaction of the actors and there is large **uncertainty** on the actual effect of proposed measures. Finally, it may seem that the measures offer a potential in CO₂ reduction largely exceeding the least-cost share of the sector, but we should bear in mind that the estimates are simplified.

2.1.5 Industry WG

The **objective** of this Working Group was to identify cost-effective CO₂ potential reduction by energy efficiency in energy sector and particularly at SMEs. The Working Group examines separately the area of fluorinated gases, renewable raw material and voluntary agreements with industry.

The **scope** of this working group was to identify the most relevant application regarding fluorinated gases, to elaborate a proposal of cost-effective instruments for each, the development of a basis of an EU policy framework for fluorinated gases (SF₆, HFCs and PFCs) and the development of an EU policy framework for renewable raw materials.

Therefore, there are **three categories** of recommendations and proposed measures. In the first category, there are recommendations regarding **fluorinated gases**. In the second category there are recommendations regarding **renewable raw material** in industry and finally the third category includes recommendations for **Voluntary Agreements** with industry.

Key recommendations regarding **fluorinated gases** were:

- ◆ Introduce voluntary agreements in order to promote the development and appropriate use of alternative fluids. Through this process it is expected that acceptability and cost-effectiveness might be improved.
- ◆ Creation of funding sources to promote integrated and independent assessment of relevant technologies in order to facilitate comparison between the use of fluorinated gases and alternatives.

Proposed measures for fluorinated gases were:

- ◆ Propose a Directive for Fluorinated gases which will improve monitoring and verification of emissions, will set standards for improved containment of fluorinated gases and introduce restrictions to certain applications.
- ◆ Link the proposed Directive with amendments regarding fluorinated gases in Directives on IPPC, on Waste Electrical and Electronic Equipment (WEEE), and End of Life Vehicles.
- ◆ Introduce voluntary agreements in semi-conductor, switchgear and foam sectors preferably with a link to the proposed Directive.

The overall potential from the above mentioned measures and recommendations is up to 30 Mt CO₂/year by 2010.

Proposed measures regarding raw renewable material were:

- ◆ To include RRM (Renewable Raw Materials) in the CAP (Common Agricultural Policy).
- ◆ To promote fiscal incentives and remove administrative barriers.
- ◆ To include RRM in EU-ECO labelling scheme to boost consumers awareness.
- ◆ To include RRM in emissions trading (CO₂ credits for manufacturers /users of RRM).

Regarding **Voluntary Agreements with the industry** the **recommendations** set a general framework:

- ◆ Voluntary Agreements should form part of other policy instruments.
- ◆ They should be carefully designed, monitored and adopt transparent reporting and independent verification.

It is important to note that for proposed recommendations and proposed measures for voluntary agreements, it was not possible to calculate with any precision the costs.

2.1.6 Research WG

The **objective** of this Working Group was to collect all relevant to climate change information accumulated during the 4th and 5th Framework on research and compiling it to coherent policy measures.

The **scope** was to **identify potential needs** and set **necessary framework** for further research in topics such as carbon sinks and climate change parameters observation. Additionally, it would help **clarify uncertainties** relevant to climate change and therefore mobilize European resources in respect of implementing the Kyoto Protocol.

As it is expected, the outcome of Research Working Group consisted of recommendations and not measures towards future needs in research.

The **key recommendations** were:

- ◆ Establishing Global Monitoring for Environment and Security (GMES) that will allow policy makers to have access to high quality information.
- ◆ Establishing a reference system for greenhouse gas emissions measurement in Europe that will foster a common understanding regarding quality of existing monitoring methodologies and will develop and put into operation new methodologies.
- ◆ Promote open and sound scientific data management and exploitation in order to keep pace with the rapid policy assessment and quick inputs to negotiation processes needed.
- ◆ Establishing a forum on economic energy and environment modeling. This forum will help estimate the impacts of internalization of environmental costs and of stringent energy efficiency standards.

2.1.7 ECCP 1- First Period –Proposed Measures

The ECCP so far, investigated more than 40 measures in total using selection criteria such as their contribution to the reduction of greenhouse emissions, cost-effectiveness and the time frame within which they could be realized.

The **proposed measures** by ECCP 1 during the First Period can be incorporated in three main categories. The realization of the technical potential depends on a number of factors such as the

accuracy of the data, the timeframe within which measures are implemented and public acceptance. Thus, the three categories are made in order to give better indication of the short term-potential and of cost-effectiveness. The first category includes measures that are “at an advanced stage of preparation”, the second category includes those which are “in the pipeline” and the third category includes those for which “more work is needed”.

- ◆ The **first category** consists of 8 possible measures with an estimating cost-effective emission reduction potential of 240Mt CO₂ equivalent. These measures anticipate the introduction of a Directive on Energy Performance on Buildings, a Directive promoting Biofuel, a Directive setting the framework for EU emissions Trading Scheme, and a Directive setting the framework for Fluorinated Gases.
- ◆ The **second category** embodies 11 additional measures with an estimating cost-effective emissions reduction potential of 140 Mt CO₂ equivalent. Proposed measures include i.a. Directives on Combined Heat and Power (CHP), energy services and minimum efficiency standards for electrical equipment a revision of the IPPC Directive with regard to energy efficiency provisions, a technology procurement initiative and support for improving the research infrastructure on Climate Change.
- ◆ The **third category** lists another 22 measures considered to be in need for further work. Measures in this category are related to i.e. promotion of heat production from renewable energy sources, long term agreements with energy intensive industries, fiscal measures for passenger cars, a voluntary agreement with the car industry on light commercial vehicles and further technological improvements for vehicles and fuels.

2.2 ECCP-1-FIRST PERIOD (2002-2003)

The first task of the ECCP 1 during the first period was to facilitate and actively support the priorities identified in the first phase. Therefore, the Commission tried to incorporate the measures proposed from ECCP 1 during the first period in these legal documents.

