REPUBLIC OF TURKEY

MINISTRY OF ENVIRONMENT AND URBANIZATION

NATIONAL CLIMATE CHANGE ACTION PLAN

REPUBLIC OF TURKEY

NATIONAL CLIMATE CHANGE ACTION PLAN

2011–2023

July 2011, Ankara

NATIONAL CLIMATE CHANGE ACTION PLAN
2011-2023

COORDINATED BY
The Ministry of Environment and Urbanization, General Directorate of Environmental Management, Climate Change Department

PREPARED FOR PUBLICATION BY
The NCCAP Project Team
The Ministry of Environment and Urbanization, General Directorate of Environmental Management, Climate Change Department, Policy and Strategy Development Division

DESIGN BY
İris İletişim Çözümleri Ltd. Şti., Ankara

PRINTED AT
Odak Offset, Ankara

Bibliography: National Climate Change Action Plan 2011-2023, Ministry of Environment and Urbanization, July 2011, Ankara.

ISBN: 978-605-393-097-6

FOREWORD

Climate change and environment are not only ecological phenomena, they are also directly related with economy, energy, industrial investments, social life and law. Under the light of recent developments, climate change has an impact on all aspects of our lives including physical and natural environment. This situation becomes a necessary that governments should increase their efforts to find solutions in these areas.

Global warming and climate change, that are affecting the whole world, have become important problems that our country should take the necessary precautions too. Increasing the capacity to adapt to the impacts of climate change and to design and promptly implement required plans is the priority of our Ministry and all related institutions.

Policies and measures that are needed to ensure a sustainable development are being implemented in Turkey for a long time. In recent years, as climate change became more and more noticeable, matters related to energy, economy and ecology are started to be handled together. This is called **the 3E (Energy-Economy-Ecology)** theory that is defined as the most crucial development criterion of the 21st century. In this regard, Turkey's main policies and measures focus on sectors such as energy, industry, transportation, agriculture, waste and forestry.

In a world that is technologically and economically developed, new economy and development concepts which are environment-friendly are developed. In this respect, minimizing the pressure on the nature and on use of natural resources, keeping energy and water use at minimum levels throughout the production-consumption chain and supporting the energy market through incentives on the use of new and environment-friendly sources of energy is the basis of the new development model for Turkey

Additionally, there are other things that we can do for competition and development. They are, hybrid cars, low fuel consuming and low emitting technologies, eco-buildings and eco-towns, and protection and improvement of forests; preparing a new administration structure that stands on transparency, accountability and participation; orienting subsidies and financial arrangements on eco-friendly research and development efforts and technologies have key roles in the environment of development.

A natural outcome is the need to integrate national and/or sectoral development strategies and climate change policies into institutional structures and legislation.

Turkey aspires to integrate its climate change policies into development policies; enhance the use of clean and renewable energy sources; participate actively in the international negotiations on climate change within the scope of its **'special circumstances'**, and in doing so, become a country that provides her people with high living standards and welfare with a low carbon intensity. With this perspective, Turkey continues its march towards its set goals.

Within the scope of the Climate Change Action Plan, we are preparing a **road map** that covers all sectors and identifies our short, medium

and long-term targets for combating climate change. Our aim in preparing this action plan that foresees year 2020, is to integrate Turkey's future development and environmental plans and to proceed seamlessly, and without losing pace.

Turkey's **Ninth Development Plan** (2007-2013) states that 'Within the scope of Turkey's circumstances, a **National Action Plan** setting greenhouse gas emission decrease policies and measures with the participation of all related stakeholders will be prepared to fulfill her commitments under the UN Framework Convention on Climate Change.' Turkey, moving forward and fulfilling her commitments in line with this statement, showed her ambition and determination in this matter by completing the Climate Change Action Plan.

Becoming a country that can pass its **heritage of civilization** on to future generations is only possible by taking on leading roles in one's time.

In this regard, I believe that this valuable work, which was prepared by dedicated efforts, will provide a visionary perspective into Turkey's future; and I would like to thank all who participated in and supported this work.

Respectfully yours,

Erdoğan BAYRAKTAR
Minister of Environment and Urbanization

ACKNOWLEDGEMENTS

The NCCAP report is the result of the efforts of a large group of stakeholders who diligently participated in and contributed their precious time, efforts and expertise to the preparation of this work that will serve to establish and enhance Turkey's future. In particular, we would like to thank the staff of the United Nations Development Program and of the British Embassy, and all the representatives of public agencies, universities, the private sector and non-governmental organizations

Ministry of Environment and Urbanization

July 2011

CONTENTS

TABLES

FIGURES

ABBREVIATIONS

ARDSI	Agriculture and Rural Development Support Institution
ARIP	Agricultural Reform Implementation Project
BEP	Building Energy Performance
CAE	Chamber of Agriculture Engineers
CATAK	Environmentally Based Agricultural Land Protection
CBCC	Coordination Board on Climate Change
CCE	Chamber of Civil Engineers
CMB	Capital Markets Board
CME	Chamber of Mechanical Engineer
CO_2e	Carbon Dioxide Equivalent
CoHE	Council of Higher Education
CORINE	Coordination of Information on the Environment Project
DA	Development Agencies
DEMP	Disaster and Emergency Management Presidency
DGAR	General Directorate for Agricultural Reform
DGCA	Directorate General of Civil Aviation
DGF	General Directorate of Forestry
DHMI	General Directorate of State Airports Authority
DLH	General Directorate of Railway, Port and Airport Constructions
EAF	Electric Arc Furnaces
ECT	Environmental Cleaning Tax
EE	Energy Efficiency
EEC	Energy Efficiency Consultancy
EECB	Energy Efficiency Coordination Board
EHCIP	Environmental Heavy-Cost Investment Planning
EIA	Environmental Impact Assessment
EIE	General Directorate of Electrical Power Resources Survey and Development Administration
EIS	Environmental Information System
EMRA	Energy Market Regulatory Authority
ENAR	Energy Sector R&D Projects Support Programme
EPC	Energy Performance Certificate
EU	European Union
EUAS	Turkish Electricity Generation Company
FAO	United Nations Food and Agriculture Organization
GAP	Southeastern Anatolia Project Regional Development Administration

GDLRC	General Directorate of Land Registry and Cadastre
GDP	Gross Domestic Product
GDS	General Directorate of Security
GEF	Global Environment Facility
GIS	Geographic Information System
GM	Greater Municipalities
HPP	Hydroelectric Power Plant
ICCAP	Impact of Climate Change on Agricultural Production in Arid Areas
ICP Forests	International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests
IEA	International Energy Agency
ILEMOD	Modernization of Provincial Inventories
IPCC	Intergovernmental Panel on Climate Change
ISE	Istanbul Stock Exchange
ISP	Integrated Steel Plants
IWMP	Integrated Waste Management Plan
KAMAG	Support Program for Research and Development Projects of Public Institutions
KGM	General Directorate of Highways
KORBIS	Forest Spatial Information System
KOSGEB	Small and Medium Scaled Enterprises Development Organization
LA	Local Authorities
LC	Land Consolidation
LULUCF	Land Use, Land-Use Change and Forestry
MCT	Ministry of Culture and Tourism
MENR	Ministry of Energy and Natural Resources
METU	Middle East Technical University
MEU	Ministry of Environment and Urbanization
MEUA	Ministry for European Union Affairs
MFA	Ministry of Foreign Affairs
MFAL	Ministry of Food, Agriculture and Livestock
MFWW	Ministry of Forestry and Water Works
MIA	Ministry of Internal Affairs
MIGEM	General Directorate of Mining Affairs
MoCT	Ministry of Customs and Trade
MoD	Ministry of Development
MoE	Ministry of Economy
MoF	Ministry of Finance
MoH	Ministry of Health

ABBREVIATIONS

MoNE	Ministry of National Education
MoTC	Ministry of Transport and Communications
MRV	Measurable, Reportable, Verifiable
MSIT	Ministry of Science, Industry and Technology
MTA	General Directorate of Mineral Research and Exploration
MTOE	Million Ton Oil Equivalent
Mton	Million tonnes
NAMA	Nationally Appropriate Mitigation Action
NCCAP	National Climate Change Action Plan
NCCS	National Climate Change Strategy
NGO	Non-Governmental Organization
NPC	National Productivity Center
OECD	Organization for Economic Co-operation and Development
OR-KOOP	Central Union of Turkish Forestry Cooperatives
PA	Privatization Administration
PPA	Public Procurement Authority
Pro. Dir.	Provincial Directorates
R&D	Research and Development
REC	Regional Environmental Center
REDD+	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
RI	Research Institute
SCST	Supreme Council for Science and Technology
SCT	Special Consumption Tax
SEPA	Special Environmental Protection Agency
SFM	Sustainable Forest Management
SHW	General Directorate of State Hydraulic Works
SME	Small and Medium Scaled Enterprises
SMS	State Meteorological Services
SPA	Special Provincial Administration
SPO	State Planning Organization
STATİP	Project on Identification and Restoration of Problematical Agricultural Areas
TARMAK BİR	Turkish Association of Agricultural Machinery and Equipment Manufacturers
TBB	Union of Municipalities of Turkey
TCDD	Turkish State Railways
TEDAS	Turkish Electricity Distribution Corporation
TEIAS	Turkish Electricity Transmission Company
TEIEN	Technical Assistance for the Establishment of a Turkish Environmental Information Exchange Network

TEMSAN	Turkish Electromechanics Industry
TEYDEB	Support Programme for Technology and Innovation
TINA	Technical Assistance to Transportation Infrastructure Needs Assessment for Turkey
TKDK	Support Authority for Agricultural and Rural Development
TKI	General Directorate of Turkish Coal
TNA	Technology Needs Assessment
TOBB	The Union of Chambers and Commodity Exchanges of Turkey
TOE	Ton Oil Equivalent
TOKI	Housing Development Administration
TRT	Turkish Radio - Television Corporation
TSE	Turkish Standards Institute
TSFC	Turkish Sugar Factories Corporation
TTGV	Technology Development Foundation of Turkey
TTK	Turkish Hard Coal Institution
TUBA	Turkish Academy of Sciences
TUBITAK	The Scientific and Technological Research Council of Turkey
TUBITAK MRC	TUBITAK Marmara Research Center
TURKAK	Turkish Accreditation Agency
TurkDEX	Turkish Derivatives Exchange
TURKLIM	Port Operators Association of Turkey
TURKSTAT	Turkish Statistical Institute
TUSIAD	Turkish Industry and Business Association
UCES	EU Integrated Environmental Approximation Strategy
UCTEA	Union of Chambers of Turkish Engineers and Architects
UfMA	Undersecretariat for Maritime Affairs
UN	United Nations
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
VCM	Voluntary Carbon Market

SECTOR CODES USED IN NCCAP CHARTS

A	Waste Sector
B	Building Sector
E	Energy Sector
O	Land Use and Forestry Sector
S	Industry Sector
T	Agriculture Sector
U	Transportation Sector
Y	Crosscutting Issues
UY	Adaptation to Climate Change

1. INTRODUCTION

With a fast-growing economy and a population half of which is below thirty years of age, Turkey is a dynamic and a developing country. Since Turkey is highly dependent on exported energy resources, its basic energy policy approach is to ensure the supply security. Turkey is a member of the Organization for Economic Co-operation and Development (OECD) and a candidate for the European Union (EU) membership. In line with the Decision 26/CP.7 taken within the context of the United Nations Framework Convention on Climate Change (UNFCCC) in 2001, Parties were invited to recognize that Turkey has a special position in comparison to that of other countries listed in the Annex-1 and it was decided to exclude Turkey from the list of countries in the Annex-2 of the Convention. Following this decision, Turkey has become a party to the UNFCCC in 2004. Since Turkey was not listed in Annex-B of Kyoto Protocol to which Turkey became a Party in 2009, it does not have any quantified emission limitation or reduction commitment.

Within the scope of combating climate change, Turkey's main objective is to contribute to the global efforts in line with the sustainable development policies on the basis of common but differentiated responsibilities and taking Turkey's special circumstances into account. Turkey, to provide its people with welfare and high living standards with less carbon intensity, aims to promote energy efficiency, increase the use of clean and renewable energy resources and to integrate its development policies with climate change policies. With this perspective, the National Climate Change Action Plan (NCCAP) was prepared for the implementation of the National Climate Change Strategy that was approved by the Higher Planning Council in 2010.

NCCAP was prepared by a large group of stakeholders in a participatory process between years 2009 and 2011 within the framework of the **Developing Turkey's National Climate Change Action Plan Project** that was coordinated by the Turkish Ministry of Environment and Urbanization[1] and carried out through the agency of United Nations Development Programme (UNDP) in Turkey.

During the preparation of the NCCAP, it was given attention to integrate gender issues into the policies, strategies, plans and programs implemented to combat climate change, considering the fact that the climate change which has direct and negative impacts on the natural resources much more affects women who are the first hand users of natural resources (water, food, etc.).

Since the effective implementation and monitoring of the outcomes of national plans and programs at

[1] As a result of organizational restructuring the Ministry of Environment and Forestry, the Ministry of Public Works and Settlement, the Ministry of Agriculture and Rural Affairs, the Ministry of Industry and Commerce, Undersecretariat of State Planning Organization, the Under Secretariat of Foreign Trade and the General Directorate of Forestry, as per the Decree Law No. 635, the Ministry of Science, Industry and Technology; as per the Decree Law No. 637, the Ministry of Economy; as per the Decree Law No. 639, the Ministry of Food, Agriculture and Livestock; as per the Decree Law No. 640, the Ministry of Customs and Trade; as per the Decree Law No. 641, the Ministry of Development; as per the Decree Law 644, the Ministry of Environment and Urbanization and as per the Decree Law No. 645, the Ministry of Forestry and Water Works were established. Because of restructuring of the public institutions, in this report, while referring to the related institutions, generally the titles of the newly established ministries are used whereas while referring to the boards established before the concerning dates of the said Decree Laws, the old names and titles of, committees, protocols, agreements etc. were kept as they are.

the local level is very crucial, local administrations have substantial responsibility. Hence, during the preparation of NCCAP, an effective cooperation with local administrations was ensured. In the implementation of some actions, local administrations were assigned as responsible organizations whereas in the implementation of most of the actions they were assigned as relevant organizations. However, in order to combat climate change more effectively and to strengthen the capacity of adaptation to climate change at the local level, it is very important for local administrations to integrate the issue of climate change into their own strategic plans and programs and to prepare Local Climate Change Action Plans.

In order to both integrate NCCAP actions with national investment programs and benefit from foreign financing mechanisms, detailed studies on the determination of the cost and mitigation-potentials of the actions and the internal/external financing mechanisms are required to be initiated immediately.

On the other hand, when it comes to putting NCCAP actions into implementation, as per the article 3 of the Law No. 6015 on the Monitoring and Audit of State Supports which defines the framework of state supports, provisional Article 1 on the promulgation of related regulations and the provisional Article 3 on the existing state support of the Law No. 6015 should be taken into consideration.

1.1.

PILLARS OF NCCAP

The preparation of the Turkey's National Climate Change Action Plan is based on the policy of the Ninth Development Plan which states that "In the framework of the national circumstances of Turkey, and with the participation of the relevant parties, a National Action Plan that sets forth the policies and measures for reducing greenhouse gas emissions will be prepared. Thus, responsibilities concerning UN Framework Convention on Climate Change will be fulfilled" (SPO, 2006, p.75).

Although the measure that is provided in the Ninth Development Plan concerns "a National Action Plan that sets forth the policies and measures for reducing greenhouse gas emissions", the issue of adaptation was also included in the Action Plan in order to ensure a holistic approach to climate change.

Basic documents and processes that guided NCCAP are as follows:

- National Climate Change Strategy
- Economic and social development axes of the Ninth Development Plan, which are:
  - Increasing Competitiveness
  - Increasing Employment
  - Strengthening Human Development and Social Solidarity
  - Ensuring Regional Development
  - Increasing Quality and Effectiveness in Public Services
- International documents on climate change, which are:
  - UNFCCC
  - Kyoto Protocol
  - Bali Action Plan
  - Cancun Agreements
- United Nations Millennium Development Goals
- Respective sector policies of the EU and the EU acquis.

1.2.

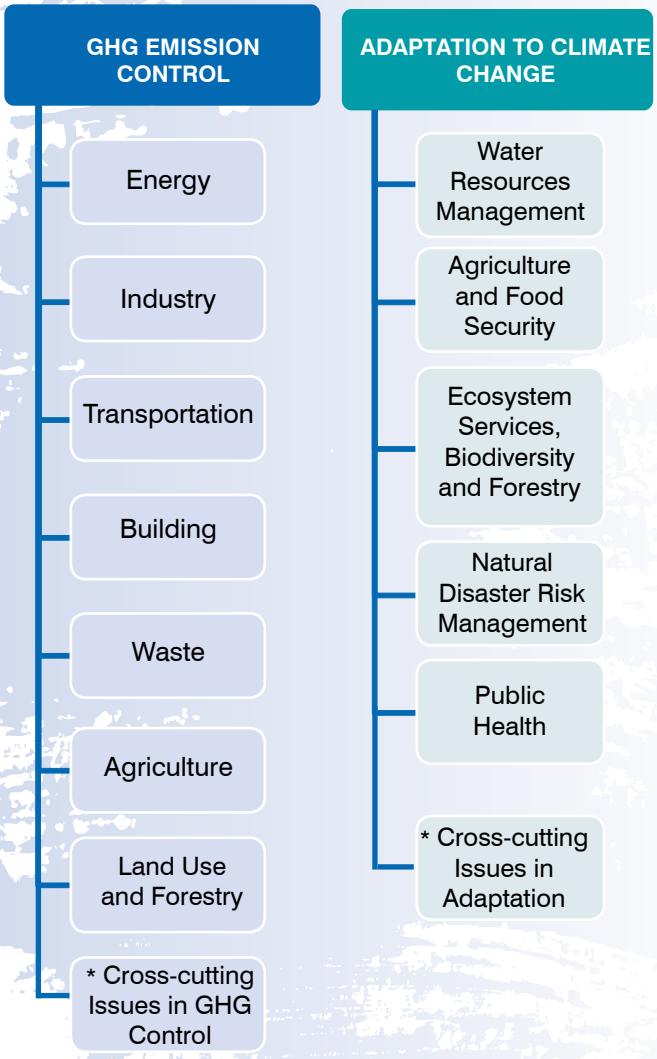
SCOPE OF NCCAP

The chapter on Greenhouse Gas Emissions Control of NCCAP is prepared on the basis of sectors specified both in the Annex-A of the Kyoto Protocol and in the UNFCCC National Communication and Greenhouse Gas Inventory reporting formats. The sectors covered are energy, buildings, transportation, industry, waste, agriculture, land use and forestry. Moreover, common actions for all sectors are covered under the title 'Cross-cutting Issues.'

The chapter on Adaptation to Climate Change is based on adaptation and vulnerability assessments as covered in the UNFCCC as well as on developing and implementing related plans and arrangements. Priority areas handled

in this chapter are water resources management, agriculture sector and food security, ecosystem services, biodiversity and forestry, natural disaster risk management and public health.