- ◆ **Directive 2003/87/EC on establishing a scheme for greenhouse gas emission allowance trading within the Community.** The provisions of this Directive were setting the framework to enable certain businesses and industries to trade their allocations for CO₂ emissions. The trading system was set to start in 2005 and should ensure that the private sector finds the most cost-effective ways to reduce its CO₂ emissions.
- ◆ **Directive on the promotion of biofuel.** With this Directive, European Commission agrees on a strategy for the development of biofuel deriving from agricultural and forest products, as well as from residues and waste from these sectors. Under this Directive, Member States should ensure a minimum proportion of biofuel placed in their markets by December of 2005.
- ◆ A proposal for a **Directive to promote Combined Heat and Power (CHP).** In the short term, this Directive served as an instrument to promote new high-efficiency cogeneration installations in the internal energy market during the liberalisation process. In order to promote CHP, it provided the regulatory certainty and in some cases the financial support which is vital for cogeneration. In the medium to long term, the Directive served as a means to create the necessary framework that will ensure that high-efficiency cogeneration, alongside other environmentally friendly supply options. It finally aimed at creating the enabling framework to establish more diversified and energy efficient supply systems.
- ◆ A **Communication regarding vehicle taxation.** The main purpose of this Communication was to propose policies and options for future action in the field of passenger car taxation. The objectives were to modernise and simplify the existing vehicle taxation systems, to include new parameter in the tax bases in order to make them CO₂ based and to remove tax obstacles and distortions to free circulation of passenger cars within the Internal Market.

The second task was to further support already existed Working Groups to investigate additional measures. In the second phase of ECCP 1 two more Working Groups were added in order to investigate the potentials of carbon sinks. These Working Groups were:

- ◆ Agriculture
- ◆ Forest related sinks

2.2.1 Agriculture WG

The **objective** of this Working Group was to consider the mitigation potential of improved use and management of agricultural soils. The **scope** was to investigate cost-effective potentials for mitigation potential of nitrous oxide from agricultural soils and sequestration potential. Additionally, mitigation potential of methane production from enteric fermentation as long as with mitigation potential of methane production from manure management were in the objectives. Finally the possibility of CO₂ emissions reduction from providing renewable raw materials for energy and industry sector was developed.

The **key recommendations** were:

- ◆ To promote the use of fertiliser-free zones and improvements in fertilizer efficiency.
- ◆ Improve of life-time efficiency to mitigate potential CH₄ from enteric fermentation.
- ◆ Stimulate the introduction of Anaerobic Digestion Plants (AD) both in farm scale and centralised ones and promote innovation to increase efficiency.

Proposed measures were:

- ◆ A stricter implementation and amendments of the existing legislation like the **Nitrate Directive 91/676/EEC**, **Water Directive 2000/60/EC**, and linkages with rural development policy.
- ◆ Introduction of a nitrogen quota and a nitrogen tax or alternatively introduction of a tax on nitrogen surplus which could be more targeted approach.
- ◆ Introduce a no-tillage scheme in the agri-environmental scheme (CAP).
- ◆ Introduce AD plants by simplifying the current legislation on co-digestion and sales of end-product.
- ◆ Introduce quality certification of end-products of Anaerobic Digestion Plants (AD) plants.
- ◆ Introduce a tax on waste if not recycled

- ◆ Introduce feed-in laws for methane used for supply gas and electricity and removal of taxes other than VAT on biofuels and automobiles using biofuels with amendments of the Directive on electricity from renewable.

It is important to stress that there are great uncertainties regarding the possibilities for the reduction potential in the agricultural sector and the reduction costs.

The potential that could be realised from the stricter implementation and amendments of the existing legislation like the Nitrate Directive 91/676/EEC, Water Directive 2000/60/EC, and the linkages with rural development policy is 10Mt of CO₂ in the first commitment period. For the anaerobic digestion the cost-effective potential can reach only the 10% of the technical potential meaning a contribution to the EU-reduction objective of 0.5%.

In the following section the activity of the Sub-group on the agriculture related sinks will be separately presented due to its significance.

Sub-group of Agriculture related sinks

The **objective** of this Sub-group was to investigate the emissions reduction potential from carbon sequestration in agricultural soils.

The **scope** was to clarify uncertainties of agriculture, to make a quantitative estimation of CO₂ absorption/hectare, to estimate carbon stored in farm soils, organic matter, and soil protection. Another objective was to develop proposals for alternative use of peat lands, composting and use of sewage sludge. Additionally, this working group had to monitor land use, land use change and forestry and to investigate the interaction of CAP with CO₂ emissions and policy options and socio-environmental side-impacts.

The **key recommendations** are:

- ◆ Promotion of increased carbon input from organic amendments (animal manure, compost, crop residues, sewage sludge). The potential is 20Mt CO₂/y during the first commitment period.
- ◆ Promotion of organic farming which apart from the environmental benefits could reduce CO₂ emissions by 14-20Mt CO₂/year.
- ◆ Support of conservation tillage. The potential is 9 Mt CO₂/year during the first commitment period.

- ◆ Permanent revegetation of set-aside areas with perennial grasses. The potential is 15 Mt CO₂/y during the first commitment period.

The above recommendations could be realized mainly under the **CAP reform proposal COM(2003)23 final** which will provide funds for providing incentives for the promotion of environmentally friendly production techniques.

Carbon sequestration in agricultural soils has an overall potential up to 60-70 MtCO₂/y during the first commitment period of the Kyoto Protocol. Nevertheless, because of the spatial component in the net sequestration potential the uncertainties in the estimates are very large.

2.2.2 Forest-related sinks WG

The **objective** of this Working Group was to assess the potential contribution of EU Member State's forest lands to achieve GHG emission reduction. The **scope** was to evaluate data on potential sink credits and assessed technical measures affecting afforestation and reforestation with regard to costs, environmental and other ancillary effects. Additionally, the Working Group assessed uncertainties and impacts on biodiversity. Finally, it aimed at assessing technical measures for sink enhancing and analyzing potential policy instruments.

The **key recommendations** of this Working Group were:

- ◆ To introduce afforestation of former agricultural lands, to increase the actual afforestation rate, introduce afforestation in land "with no clear use as source of product" and to establish plantation of fast growing trees on agricultural land.
- ◆ Introduce management measures for C-conservation (preserving the amount of carbon in the forests) like the restoration of forest wetlands and prevention of forest fires.
- ◆ Introduce management measures for enhancement of C-sinks (processes or mechanisms which remove CO₂ from the atmosphere) like improvement of management of fast growing plantations and biomass management for fire prevention which was the most interesting option.

Proposed measures were:

- ◆ To provide financial support to private forest owners and municipalities for sustainable management and development of forests under the **EU rural Development policy** and the **Rural Development Regulation (1257/99)**.
- ◆ To provide financial support to public forest owners for Rural Development measures linked to prevention of forest fire and natural disasters under the **EU rural Development policy** and the **Rural Development Regulation (1257/99)**.
- ◆ Potential financing for forest management actions through the **CAP reform proposal COM(2003)23 final**).
- ◆ Opportunities for financial support for the budgetary period starting in 2007 through the **European Regional Development Fund (ERDF)**, the **Cohesion Fund**, the **European Agricultural Guidance and Guarantee Fund (EAGGF)** and the **European Social Fund (ESF)**.

It is important to bear in mind that proposed measures and recommendations are largely based on empirical conversions and gross estimates with no limits of confidence and regarding processes in carbon cycle there is large uncertainty. Furthermore, geographical differentiation is of extreme importance when applying measures in different countries.

3 ECCP 2 (2005-TODAY)

The second European Climate Change Programme was launched in October 2005. The objective was to further explore cost-effective options for reducing green house emissions and support actions in synergy with EU Lisbon Strategy for increasing job creation and economic growth. Therefore, the structure of ECCP 2 is more complex and diverse, and new Working Groups have been introduced. This section will present the new groups and their objectives. The new groups are:

- ◆ Aviation
- ◆ CO₂ and Cars
- ◆ Carbon Capture and Storage (CCS)
- ◆ Adaptation
- ◆ EU trading Scheme Review

Apart from the new working groups introduced in ECCP 2, there is a Working Group reviewing the ECCP 1 Working Groups. The primary **objectives** of ECCP 1 review Working Group are threefold.

- ◆ To review the implementation of climate change related EU-wide policies and measures.
- ◆ To assess their concrete implementation in the Member States and the resulting actual and projected emission reductions.
- ◆ To identify new opportunities for potential emission reductions.

The **main findings** of the review show that the implementation among different Member States varies a lot. Apart from that, the existing databases are lacking the necessary data for a quantitative assessment of impacts of individual policies and measures.

Thus the European Commission elaborates **a new study** which is anticipated to end in June 2008. The study elaborates quantitative sectoral emission reduction potentials and economic costs of climate change. The **main objective** is to identify the least-cost contribution of different sectors and gases for meeting post-2012 obligations of EU 25+ (EU 25, Romania, Bulgaria and if possible Croatia and Turkey). It will furthermore determine a package of cost-effective policies and measures for all sectors and gases towards meeting the objectives.

3.1 AVIATION WG

The **objective** of Working Group on Aviation was to consider ways of including aviation in the EU ETS.

The **scope** of the Working Group was **to assess** how monitoring and reporting the climate impact of aviation can be addressed taking into consideration the existing methodologies used therein as a benchmark and noting the potential for achieving greater accuracy over time. In the scope also was to **explore** whether the flexibility offered by the tier system of Decision 2004/156/EC would be appropriate for the aviation sector or whether further harmonisation is required. Additionally, it considered to be necessary **to analyse** the possibility that incomplete coverage of the climate impact of aviation could provide an incentive for reduction of one impact within the scheme at the expense of another outside the scheme. Finally, the WG tried to **consider** the complementary use of charges or other flanking measures to establish full coverage of the climate impact of aviation in order to avoid the identified potential adverse effects from incomplete coverage.

The results from the research of this Working Group were incorporated in the proposal for **amending Directive 2003/87/EC so as to include aviation activities in the scheme of greenhouse gas emission allowance trading scheme** which was adopted on **20th December 2006**.

This proposal has two steps in order to bring aviation to the EU ETS. At first, emissions from all domestic and international flights between EU airports will be covered in EU ETS from the year 2011. Secondly, at the beginning of 2012, the EU ETS will be expanded to cover all international flights arriving or departing from an EU airport.

Key aspects of the proposed Directive are:

- ◆ **Aircraft operators** will be the entities responsible for complying with the obligations imposed by the scheme.
- ◆ The scheme **will cover all flights arriving at or departing from an airport in the Community** as of 1 January 2012. Flights between EU airports will be covered from 1 January 2011.
- ◆ Flights by State aircraft, flights under visual flight rules, circular flights, flights for testing navigation equipment or for training purposes, rescue flights and flights by aircraft with a maximum take-off weight of less than 5 700 kg **will be excluded from the scheme**.

- ◆ To address other gases, by the end of 2008, the Commission will put forward a proposal to address the **nitrogen oxide emissions** from aviation after a thorough impact assessment.
- ◆ In order to avoid duplication and an excessive administrative burden on aircraft operators, each aircraft operator, including operators from third countries, will be administered by one Member State only.
- ◆ In contrast to the existing scheme, the method of allocating allowances will be harmonised across the Community.
- ◆ The total number of allowances to be allocated to the aviation sector will be determined at Community level by reference to average emissions from aviation in the years 2004-2006.
- ◆ A **fixed percentage of the total quantity of allowances** will be allocated **free of charge** on the basis of a benchmark to aircraft operators which submit an application (the earliest application relating to 2008 data). For the period 2011- 2012 this percentage will correspond to the average percentage proposed by the Member States including auctioning in their national allocation plans. Thereafter this will be reviewed in the light of the results of the general review of the emissions trading scheme.
- ◆ The details of how auctioning will work such as appropriate design and timing will be set out in a Commission Regulation. Auctioning proceeds should be used to mitigate and adapt to the impacts of climate change and to cover administrative costs.
- ◆ Like other participants in the Community scheme, aircraft operators will have to **monitor their emissions of carbon dioxide** and report them to the competent authority of its administering Member State by 31 March each year. The reports must be verified to make sure that they are accurate. The basic principles for monitoring, reporting and verifying emissions set out in the proposal will be elaborated by guidelines.
- ◆ Aircraft operators will be able to **buy allowances** from other sectors in the Community scheme for use to cover their emissions.
- ◆ Aircraft operators will also be able to use project credits – so-called **Emission Reduction Units (ERUs)** and **Certified Emission Reductions (CERs)** - from the Joint Implementation and Clean Development Mechanisms (JI/CDM) respectively up to a harmonised limit equivalent to the average of the limits prescribed by Member States in their national allocation plans for other sectors in the Community scheme.