Figure 1: NCCAP Structure



* Under these titles, the actions pertaining to institutional structure and policy making, technology development and transfer, financing and economic tools, data and information systems, training and capacity building, and NCCAP monitoring and evaluation mechanisms are assembled

1.3. PREPARATORY PHASE

NCCAP was prepared in three stages:

- Stakeholder Analysis,
- Stocktaking and Identification of the Needs,
- Identification of Goals, Targets and Actions of NCCAP.

1.3.1. Stakeholder Analysis

In the initial phase of the project, a sector-based stakeholder analysis was conducted to identify stakeholders that will have an impact on and will, in return, be affected by climate change and related policies and measures and during the NCCAP preparation process, their active participation was ensured.

1.3.2. Stocktaking Analysis and Identification of the Needs

In the second phase, within the framework of combating climate change, the present situation in the country was studied on two axes:

- Existing policies, practices and needs that directly or indirectly relate to control greenhouse gas emissions,
- Existing policies, practices and needs that directly or indirectly relate to adaptation to climate change.

Turkey's existing policies, implementation tools and practices for controlling greenhouse gas emissions as well as other ongoing activities were evaluated from a sectoral perspective. Within this framework, the positive achievements as well as the other aspects that should be improved and developed concerning combating the climate change in the sectors of energy, industry, buildings, transportation, waste, agriculture, land use and forestry were identified by a large group of participants and thereby the existing situation has been assessed. Furthermore, framework policies and practices for Turkey's fight against climate change have been handled in this participatory process. The present situation was discussed under nine headings for each sector:

1) Strategies, Policies and Plans,

2) Legal Framework,

3) Institutional Structure,

4) Finance,

5) Economic Tools,

6) Physical Investments and Practices,

7) Research and Development,

8) Data and Information Systems,

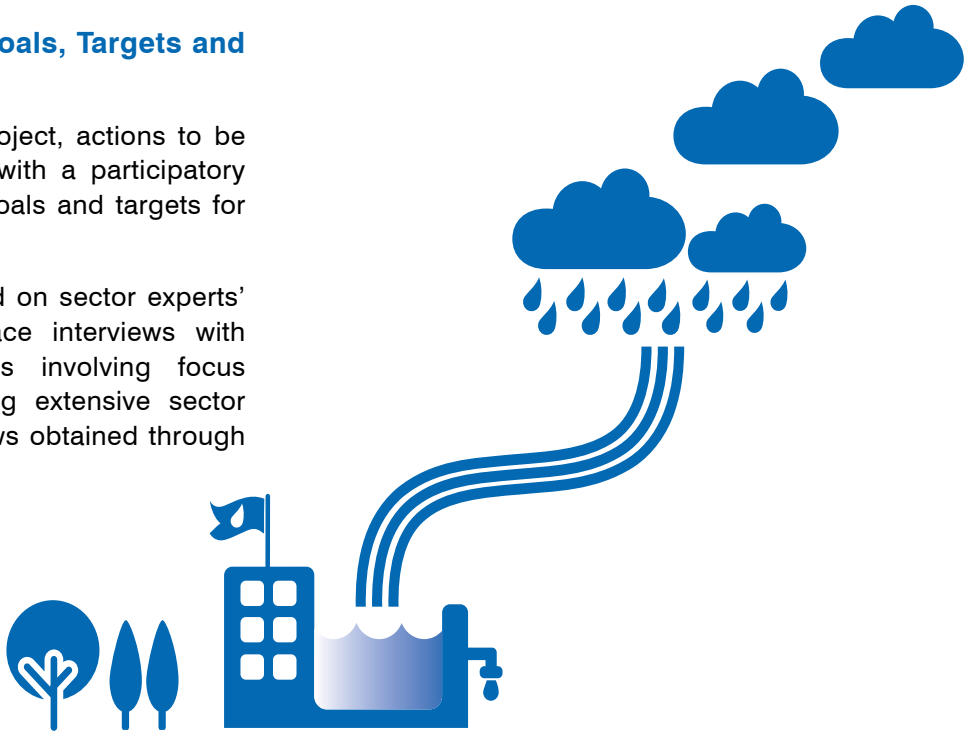
9) Education, Awareness Raising and Capacity Building

On the issue of adaptation to climate change, existing policies, practices and needs were identified and climate change adaptation analysis of the existing legislation was carried out in order to establish the basis of the stocktaking analysis. In addition to the stocktaking analysis and pilot implementations, Participatory Vulnerability Analyses were carried out in different regions of Turkey, as a result of which five areas of vulnerability were identified for Turkey: management of water resources, agriculture and food security, ecosystem services, biodiversity and forestry, natural disaster risk management, and public health.

1.3.3. Identification of Goals, Targets and Actions of NCCAP

In the third phase of the Project, actions to be carried out were identified with a participatory approach, in line with the goals and targets for each of the sectors..

NCCAP was prepared based on sector experts' literature studies, face-to-face interviews with stakeholders, other studies involving focus groups, workshops involving extensive sector stakeholder groups and views obtained through official correspondence.



2. STOCKTAKING ANALYSIS

2.1. AN OVERVIEW

The most outstanding legal regulations addressing the issue of combating global climate change are the **UNFCCC** and **Kyoto Protocol.** Being effective since 2005, the Kyoto Protocol employs a number of flexibility mechanisms to reduce greenhouse gas emissions on a global scale on the one hand and it also triggers technology and global capital transfers and thereby it creates many new job opportunities in many fields especially renewable energy resources. However, the end of 2012 will also mark the end of the implementation period of the Kyoto Protocol. So, in order to establish an international climate change regime in the post-2012 Kyoto period, the 13th Conference of the Parties to the UNFCCC convened in 2007 and the Bali Action Plan was ratified. Being an outcome of the 16th Conference of the Parties to the UNFCCC that was held in 2010 in Mexico and establishing the basis of the post-2012 climate change regime, Cancun Agreements (1/CP.16) include a series of political decisions in parallel with the Bali Action Plan. One of the important decisions in this regard was that the parties had agreed that combating climate change require a shift in the existing paradigm that ensures the creation of a low-carbon society which introduces many important opportunities and ensures the sustainable development and improvement (UNFCCC COP16, 2011).

Turkey became a party to the UNFCCC in 2004 and to the Kyoto Protocol in 2009. With reference to Turkey's sui generis position, the need to improve Turkey's access to finance, technology and capacity building in a way to allow Turkey to carry out its responsibilities as set forth in the UNFCCC, is still being negotiated.

2.1.1. Basic Indicators

Turkey's economic, social and greenhouse gas emission indicators (Table 1) show that Turkey, when compared with other developed countries that are in the Annex-1 of the UNFCCC, holds a different position in terms of its level of economic development as well as its greenhouse gas emissions. Per capita electricity consumption and per capita greenhouse gas emission levels in Turkey are about one third of those in other OECD countries. On the other hand, the energy intensity of the Turkish economy is higher than that of other OECD countries nearly by one third.

GDP in Turkey increased by 170.82% between 1990 and 2008 whereas the increase in total greenhouse gas emissions was only 95.96%, indicating that economic development will be based less on greenhouse gas emitting activities (Table 1). On the other hand, the decrease in the energy intensity of economy between 1990 and 2008 was 29.41% whereas the decrease in the carbon intensity of economy was only 27.87% and in the same term, carbon intensity of the energy supply increased by 15.06%. This means that there is still some room for improvement to

Table 1: A Comparison of Turkey's Socio-economic, Energy and Carbon Indicators for 1990-2008

INDICATORS		1990	2008	1990-2008 (% Change)
SOCIO-ECONOMIC	GDP (PPP)* *(billion 2000 US$)*	306.90	831.16	170.82
	Population *(million people)*	56.20	71.08	26.48
	Per capita GDP *(PPP) (2000 US$/person)*	5,466.00	11,693.00	113.92
ENERGY	Total Primary Energy Supply *(MTOE)*	53.00	98.50	85.85
	Total Electricity Generation *(billion kWh)*	57.50	198.40	245.04
	Per Capita Primary Energy Supply *(TOE/person)*	0.94	1.39	47.87
	Per Capita Electricity Generation *(kWh/person)*	1,020.00	2,791.00	173.63
	Per Capita Electricity Consumption *(kWh/person)*	1,024.00	2,400.00	134.38
	Energy Intensity of Economy *(TOE/thousand 2000 US$-PPP)*	0.17	0.12	-29.41
CARBON	Total Greenhouse Gas Emissions ** *(Mton CO_2e)*	187.03	366.50	95.96
	Total CO_2 Emissions *** *(Mton CO_2)*	126.70	270.86	113.78
	Greenhouse Gas Emissions from Electricity Production *(Mton CO_2e)*	30.44	101.79	334.40
	Total Sinks *(Mton CO_2e)*	44,87	80,58	79,59
	Per Capita Greenhouse Gas Emissions *(ton CO_2e/person)*	3.33	5.16	54.94
	Carbon Intensity of Economy *(ton CO_2e/2000 US$-PPP)*	0.61	0.44	-27.87
	Carbon Intensity of Energy Supply *(ton CO_2e/TOE)*	2.39	2.75	15.06

* PPP: Purchasing Power Parity
** LULUCF not included.
*** Including CO_2 emissions from fuel combustion only.

Source: *International Energy Agency, 2010; Turkish Statistical Institute, 2011; Regional Environmental Center Turkey, 2008.*

Table 2: A Comparison of Socio-economic, Energy and Carbon Data for OECD Countries, Turkey and the World in 2008*

INDICATORS		TURKEY	OECD COUNTRIES	WORLD
SOCIO-ECONOMIC	GDP *(billion 2000 US$)*	375.96	30,504.00	40,482.00
	Population *(million people)*	71.08	1,190.00	6,688.00
	Per Capita GDP *(thousand 2000 US$/person)*	5.29	25.63	6.05
ENERGY	Total Primary Energy Supply *(MTOE)*	98.50	5,422.00	12,267.00
	Total Electricity Consumption *(billion kWh)*	170.60	10,097.00	18,603.00
	Per Capita Primary Energy Supply *(TOE/person)*	1.39	4.56	1.83
	Per Capita Electricity Consumption *(kWh/person)*	2,400.00	8,486.00	2,782.00
	Energy Intensity of Economy *(TOE/thousand 2000 US$)*	0.26	0.18	0.30
CARBON	Total CO_2 Emissions** *(Mt CO_2)*	263.53	12,630.00	29,381.00 ***
	Per Capita CO_2 Emissions *(ton CO_2/person)*	3.71	10.61	4.39
	Carbon Intensity of Economy *(ton CO_2/thousand 2000 US$)*	0.70	0.41	0.73
	Carbon Intensity of Energy Supply *(ton CO_2/TOE)*	2.68	2.33	2.40

* The data used in this table were received from IEA so as to ensure the comparison with that of other countries. In this sense, IEA data may dif ferentiate from the national data.
** Including CO_2 emissions from fuel combustion only.
*** Global greenhouse gas emissions also include greenhouse gas emissions from international aviation and maritime activities.

Source: *International Energy Agency, 2010*

mitigate greenhouse gas emissions. Also, there was a 79.59% increase in the total amount of sinks between the same years and this has to be considered as another important development.

2.1.2. Turkey's Greenhouse Gas Emission Trend

Turkey's greenhouse gas emission inventory for the period 1990-2009, inclusive, was submitted to the UNFCCC Secretariat in April 2011. On the basis of the information provided in that inventory, a sector-by-sector breakdown is presented in Table 3 showing Turkey's total GHG emissions for the period from 1990 through 2009.

Considering greenhouse gas emissions for different sectors by years (Figure 2) a constant increase is seen until 2007 except for the period of economic crisis in 2001. It can also be said that the global financial crisis between 2008 and 2009 had a positive impact on mitigation of greenhouse gas emissions. When the sectors are compared, it is seen that greenhouse gas emissions from agricultural activities and wastes remained almost constant since 2005 and that the total increase in emission levels is largely a result of energy generation, energy consumption and industrial processes.

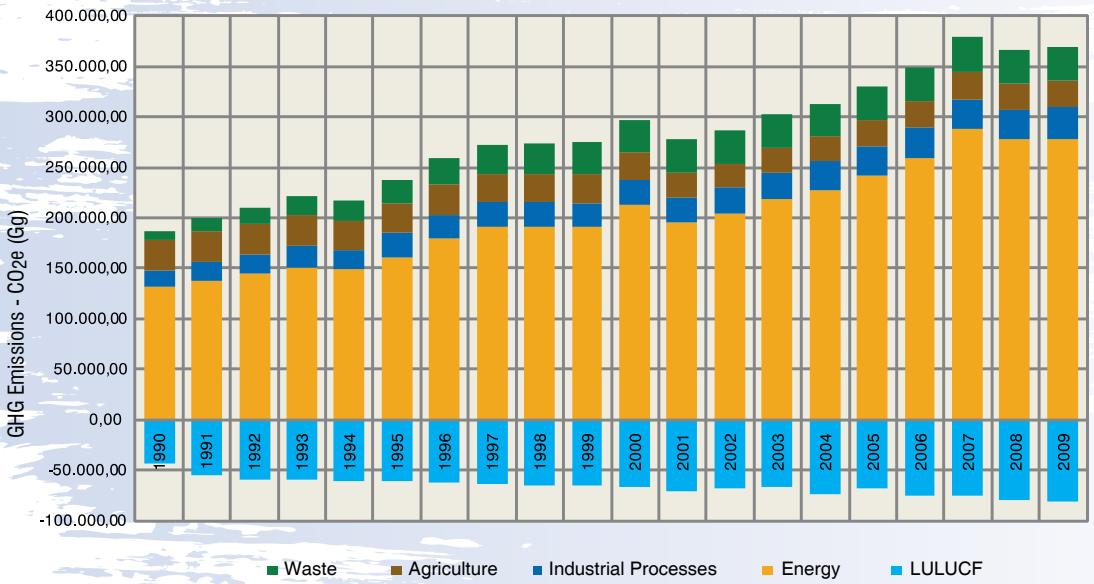
Table 3: Total Greenhouse Gas Emissions in Turkey (1990-2009): A Sector-By-Sector Study

Total Greenhouse Gas Emissions (Mt CO_2e)								
Years / Sectors	1990	1995	2000	2005	2006	2007	2008	2009
Energy	132.13	160.79	212.55	241.75	258.56	288.69	276.71	278.33
Industrial Processes	15.44	24.21	24.37	28.78	30.70	29.26	29.83	31.69
Agricultural Activities	29.78	29.68	27.37	25.84	26.50	26.31	25.04	25.70
Waste	9.68	23.83	32.72	33.52	33.88	35.71	33.92	33.93
TOTAL	**187.03**	**239.17**	**297.01**	**329.56**	**349.64**	**379.98**	**366.49**	**369.65**

Note: Emissions from land use, land use-change and forestry are not included. Also, since the amount of greenhouse gas emissions from use of solvents and other products cannot be calculated, they are not included in this table.

Source: *Turkish Statistical Institute, 2011*

Figure 2: Sector-based Breakdown of Greenhouse Gas Emissions between 1990 and 2009

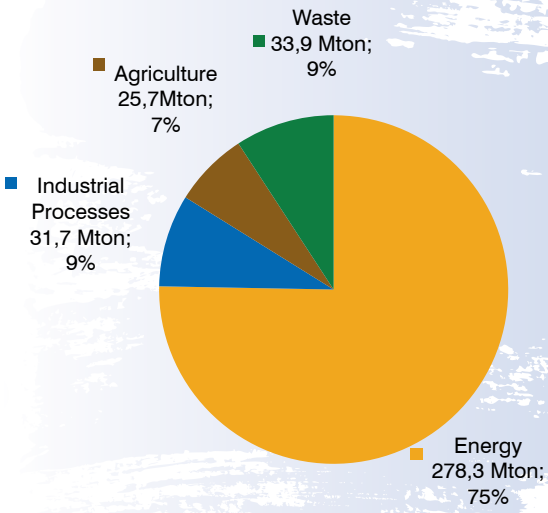


Source: *Turkish Statistical Institute, 2011*

Sectoral distribution of greenhouse gas emissions for 2009 can be seen from Figure 3. Energy sector has the largest share of total emissions with 75%. Energy sector includes emissions from fuel used in energy generation, industry, transportation and other sectors (buildings, agriculture, forestry and fisheries). Waste and industry sectors follow with 9% share each and agriculture sector with 7% share.

Greenhouse gas emissions from fuel combustion accounts for 99.3% of emissions under the title of 'Energy' in the 2009 National Inventory Report. Solvents and VOCs from fossil fuels constitute the remaining 0.07% of these emissions. As shown in Figure 4, the largest portion (37%) of greenhouse gas emissions from fuel combustion comes from use of fossil fuels in the energy industry.

Figure 3: Sector Based Total Greenhouse Gas Emissions in 2009



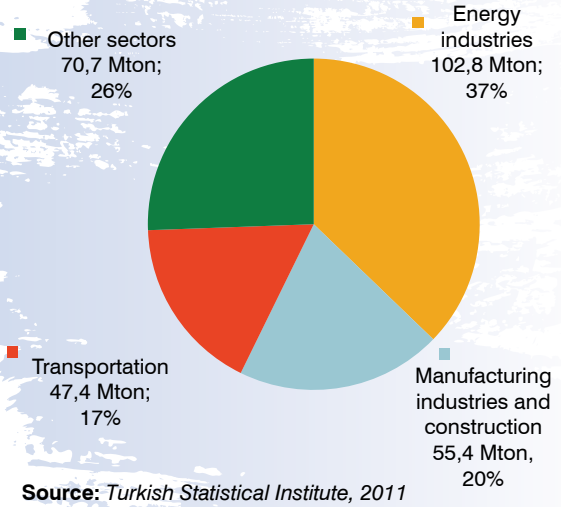
Source: *Turkish Statistical Institute, 2011*

2.1.3. Strategies, Policies and Plans

Turkey participates in global negotiations within the scope of the UNFCCC and simultaneously carries on with the membership negotiations to the EU. These processes, for Turkey, pose some threats as well as opportunities. Relevant negotiation strategies can help turn these threats into opportunities; also, global funds can be used, Turkey can become more and more of a global actor by taking the necessary strategic steps for technology development and transfer and that this entire process can do a lot in terms of accelerating Turkey's sustainable development.

The main document on climate change is the National Climate Change Strategy (2010-2020)

Figure 4: Sub-Sector Breakdown of Greenhouse Gas Emissions from Fuel Consumption in 2009



Source: *Turkish Statistical Institute, 2011*

that was approved by the Higher Planning Council on May 3rd, 2010. This document sets forth the activities that need to be carried out by each sector to combat climate change and also measures that need to be in place for adaptation to climate change.

Ninth Development Plan directly paves the way for the preparation of the National Climate Change Action Plan. Furthermore, it emphasizes that international responsibilities have to be carried out within the framework of sustainable development and common but differentiated responsibilities.