- ◆ **Domestic aviation** will be included in the scheme and treated in the same way as international aviation.
- ◆ Special consideration to the treatment of air **services to remote or isolated regions**, which are particularly dependent on air transport services, can best be given within the framework of existing measures such as public service obligations and aid having a social character under Article 87(2) of the Treaty.

3.2 CO₂ AND CARS WG

The **objective** of this Working Group was to assist the Commission services in preparing the review of the Community strategy to reduce CO₂ emissions from light-duty vehicles. Therefore, in 2007, the Commission adopted a **Communication** on the results of the review of the EU strategy to reduce CO₂ from cars and light-commercial vehicles. The **objective of the proposed legislative framework** is to focus on mandatory reductions of the emissions of CO₂ to reach the objective of **130gr CO₂/km** for the average car fleet by means of **improvements in vehicle motor technology** and another **10gr CO₂/km by means of other technological improvements and by an increased use of biofuel**.

Supply oriented measures from the proposed legislation are:

- ◆ Setting minimum efficiency requirements for air-conditioning systems.
- ◆ The compulsory fitting of accurate tire pressure monitoring systems.
- ◆ Setting maximum type rolling resistance limits in the EU for tires fitted on passenger cars and light commercial vehicles.
- ◆ The use of gear shift indicators.
- ◆ Increased use of biofuel maximizing environmental performance.

Apart from supply oriented measures there are also other measures recommended by the Commission such as **taxation measures** and **consumer information measures**.

- ◆ The Commission has made a proposal for **Directive on passenger car taxation (COM (2005) 261)** and encourage the Member States to adopt the proposal.
- ◆ The Commission will adopt in 2007 an amending proposal to improve the effectiveness of the **Fuel Efficiency Labelling Directive 1999/94/EC**
- ◆ **Voluntary Agreement** with car manufacturers is expected to be signed in mid-2007 on an EU wide code of good practice regarding car marketing and advertising aimed at the promotion of sustainable patterns.

3.2.1 Existing Strategy

The existing strategy to reduce CO₂ emissions from light-duty vehicles has three main points.

- ◆ The three Agreements signed by the automobile manufacturers (ACEA, JAMA, KAMA) for CO₂ emission reduction. The objectives are to be achieved mainly by means of improved vehicle technology, namely:
 - To have an average CO₂ emission by car 140 g CO₂/km by 2008/2009.
 - The fleet put on the market in 2008/2009 will consume on average 5.8 litre petrol/100 km or 5.25 litre diesel/100 km.
- ◆ Improvements of consumer's information on fuel-economy of cars which will be mainly achieved with the Labelling Directive. The Labelling Directive has three main requirements:
 - fuel economy label for all new cars to be displayed at the point of sale,
 - poster (or a display) showing the official fuel consumption and CO₂ emission data of all new passenger car models displayed or offered for sale or lease at or through the respective point of sale, guide on fuel economy and CO₂ emissions,
 - all promotional literature must contain the official fuel consumption and specific CO₂ emission data for the passenger car model to which it refers.
- ◆ Market-orientated measures to influence motorists' choice towards more fuel-efficient cars:
 - introducing CO₂ element in the calculation of car –taxes,

- close the 20 g CO₂/km gap between the Community target and the car manufacturers' associations argument.

It is interesting to see some real figures concerning the current fleet of cars. Currently, only three car brands are available with emissions lower than 120g CO₂/km. These are the Toyota Prius Hybrid with 104 g CO₂/km, the Peugeot 107 with 109g CO₂/km and the Renault Modus with 119g CO₂/km.

In 2006, brands with the highest sales (Opel Astra, Renault Clio, Ford Focus, Volkswagen Golf and Fiat Punto) had an average of 117-224 g CO₂/km. When considering the average CO₂/km emissions of a brand, it is interesting to notice that from 20 popular brands only one (FIAT) have an average of 139g CO₂/km.

It is therefore straightforward to conclude that it would be extremely difficult to achieve the target of an average CO₂ emission by car 140 g CO₂/km by 2008/2009.

3.3 CARBON CAPTURE AND GEOLOGICAL STORAGE (CCS) WG

The **objective** of this Working Group is to investigate the potential for CO₂ emission reduction from carbon capture and storage.

The **scope** is to assist in the evaluation of technical characteristics, cost and economic potential and possible implications of CCS for greenhouse emissions reduction. It also investigates potential risks and barriers to uptake.

This Working Group also has set **two main targets** to be achieved:

- ◆ To **develop the enabling legal framework** which would manage risk related to CCS, remove unwarranted barriers in existing legislation and assess long-term liability issues for the storage site. Finally, the legal framework will improve communication to the public and the stakeholders on the risks and how they are addressed.

- ◆ To **encourage a network of demonstration** projects in Europe and key third countries. This has three aspects. Firstly, the incorporation of CCS to Global Carbon Market and EU ETS is necessary in order to address in what extent to recognize CCS, having regard to the need for comparable treatment of low or non-emitting CO₂ activities. Secondly, the Zero Emission Fossil Fuel Technology Platform (ZEP) which supports strategic deployment for CCS and recommends 10-12 integrated large-scale international projects. Thirdly, a Communication on Sustainable Power Generation from Fossil Fuels which set out the options for supporting the network and provide economic incentives.

The results of the Working Group were incorporated in the “**Communication on sustainable power generation from Fossil Fuels**” adopted on **10 January 2007**. The Communication sets out the general strategy with respect to Carbon Capture and Storage, including the general regulatory framework, incentive framework, and support programmes, as well as external elements (technology co-operation with key countries on CCS). It outlines the work programme on CCS to be pursued in the coming 2-3 years.