2.1.4. Legal Framework and Institutional Structure

Before becoming a party to the UNFCCC, Turkey, in 2001 has carried out an institutional structuring and with the Prime Ministerial Circular No. 2001/2 established the Coordination Board on Climate Change (CBCC). The Board was restructured in 2004, after Turkey became a party to the UNFCCC[2] and in 2010 its remit was expanded with the participation of new members.[3] Members of the CBCC are[4]:

- Ministry of Science, Industry and Technology,
- Ministry of Environment and Urbanization (Coordinator),
- Ministry of Foreign Affairs,
- Ministry of Economy,
- Ministry of Energy and Natural Resources,
- Ministry of Food, Agriculture and Livestock,
- The Ministry of Development
- The Ministry of Finance
- The Ministry of Forestry and Water Works
- The Ministry of Health
- The Ministry of Transport and Communications
- The Undersecretariat of Treasury
- Turkish Union of Chambers and Commodity Exchanges (TOBB)
- Turkish Industry and Business Association (TUSIAD)

There are 11 working groups established under this Board. These and their coordinating agencies are as follows:

- Study on the Impacts of Climate Change (Turkish Turkish State Meteorological Service)
- Inventory of Greenhouse Gas Emissions (Turkish Statistical Institute-TURKSTAT)
- Mitigation in Industry, Housing, Waste Management and Service Sectors (Ministry of Energy and Natural Resources)
- Mitigation in Energy Sector (Ministry of Energy and Natural Resources)
- Mitigation in Transport Sector (Ministry of Transport and Communications)
- Land Use, Land Use-Change and Forestry-LULUCF (General Directorate of Forestry)
- Policy and Strategy Development (Ministry of Environment and Urbanization)
- Education and Awareness Raising of Public (Ministry of Environment and Urbanization)
- Adaptation to Climate Change (General Directorate of State Hydraulic Works)
- Finance and Technology Transfer (Ministry of Development)

2 Prime Ministry's Circular No. 2004/13.

3 Prime Ministry's Circular No.2010/18.

4 Titles of institutions that are the members of the CBCC have been changed in line with Decree Laws Nos. 635, 639, 641, 644 and 645

- Carbon Markets (Ministry of Environment and Urbanization)

In addition to the Coordination Board on Climate Change, also the Climate Change Department within the Ministry of Environment and Urbanization was established in 2010. Furthermore, making necessary amendments in the establishment laws of the institutions to assign their roles and responsibilities for combating climate change will be a significant improvement in terms of institutional structuring.

2.1.5. Data and Information Systems

TURKSTAT is responsible to prepare and report the National Inventory for greenhouse gas emissions and sinks as a part of its UNFCCC liabilities. National Greenhouse Gas Inventory is submitted to the UNFCCC Secretariat annually, in April.

However, greenhouse gas emission estimations are mostly based on the international emission factors that are set forth in the guidelines, prepared by the Intergovernmental Panel on Climate Change (IPCC) using the Tier-1 method. More precise sector specific methods for Turkey can be identified once country specific emission factors are determined. This will be an important step for the establishment of country specific emission data.

Annex I Parties to the UNFCCC are obliged to periodically submit their National Communications to the Secretariat. In this regard, Turkey submitted its Initial National Communication to the UNFCCC Secretariat in 2007. This report is an important document that provides information about country's greenhouse gas emission inventory and respective projections, and a detailed breakdown of existing as well as planned policies. It is also among the very first documents that are submitted to the international platform. Preparation of the second National Communication started in 2010.

2.1.6. Science and Technology

One of the national targets to increase the number of scientific and technological studies is to raise, until 2013, the GDP share of research and development (R&D) expenditures to 2%. Another main objective is to increase the number of full-time equivalent research and development staff to some 150.000 by 2013 (TUBITAK, 2010).

The Law No. 5746 Law on Support to Research and Development Activities introduces new support and incentive mechanisms for R&D activities. Also, tax reduction for R&D activities is raised to the level of 100%. The law provides that SMEs (Small and Medium Scale Establishments) shall be prioritized and receive support on a project basis and large scale companies shall be supported on the basis of research and development activities they carry out. Furthermore, new products and processes developed by R&D projects by public institutions and agencies will be encouraged by tax reductions so as to ensure their use.

Following the publication of this law, an increase in research and development activities was observed and private sector started to play a bigger part in such activities that were carried out, until last year, within a cycle of universities, state agencies and TUBITAK (the Scientific and Technological Research Council of Turkey). Research and development investments in the energy sector, on the other hand, started to focus more on energy efficiency and development of domestic renewable energy technologies.

TUBITAK, with many programs tailored to support research and development projects, is the pivot agency in the planning, coordination and implementation of such science and technology projects. All programs have the same criteria: Highly effective projects to address climate change shall be prioritized. TUBITAK coordinates the preparation of national R&D and innovation strategies for Energy, Water and Food and is expected to integrate strategies to combat climate change into those.

2.1.7. Finance

On the issue of financial resources that can be used to combat climate change, the general budget that is coordinated by the Ministry of Development and local funds for sustainable development managed by Development Agencies are the two indirect sources of finance available for climate change. Also, a variety of studies to direct bank loans to this field as well as to create

international sources of finance are carried out by the Ministry of Science, Industry and Technology, Ministry of Environment and Urbanization, Ministry of Economy, Ministry of Energy and Natural Resources, Undersecretariat of Treasury, EIE, KOSGEB, the Development Bank of Turkey and the Industrial Development Bank of Turkey.

In addition to national resources, EU and GEF funds are also available among many others that are based on international and bilateral agreements. Funds that are allocated by the World Bank, European Bank of Reconstruction and Development, French Development Agency, German Bank of Development, Trade and Investment Agency of the UK, Japan Bank of International Cooperation are worth mentioning. Within the scope of multilateral Climate Investment Funds[5], Turkey receives a considerable amount of finance from the Clean Technology Fund[6], which is an important achievement in terms of funding of policies for combating climate change and climate change adaptation.

Analytical studies on technical and technological options, their respective greenhouse gas mitigation potentials and related costs are ongoing. Following the completion of these studies, funding requirements for investments will be determined.

A similar option for Turkey, as it cannot benefit from the flexibility mechanisms of the Kyoto Protocol, is voluntary carbon markets. Circular on the Registry of Projects for Greenhouse Gas Mitigation by the Ministry of Environment and Urbanization was prepared to ensure a more effective functioning of voluntary carbon markets and to provide guidance to project developers. This circular took effect following its publication in the Official Gazette No. 27665 on 07.08.2010. By registering these projects, the main objective is to increase the credibility of carbon certificates that are developed in Turkey.

Turkey's profile in the voluntary carbon markets can be seen in Table 4 and Figure 5.

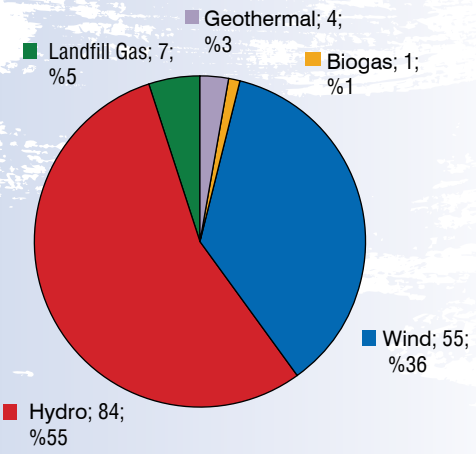
Although Turkey has a sui generis position within the scope of the UNFCCC and despite some uncertainties within the international climate regime, Turkey, in the voluntary carbon market, has taken some encouraging steps forward. Majority of these projects focus on renewable energies such as hydroelectricity, wind and geothermal, yet there are also other projects focusing on power generation from wastes and biomass. According to data from March 2011, of all the projects that are developed in Turkey (151 projects), 84 projects are on hydroelectricity, 55 are on wind, 4 are on geothermal, 7 are on landfill gas and 1 is on biomass.

Table 4: Voluntary Carbon Market Profile for Turkey

Voluntary Carbon Market (VCM) Profile for Turkey (as of March 1, 2011)	
VCM Projects Registered Up to Date *(Limited to information sources that are publicly available)*	151
Annual emission mitigation estimate *(All project applications)*	10 Mt CO_2e

Source: *Ministry of Environment and Urbanization, 2011*

Figure 5: Types, Number and Percentage of VCM Projects in Turkey



Source: *Ministry of Environment and Urbanization, 2011*

2.1.8. Education, Awareness Raising and

5 Climate Investment Funds (CIF): http://www.climateinvestment-funds.org/cif/

6 Clean Technology Fund (CTF): http://www.climateinvestmentfunds.org/cif/node/2

Capacity Building

To comply with the institutional requirements to provide training and raise awareness on climate change as set forth in Art. 6 of the UNFCCC, the Regional Environment Center (REC) was assigned the task to serve as the National Focal Point between 2005 and 2008. In this regard, REC Turkey has carried out many activities to provide guidance in this field.

In 2008, the General Directorate of Environmental Management under the Ministry of Environment and Urbanization was appointed as the Focal Point and since that year has been working in coordination with Training and Publications Department. These units together with the Ministry of National Education and the media, carry out training activities as well as prepare educational programs on environment and climate change; the Environmental Education Project thus prepared and implemented, so far reached 360 primary education institutions only in Ankara and 2400 similar institutions nationwide.

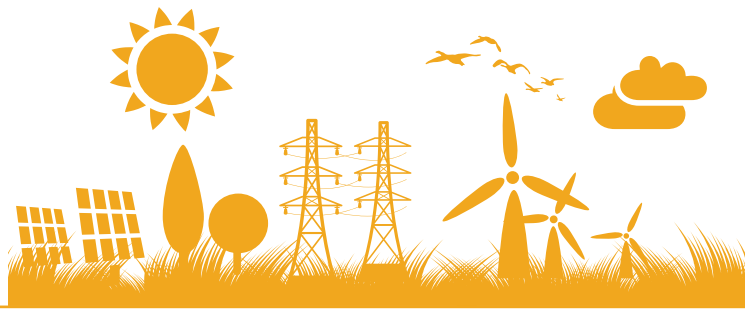
In recent years, there has been an increase in the number of capacity building efforts for climate change. The underlying reason for such an increase is Turkey's aspiration to take active part in climate change efforts as well as extensive national media coverage on the negative impacts of climate change and ongoing debates. Being key partners on climate change, public agencies, the private sector, local administrations and the civil society take part in many capacity building projects, especially in partnership with international entities, addressing their technical capacities. These capacity building projects, more than providing mere overviews and general evaluations are designed to effectively handle 'sub-headings' of climate change such as adaptation, participation to negotiations and carbon markets.

However, when it comes to higher education there is a gap; no faculties in universities provide training on climate change and mitigation of greenhouse gases and there are insufficient time and human resources allocation to these issues in relevant departments such as environmental engineering.

UNDP recently carries out many joint projects with national agencies and organizations –especially with the Ministry of Environment and Urbanization- so as to provide its support to build the capacities of parties involved and to ensure effective implementation of the provisions of the UNFCCC.

Some of the completed and ongoing projects and implementing agencies are as follows:

- Developing Turkey's National Climate Change Action Plan Project (Ministry of Environment and Urbanization, with UNDP Turkey)
- UN Joint Programme on Enhancing the Capacity of Turkey to Adapt to Climate Change (Ministry of Environment and Urbanization with UNDP Turkey, UN Food and Agriculture Organization (FAO), UN Industrial Development Organization (UNIDO) and UN Environment Program (UNEP)
- National Capacity Self Assessment for Global Environmental Management (Ministry of Environment and Urbanization, with GEF)
- Capacity Building for Climate Change Management in Turkey (Ministry of Environment and Urbanization and the Ministry of Development, with UNDP Turkey)
- Preparation of the First and Second National Communication Projects (Ministry of Environment and Urbanization with UNDP Turkey)
- Promoting Climate Change Policies in Turkey Project (Ministry of Environment and Urbanization and REC Turkey)



2.2. ENERGY SECTOR

On the basis of 2008 energy indicators published by the International Energy Agency, global per capita primary energy consumption average is 1.83 TOE and the OECD average is 4.56 TOE. Per capita primary energy consumption value in Turkey is 1.39 TOE, which is below the world and OECD averages (IEA, 2010). On the other hand, Turkey's energy consumption between 1990 and 2009 increased by 100% (41,611 TOE in 1990; 80,574 TOE in 2009).

Together with an increasing energy demand, the energy supply is becoming more and more fossil-fuel-reliant, a problem that demands a solution from national energy policies. When we look at the policy documents prepared by the Ministry of Energy and Natural Resources we see that Turkey's energy policies are designed in a way to ensure supply security in line with the above mentioned situation.

On the other hand, according to the Turkish National Inventory that was submitted to the UNFCCC in April 2011, the energy sector share in the total amount of emissions in 2009 was 75.3%. According to the National Inventory Report, Turkey's greenhouse emissions have risen by 97.6% on the total and the increase in levels of CO_2 emissions in the energy sector was 114% (TURKSTAT, 2011). Emissions from the electricity sector have the largest share in the emissions in the energy sector; however, by 2007 these emissions display a decreasing trend. 2009 being the year of crisis, the decrease in production must not be overlooked.

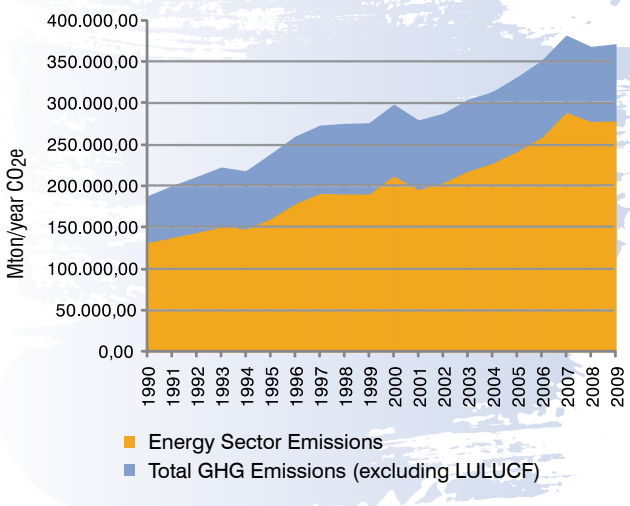
In the light of the above mentioned conditions and trends it can be said that the possibility to mitigate emissions in Turkey is as weak as none and mitigating increasing portions of emissions, in other words pursuing emission limitation policies seems to be the most likely option to carry on with efforts to combat climate change.

Table 5: Greenhouse Gas Emissions from the Energy and Electricity Sectors

Sectors	Total CO_2 for 2007 (1000 ton)	Total CO_2 for 2008 (1000 ton)	Total CO_2 for 2009 (1000 ton)
Energy	282,833	270,862	271,109
Electricity	106,602	105,940	96,286

Source: *Ministry of Energy and Natural Resources, 2011*

Figure 6: Turkey 1990-2009: Greenhouse Gas Emissions Trends and the Energy Sector



Source: *Turkish Statistical Institute, 2011*

Primary Energy Supply

According to 2009 data from the Ministry of Energy and Natural Resources, fossil fuels constitute some 91% of Turkey's primary energy supply, and renewable resources including hydropower add up to 9% (MENR, 2011).

Based on 2009 figures Turkey imported 77.4% of its primary energy supply (the foreign dependency rate is 70.9%). Energy consumption mainly constitutes of oil and natural gas (29% and 31% respectively) and the volume of national production for the two are 7.7% and 1.9%, respectively; marking a serious bottleneck for energy supply. 57% of the primary energy generated in Turkey in 2009 came from domestic coal (17,402 thousand TOE). However, the share of domestic coal supply (lignite) decreased from 15.5% in 2000 to 13.6% in 2007 as a result of heavy utilization of natural gas, but reaching once more to 14.7% in 2009.

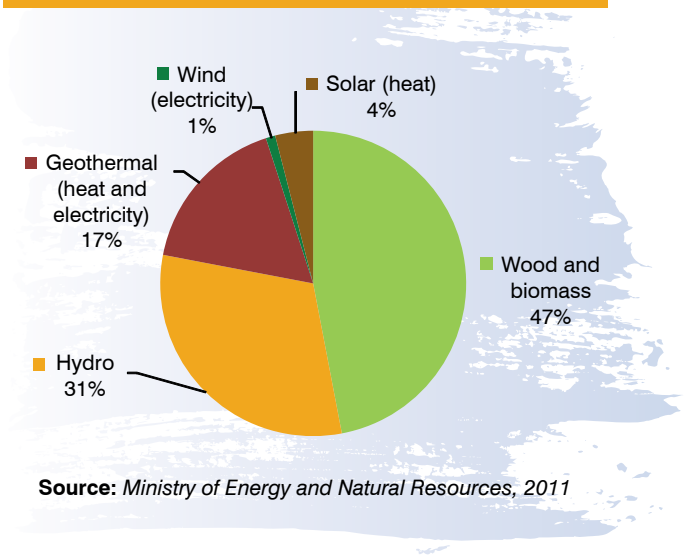
Coal (both domestic and imported) has a considerable share in energy supply (31%). Amount of imported hard coal, which was 5.6 Mton in 1990, reached 20.4 Mton in 2009. Considering the 7,470 MW of new plants that utilize imported coal are licensed by the EMRA, the future increase in hard coal imports is obvious (CME, 2010).

9% (9,949 MTOE) of Turkey's total primary energy supply in 2009 came from renewable energy resources. As shown in Figure 7, by the end of 2009, 47% of renewable energy resources in Turkey came from biomass, 31% from hydraulic resources, 17% from geothermal resources (heat and electricity), 1% from wind (electricity generation) and 4% from solar power (heat energy).

Turkey uses city scale geothermal central heating systems and spas since 1987 and at an increasing rate. Studies by the Geothermal Association demonstrate that in 2007 the total geothermal heat energy used is 1,385 MW (117,000 household equivalent (983 MW) of urban, residential, thermal facility, greenhouses, etc. heating and 215 spas (402 MW, approximately 10 million people/year). These figures add up to some 1.4 billion TL worth of savings (in 2007 figures) that is the equivalent of 1 million tons of oil/year.

Turkey is geographically located in one of the

Figure 7: Turkey's Renewable Energy Supply in 2009: Distribution of Resources



Source: *Ministry of Energy and Natural Resources, 2011*

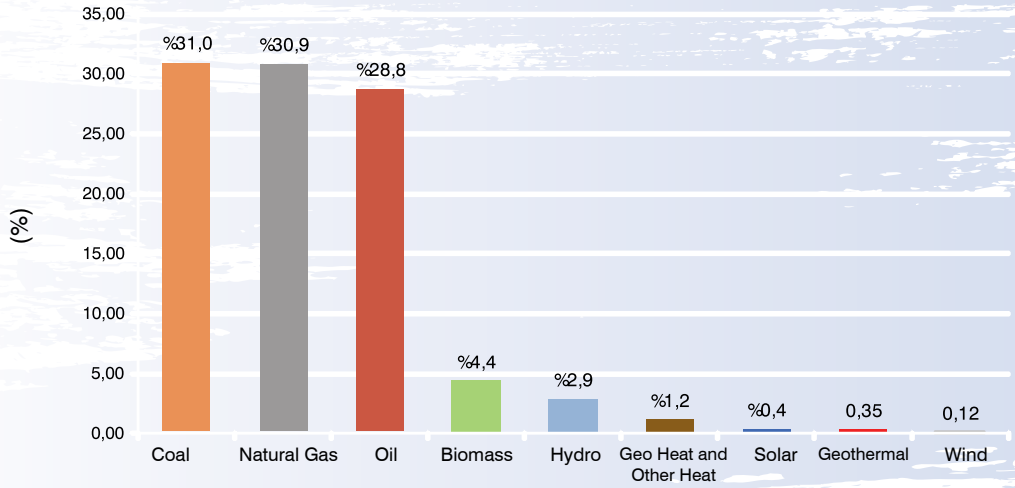
'sun belt' regions being able to utilize solar energy. Common practice in Turkey is to use solar energy is to heat water, greenhouses and to dry agricultural products. Solar panels (collectors) are used in 3-3.5 million homes mostly in the Mediterranean, Aegean and the Southeastern regions. According to information from the International Solar Power Society Turkey Branch, in 2008, the total area of solar panels in Turkey was 11.5 million m^2 and the total annual production of these panels is estimated to be more than 1 MTOE. On the other hand, the Ministry of Energy and Natural Resources has announced this figure to be 429,000 TOE in 2009 (MENR 2011).

Biomass resources (forest, agricultural and animal wastes) that are collected and converted into energy in Turkey, constitute 4.5% of the annual primary energy supply; and in contrast with the global trend, the use of biomass is decreasing (MENR 2011).

Electricity's impact on the overall energy balance was about 9% in 1990 and increased to 17% in 2009.

This is a result of changes in Turkey's energy supply and demand patterns. Data from the Ministry of Energy and Natural Resources (MENR) show that by the end of 2010, in Turkey, there will be quite an important number of electric power plants with 50,000 MW established power. In 2010, there was an addition of 4,762.9 MW of power to the grid, increasing Turkey's established

Figure 8: Primary Energy Supply in 2009: Distribution of Resources



** Biomass: Wood, animal and plant residues including biofuels in liquid form (ethanol and biodiesel)*

Source: *Ministry of Energy and Natural Resources, 2011*

Table 6: Final Energy Consumption and Electricity Use

Sectors	1990 (1000 TOE)	2009 (1000 TOE)
Final Energy Consumption	41,611	80,574
Electricity	3,928	13,395

Source: *Ministry of Energy and Natural Resources, 2011*

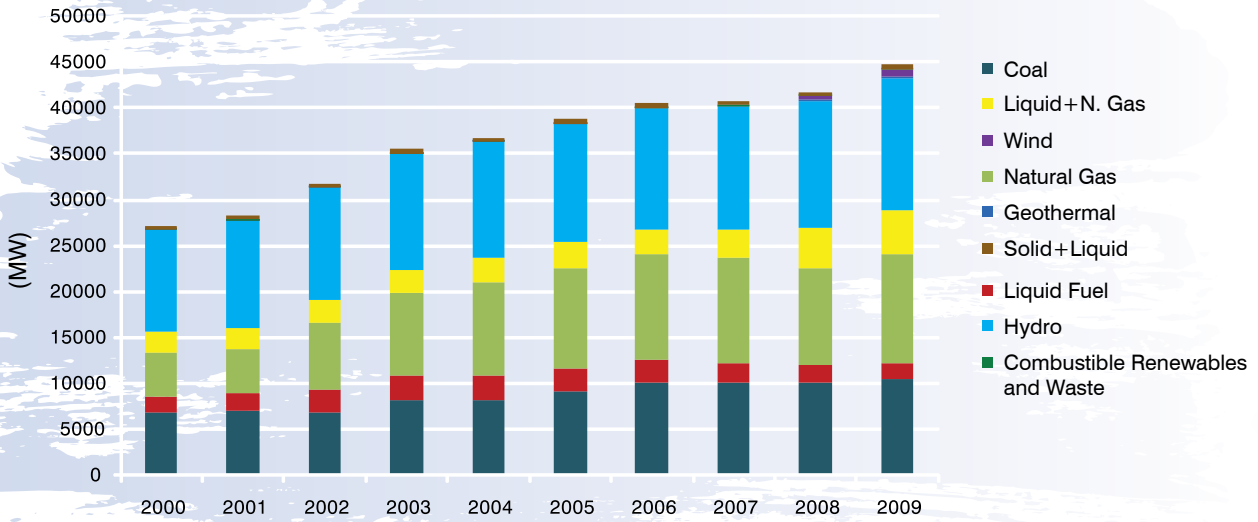
power to 49,524.1 MW. 32,372.7 MW of this installed capacity comes from thermal power (including biomass and geothermal), 15,831.2 MW from hydraulic power and 1,320.2 MW from wind power. 65% of these investments are fossil fuel-based initiatives and with higher availability, their total contribution to the overall energy supply was 83%. Although today, the number of renewable energy plants (geothermal, wind energy and biomass) is on the rise, their share in the total installed capacity is relatively small. In late 2009, wind and geothermal power provided only a 2% portion of the total installed capacity.

When we look at the breakdown of electricity generation on a resource basis, we see that natural gas alone provides half of the total electricity produced; followed by power plants utilizing imported and domestic coal with a share of 29%. One thing to pay attention: thermal plants in Turkey date as back as 25-30 years and this is an average figure. As a matter of fact, there some 50+ age plants that wait further rehabilitation investments. On the other hand, most of these plants are now to be privatized and long privatization procedures keep these improvement investments in suspension. Hydraulic and other renewable sources of energy will decrease dependency on imports (with the exception of biomass) but they only constituted 17.4% of domestic production in 2009 and could meet the total demand only by some 5%. Electricity generation based on wind and geothermal resources' share of total supply was 1% (MENR, 2011).

According to the State Hydraulic Works Activity Report for 2009, 140 GW/h of Turkey's hydroelectricity potential is economically feasible. However, Turkey has so far developed only 37% of this technical and economical HEP potential. According to the Electricity Supply Strategy Document that was approved and published by the MENR in 2009, it is foreseen that the total capacity would be used in 2023.

In a similar fashion to global practices, in the last 5-6 years wind energy in Turkey has become the most popular renewable source of energy as a result of wind-rich zones. According to Turkey's Wind Atlas published in 2006 by the General Directorate of State Meteorological Service, considering wind speeds above 7m/s Turkey has a wind energy potential of 48,000 MW. Grid

Figure 9: Installed Capacity of Turkey's Electricity Generation (2000-2009)



Note: *'Renewable and waste' resources as used in TEIAS Electricity Statistics covers organic wastes and other biomass wastes.*

Source: *Electric Transmission Inc. of Turkey, 2011*

connected wind energy and electricity generation capacity in Turkey have risen by more than 100% every year and by the end of 2010 reached 1,329 MW (GWEC, 2011).

On the other hand, the increase in the installed power of geothermal plants was fast in recent years; 29.8 MW in late 2008, reaching 77.2 MW after an increase of more than 100%, in late 2009. Amount of electricity generated in geothermal power plants is also on the rise (MENR, 2011). Also, there are three plants under construction, with a total installed power of 89.5%.

On the issue of electricity generation from solar resources, the technical potential for annual electricity generation from solar resources is established as 380 billion kWh in the Atlas of Solar Energy Potential that is prepared by EIE. This potential was calculated on the basis of 4,600-km^2 available land areas with an annual solar radiation of more than 1650 kWh. Utilization of this potential requires comprehensive incentivizing programs.

The installed capacity of renewable energy from biomass at Turkey's renewable and landfill gas power plants was, in April 2010, 86.6 MW and electricity generated in these plants was 2,199 GWh/year (TEIAS, 2011). In line with official figures, the amount of biofuel generation in Turkey was 10,000 ton in 2009 (MENR, 2011).

Energy Consumption

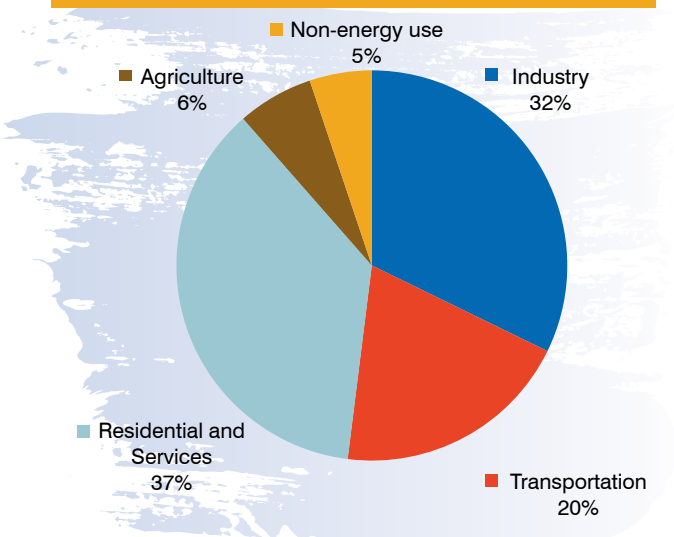
With the global financial crisis, in the second half of 2008 and in 2009 the upward trend in Turkey's energy supply reversed. Consumption that was 106.4 MTOE in 2008 receded back to 106.1 MTOE in 2009. However, this downward trend that had started in 2008 is seen to slow down in 2010.

Within the 80.6 MTEP equivalent of final energy consumption in 2009, the share of industry was 32% and buildings was 37%. Although, for many years in Turkey the industry held the largest share in terms of total consumption, this share decreased with receding production following the global financial crisis, leading to reversed consumption figures starting in 2008. Yet, normal annual upward trend in the energy consumption of the buildings sector has continued uninterrupted, regardless of the crisis (MENR, 2011).

2.2.1. Strategies, Policies and Plans

The most prominent measure regarding the sustainability of energy policies employed in Turkey is energy efficiency. The ***National Energy Efficiency Strategy Document*** published by the Ministry of Energy and Natural Resources in 2004 and the ***Law on Energy Efficiency*** published in 2007 are the two important steps toward energy efficiency. The Law on Energy Efficiency includes

Figure 10: Sector-by-Sector Breakdown of Final Energy Consumption (2009)



Source: *Ministry of Energy and Natural Resources, 2011*

provisions and incentives for the industry, building and service sectors and provides the basis for the establishment of the ***Energy Efficiency Coordination Board***. The law defines responsibilities and support awareness raising activities in the industry, buildings, transport and energy sectors and also seeks harmonization with the related directives of the EU.

Turkey has a significant potential to increase energy efficiency and decrease energy intensity at every stage of supply and demand chains. According to the *"The Energy Efficiency in Turkey: Planning for the Present and Future"* published by the EIE in November 2009:

> *"We have the potential to save energy at least 15% in our industry, 35% in our buildings and 15% in our transport. The amount of energy saved will be higher than the energy we can generate using renewable energy resources. If we succeed in taking decisive and successful steps in energy efficiency, we can reduce our supply estimates for the year 2020 by at least 20% (i.e. 45 MTOE). This amount is 2.5 times larger than the amount of electricity we can generate from domestic and clean resources and can meet the energy requirement of 30 million households on the average."*

In the ***Electrical Energy Sector Reform and Privatization Strategy Document*** that was prepared by the MENR and come into force following its approval by the Higher Planning Council. This strategy foresees, increase in the variety of resources available for electrical energy, increase in the number of investments on renewable energy sources such as hydraulic, wind, geothermal, biomass and biogas.

With the decision of Higher Planning Council, the ***Electrical Energy Sector Reform and Privatization Strategy Document***[7] that was ratified in 2009 sets forth targets for 2023 and envisages considerable changes in the existing supply structure. According to this document, the share of natural gas in the total installed capacity will decrease from 34% to 30% and total installed wind power will reach 20.000 MW. Moreover, Turkey is planning to utilize economically feasible domestic and renewable resource potential. In the ***Strategic Plan for 2010-2014*** prepared by the Ministry of Energy and Natural Resources, strategic goals and objectives for the energy sector are clearly set forth. The document envisages a reduction of energy intensity to increase energy efficiency, without setting quantified targets. Also, in the same strategic plan there are very important strategic targets set for renewable energy.

However, the study by the TEIAS, *'Turkey's Electrical Energy: Generation Capacity Projections for the Next 10 Years'* covering the term 2009-2018 envisages lower capacity investments for renewable energy compared to other sources of energy supply.

2.2.2. Legal Framework and Institutional Structure

The Turkish energy sector is regulated by many laws and related regulations listed below:

- Electricity Market Law, Law No: 4628, Official Gazette: 03.03.2001/24335.
- Natural Gas market Law, Law No: 4646, Official Gazette: 02.05.2001/24390.
- Petrol Market Law, Law No: 5015, Official Gazette: 20.12.2003/25322.
- Liquefied Petrol Gases (LPG) Market Law, Law No: 5307, Official Gazette: 13.03.2005/27754.
- Law on the Use of Renewable Energy Resources in the Generation of Electricity, Law No: 5346, Official Gazette: 18.05.2005/25819.
- Energy Efficiency Law, Law No: 5627, Official Gazette: 02.05.2007/26510.

7 Strategy Document for the Electrical Energy Market and Supply Security, decision of the Higher Planning Council dated 18.5.2009 and No. 2009/11.

- Law on Geothermal Resources and Natural Mineral Waters, Law No: 5686, Official Gazette: 13.06.2007/26551.
- Law on the Establishment and Operation of Nuclear Power Plants and Energy Sales, Law No: 5710, Official Gazette: 21.11.2007/26707.

Law No. 5346 on the Use of Renewable Energy Resources in the Generation of Electricity (Renewable Energy Law) and the Energy Efficiency Law No. 5627 are the most prominent ones in the list.

With the Renewable Energy Law that was published in 2005 and with related regulations, the sector attained a certain level. The Law was amended to include new tariffs and re-enacted in January 2011. EMRA, EIE, MENR, their affiliated institutions and other sectoral organizations support the implementation of renewable energy policies and respective legislation.

The main implementing agency of the Energy Efficiency Law is EIE, with the responsibility to carry out surveys and studies on renewable energy resources and to ensure the development and implementation of energy-efficient activities and processes in the industry, buildings and service sectors. EIE and EECB cooperate in the implementation of greenhouse gas mitigation policies and the existing legislation whereas other institutions such as KOSGEB, Ministry of Science, Industry and Technology and TUBITAK carry on with their activities in their respective fields. In addition to the in-house experts and other specialists from 15 EEC companies, EIE also works with a pool of academicians.

The circular by the Prime Ministry in 2008 set forth energy efficiency measures for public institutions. The circular was intended to serve as an example for the implementation of energy efficiency policies. National Energy Efficiency Campaign thus started and 2008 was announced as 'energy efficiency year'. In 2010, preparatory work to design ISO 50001 Energy Management standards was completed and related implementation is expected to start soon.

2.2.3. Finance

International funds for energy efficiency and renewable energy projects can be classified under two main titles:

i) **Direct resource transfer:** Sector having direct access to low interest loans for projects developed. Intermediaries are banks such as the Industrial Development Bank of Turkey, Development Bank of Turkey, Economy Bank of Turkey and NGOs such as Technology Development Foundation of Turkey.

ii) **Indirect resource transfer:** This is defined as using finances that flow through projects prepared by GEF and EU funds available to Turkey as a member and a candidate country, respectively. Financial support is available to public agencies such as the Ministry of Environment and Urbanization, Ministry of Science, Industry and Technology, EIE and KOSGEB that have a right to use these funds and that can design and implement projects to provide training, expertise infrastructure, technology transfer and issues alike.

In Turkey, there is a considerable number of international finance corporations, development and cooperation agencies (such as the World Bank, European Bank of Reconstruction and Development, French Development Agency, German Bank of Development, Trade and Investment Agency of the UK, Japan Bank of International Cooperation etc.) that are either working to provide funds to the Turkish energy sector or still carrying on with preparatory work or research activities. Together with government guarantees and other guarantees, these funds from such agencies and corporations can be disbursed in the form of loans mostly through the Development Bank of Turkey and the Industrial Development Bank of Turkey for climate-friendly activities as well as investments.

2.2.4. Economic Tools

IIn Turkey, the existing legislation allows for certain incentives for renewable energy resources. Moreover, the Energy Efficiency Law also lays the ground for certain support mechanisms available for energy efficiency projects and other activities.

One of the economic tools to combat climate change is the purchasing guarantee that was introduced by the Renewable Energy Law dated 2005. On January 8th 2011, the law was amended to include provisions and incentives,

favoring and promoting energy suppliers through differentiated feed-in tariffs that are at once higher than those in 2005. Within the scope of the Renewable Energy Law, by the end of year 2010, 853 plants (736 hydro, 91 wind, 11 geothermal, 4 waste gas, 4 biomass, 7 biogas facilities) were licensed (EMRA, 2011).

2.2.5. Research and Development

The Regulation on the Program to Support Research and Development Projects in the Energy Sector that was published in the Official Gazette dated June 8th 2010 and No. 27605 regulates procedures and principles to support research and technology development projects to serve energy policies, supply security and national energy technologies as well as the domestic energy industry. The regulation also covers renewable energy technologies, clean energy technologies, energy efficiency technologies and hazardous emission mitigation technologies. The Ministry of Energy and Natural Resources provide in cash support to projects that are approved in line with the provisions of this Regulation.

Moreover, in response to increasing the number of resources available for R&D activities, in line with the Research and Development Master Plan that will be published by the MENR. TUBITAK will be the first agency to support applied R&D projects for the promotion of energy efficiency and use of renewable energy resources.

2.2.6. Data and Information Systems

There are some issues with respect to data and information collection systems, databases and monitoring and reporting systems required for the implementation of greenhouse gas mitigation policies and legislation for the energy sector and respective agencies. Additional data is required for more detailed analyses and projections. In recent years, related bodies improved their capacities in terms of collecting and processing of data in line with the requirements of the UNFCCC National Communication Reporting process.

2.2.7. Education, Awareness Raising and Capacity Building

In 2004, the Ministry of Energy and Natural Resources built an Energy Park extending over some 10.000 m^2 to provide visitors with active training and skill building opportunities on energy.

Also, EIE carries out training courses for high-ranking energy personnel in the energy-intense industrial establishments since 1997. The scope of energy efficiency training and energy management certificate programs for energy sector managers that have been ongoing in the industry was extended in 2007 to cover building and service sectors as well as consulting companies. In addition to EIE, there are 17 authorized EEC companies and the Chamber of Mechanical Engineers organizes training courses nationwide.