The **key recommendations** are:

- ◆ Commission will substantially increase the funding for R&D in the energy area making the demonstration of **Sustainable Fossil Fuels** technologies one of the priorities for 2007-2013.
- ◆ The Commission will assess on the basis of recent and planned investments whether new fossil fuels power plants built and to be built in the EU use best available technologies and whether if not equipped with **CCS**, new coal and gas fired installations are prepared for later additions of CCS technologies. If not, the **Commission will be prepared to propose legally binding instruments as soon as possible**.
- ◆ In 2007, Commission will lay down **requirements for the licensing** of CCS activities and for managing the risks and afterwards will amend **the existing environmental regulatory framework**, amend **EIA and IPPC** Directives and will address the recognition of CCS activities in the **EU ETS**.
- ◆ Commission should justified **incentives** through establishing more favorable context for long-term investment decisions, developing EU CO₂ storage and pipelines for multi-user access.

- ◆ Commission will lay groundwork for close collaboration with China in the **2005 EU-China Partnership on Climate Change** and the subsequent **2006 Memorandum of Understanding** focusing on the **joint CCS demonstration** but also with other key emerging economies like India and South Africa.

3.4 ADAPTATION WG

The **objective** of this Working Group is to consider climate change impacts on a range of sectors, organizations and people. It will assist to make decisions by providing risk assessments and costs and benefits estimation on different policy options on adaptation. Impacts of climate change can vary a lot among Member States; therefore, this Working Group aims to assist European Union to develop a policy strategy to adapt to the impacts of unavoidable climate change.

The **scope** of the Working Group is to consider adaptation issues in national strategies, in water cycle and water resources management, in agriculture and forestry, in biodiversity, human health in regional planning, built environment, public and energy infrastructure, in structural funds, in marine resources and coastal zones and tourism in urban planning and construction, in insurance industry and in development of co-operation.

The next section will present these activities and will highlight only the key points of each one (where available).

3.4.1 Building national strategies for adaptation (country reports)

Currently, the EU does **not have any direct policy** to stimulate the preparation of national adaptation strategies at Member State level. On the other hand, several Member States like France, Denmark, and Finland have already set out relevant initiatives which aim at improving capacities to address extreme weather events, include climate change into long-investments, and develop further research and monitoring systems.

Gaps are identified in the area of addressing scientific uncertainties, increasing awareness of the timescales needed for effective action, cross sectoral relations, funding resources and performing cost-benefit analyses. These are **the priority areas** for policy options under the EU.

3.4.2 Impacts on water cycle and water resources management and prediction of extreme events

The hydrological cycle is expected to become enhanced as global temperature increase. The frequency of extreme weather events like droughts and flood will increase. The economic impact of floods and droughts can be considerable.

Existing relevant policies in EU is the **Water Framework Directive (2000/60/EC)** which is a key instrument in climate adaptation policies, the **Bathing Water Quality Directive (76/160/EEC)**, the **Drinking Water Quality Directive (98/83/EC)**, the existing **Groundwater Directive (80/68/EEC)** and the proposed Directive on the protection of groundwater against pollution (COM(2003)550).

The key action at a national, regional and local level is the comprehensive implementation of the Water Framework Directive with full integration of climate change impacts and dedicated adaptation measures.

3.4.3 Agriculture and Forestry

The sub-group on Agriculture and Forestry points out that **south-east and Mediterranean areas** are the most vulnerable on climate change. It estimates that slightly warmer winters will be the most influential in longer term but the increased frequency of extreme weather events will be more important.

In agriculture, changes in mean temperatures, precipitation patterns could lead to increased water deficit, soil-compaction, mineralization of soil carbon, changes in pest and diseases which will eventually affect yield and crop opportunities.

In forestry the **findings** of the working group shows that climate change could change productivity, increase water stress, increase fire risk and susceptibility of forests to disease and pests.

The working group **proposes proactive adaptation policies** like new management techniques, monitoring of soil changes, develop sustainable farming e.g. practicing land rotation, putting back natural features like hedgerows, changing field design and minimum tillage techniques.

3.4.4 Biodiversity

Biodiversity and semi-natural habitats and ecosystems are already exposed to many other pressures like pollution, habitat fragmentation and land use change and they can be more vulnerable to climate change impacts.

The existing relevant policies which will be the key instruments are the **Birds Directive** (97/409/EEC), **Habitats Directive** (92/43/EEC), **Environmental Impacts Assessment Directive** and **Strategic Environmental Assessment Directive** in connection with **Water Framework Directive** and **Common Agricultural Policy**.

Use of the CAP and EU budgets reform are necessary to integrate biodiversity conservation with other key sectors for planning and delivering of conservation objectives.

3.4.5 Human Health

The key impacts of climate change in human health are mainly communicable diseases, food and water-borne diseases, extreme temperatures, flooding, other extreme events like fire.

Currently there **are not direct health adaptation policies** to climate change. The topic is in very early stage of development and the research needs will be covered partly in the 7th Framework Program for research and technological development (FP7).

3.4.6 Regional planning, Energy and Public Infrastructure

Urban planning has to be designed in a way that copes with the unique qualities of the urban environment including increased density of development, increased density of people, different cost-dynamics and lifetimes of development. Urban planning will play a key role in the minimisation of climate related risks in the human environment and within Europe the impacts has to do with extreme weather events,(heat, storms, flooding in low-lying areas, etc)

The key policies of importance at EU level are the **EU Energy Performance in Building Directive**, the **EU Thematic Strategy on the Urban Environment** and **Strategic Environmental Assessment Directive**.

3.4.7 Marine resources and coastal zones and tourism

The key factors for impacts and adaptation in the marine environment are the presence of suitable habitats for range extension, temperature effects on life cycle stages and water quality.

The tourist sector has shown also to be sensitive in climate change with both negative results and positive opportunities. Climate change will impact on spatial and seasonal distribution of tourism and thus cost and benefits.

The key instrument for the management of coastal areas in order to minimise impacts of climate change is the proposed **Integrated-Coastal Zone Management (ICMZ)** for the EU in 2000(COM(2000)547) final. In the ICMZ aspects of long-term and cross sectoral planning are addressed regarding coastal management.