2.3. BUILDINGS SECTOR

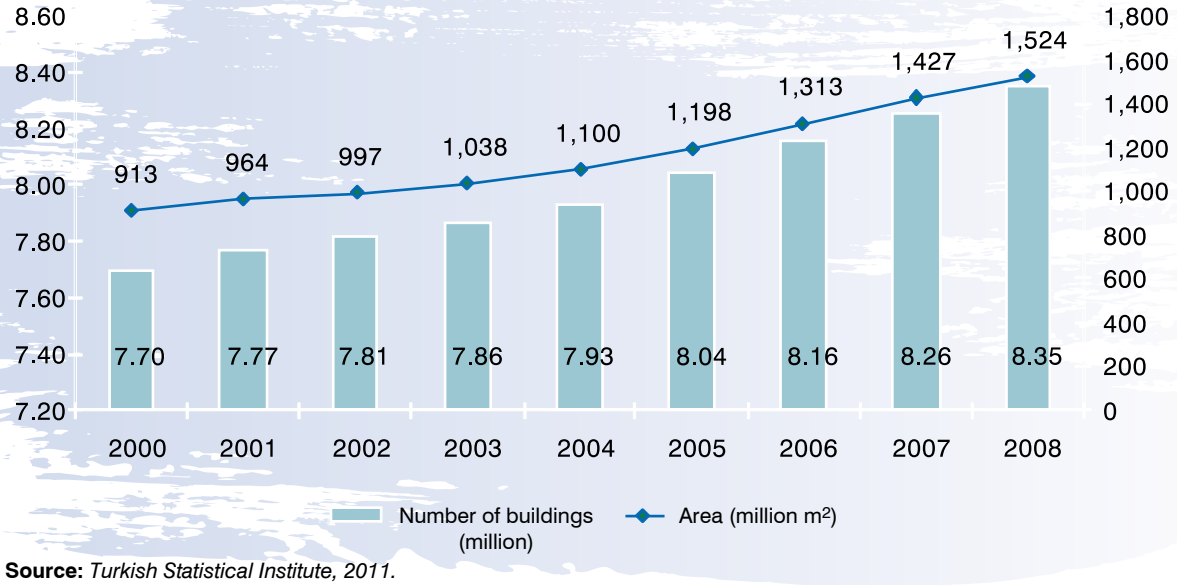
Buildings sector is among the most energy intensive sectors and it shall be considered as a priority area for all policies and programs dealing with increasing energy efficiency and combating climate change. Buildings are handled in line with this perspective in the EU members and in all developed countries, to take action to mitigate greenhouse gas emissions.

According to the building count carried out by the TURKSTAT, the total number of buildings in Turkey in 1984 was 4.3 million and it increased by 78% and reached 7.8 million in 2000. Also, according to the same timeframe, the total number of dwellings has reached 16.2 million after a 129% increase.

Construction permits issued between 2000 and 2008 indicate an increase of 56% in the total area of land covered by residential, commercial and public buildings, reaching to 1,524 million m^2. Also, the total number of such buildings has increased by 7%. With these indicators following an upward trend of demands, there is a need to employ energy efficiency measures in buildings.

Building sector in Turkey generated 53.4 Mt of CO_2 emissions in 2009. Sector's energy consumption in the same year was 29.5 million TOE and it is estimated to reach 47.5 million TOE in 2020 (MENR, 2010) meaning that the CO_2 emission figures will double in 2009.

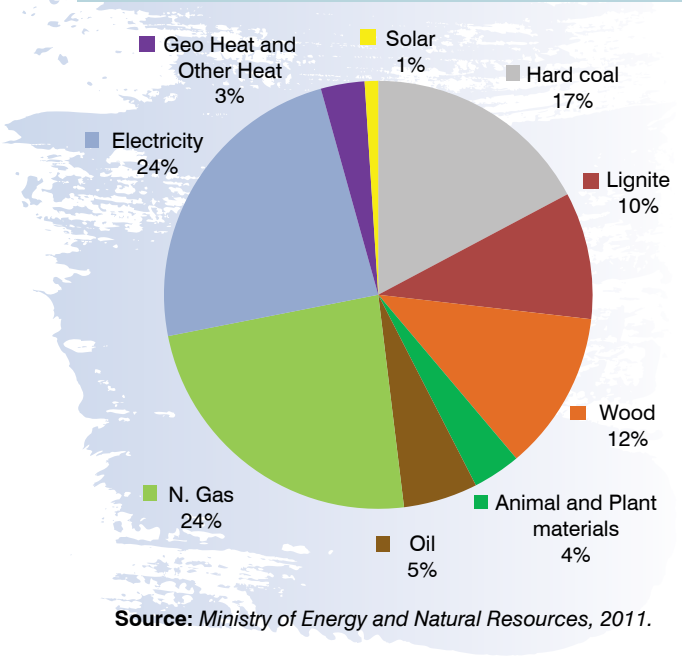
Figure 11: Building Sector Development Based on Number of Buildings and Land Areas (2000-2008)



Source: *Turkish Statistical Institute, 2011.*

The most outstanding developments in the building sector for the last five years are nationwide investments by the Housing Development Administration of Turkey (TOKI) and big shopping malls to serve the fast growing retail sector in Turkey. According to the Association of Shopping Malls and Retailers, the sector handles an annual turnover of 200 billion dollars (60 billion dollars from shopping malls) and extends over a sales area of 17.5 million m^2.

Figure 12: Energy Consumption and Types of Resources Consumed in the Building Sector in 2009



Source: *Ministry of Energy and Natural Resources, 2011.*

In 2009 coal consumption for heating was approximately 14 million tons in Turkey. According to data from the Ministry of Energy and Natural Resources, amount of coal and natural gas used in the building sector are quite similar (27% and 24% respectively - MENR, 2011). As of late 2009, number of cities that supply natural gas was 66. Considering the plan to supply natural gas in almost all Turkish provinces by 2012, in case of advantageous prices , it can be expected that natural gas become widespread in heating.

20% of the total energy consumed by the building sector comes from electricity and 21% from other renewable resources such as solar, geothermal, wood, animal and vegetative wastes.

More than one third of energy consumed in Turkey is used for heating and cooling. The most important measure to reduce this consumption in buildings; in cold regions, measures to prevent heat loss, and in hotter places, measures to prevent heating up, in other words heat insulation. Especially cities that are located in first degree-day zones exterior temperatures rise up to 40~450C in summer. Cooling process is 3-6 times more costly compared to heating process. In recent years, with the increasing of temperatures in summer, window type air conditioner sales have considerably increased especially in southern regions. According to data from İSKİD (Air Conditioning and Refrigeration Manufacturers' Association)[8] in 2010 a total of 1.4 million air conditioners were sold and 69% of this sales is Type A appliances. These figures show a 100% increase between 2007-2010.

In our country there is a considerable heat insulation market and service sector for insulation. According to TURKSTAT's Household Energy Consumption Study (1998), 84% of all buildings have single-glass type windows and only 16% of all buildings have roof insulation. According to the *İZODER Perception Survey*, only 9% of consumers had insulation in their residential buildings. Also, the fact that insulation material consumed per capita in Turkey is 10 times less than Europe clearly demonstrates the main reason for the energy loss in our buildings.

The building stock before 2000 consumes double the energy envisaged by existing regulations even when only the presently applicable building standards are concerned. Energy efficiency potential for buildings, according to the General Directorate of Electrical Power Resources Survey and Development Administration, is 35% and with 10 million more residences to be insulated, the cooling and fuel savings until 2023 are estimated to be 2,400GWh and 2.3 million TEP, respectively.

2.3.1. Legal Framework and Institutional Structure

The heat insulation rules for reduction of heating and cooling energy consumption in terms of heat insulation in buildings implemented on housing

8 http://www.iskid.org.tr/bilgi_bankasi/istatistikler

and commercial buildings that are new or renovated is regulated with the standard ***TS 825 Thermal Insulation Regulations for Buildings***. The Ministry ensures that this standard is obligatory for all new buildings to be built after June 14th 2000.

With new provisions it introduced, the **Regulation on Energy Performance in Buildings** (published on December 5th 2008, effective on December 5th 2009 and amended on 1 April 2010) has been an important step towards increased energy efficiency in buildings. This regulation provides that buildings with more than 2000 m^2 of usable space shall be equipped with a central heating system, and especially for buildings with more than 20.000 m^2 ways to use renewable energy and cogeneration facilities more is defined.

2.3.2. Economic Tools

Presently, there are no incentivizing mechanisms to support energy efficiency in buildings in the building sector. In order to encourage and promote insulation activities in the existing building stock, a comprehensive leap covering many actions from laying a legislative foundation including incentives and sanctions to augmenting the level of information and awareness raising is needed.

2.3.3. Physical Investments and Practices

The transformation of the Turkish home appliances (white goods) market, to Level A and above energy labels is provided especially on refrigerators. In order to support this process the project ***Market Transformation of Energy Efficient Appliances in Turkey*** was launched in early 2011.

Similarly, the Project ***Promoting Energy Efficiency in Buildings*** with support from UNDP and GEF started in 2010 will aim promoting and implementing the concept of ***Integrated Building Design*** and training of the stakeholders in Turkey.

In Turkey, the most important problems regarding thermal insulation practices are the lacking level of knowledge and training of especially the intermediary personnel, i.e. the 'implementers' of thermal insulation. Also, the consumers are not knowledgeable enough about their dwellings and, finally, construction/building inspection agencies and companies have always failed to attain the expected inspection standards. As an example to positive steps taken, the Ministry of Environment and Urbanization, last year, has extended its Building Inspection Standards nation-wide and introduced new arrangements to ensure the efficiency of the system.

2.3.4. Education, Awareness Raising and Capacity Building

The trainings started in 2006 within General Directorate of Electrical Power Resources Survey and Development Administration on the building sector continues.

There are also projects aiming to raise awareness on energy efficiency in buildings to support fight against climate change. Most important ones are: The ENERTACH project; ***Development of Further Training Modules in the Fields of Energy Efficient Construction and Renewable Energy Applications in Buildings*** supported by the Leonardo da Vinci Program Transfer of Innovation Project and ***Increasing Public Awareness on Energy Efficiency in Buildings*** supported by the EU.

Moreover, following the publication of the Regulation on Energy Performance in Buildings, the Ministry of Environment and Urbanization took on the task of promoting the legislation on energy efficiency in buildings, ensuring effective implementation, public awareness raising and organizing training activities on energy efficiency for the staff of provincial directorates as well as for those of building inspection companies.

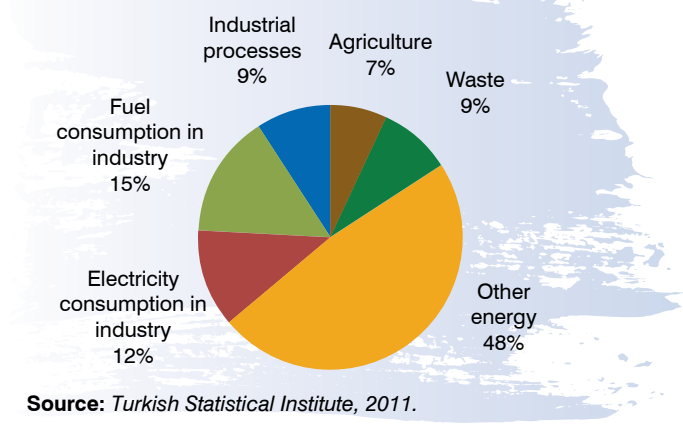
2.4. INDUSTRY SECTOR

The share of Turkish industry in the GDP is 20-25% and it has a considerable impact on economic growth figures. The Turkish industry comprises of many sub-sectors with different features. On the basis of production share, food industry and textiles are the two most prominent sectors with shares of, respectively, 18.8% and 16.3%. Petroleum products sector (8.8%), iron and steel sector (6.2%), automotive sector (5.8%) and chemicals sector (5%) follows these sectors. When we look at the shares of these sectors in exports that the automotive sector is at the top of the list with a share of 13.5%, followed by iron and steel sector (12.8%) and textiles (10.3%).[9] 99% of all establishments in the industry sector are SMEs (Small and Medium Scale Establishments). 56% of the total employment and 24.2% of the total value added in the sector comes from SMEs.[10]

Greenhouse gas emissions generated as a result of industry (the industry sector) can be handled in two groups as manufacture based and energy based. Turkey's final energy consumption in 2009 was 80,574 MTEP and the industry's share in this was 25,966 MTEP and about 32%. Also, total final electricity consumption in Turkey in 2009 was 13,4 MTEP and the industry's share in this was 6 MTEP and about 44.5% (MENR, 2011). Similarly, in 2008, the total final electricity consumption was 13,8 MTEP and 45.5% of this amount (6,3 MTEP) was consumed by the industry sector (MENR, 2010). The upward trend in the industry's electricity consumption that extends over many years is seen to develop a reverse trend in 2009. This is indicative of the impacts of the global financial crisis in 2009 on the manufacturing industry and also of the need to consider the impacts of this crisis when evaluating any data from 2009.

When analyzing the impact of growth on energy consumption with the TURKSTAT statistics between 1999-2008 period; the GDP increased by 51.1% with fixed prices (i.e. an average of 4.2%/year) whereas electricity consumption increased by 75% in residences (i.e. an average of 5.8%/year), by 90% in trade sector (i.e. an average of 6.6%/year) and by 66% in industry (i.e. an average of 5.2%/year). In the period 2004 – 2008 the industrial production index increased by 14.5% and industrial electricity consumption increased by 30%.

Figure 13: Industry Sector Share in the Total Greenhouse Gas Emissions in 2009



Source: *Turkish Statistical Institute, 2011.*

9 According to data obtained from the Ministry of Economy, the industry sector share in total exports in 2008 was about 80%. Same data sow that here is an increase in the sector share for the iron and steel industry whereas the textile share in total exports is diminishing.

10 SMEs are defined as enterprises employing up to 250 people and with an annual turnover of less than 25 million TL. They are classified as micro, small and medium scale SMEs. According to KOSGEB statistics, SMEs operating in the industry sector are largely (85%, or in other words some 240.000 SMEs) micro enterprises with a staff of 1-9.

Amount of greenhouse gas emissions from industrial processes reached to 31.7 Mton from 13.1 Mton (an increase of 142%) between the years 1990-2009 (TURKSTAT, 2011). Main sources of emissions in the industry sector are the production of cement, sugar, fertilizer, steel-iron and certain chemicals.

According to the Greenhouse Gas Inventory 2009 published by the TURKSTAT in April 2011, total greenhouse gas emission for the energy sector equals to 278.33 Mton CO_2e. In this inventory, under the title 'Fuel Combustion in Industry' industry's share in this total amount of greenhouse gas emissions is given as approximately 55.4 Mton CO_2e; electricity generation (including the impact of end users) contributes to this figure by approximately 45.2 Mton equivalent of CO_2, totally adding up to about 100.6 Mton CO_2 equivalent. Also, there is approximately 31.7 Mton equivalent of CO_2 from processes. Thus, the total amount of greenhouse gas emissions from industrial activities is approximately about 132.3 Mton equivalent of CO_2, which constitutes 35.8% of the total greenhouse gas emissions.

Steel manufacturing has two different processes: ISP ***(integrated steel plants)*** and EAF ***(electric arc furnaces).*** ISP uses basic raw materials such as iron ore, coal, limestone etc. to produce steel whereas EAF process uses scrap metal. In Turkey, out of 26 plants producing crude steel, 3 are ISP, 21 are EAF and 2 are induction furnaces. Total energy consumption of ISPs was 5,130 Mcal/ton steel in 2009 and and it is expected to reach 4,750 Mcal/ton steel in 2015; total electricity consumption of EAFs was 509 kWh/ton steel in 2009 and and it is expected to reach 475 kWh//ton steel in 2015. Total amount of crude steel production was 20.9 Mton in 2005 and 29.1 in 2010. It is foreseen that this amount will be 37 Mton in 2013 (DÇÜD, 2011). International benchmarks for energy use in the iron and steel sector are around 0.33 TEP for best practices and in Turkey this figure is 0.51 TEP/ton steel which is near averages (IEA, 2007).

Currently in Turkey there are 48 integrated cement plants and 19 clinker-grinding plants. In 2006, these plants produced 44 Mton of cement, bringing this figure up to 60 Mton in 2009. Existing capacities in this sector are expected to increase as a result of new plant investments s until 2020. According to information obtained from the General Directorate of Electrical Power Resources, Survey and Development Administration, energy consumption per ton of cement produced in these cement plants in Turkey varies between 0.083 - 0.109 TEP whereas the same figure in the EU best practices is 0.075 TEP[11]. When compared to other countries it can be said that the Turkish cement industry, in effect, has a good greenhouse gas management.

Continuing energy efficiency investments especially in the steel-iron, cement and refinery sectors has led to many considerable achievements.

As of late 2009, there are 45 pulp and paper manufacturing plants in Turkey. Although the most of these facilities produce paper from pulp, 2 of them use cellulose for production. With energy efficiency efforts the sector succeeded in achieving an energy intensity level that is lower than the EU average.

Although textile sector has lost its competitiveness in recent years; the sector holds an important share of the Turkish exports. In energy scan carried out by the Textile Research Center in 12 different companies remarkable energy efficiency potential was determined (UNDP and UNIDO, 2010). Textile sector is mostly SME-scale enterprises that face many challenges in meeting financial and expertise requirements; and the biggest problem to tackle with in order to extend the coverage of energy efficiency efforts.

Glassware is another energy intense sector where 15%-20% of all operation costs come from energy expenditures. Turkey has taken many positive steps in compliance with the international competitiveness requirements and succeeded in achieving a consumption level which is not far from other competitors ((0.30 TEP/ton) (IEA, 2009).

Ceramics sector constitutes 11% of the total European ceramics production. This sector represents 1% of the total energy consumption in industry. According to the energy surveys carried out in the ceramics sector it is indicated that there is an energy efficiency potential in this sector IEA, 2009; EİE, 2008).

With many different sub-branches, the chemicals

11 Views shared by EİE during the NCCAP Project.

sector constitutes 11% share of the energy consumption in industry. Studies which have been carried out since 2005 by General Directorate of Electrical Power Resources Survey and Development Administration indicate that there is a potential for energy savings in this sector (IEA, 2009; EİE, 2008)

Although it is not included in the list of energy intense sectors, the food industry is another important source of greenhouse gas emissions. In line with data from the General Directorate of Electrical Power Resources, Survey and Development Administration, food sector contribution to industry's total energy consumption is 6%. Also, studies by the General Directorate of Electrical Power Resources, Survey and Development Administration indicate an energy saving potential in this sector.

Industry's energy efficiency efforts has basically two pillars: i) Energy efficiency efforts to ensure efficient use of energy during industrial processes in a way to reach greenhouse gas emission mitigation targets; ii) Efforts to create a low carbon industry to ensure a transition to clean technologies from existing technologies that generate high levels of greenhouse gas emissions.

2.4.1. Strategies, Policies and Plans

Within the 'Turkish Industry Strategy Document', approved by the Higher Planning Council Decision dated December 7th 2010 underlies the low carbon and low fossil fuel economies and indicates the importance of clean energy use, energy efficiency and use of clean technologies. Moreover, the strategy document also underlines the importance of implementing industrial policies in line with the National Climate Change Strategy (2010-2020), the EU Integrated Environmental Approximation Strategy- 2007-2023 (UCES), Turkish National Action Program for Desertification and the National Biodiversity Strategy Document.