3.4.8 Energy planning and construction

The main topic of the group was climate change impacts on energy infrastructure. The impacts can affect among other things building design, the availability of types of power, the availability and safety of water power plants, the demand for power etc.

There are a range of EU policies that have the potential to tackle the impacts of climate change. These policies include the **Water Framework Directive**, the **Flood Directive**, the **Integrated Coastal Zone Directive**, the **Common Agricultural Policies** and many more.

Additionally the **Structural Funds** have the power to influence the investments in eligible regions and they are currently being updated in order to fund climate change adaptation related policies and initiatives.

3.4.9 Role of insurance industry

The impacts from climate change on the insurance industry are most likely to be felt via increase in damage costs through changes in the frequency and intensity of extreme weather events.

The EU has installed the **Solidarity Fund** after catastrophic flooding in central Europe and France in 2002. The fund compensates for economic losses due to major natural disaster.

3.4.10 Development cooperation

Developing countries are more vulnerable to climate change impacts as they depend more on weather sensitive natural resources and even more their capacity to adapt is lower as it is determined by the amount of financial resources skills, technology etc allocated for this purpose.

In the current EU development policy climate change has become a priority under the needs for capacity building on environment and sustainable management of natural resources.

In response to the communication on **Climate Change in the Context of Development Cooperation (COM (2003) 85 final) an Action Plan on Climate Change and Development** has been adopted.

3.5 EU EMISSION TRADING SCHEME REVIEW

In January 2005 the European Union Greenhouse Gas Emission Trading Scheme (EU ETS) commenced operation as the largest multi-country, multi-sector Greenhouse Gas emission trading scheme world-wide.

The scheme is based on **Directive 2003/87/EC**, which entered into force on 25 October 2003.

Under the **Article 30** of the ETS Directive, the Commission needs to review the application of the ETS and report to the European Parliament and the European Council. The European Commission's DG Environment appointed McKinsey & Company and Ecofys to support it in developing the review. A web survey was carried out from the Ecofys and McKinsey & Company, regarding the views of stakeholders on a range of aspects of the EU emissions trading scheme. The final report with the survey results was published in August of 2006.

In November of 2006, the Commission submitted a **report to the European Parliament and the Council considering the functioning of the EU Emissions Trading Scheme (ETS)** [COM\(2006\)676 final](#)

The **objective** of this report is to analyse how the ETS has worked to date. The **scope** is to outline the areas in which changes are considered and **it identified the need of a review process** with a view to adapting some features of the ETS for the trading period starting in 2013.

Some **Key findings** on how the ETS has worked do far are:

- ◆ For the first compliance cycle 8.980 installations representing more than the 99% of allowances allocated had fulfilled their obligations.
- ◆ Based on this scheme, **CO₂ involves a real cost**. About half the companies already “price in” the value of CO₂ allowances and over 70% intend to do so in the future
- ◆ For half of the companies, the EU ETS is **one of the key issues** in long-term decisions; for the other half, it is only one among many issues
- ◆ About half of the companies claim that the EU ETS has a **strong or medium impact** on decisions to develop innovative technology
- ◆ In the first quarter of 2006, overall transactions worth US\$7.5 billion
- ◆ EUAs (EU Allowances) worth US\$48.2billion were traded in 2005 that correspond to 322 million tons of carbon dioxide equivalent
- ◆ Developing countries began to participate meaningfully in the market. The market share of Clean Development Mechanism (CDM) was 49.2% of the overall volumes transacted globally.

In this report, Commission **has identified a number of issues** that can be grouped into **four categories**, namely (1) the scope of the Directive, (2) further harmonization and increased predictability, (3) robust compliance and enforcement and (4) links to third countries.

A number of **studies and position papers** from the stakeholders have been already developed regarding the above four categories.

Therefore, the European Commission has launched a Working Group in view of adapting some features of the ETS for the trading period starting in 2013.

The **objective** of the Working Group on reviewing of EU ETS is to assist the Commission on proposing the **legislative framework** for EU ETS for the trading period starting in 2013 which will be proposed in 2007.

The **scope** of Working Group on EU emission Trading scheme review focuses on the following issues:

1. all additional activities and gases to be included in the EU ETS,
2. to further harmonize and increase predictability,
3. to improve compliance and enforcement and finally,
4. to involve third countries.

The **key recommendations** are:

- ◆ Further extension of the EU ETS but with a harmonised approach including MRV (Monitoring, Reporting, Verification), and clearer legal definitions. This extension could reduce abatement costs and make the scheme more efficient.
- ◆ Regarding the streamlining of the application of the current scope of the Directive, the definition of combustion installations should be improved or a definition of the process emissions should be established with a view to ensuring consistent application.
- ◆ Regarding the cost-effectiveness of small-installations, cost per ton is much higher for small installations. Therefore, opting –out small installations has to be measured against alternative instruments, while the opt-in should be maintained as an effective way of dealing with emission reduction.

It is important to note that this Working Group is quite premature as it has only met once during March 2007. Therefore, more results and recommendations are expected to come in the forthcoming months.

4 INTERRELATION OF ECCP WITH THE TURKISH MEASURES

4.1 GENERAL FRAMEWORK OF COORDINATION WITH THE ECCP

Turkey has many policy reasons to seriously follow the developments of the ECCP and the steps of implementation of the policy measures elaborated by the Working Groups and supported by the European Commission in principle. These are:

- Turkey is in pre-accession discussions with the EU and most of the ECCP measures influence environmental policies that should be harmonized in a certain period.
- The ECCP initiative offers a coordinated vehicle to reduce carbon emissions. It intervenes in a big number of economic and social sectors supporting existing or under consideration policies to become more vigorous and effective. Thus, this integrated approach, under the restriction of Kyoto Protocol, contributes to better and substantial understanding of the real dimension of the changes required. Turkey has not yet been organised to face such a challenge and for this reason the ECCP exercise offers experience and good practice to be exploited by the Turkish institutions.
- There are certain linkages in the area of economy, trade, transport and research between Turkey and the EU that continuously impose collaboration and harmonized policies. The ECCP policies will influence consumer behaviours and product/service specifications in a way improving environmental impact. This fact will surely require significant modifications in industry and services at least. The Turkish state is obliged to consider these new conditions and encourage, support the relevant restructuring/altering activities in the private and public sector.

The ECCP studies and elaborates actually an impetus of legal, institutional, technical, technological measures, the most significant of which have been presented in the previous sections. On the other hand the recent Turkish policy has endorsed a number of legal initiatives and actions towards the same direction. The prevailing incentive could be better attributed to economy modernisation and security of energy supply than to carbon emission reduction. Therefore the ECCP measures are broader and cover sectors which have not been touched at the moment in Turkey. In the following sections a selection of ECCP measures are considered as most

appropriate to be adopted within the Turkish policies during the pre-accession period. The criteria of selection could be summarized:

- certain linkage of economic activity with the EU not allowing ignorance from the Turkish side,
- market obstacles which could create significant damages to Turkish economic sectors,
- need for harmonization due to neighbourhood conditions and social impacts, and
- enrichment of existing Turkish policies with more advanced approaches, as they have been implemented in the EU which acts under the cap of Kyoto Protocol target and is not easily susceptible to pressings from interest groups.

4.2 PROPOSED SPECIFIC MEASURES FOR ECCP HARMONIZATION

As it is mentioned earlier in the Chapter 4.1, there are strong incentives for Turkey to put in place policies which will assist harmonization with policies, measures and actions set out by the development of ECCP in Europe.

There is a range of topics that provide harmonization opportunities for the Turkish government, but we will prioritize the proposed actions-measures according to their potential significance. The criteria for this ranking are the potential political cost, economic viability etc.

The topics with the largest significance in terms of interrelation are:

- ◆ The aviation sector.
- ◆ The car production sector.

4.2.1 Aviation sector

As it is mentioned before, the EU intends to bring aviation to the EU ETS, in particular from 2012 the ETS will be expanded to cover all international flights arriving or departing from an EU airport. Flight connections between Europe and Turkey are extremely frequent supporting a massive wave of tourism and assisting co-operation and development. Therefore, it is urgent for the Turkish airlines to be in line with the provisions of the Amending Directive 2003/87/EC which will include aviation activities in the scheme of greenhouse gas emissions allowance trading scheme.

Government's intervention is considered to be necessary. Policy intervention should put in place measures in order to inform and activate the airline companies to become more effective and ready to face the challenges. The government should support dissemination of information and monitoring of forthcoming developments in order to assist the airline companies to implement carbon emission reduction plans and relevant optimized flights schedules. Flights arriving and leaving from EU airport will be under certain restrictions in order to have a certain environmental performance. Therefore, the Turkish airlines should be prepared in order to be able to follow the imposed restrictions or otherwise be prepared to pay for their emissions.

The potential cost in terms of economic loss from tourism decline can be substantial. It is important to notice that particular tourism from the North European countries is very susceptible to environmental considerations. The consideration of potential environmental damage (or in other way, the effect on global warming) could alter the decision of many tourists to visit Turkey.

4.2.2 Car production sector

According to the existing strategy on CO₂ emissions from light-duty vehicles the three Agreements signed by the automobile manufacturers (ACEA, JAMA, KAMA) aimed at having an average CO₂ emission by car 140 g CO₂/km by 2008/2009. The target for 2012 is an average CO₂ emission by car of 120 g CO₂/km.

Many cars are manufactured in Turkey. These are sold either in national market or they are exported to Europe and third countries. Therefore, it is very important for the Turkish industry to harmonize with the European Standards in order to be able to keep the exporting market. If the new cars produced in Turkey do not meet the required qualifications they can be excluded from the European market.

Apart from the above, the internal car market in Turkey is yet developing meaning that each year a growing number of cars is being sold. If no measures are taken, it is expected that the new cars will have lower specifications considering CO₂ emissions therefore imposing an additional burden to the already compromised urban environment. Therefore, there should be a target for reaching an agreement with the car industry to follow the EU developments.

Voluntary Agreements with the car industry is considered to be the most appropriate way for the Turkish government to achieve improved car performance. They provide a certain degree of flexibility to the producers on how they will achieve the target with in a cost-effective way and they lower enforcement costs. This approach might be more effective than imposing a regulatory framework.

Apart from the two above sectors, there are also other areas which have a potential impact on Turkey. These areas will be analysed in the following sections.

4.2.3 Biofuels

Turkey has done already important steps towards the development of biomass exploitation for energy purposes. Considering the yet increasing demand for Biofuels in Europe, there is a large potential for Turkey to become one of the exporters but also to enhance its local consumption with Biofuels thus harmonizing with the EU. The demand for biomass is larger in North European countries but there are indications that the South Market (Italy, Spain, Greece), eventually will grow offering a significant potential for Turkey to export their products.

Therefore, government should put in place measures to promote efficient production of biomass (including efficient logistics) and even more to help in the standardization of the product. In order for the product to be competitive it should comply with the specific requirements set by the European Committee of Standardization (CEN).

4.2.4 Energy efficiency in buildings and public procurement

New possibilities emerge under the **Directive on the energy performance of buildings** and the **Energy-efficient Public Procurement Initiative**. As it is mentioned before, Turkey should

watch closely the march of events in Europe which will determine future demand in several commodities, in order to be able on time to expand their market. The potential economic benefits could be significant.

Therefore, an increase in demand for specific products, which are requested due to the **Directive on the energy performance of buildings** (i.e. boilers, heating and cooling systems, insulating material, windows etc.), is been foreseen. In order for the Turkish industries to be able to keep exporting and expand their markets in Europe, they should be harmonized with the European standards. Government's targets should be twofold. At the beginning they should support dissemination actions of the relevant information to the industries, organizing campaigns and even training in the new standards required. Secondly, financial supporting measures for the investments needed in the production line should be put in place.

Apart from the potential from the **Directive on the energy performance of buildings** there is also a potential in **Energy-efficient Public Procurement Initiative**. The economic benefits may not be directly linked with the market but there are directly linked with Turkey's environmental image. A movement like that promotes Turkey's image and shows a deep commitment in supporting environmental actions proposed from EU.