2.4.2. Legal Framework and Institutional Structure

Within the scope of the Energy Efficiency Law, the regulation on Increasing the 'Efficiency of Energy Resources and in Energy Use' was issued in 2008, energy surveys are obliged in energy-intense heavy industries. Energy saving potentials according to the surveys and measures are identified by EIE in cooperation with TOBB and EEC until the end of 2011. The results of these energy surveys show that the industry's energy saving potential is at least 20%. Energy Efficiency Law provides for enforcing a limit to the sale of products that are not energy-efficient. In line with this provision, the regulation on 'Environment-friendly Design of Energy Related Products' that was prepared by the Ministry of Science, Industry and Technology on the basis of the EU 'Eco-Design' Directive took effect following its publication in the Official Gazette dated October 7th 2010.

On the other hand, national legislation was harmonized with the Directive 1999/94/EC of the European Parliament and of the Council of 13 December 1999, Relating to the Availability of Consumer Information on Fuel Economy and CO_2 Emissions in Respect of the Marketing of New Passenger Cars. This Directive took effect on 01.01.2009. Regulations that were prepared within the scope of the EU membership and that closely relate to the industry and climate change:

- The Regulation on the Amendment of the Regulation on the Carbon dioxide Emissions from and Fuel Consumption of Motor Vehicles that was published in the Official Gazette dated August 26th 2006 and No. 26271,
- The Regulation on the Generic Approval of Motor Vehicles Relating to the Availability of Consumer Information on Maintenance and Service in Respect of Emissions (Euro 5 and Euro 6) from Light Passenger and Commercial Vehicles that was published in the Official Gazette dated April 21st 2009 and No. 27207,
- The Regulation on the Generic Approval of Emissions (Euro 4 and Euro 5) from Heavy Duty Vehicles and Engines that was published in the Official Gazette dated October 24th 2007 and No. 26680,
- The Regulation on Gas Combusting Devices that was published in the Official Gazette dated April 1st 2002 and No. 24713

2.4.3. Finance

KOSGEB was assigned the task to facilitate the implementation of the Energy Efficiency Law and other activities to be carried out at the SME level. Also, EİE was given the task to establish financial mechanisms for projects up to 1 million TL; similarly the responsibility to establish financial mechanisms for projects above the 1 million TL threshold was given to the Undersecretariat of Treasury. Various incentives and related legislation were promulgated as of 2009 by EIE (for medium and large scale industries) and KOSGEB (for SMEs). In line with the Energy Efficiency Law, General Directorate of Electrical Power Resources, Survey and Development Administration provides financial support to efficiency increasing projects for the industry as well as to other contracts offered to reduce energy intensity. Following the approval of their project reports enterprises who have finalized their efficiency promoting projects are entitled to receive a project grant support of up to 20% for projects up to 500.000 TL. Moreover, on the issue of contract offers, establishments can receive a grant for up to a 20% portion of their energy expenditures (not to exceed 100.000 TL) for the contracted year if they guarantee reducing energy intensity by an average of at least 10% in 3 years.

Identification of measures in the energy-intense heavy industry sector is gaining pace whereas periodic checks in other sectors -i.e. cement, iron and steel, ceramics and textiles- are still ongoing. Projects to promote efficiency in these sectors are receivers of the World Bank support via the Industrial Development Bank of Turkey and the Development Bank of Turkey since 2009.

2.4.4. Physical Investments and Practices

As part of the program 'Enhancing the Capacity of Turkey to Adapt to Climate Change', Eco-efficiency (Clean Production) Program focusing on adaptation of the industry to climate change risks is coordinated by the Ministry of Science, Industry and Technology and implemented by the Technology Development Foundation of Turkey and the Middle East Technical University through UNIDO.

Also, the National Productivity Center (NPC) carries out a project entitled 'Promoting Industrial Efficiency and Environmental Performance at the SME Level' that aims to use data that is being collected at provincial, sectoral and establishment levels to carry out a nationwide eco-efficiency program and to establish a 'National Eco-Efficiency Center'.

2.4.5. Research and Development

San-Tez (Industrial Thesis) Program that is being carried out within the scope of the 'Regulation for Support to Industrial Theses Projects by the Ministry of Industry and Trade' was published in the Official Gazette dated July 5th 2007 and No. 26573. Aiming to improve the cooperation between the universities and the industry, the program seeks to make best use of outputs of scientific studies that are carried out in developing new products and/or production methods to promote Turkey's competitiveness in the international markets as well as to create added value. The Ministry grants 75% of the total budget for all approved San-Tez projects.

Moreover, techno-entrepreneurship capital support is another tool available to youth for innovative and technology-based ideas. The Law No.5746 on Supporting Research and Development Efforts provides the basis for these supports. Yet, the support and programs provided no priorities as to support climate-friendly technologies. TEYDEB (Technology and Innovation Funding Programs Directorate) is established under TUBITAK to promote research and technology, to support, encourage and monitor innovativeness as well as to establish links between universities and industry. TEYDEB provides support through programs listed below:

- Program to Support Research and Development in the Industry
- Program to Support Project Market
- Program to Support Initial Research and Development in SMEs
- Program to Support Technological and Innovative Initiatives

Technology Development Foundation of Turkey supports technology development, techno-entrepreneurship and environmental projects for the industry.

2.4.6. Data and Information Systems

In the Energy Efficiency Portal[12] set up by the General Directorate of Electrical Power Resources, Survey and Development Administration aims to measure and evaluate the energy consumption in the manufacturing industry to generate available data. New energy-intense sectors have been added to the portal to support these efforts.

E-KOBİ[13], an SME database established by the KOSGEB (Presidency of SME Development and Support Administration) provides extensive and detailed data on a lot of establishments. KOSGEB's efforts to improve this database to evaluate available data on energy efficiency and greenhouse gas emissions have been heeded by various international projects.

2.4.7. Education, Awareness Raising and Capacity Building

In order to train the specialist workforce that the industry needs in the field of energy efficiency, the General Directorate of Electrical Power Resources, Survey and Development Administration organizes energy management trainings. Since the obligation of employing energy managers for medium and large-scale establishments in the sector since 2007, interest in such trainings has grown considerably. Companies and organizations such as EEC companies and the Union of Chambers of Turkish Engineers and Architects (UCTEA) the Chamber of Mechanical Engineers (CME) start to organize these trainings. The industry employs –big companies- about 2500 energy managers in the sector. Setting-up of energy management offices in medium and small-scale businesses as a separate section is about to come to fruition. The number of such businesses is estimated to be about 6000. Yet, the assumption that the SMEs have the greatest potential is very likely.

REC Turkey also carries out training and capacity building efforts to promote and discuss various strategies and methods to combat climate change for the industry as well as for the public. Moreover, a REC initiative, the 'Climate Platform' was launched to carry out activities to support the business environment on the transition path to combating climate change and low carbon economy.

Within the scope of the 'Capacity Building for Climate Change Management in Turkey Project' implemented by the Ministry of Environment and Forestry and UNDP Turkey between 2009-2010, a platform for dialogue and cooperation between industrialists and public agencies was established in a way to improve public-private sector dialogue to ensure effective participation of Turkey to international climate change negotiations, and to strengthen the cooperation between the two sectors in the preparatory process before the negotiations.

12 http://enver.eie.gov.tr/ENVER.portal
13 http://destek.kosgeb.gov.tr/

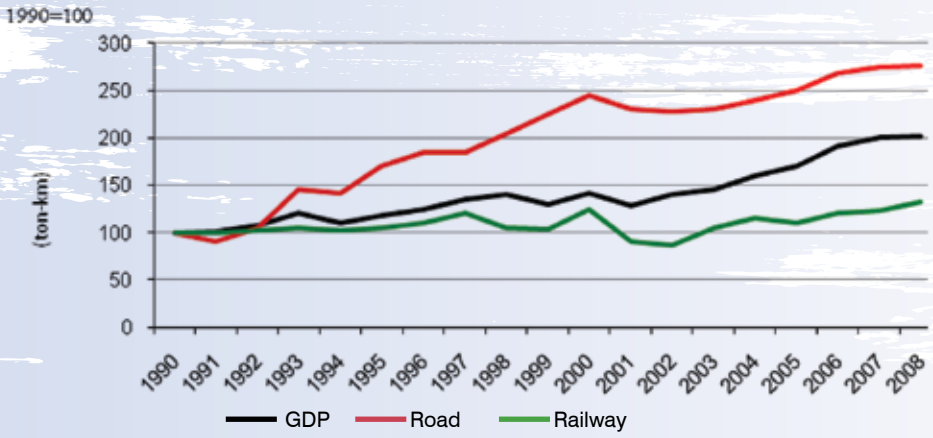
2.5. TRANSPORTATION SECTOR

Transportation has to be handled under two sub-headings: first intercity, national and international transportation. In this respect, roads, railroads, maritime routes and airline transportation are the sub sectors. Second one is urban transportation, which are public transport, private vehicles and non-motorized transportation; i.e. use of bicycles and/or pedestrians.

The total amount of CO_2 equivalent greenhouse gas emissions from the transportation sector in Turkey is 17% of total emissions (TURKSTAT, 2011). There are basically two reasons as to why this figure is lower than developed countries. Firstly, developed countries have a more advanced energy efficiency level in other emission generating sectors. Whereas in Turkey, energy efficiency in other sectors in Turkey are still relatively low, meaning that CO_2 emissions in other sectors are high. Hence, percentage of transportation sector in the total emissions seems small. Second reason is mobility. Where, in developed countries mobility or in other words number of per capita trips is high and trip durations are longer; this not so in developing countries such as Turkey where mobility is less.

In parallel to increasing levels of income in Turkey between 1990-2005, a similar increase in the transportation of goods as well as people was observed (Figure 14 and Figure 15). In fact, the growth in transportation almost doubled the amount of growth in income levels (OECD, 2008, p.49). Although emissions from transportation seem relatively low, the rate at which the amount of these emissions increases is high. Through the 19-year period between 1990 and 2009, CO_2 equivalent greenhouse gas emissions in the world increased by 44%. In the same period in Turkey, greenhouse gas emissions from transportation

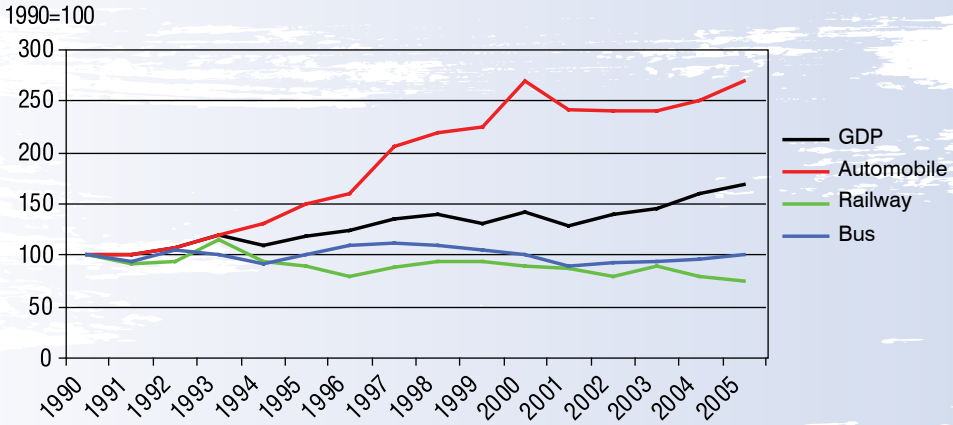
Figure 14: Transportation of Goods in Turkey



Note: *Variations since 1990 have been considered for ton-km values. For GDP, prices and PPP (purchasing power parity) in 2000 were used and variations since 1990 were considered.*

Source: *Organization for Economic Cooperation and Development, 2008; Turkish State Railways, 2010.*

Figure 15: Passenger Transport in Turkey



Note: *Transportation data is based on variations of the passenger-km value since 1990. For GDP, prices and PPP (purchasing power parity) in 2000 were used and variations since 1990 were considered.*

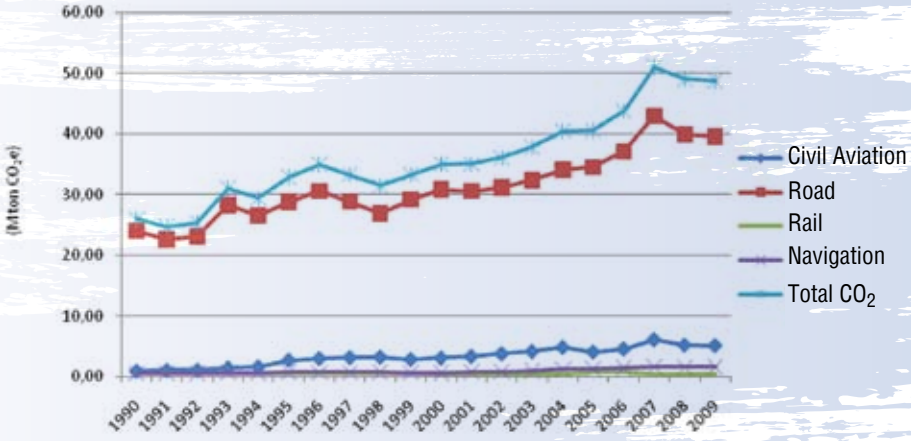
Source: *Organization for Economic Cooperation and Development, 2008.*

sector have increased by 78% (ITF, 2008). During the same period, the annual increase in CO_2 emissions in OECD countries was about 1.37%, the global annual increase was about 2.05% and in Turkey it was 3.26% (ITF, 2008).

As shown in Figure 16, CO_2 emissions from transportation activities between 1990 and 2007 increased from 24 Mt to 42,9 Mt by 79%; and in parallel to the increase in CO_2 levels in international transport activities, emissions from maritime and air transport activities also increased. It is well known that the two sub-sectors of transportation generating the most greenhouse gas emissions are road and air transportation. On the contrary, railroad transportation is a highly efficient transportation activity, creating the least amount of greenhouse gas emissions. Also, generation of electricity, the basic energy for railroad transportation is another factor that generates CO_2. However, considering emissions generated per load or per passenger, it is clear that railroad transport is the most environment-friendly, less polluting and a sustainable mode of transport. In the second half of the last century, Turkey has made almost no investments in railroad infrastructure. In Turkey, total length of railroad infrastructure in 1950 was (main lines) 7671 km. After 60 years, in 2010, it only rose to 9594 km (11.940 km with secondary railway lines) (TCDD, 2010, p.23). Only a 3161 km portion of total lines has been electrified (TCDD, 2009, p.42). So, in the last 60 years railroad infrastructure has grown by only 25%. Length of railroads per 1000 km^2 11.6 km, and the railroad length per each 10.000 people is 1.3 km in Turkey. With these figures, Turkey is the least railroad-intense country in Europe (TCDD, 2010, p.128).

Being the most widely used mode of transport, road transport holds the largest share of CO_2 emissions generated by the transport sector. On

Figure 16: CO_2 Emissions in Transportation Sub-sectors in Turkey (1990-2009)



Source: *Turkish Statistical Institute, 2011*

the other hand, in Turkey, CO_2 emissions per vehicle-km decreased by 8.7% from 1990 to 2004. Main reasons this decrease are improvements in the vehicle and engine technologies, increase in the use of alternative fuels and removal of approximately 320.000 old vehicles from traffic via tax reductions in the term 2003-2004. In this 2-year period, a reduction of 4.9% in CO_2 emissions was achieved (Ministry of Environment and Forestry, 2007: 69).

Urban transport also plays an important role in terms of greenhouse gas emissions. Although statistics and data on urban emissions are limited; it is so far known that İstanbul and Ankara are the list-tops for CO_2 emissions from transportation activities (Ministry of Public Works and Settlement, 2009). For İstanbul, CO_2 emissions from road transport were calculated to have increased by 37%, reaching 8.9 million tons/year from 6.5 million tons/year between 1990 and 2007. (Gerçek and Demir, 2008). Another trend that results in increased levels of greenhouse gas emissions from urban transport is the increase in the number of private cars thus increasing number of private car round. In the 1990s, private car travel constituted only 17%-20% of the total number of intercity travels in Ankara and İstanbul. In late 2000s, it rose to 35% in İstanbul and 28% in Ankara (CCE, 2009; EGO, 2008). Automobiles cause 125 times more air pollution per passenger/km than buses. Also, passenger/km energy consumption for cars is 5 times more than that of buses and the subway (Elker, 1999). Another trend that leads to increased greenhouse gas emissions in urban transport is the expanding urban areas, scattered urbanization, development of low-density residential areas at the urban periphery, all leading to an increased average travel time for each individual.

2.5.1. Strategies, Policies and Plans

In the Ninth Development Plan for the term 2007-2013, it is stated that 'a balanced, rational and effective transportation infrastructure utilizing all modes of transport in technically and economically shall be established. For this, the entire system shall be handled in a holistic manner and policies focusing on railroads for transportation of goods, seeking to transform important port areas into logistics centers and prioritizing safety in all modes of transport shall be pursued'. Focusing transportation of goods on railroads is a strategic target for the transportation sector; a strategic target that aims to achieve an annual increase of 12% in domestic railroad cargo transportation, and an annual increase of 25% in international railroad transportation between 2007-2013.

The plan also provides comprehensive policy recommendations for intercity transportation. The plan envisages a sustainable, extensive intercity transport strategy that will be binding for the public sector and guiding for the private sector; laying the groundwork for an intercity transport that offers equal opportunities to all levels of the society; that is participatory, seeking commonwealth, prioritizing use of domestic resources in a way to minimize foreign dependency, environmentally sound and sensitive, economically efficient, safe and that is based on uninterrupted pedestrian mobility, which is also in line with energy, environment, economic, housing, urban and rural land policies. Also, according to the plan, pedestrian and bicycle transportation would accompany public transport services in a way to allow the establishment of a sustainable intercity transportation system and these modes of transport would be prioritized and encouraged.

On the other hand, 'Transportation Master Strategy' was developed the within the scope of the Transportation Master Plan that was envisaged by the 8th Five-Year Development Plan (2001-2005).

2.5.2. Legal Framework and Institutional Structure

Based on the Energy Efficiency Law No. 5627 (2007), the Ministry of Transport prepared the 'Regulation on the Procedures and Principles for the Promotion of Energy Efficiency in Transport'. This regulation was published in the Official Gazette dated 09.06.2008 and No. 26901 and became effective. The regulation includes procedures and principles for reducing unit fuel consumption in motor vehicles, improving efficiency standards for vehicles, promoting public transport, establishing systems to improve traffic circulation so as to promote efficiency in transport. However the absence of preventive measures dealing with pedestrians is considered as a setback.

The 'Regulation on the Reduction of Sulphur

Content of Certain Fuels' that took effect following its publication in the Official Gazette dated 06.10.2009 and No. 27368 is supplementing the efforts to reduce emissions from the transportation sector.

The 'Regulation on Vehicle Inspections and on the Establishment and Operation of Vehicle Inspection Stations' that was published in the Official Gazette dated 23.09.2004 and No. 25592 aims to ensure a more effective and sound technical inspection of motor vehicles and non-motorized vehicles in the traffic circulation. The regulation also covers other provisions regarding the privatization of inspection stations.

The 'Regulation on the Information of Consumers on the Issue of Fuel Economy of New Vehicles and on CO_2 emissions' that was published in the Official Gazette dated 28.12.2003 and No. 25330 aims to provide information regarding CO_2 emissions and fuel economy specifications of automobiles that are on the market or for rent. Within this scope, the Ministry of Science, Industry and Technology has launched on its web site, a new application to inform the Turkish consumers before buying their new car, on fuel consumption and emission specifications of all automobiles that can be found in the Turkish market.

Regarding, maritime transportation as a part of the transportation sector, the Special Consumption Tax (SCT) exemption dealing with cabotage activities became effective in 2004 and is one of the provisions on this field. Availability of SCT-free fuel led to an increase in sea transport. Moreover, amendments to the Customs Regulation allowed for shipping cabotage loads with transit loads and this is also expected to lead to an additional increase in cabotage transportation.

The comprehensive 'Railroad Bill' that has not yet in force, provides for the improvement of railroads among other modes of transportation. The bill also aims to 'offer to the consumers, railroad services that are safe, well-priced and that are of quality from a competitiveness perspective; to create a more liberal sector in order to ensure a strong, stable and transparent structure and to provide independent regulations and inspections'.

2.5.3. Finance

Urban transport projects that require central government support, especially those dealing with urban rail systems, are evaluated by the Ministry of Development; General Directorate of Railroad, Port and Airport Construction examines such projects as to their technical specifications and in cases where international finance is requires approval from the Undersecretariat of Treasury (Ministry of Public Works and Settlement, 2009).

Improving the infrastructure for the sea and railroad transportation, which are sustainable, energy-efficient and environment-friendly modes of transportation, can be carried out with resources to be allocated from the ***state budget***. The Ministry of Development allocates funds to these projects during the preparation of the annual development programs that are designed as a part of the general development plans.

The ***Instrument for Pre-accession Assistance*** of the EU that is available for candidate countries to finance their projects that create a positive impact on EU harmonization process. As an example, projects by the Ministry of Transportation such as the 'Turkish Rail Sector Restructuring and Strengthening Project', 'Assistance to the Turkish Road Sector for Harmonization with the EU Acquis' and 'Assistance to the Promotion of Safety of Sea Transportation' are financed through IPA funds.

Although the ***revolving funds*** of the Ministry of Transportation can be considered among these financial resources, it can be used to finance training courses, exams and similar services as well as other activities such as seminars, trainings, meetings, symposiums, conferences, congresses and sectoral studies, surveys, plans, master plans and projects that can contribute for the improvement of the sector.

2.5.4. Economic Tools

5% biofuel can be added to other types of fuel in Turkey. There is a SCT (special consumption tax) exemption applicable up to 2% bio-diesel mixed portion of fuel. However, there are no obligations as to use of bio-diesel in motor vehicles. In addition, decisions regarding incentivizing the use of renewable fuels such as bio-diesel should benefit from various analyses on the impacts of the fuel concerned on other sectors such as agriculture and food safety.

Pricing policy for the use of the transportation infrastructure can be designed in a way to

promote sustainable and environment-friendly modes of transportation so as to reduce the demand on other modes that generate more greenhouse gas emissions. Yet, recently in Turkey with the introduction of new regulations on aviation led to a considerable reduction in ticket prices, increasing the demand on air transport as well as the number and frequency of flights. This indicates an increase in mobility, in access to airline services and an improvement in quality of service for the sector as well as for the fliers but, it is also an increase in airline traffic which is the most polluting mode of transport –hence an increase in greenhouse gas emissions.

Another important economic tool is motorway and bridge fees. Presently, in Turkey, these facilities are only operated on the principle of ***user pays***; and other rules such as ***polluter pays*** or the ***polluter pays in line with the amount of pollution generated*** are not applied for pricing.

2.5.5. Physical Investments and Practices

Recent years' investments to improve and rehabilitate the railroad infrastructure and to expand the railroad system through the construction of new lines have increased. There are other projects focusing on electrification of the railroads. There are ongoing project investments such as high speed train and the underwater tube tunnel speed rail passage (Marmaray) under the Bosphorus in İstanbul. In addition to these improvements and construction work in railroads, rehabilitation of existing locomotives as well as passenger and freight cars are being carried out.

There are ongoing projects to construct and modernize ports as well as improving the railroad links to port areas in order to improve sea transportation, and especially to increase the sea transportation share in the overall cargo shipments. All of these are considered as practical efforts. Integrating ports with other modes of transport, establishment of logistics centers and villages are other areas for improvement.

There are practical efforts also in the air transportation sector such as the ongoing work to shorten existing routes. Also, the Systematic Modernization of ATM Resources in Turkey Project (SMART) that aims to modernize the air traffic system in Turkey is another effort that focuses on energy efficiency.

Regarding urban transportation, there are significant investments for the improvement of public transport systems. In Ankara, İstanbul, İzmir, Bursa, Antalya, Eskişehir, Konya and Kayseri urban rail systems (subway, light rail and street trams) are operational and groundwork to set up investments for similar systems in other cities is ongoing. In 2006, investments for lanes prioritized for busses, and metro-bus services started in İstanbul, with the capacity to serve as many passengers as rail systems. Another effort that focuses on bus services within the scope of public transport is the renovation of bus fleets through the procurement of new CNG buses. Such procurements for fleet renovation took place in Ankara and in İstanbul, creating considerable positive changes in air quality as well as supporting greenhouse gas emission mitigation strategies.

Green wave zones at city centers in order to reduce traffic jams in downtown areas are also beneficial in terms of reducing greenhouse gas emissions.

On the other hand, facilities such as air taxi and sea-taxi do not actually support public transport but individual transportation and they can both have negative impacts as to energy consumed per passenger and emissions generated. Therefore, they need to be carefully monitored.

Multi-leveled road junctions and road extensions are among services that promote and encourage the use of individual modes of transportation; i.e. use of cars.

Withdrawal from traffic of vehicles that are older than 1972 model age by the General Directorate of Land Transportation is worth mentioning as one of the investments to have a positive impact on greenhouse gas emissions.

2.5.6. Research and Development

The project 'Greenhouse Gas Mitigation in the Transportation Sector' (2006-2009) is one of the leading research and development efforts conducted by the TUBITAK Marmara Research Center (MRC). Another project, by the TUBITAK

MRC and SPO was 'Renewable Alternative Motor Fuel: Biodiesel' that was carried out in 2005-2006. The project 'Improvement of Advanced Fuel Cell Manufacturing Technology', again a joint effort with the Ministry of Development, focused on the establishment of a fuel cell research and development activities and testing infrastructure for fuel-cell manufacturing and to manufacture prototypes. Output of this project was the establishment of the infrastructure for TUBITAK MRC Institute of Energy Fuel Cell Laboratory and the start of research and development activities. Development of electric vehicle technologies and manufacturing vehicles are the two areas where TUBITAK MRC and the Ministry of Development implement joint projects. Furthermore, a hybrid car prototype was developed, and within the scope of the projects 'Development of a Light Commercial Hybrid Vehicle and a Prototype' electric vehicle configuration was applied to some vehicle and an electric vehicle prototype was developed.

The ***automotive*** industry also carries out efforts focusing of the production of an ***environment-friendly vehicle***. ***Automotive Industry Association*** provides support to research and efforts focusing on application of new vehicle technologies that are highly energy efficient and environment-friendly. Although efforts to produce ***Rail System Vehicles*** in Turkey are rare, İstanbul Transportation Inc. has past efforts in this field and with considerable outputs. In İzmir, the Municipality of Seferihisar supports the use of environmentally sound modes of transport such as bicycles and walking as sustainable alternatives to using faster motor vehicles. With such an urban policy, Municipality of Seferihisar was awarded the first "slow city" certificate in Turkey. This town also developed a ***solar motorbike*** that is being promoted.

Also, there are other studies such as examining road coating material impacts on greenhouse gas emissions.

2.5.7. Data and Information Systems

The most comprehensive and comparable information about the passenger and freight services as a part of the Turkish transportation sector are available at the under secretariat of the Ministry of Development, TURKSTAT, and the General Directorates of TCDD, and Land Transportation and the State Rail Roads that are responsible for the planning and development of different modes of transportation under the Ministry of Transportation. These are the institutions that collect and publish related data. Also, ***traffic volume maps*** are prepared and published annually.

The project for establishing an ***on-line vehicle registry system*** is still ongoing. When in place, this system is expected to have many benefits from data logging to sharing and to data monitoring.

European Commission funded the Technical Assistance to Transportation Infrastructure Needs Assessment in Turkey Project (TINA) with a focus on the development of multi-modal transportation and establishing a compatible transportation network in Turkey. Within the scope of the project, work on the establishment of a GIS-based transportation database is also ongoing.

Another important project, Inventory of Emissions from Transportation (ELTIS 2009a) is also ongoing in İstanbul.

2.5.8. Education, Awareness Raising and Capacity Building

The EU project 'Planning Sustainable Transport in Mediterranean Region' which, in addition to other cities in other countries, also covers the Gaziantep Metropolitan Municipality is a forward step in terms of capacity building. The 'Bicycle Festival' in Konya, the 'Green Nilüfer Week' in the Nilüfer district in Bursa and the Campaign[14] in İstanbul 'Ayda Bir Gün Sokak Bizim' (Claim the Streets Once Every Month) that was launched by NGOs and universities with the support from the İstanbul Metropolitan Municipality are other outstanding projects that focus their efforts of sustainable transportation.

Another similar effort is the eco-driving techniques training that are given as a part of occupational qualification certificate for national or international forwarding drivers.

The Urbanization Congress and the Transportation Congress both of which took place in 2009 were effective and important events in term of awareness raising and public information.

14 http://www.sokakbizim.org/

2.6. WASTE SECTOR

Waste sector plays an important role in climate change and global warming as one of the main sectors generating methane (CH_4) and carbon dioxide (CO_2), the primary greenhouse gases.

The share of the waste sector in the total greenhouse gas emissions in 2009 was 9.18% (33.93 Mt CO_2-eq), being the second largest sector after energy. According to TURKSTAT data, as of 2008, the total amount of urban wastes collected in Turkey was 24,360,863 tons/year (1.15 kg/person/day; i.e. 420 kg/person/year). 82% of the total population and 99% of the municipal population benefit from waste collection services.

46% of wastes collected from the municipalities are disposed of in line with the provisions of the existing legislation. 46% of the municipal population benefits from such services whereas wastes generated by the remaining 54% go to unmanaged waste disposal sites.

Packaging wastes constitute 30% of all municipal wastes in terms of weight and 50% in terms of volume. Packaging wastes are recyclable, therefore transporting these wastes to the landfill instead of recycling causes, reduction of materials' life period, extraction of new raw material, processing and transporting leads to consumption of energy and generation of more greenhouse gas emissions. For this reason, package wastes have to be collected separately at the source and recycled, in order to combat climate change and to have a sustainable waste management system. According to the Department of the Ministry of Environment and Urbanization, as of 2008 the total amount of recycled packaging wastes was 2.32 million tons. This figure, according to TURKSTAT figures[15]

Table 7: CH_4 Emissions from the Waste Sector in Turkey

SOURCES OF CH_4	1990	1995	2000	2005	2007	2009
	(1000 tons)					
Waste (Total)	**395.01**	**1,065.54**	**1,483.25**	**1,516.66**	**1,618.97**	**1,532.39**
Solid Waste Disposal	**304.12**	**967.32**	**1,382.98**	**1,416.78**	**1,516.65**	**1,436.66**
1. Managed waste disposal sites	0.00	111.18	548.83	545.02	725.73	842.95
2. Unmanaged waste disposal sites	304.12	856.14	834.15	871.76	790.93	593.70
Waste Water Disposal	**92.89**	**98.21**	**100.27**	**95.73**	**102.32**	**95.73**
Domestic and Industrial Waste Water	92.89	98.21	100.27	95.73	102.32	95.73

Source: *Turkish Statistical Institute, 2011*

Table 8: Packaging and Packaging Wastes Statistics for 2008

Type of Package	Amount of Manufactured Packages (ton)	Amount of Marketed Packages (ton)	Recycling (%)	Amount of Recycling Required (ton)	Amount of Recycling Realized (ton)	Recycling Realized (%)
Plastic	624,692	495,346	35	225,064	195,263	39
Metal	223,507	116,863	35	38,507	71,018	61
Paper/ Cardboard	1,584,043	667,672	35	224,727	1,923,575	288
Glass	354,453	418,979	35	134,448	112,436	27
Composite	76,179	58,983	35	19,856	16,152	27
TOTAL	**2,862,874**	**1,757,843**		**642,602**	**2,318,444**	**131**

Source: *Ministry of Environment and Urbanization, 2011*

constitutes 9.5% of the 24.36 million ton municipal solid wastes in 2008. Package and packaging waste statistics for types of packages for 2008 are given in Table 8.

Data in the Table-8 have been gathered from the records of the establishments that are registered in the package data registry. However, since all companies have not yet been registered as ***marketers***, the recycling ratio for paper/ cardboard is shown as 288%, which is far above the expected recycling ratio.

2.6.1. Strategies, Policies and Plans

Waste management policies are covered in the Eighth and Ninth Development Plans. Policies such as recycling of package wastes, integrated waste management, centralized planning and implementation of waste management services at the municipal level, determining realistic Environment and Cleaning Tax (ECT) figures that are based on actual costs and ensuring due tax collection and other policies relating to increasing the financial capacity of the General Directorate of the Provincial Bank of Turkey have been handled in the Eighth Development Plan. On the other hand, the Ninth Development Plan for the term 2007-2013 covered issues and policies pertaining to the establishment of local waste management associations, the planning of waste management as an integrated effort to ensure best disposal/ treatment technologies in line with Turkey's needs, building the capacity of municipalities for better handling the planning, construction and operation phases of environmental infrastructure processes and development of new financial models to ensure private sector participation to the funding of environmental investments.

With financial support from the EU, the EHCIP[16] Project was planned for the term 2003-2005 in order to assess the present situation of the Turkish solid waste management system and to ensure a planning activity that is compatible with the EU. The project was coordinated by the Ministry of Environment and Urbanization. Within the scope of this project, the existing conditions of Turkey's solid waste sector was identified and the financial needs analysis (impact analysis) was carried out for harmonization with the EU Landfill Directive (EU, 1999) and EU Directive on Packaging and Packaging Wastes (EU, 1994) (ENVEST, 2005). Within the framework of the EHCIP Project, an 'Integrated Solid Waste Management Plan for Turkey' in line with the EU legislation was prepared. The plan envisages that certain waste management regions can be established and the related facilities to be carried out by waste management unions. Target year was set as 2023, with a transition period of nine years considering required finance and to allow for the establishment of new and managed disposal sites in line with the provisions of the EU Landfill Directive.

EU Landfill Directive envisages that, for the

15 http://www.tuik.gov.tr/VeriBilgi.do?tb_id=10&ust_id=3

16 Technical Assistance for Environmental Heavy Cost Investment Planning, Turkey

year 2006, 75% of biodegradable wastes from 1995, for the year 2009, 50% of biodegradable wastes from 1995, and for the year 2016, 35% of biodegradable wastes from the same year can be disposed by landfills. As Turkey was expected to attain the 75% target in 2015, it is expected to reach the 50% target no earlier than 2018.

According to the waste sector investment plan prepared under the EHCIP Project an integrated waste management plan shall be prepared in line with the provisions of the EU legislation regarding the closure of unmanaged disposal sites, ensured by 50% in 2015 and by 100% in 2023. In this context, the expectation is that, both the recycling of packaging wastes and disposal of biodegradable wastes to landfills will be strictly regulated to significantly decrease greenhouse gas emissions especially after 2015.

Within the scope of the Solid Waste Master Plan, waste management plans for municipalities other than metropolitan municipalities were re-arranged in line with the EU directives on the basis of specific local conditions.

The Waste Management Action Plan (2008-2012) is based on EHCIP and Solid Waste Master Plan projects that focus on EU-harmonized waste management planning as well as on the outputs of the EU Integrated Environmental Harmonization Strategy (2007-2023) (Ministry of Environment and Forestry, 2008.b). According this plan, certain targets are set; such as the design of regional and national waste plans, preparation of a waste inventory, use of technologies that minimize generation of wastes, harmonization of international trade of wastes with EU criteria, awareness raising for waste generators and for the public and strengthening institutional structures and capacity building.

2.6.2. Legal Framework and Institutional Structure

Main directives and regulations which were passed during the negotiations between Turkey and the EU and that provide for greenhouse gas emission mitigation are provided in Table 9. The important difference between the Turkish and EU waste management legislations is that the base year for establishing quotas is 2005 for Turkey instead of 1995.

Hence, the legal infrastructure that will significantly reduce greenhouse gas emissions

Table 9: EU Waste Legislation and the Legal Framework of the Existing Waste Management in Turkey

National Legislation	EU Legislation
Regulation on the General Principles of Waste Management (RG: 05.07.08/26927)	Framework Waste Directive (75/442/EEC)
Regulation on the Incineration of (OG: 06.10.2010/27721)	Waste Incineration Directive (2000/76/EC)
Hazardous Waste Control Regulation (OG: 14.03.2005/25755) (OG: 06.10.2010/27721)	Hazardous Wastes Directive (91/689/EC)
Regulation on the Use of Domestic and Urban Treatment Sludge on Soil (OG. 04.08.2010/27661)	Sewage Sludge Directive (86-278-EEC)
Regulation on Regulated Storage of Wastes (OG: 26.03.10/27533)	Landfill Directive (1999/31/EC)
Regulation on the Control of Waste Oils (OG: 30.07.2008/26952)	Directive on the Disposal of Waste Oils (75-439-EEC)
Regulation on the Control of Packaging Wastes (OG: 25.06.2007/26562)	Directive on Packaging and Packaging Wastes (94/62/EC)
Regulation on the Control of Expired Tires (OG: 25.11.2006/26357)	Waste Framework Directive (75/442/EEC)
Regulation on the Control of Medical Wastes (OG: 22.07.2005/25883)	Framework Waste Directive (75/442/EEC)
Regulation on the Control of Vegetative Waste Oils (OG: 19.04.2005/25791)	Framework Waste Directive (75/442/EEC)
Regulation on the Control of Solid Wastes (OG: 14.03.1991/20814)	Framework Waste Directive (75/442/EEC) Landfill Directive (1999/31/EC)

in the waste sector especially post 2010 period is in place. With this legal infrastructure, and in line with efforts to ensure harmonization with the EU, packaging wastes will be recycled by at least 60%; biodegradable wastes will not be disposed to landfills; disposal of biodegradable wastes in landfills and unmanaged waste disposal sites will be improved, and waste gas will be flared and/or will be utilized for energy production.

In the existing institutional structure in Turkey, municipalities are the implementing bodies. Since there are metropolitan municipalities and smaller municipalities, waste management services are carried out in two different ways. Considering the financial gains of economies of scale, waste management models are established using the necessary engineering works, to encourage a joint effort by metropolitan municipalities and smaller municipalities for waste collection and disposal services. 'Solid Waste Master Plan' (2006) was prepared to facilitate the establishment of waste management associations by district or smaller municipalities that serve in areas that are outside the responsibility area of metropolitan municipalities. These associations and institutional structures have been re-evaluated in 2010 and decisions concerning new arrangements for the future were taken and the necessary works are continuing.