4.2.5 Agriculture and organic farming

Under the ECCP there is a strong promotion of organic farming. During the last years the organic farming market is expanding with increased rates and more and more products in Europe but also in Turkey.

It is a fast growing dynamic market which has not been yet saturated leaving large potentials for development. Therefore, there is a substantial potential for Turkish agriculture to further expand the exporting market. Therefore, it is recommended for the government to harmonized with the current European legal framework and promote organic farming. As it is mentioned before, the economic benefits for expanding the exports in such a fast-growing market.

4.2.6 ETS and Renewable Electricity

The two last potentials to be analyzed are considered to be the most ambitious ones. According to the latest developments under the ECCP, it is clear that the Emission Trading Scheme is considered to a dynamic market and it will be further expanded to include aviation. There are also proposals to include in the ETS the use of

renewable raw material in industry (CO₂ credits for manufacturers/users of Renewable Raw Material). Thus, considering the abundance of renewable raw material from agriculture, the yet unexploited potential of energy efficiency in SMEs (small-medium scale enterprises) and the large dissemination of co-generation in Turkey, it comes to the conclusion that entering the ETS could only give rise to benefits. The entrance of Turkey in ETS could vigorously alter the current market.

As it is mentioned before, Turkey has both a large potential of renewable raw material and a large co-generation capacity. It would be promising to interlink the supply of raw material with the production of electricity. The electricity produced will be considered being green electricity and could be sold in EU where there is a demand for green electricity. We should also note that production of green electricity (e.g. from biomass) is not always economical efficient in many countries. Therefore, if there is a strong potential in Turkey to produce cheap green electricity (due to abundance of cheap raw material) it may be feasible to explore the possibilities of the market in Europe.

5 REFERENCES

1. <http://ec.europa.eu/environment/climat/eccp.htm>
2. <http://ec.europa.eu/environment/climat/emission.htm>
3. <http://europa.eu.int/eur-lex/en/>
4. Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity from renewable energy sources in the internal electricity market [Official Journal L 283 of 27.10.2001].
5. European Commission, Commission Recommendation of 5 February 1999 on the reduction of CO₂ emissions from passenger cars (1999/125/EC). [Official Journal L 40 of 13.2.1999].
6. European Commission, Commission Recommendation of 13 April 2000 on the reduction of CO₂ emissions from passenger cars (2000/304/EC). [Official Journal L 100/57 of 20.4.2000].
7. European Commission, Commission Recommendation of 13 April 2000 on the reduction of CO₂ emissions from passenger cars (KAMA) (2000/303/EC) [Official Journal L 100/55 of 20.4.2000].
8. European Commission, Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity.
9. European Commission, Final Report, Working Group 1 “Flexible Mechanisms” (2001) Brussels.
10. European Commission, European Climate Change Programme Final Report (2001) Brussels.
11. European Commission, Communication from the Commission on the implementation of the first phase of the European Climate Change Programme COM(2001) 580 final, Brussels.
12. European Commission, Proposal for a Council Decision concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfillment of commitments there under , COM/2001/0579 final, Brussels
13. European Commission, Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC
14. European Council, Communication from the Commission to the European Parliament, the council, the Economic and Social Committee and the Committee of regions on alternative fuels for road transportation and on a set of measures to promote the use of biofuels COM(2001) 547, Brussels
15. European Climate Change Programme, Working Group on JI/CDM Conclusions, 2002, Brussels

16. European Commission Agriculture-Directorate-General, European Climate Change Programme, Working Group on Agriculture, Final Report, 2000, Brussels
17. European Commission Agriculture-Directorate-General, European Climate Change Programme, Working Group on Agricultural Soils Final Report, 2000, Brussels
18. European Commission, European Climate Change Programme Working Group on Forest Sinks Final Report Conclusions and recommendations regarding forest related sinks & climate change mitigation, Brussels
19. European Commission, Communication from the Commission to the Council and the European Parliament on Sustainable power generation from fossil fuels aiming for near-zero emissions from coal after 2020 COM(2006) 843 final Brussels
20. European Commission, Communication from the Commission to the Council and the European Parliament 6 Results of the review of the Community Strategy to reduce CO₂ emissions from passenger cars and light-commercial vehicles COM/2007/0019 final , Brussels
21. Intergovernmental Panel on Climate Change Special Report on Carbon Dioxide Capture and Storage, 2005
22. European Commission, Giving wings to emission trading Inclusion of aviation under the European emission trading system (ETS): design and impacts, 2005, Brussels
23. European Climate Change Programme, Working Group II Impacts and Adaptation Water Management Sectoral Report, 2006, Brussels
24. European Climate Change Programme, Working Group II Impacts and Adaptation, Marine and Coastal Zones Sectoral Report, 2006, Brussels
25. European Climate Change Programme Working Group II Impacts and Adaptation Human Health Sectoral Report, 2006, Brussels
26. European Climate Change Programme Working Group II Impacts and Adaptation Agriculture and Forestry Sectoral Report, 2006, Brussels
27. European Climate Change Programme Working Group II Impacts and Adaptation Human Health Sectoral Report, 2006, Brussels
28. European Climate Change Programme Working Group II Impacts and Adaptation Agriculture and Forestry Sectoral Report, 2006, Brussels
29. European Climate Change Programme Working Group II Impacts and Adaptation Biodiversity Sectoral Report, 2006, Brussels
30. European Climate Change Programme Working Group II Impacts and Adaptation Regional planning, built environment, public and energy infrastructure, Structural funds Sectoral Report, 2006, Brussels
31. European Climate Change Programme Working Group II Impacts and Adaptation Urban Planning and Construction Sectoral Report, 2006, Brussels
32. European Climate Change Programme Working Group II Impacts and Adaptation Development Cooperation Sectoral Report, 2006, Brussels

33. European Climate Change Programme Working Group II Impacts and Adaptation Insurance Sectoral Report, 2006, Brussels
34. European Climate Change Programme Working Group II Impacts and Adaptation Building national strategies for adaptation Sectoral Report, 2006, Brussels
35. European Commission, Green Paper from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Adapting to climate change in Europe – options for EU action COM/2007/0354 final , Brussels