2.6.3. Finance

The Ministry of Environment and Urbanization allocates from its grants budget, financial support to Municipalities that establish waste management associations in line with the provisions of the Solid Waste Master Plan to facilitate project implementation and establishment of landfills.

Fees for environmental services are necessary in two ways: first, it is an important component of the investment strategy as a source of funding; and second, these fees are needed to ensure compliance with the 'polluter pays' principle. However, fees that are collected from users shall compensate for the services that are provided by local administrations. As one of the important sources that generate funds for environmental investments, tariffs are significant tools to ensure the sustainability of services. Consumers' ability to pay and investment costs have to be considered during the design of tariffs.

In line with National Environment Strategy (UCES), solid waste services are considered as locally provided services and according to the polluter pays principle, local administrations are responsible for financing these services (Ministry of Environment and Forestry, 2006). Central administration's support is limited to internationally big-scale projects and to other projects implemented in the special environmental protection areas that are under the protection of the central government. 30% of the EU funds that are allocated for environmental issues will be used in solid waste projects. Local administrations will co-finance these EU projects and for this they can have support from the Provincial Bank loans as well as international funds where interest rates are low. 20% of loans from Provincial Bank and 40% of international loans shall be used for solid waste projects. Local administrations will allocate 22% of their own equities to solid waste projects. In this regard, local administrations, i.e. public agencies such as the State Hydraulic Works and the GAP Administration are expected to provide a 13% portion of environmental investments. Also, Provincial Bank is expected to contribute by 12%, 22% contribution is expected from municipal equities, 2% from international loans and 1% from public-private sector partnerships, adding up to 37% of the total environment investments (Ministry of Environment and Forestry, 2006).

The main source of funds to meet the financial requirements of the waste sector is the Environmental Cleaning Tax (ECT) that is collected as a part of water bills. Its scale is far from meeting the requirements of waste management services and can only provide 20%-30% of the EU-harmonized waste management tariffs. Moreover, in cases when water fees cannot be adequately billed and collected, difficulties in the collection of ECT also arise. In order to ensure the sustainable provision of services such as the establishment, maintenance, servicing, closure and monitoring of domestic solid waste disposal sites; and setting of cost-based tariffs that are required to run these services by waste water infrastructure administrations, metropolitan municipalities and smaller municipalities, the Regulation on Rules and Procedures to be Followed for Determining Tariffs for Waste Water Infrastructure and Municipal Solid Waste Disposal Sites was published in the Official Gazette dated 27.10.2010 and No. 27742.

Waste Stock Exchange is an intermediary service facilitating the recycling of wastes generated as a result of manufacturing activities in enterprises and using of these wastes as secondary raw materials, also reducing the amount of final disposal wastes and in return decreases costs incurred from using costly disposal methods (TOBB, 2007). Waste stock exchange is active in Turkey, but the transaction volume is not at expected rates.

2.6.4. Physical Investments and Practices

As of 2011, in Turkey there are 59 landfills and according to data from the Ministry of Environment and Urbanization, 46% of the annually generated wastes are disposed to these sites. 229,500 tons of waste generated is processed in the 4 composting facilities with an annual capacity of 599,750 ton (TURKSTAT, 2010). In Turkey, the total cost of the EU-harmonized solid waste management system for the term 2007-2023 is estimated to be approximately 9.6 billion € (ENVEST, 2005). Furthermore, Waste Management Action Plan requires 2.1 billion € investment (Ministry of Environment and Forestry, 2008.b). 1.9 billion € of this amount will be allocated to landfills and the remaining 205 million € will be allocated to packaging waste plants.

In Turkey, the total number of unmanaged waste disposal sites is estimated to be 2050 (2000 small scale sites and 50 large scale sites) (Ministry of Environment and Forestry, 2006). The absence of an accurate and updated inventory of these unmanaged waste disposal sites is a real setback. According to a survey/inventory study carried out within the framework of the Solid Waste Master Plan that was prepared by the Ministry of Environment and Urbanization in 2006, the total number of such sites is estimated as approximately about 1400. Amount of investment required for the closure and improvement of unmanaged waste disposal sites is estimated to be roughly 350 million € (ENVEST, 2005).

In compliance with the existing legislation, real and legal persons that wish to recycle packaging wastes have to be licensed by the Provincial Directorates of Environment and Urbanization. In this regard, there are two types of licenses: one is for 'collection and segregation plants' and the other one is for 'recycling'. The number of licensed plants was 28 in 2003 and their number increased to 382 in 2011.

Regarding the utilization of the landfill gas generated in Turkey, there are established power generation plants in Ankara, İstanbul and Bursa. Gaziantep Metropolitan Municipality has also started working on this matter (Ministry of Environment and Forestry, 2009). Installed capacities of these plants are given in Table 10.

2.6.5. Data and Information Systems

'Packaging Waste Software' is one of the successful applications of the Ministry of Environment and Urbanization, to provide access to the required information needed to develop waste management plans and policies and to

Table 10: Installed Capacities of Plants Generating Power from Landfill Gas

Plants	Installed Capacity	Realized Production
Ankara Mamak Biogas Power Generation Plant	22,6 MW	22,6 MW
Hasdal (İstanbul) Biogas Power Generation Plant	4 MW	8000000 kWh
Odayeri (İstanbul) Biogas Power Generation Plant	17 MW (Project Phase 1) 28 MW (End of Project)	7 MW
Kömürcüoda (İstanbul) Biogas Power Generation Plant	7 MW	3,45 MW
Bursa Demirtaş Biogas Power Generation Plant	1,4 kWh	
Gaziantep Biogas Power Generation Plant	3,93 MW	1,13 MW
Samsun Landfill	Work ongoing	-
Konya Unmanaged Waste Disposal Site	4.2 MW (Not yet established. Work ongoing.)	-
Adana Biogas Power Generation Plant	9.8 MW	4.2 MW

Source: *Ministry of Environment and Forestry (2010.a)*

monitor the implementations. This software allows packaging manufacturers and marketers to register on-line. This allows for easy monitoring of packaging waste supplies and recycling activities. There is also the greenhouse gas emissions inventory/data base that is operated by TURKSTAT with technical support from the Ministry of Environment and Urbanization since 1992. This database/inventory facilitates the monitoring of waste flow to waste storage and composting areas and also used for greenhouse gas emissions estimation.

2.6.6. Research and Development

TUBITAK provides financial support to projects mostly through R&D support programs with codes 1007 and 1001. Within the scope of the TUBITAK 1007 KAMAG program (Program for Support Research and Development Projects of Public Institutions) large scale projects to provide research and development activities-supported solutions to problems faced by public agencies are financed. And, within the scope of the TUBITAK 1001 Program to Support Scientific and Technical Research Projects, mostly small scale academic research and development activities projects are supported. Recently, and especially within the scope of the 1007 Program some environmental projects were supported. Public agencies that receive the most projects support from the 1007 Program are the Ministry of Environment and Urbanization, the Ministry of Energy and Natural Resources, the Ministry of Food, Agriculture and Livestock and municipalities. Some of the important projects in terms of integrated waste management and greenhouse gas mitigation that are supported by the 1007 Program are as follows:

- Research on Renewable Energy (Bio methane) Recovery Technologies: Co-treatment of Domestic Waste Waters and Organic Solid (2009). Project No: 105G024. Client Agency/ Project Implemented by: MOEF/Department of Environmental Engineering İ.T.Ü.
- Research on the Applicability of Compost from the İstanbul Metropolitan Municipality's Compost Plant in Kemerburgaz in Cultivation and On Grass Fields as Manure (2009). Project No: 105G-148. Client Agency/Project Implemented by: MOEF/İstanbul Metropolitan Municipality/Sabancı Univ., İTÜ, İSTAÇ Inc., Selçuk Univ., Bahri Dağdaş Research Institute.
- Research on the Conversion of Recyclable Plastic Wastes into Granulated Products and Usability of Other Non-convertible Wastes at Cement Factories as Additional Fuel (2010). Project No: 105G-108. Client Agency/Project Implemented by: İstanbul Metropolitan Municipality/ İSTAÇ Inc., Akçansa, TUBITAK-MRC.
- Generation of Biogas from Vegetative and Animal Wastes for Use in the Power Generation System (ongoing). Client Agency/ Project Implemented by: Kocaeli Metropolitan Municipality/ TUBITAK-MRC.

2.6.7. Education, Awareness Raising and Capacity Building

As per the protocol signed between the Ministry of Environment and Urbanization and the Ministry of National Education, since 1999, significant activities were carried out to raise environmental awareness among students, to develop good consumption habits in students, to extend children's knowledge on reforestation, to raise awareness on segregated collection of recyclable wastes at source and waste recycling.

2.7. AGRICULTURE SECTOR

Due to agricultural activities, the agriculture sector is an emission source, but is also considered as a sink because of biomass and soil. Furthermore, agricultural products are considered as alternative renewable energy sources. On the other hand, changes in the land use which is both the cause and result of climate change directly affects the agriculture sector.

2.7.1 Strategies, Policies and Plans

In the Ninth Development Plan for the term 2007-2013 identified matters in relation to the agriculture sector are as follows:

- Achieving food security and safety and sustainable use of natural resources will be taken into account in creating an agricultural structure that is highly organized and competitive.
- The main principles include making efficient use of soil resources through the use of highly productive agricultural fields for agricultural production purposes, utilizing agricultural lands in line with their capabilities determined with analyses and by making use of proper agricultural techniques as well as through land use planning and widespread erosion prevention.
- Importance and priority will be placed in the effective use of water resources through saving water within a comprehensive mechanism, which is rearranged to provide a strong and structural coordination among relevant institutions, enabling the planning of activities for developing water resources basin-wise with an integrated approach, and providing flexibility in meeting the changing consumption demands.
- Effective protection of the natural ecosystem of forests against various factors, primarily fires and pests and its management in a multipurpose and efficient way will be aimed by considering the protection-utilization balance, biological diversity,gene sources, forest health, non-wood products and services and ecotourism development.
- In such a way as to directly contribute to the competitiveness of agricultural production, irrigation investments will be expanded with the aim of increasing the production of those agricultural products with high production value in a cost effective manner, and land consolidation investments will be expanded against the mitigation of land fragmentation observed in agricultural holdings.
- Along with increasing the scale of agricultural enterprises, modernization efforts of agricultural, food enterprises, primarily the improvement of production techniques and production conditions, will be supported within the framework of the determined priorities by utilizing the Pre-Accession Supports of the EU, as well. Furthermore, agriculture-industry integration will be encouraged.
- By providing agricultural credit subsidies and support payments to producers through various channels, financial services for the agricultural sector will be diversified.

- With the aim of increasing productivity and producer incomes in a stable way, training and extension services in various subjects, mainly the use of pesticides, fertilizers, and quality seeds, and also irrigation, plant and animal health and food hygiene, will be increased in agricultural production and marketing stages towards ensuring food safety from the farm to the table.
- Emphasis will be placed on carrying out these services in a way to include young and women farmers by producer organizations with strengthened structures.
- As far as activities in the area of animal husbandry, where products with relatively high value-added are obtained, are concerned; increasing the competitiveness prior to EU accession will be aimed by placing emphasis on animal breeding,fighting against animal diseases and pests, organizing the rehabilitation and use of pastures, increasing qualitative fodder plant production and dissemination services.
- The main principles to be adhered in fisheries policies include determination of fisheries policies on the basis of establishing resource utilization balance in fishery production by conducting stock assessment studies in line with the EU acquis, ensuring environmental sustainability in agriculture activities in parallel with the increasing demand and the recently provided supports, and establishing the required administrative structure in compliance with these goals.

Moreover, the Strategic Plan prepared by the Ministry of Food, Agriculture and Livestock (2010-2014) includes the statement 'agricultural rural development, human health, environmental consciousness, protection and improvement of biodiversity and genetic resources, establishing an energy agriculture system, ensuring required measures against the threat of global warming and increasing the variety of export products are among the agricultural public services'.

Policies and measures related to adaptation to climate change, as included in the Ninth Development Plan are:

- ÇATAK (Environmentally Based Agricultural Land Protection Program),
- Identification of agricultural basins where basin-based sustainable agricultural policies will be implemented, ensuring an ecological balance,
- Minimizing the negative impacts of agricultural activities on environment by promoting sustainable use of natural resources and organic agriculture.

Also, the Agricultural Strategy Document for the term 2006-2010 that was approved by the Higher Planning Council in 2004 brings a strategic perspective to the sector.

National agricultural policies to combat climate change are; the management of soil and water resources; modernization of irrigation; support policies and other policies supporting crop, livestock and animal feed production; and those that focus on the development and improvement of agricultural infrastructure. These are among other areas where related measures need to be identified.

2.7.2 Legal Framework and Institutional Structure

In line with the provisions of the Agriculture Law No. 5488, the Ministry of Food, Agriculture and Livestock is responsible to design, plan and coordinate agricultural policies and to implement them in coordination with related public institutions and other organizations. The Law No. 5488 brings a definition to agricultural policy targets: 'Designing agricultural production in a way to meet national as well as international demands; protection and improvement of natural and biological resources; increasing productivity; ensuring food safety and security; establishment of producer organizations; strengthening of agricultural markets; ensuring rural development and finally, improving welfare in the agriculture sector'. The existing Agriculture Law with the supporting law provides the required legal basis for the protection and improvement of natural resources and also for the implementation of EU and other adaptation policies.

On the other hand, the Law No. 5403 on 'Soil Protection and Land Use' is another important legal document that provides the legal basis for the protection and sustainable use of soil. Although the law contains no direct provisions on issues such as combating climate change,

mitigation of greenhouse gas emissions or establishing sink capacities, responsibilities defined in this law are directly linked to climate change. The law provides for the completion of land inventories; prohibits the use of agricultural land for purposes other than agriculture and for putting all sorts of measures in place to ensure protection and sustainable use of agricultural lands. Similar arrangements are also defined in the Law on Agricultural Reform for the Regulation and Organization of Land in Irrigation Areas No. 3083.

The Pastures Law No. 4342 on the other hand puts forth regulations for the identification, allocation and sustainable common use of pastures, prairies and meadows as well as increasing their productivity, and the improvement, inspection, control and monitoring of activities in such areas, and is thus parallel to policies for combating climate change and climate change adaptation.

The Regulation on Good Agricultural Practices in Turkey became effective following its publication in the Official Gazette dated 08.09.2004 and No. 25577. It was amended twice, later, on 05.05.2005 and 15.05.2006. In line with the provisions of this Regulation, control and certification activities are carried out by private companies that are licensed by the Ministry of Food, Agriculture and Livestock. Within this scope, the Ministry has authorized 12 companies to carry out control/certification activities. Moreover, these companies are required to have EN 45011 or ISO/IEC Guide 65 accreditation.

Other related laws are listed below:

- Agriculture Law, Law No. 5488, OG: 18.04.2006/26148
- TKDK (Agricultural and Rural Development Support Institution) Law, Law No: 5648, OG: 18.05.2007/26526
- Law On Underground Waters, Law No: 167, OG: 23.12.1960/10688
- Law On Pest Control and Agricultural Quarantine, Law No: 6968, OG: 24.05.1957/9615
- Law On Aids and Support For Farmers Victimized by Natural Disasters, Law No: 2090, OG: 05.07.1977/15987
- Law On Aquatic Products, Law No: 1380, OG: 04.04.1971/13799
- Environment Law, Law No: 2872, OG: 11.08.1983/18132
- Provincial Administration Law, Law No: 5442, OG: 18.06.1949/7236
- Law On the Dissolution of the General Directorate of Rural Affairs and On Amendments to Other Laws, Law No: 5286, OG: 28.01.2005/25710
- Agricultural Insurance Law, Law No: 5363, OG: 21.06.2005/25852
- Special Provincial Administrations Law, Law No: 5302, RG OG 04.03.2005/25745
- Metropolitan Municipalities Law, Law No: 5216, OG: 23.07.2004/25531
- Municipal Law, Law No: 5393, OG: 13.07.2005/25874
- Biosecurity Law, Law No. 5977, OG: 26.03.2010/27533
- Seeds Law, Law No: 5553, OG:08.11.2006/26340
- Veterinary Services, Plant Health, Food and Feed Law, Law No: 5996 OG: 13.06.2010/2761

2.7.3. Finance

Carbon markets in the world are becoming more and more powerful every day. In order to enter these markets, Turkey has begun to improve

Table 11: Main Areas in Turkey That Can Be Linked to Voluntary Carbon Markets

CORINE 2006 Name	Total Area in Turkey (Ha)	Percentage in Total Turkish Land Area (%)
231: Pastures	1,775,506	2.23
321: Natural Meadows	9,391,592	11.82
324: Vegetation Change Areas	8,280,185	10.43
Total	**19,447,283**	**24.48**
Overall Area in Turkey	**79,426,158**	

Source: *Ministry of Environment and Forestry, 2006*

its infrastructure. Agricultural areas that can be linked to voluntary carbon trade are given in Table 11.

Long-term World Bank loans, EU Funds and other rural development grants by the Ministry of Food, Agriculture and Livestock for renewable energy projects are important sources of finance to be used for the improvement of natural resources, especially soil and water resources. Agricultural Reform Implementation Project and Eastern Anatolia Water Basins Rehabilitation Project are two examples of similar World Bank projects.

2.7.4. Economic Tools

Some agricultural supports financed by the general budget are as follows:

A. **Agricultural Support Budget:** Procedures and principles applicable for agricultural support activities that are carried out by the Ministry of Food, Agriculture and Livestock are determined annually by the Council of Ministers upon the proposal by the Agricultural Support and Steering Committee. These supports are as follows:

1. **Land Based Supports:** This includes diesel, alternative crop, organic agriculture, good agricultural practices, soil analysis and bumble bee support.
2. **Deficiency Payments:** These are support payments made on the basis of variations between production costs and domestic and international prices.
3. **Livestock Support: This support covers, cultivation of fodder crops to achieve quality fodder crops;** supporting breeding and hybrid livestock as well as disease-free pedigree breeding stocks in order to improve livestock activities and increase livestock production; providing incentives and encouraging producers of aquatic products as well as breeders of sheep, goats, angora goats and silkworms; supporting beekeepers; production and improvement of livestock genes and gene resource; compensation support for livestock diseases and milk support.
4. **Supports Available Through the Environmentally Based Agricultural Land Protection Program:** This covers the preservation of soil and water quality; sustainability of renewable natural resources, prevention against erosion and mitigation of the negative impacts of agricultural activities.
5. **Urban Development Supports:** This covers financial support in the form of grants that are proportionately applicable to the procurement of agricultural machinery and equipment that are required for use in rural areas.
6. **Premium Payments for Insured Crops:** In order to encourage farmers and breeders to insure their production tools, materials and crops, this support involves state coverage by 50% of related insurance premiums.
7. **Compensatory Payments:** Pest control practices that are recommended for field-farming activities are supported or producers are encouraged to shift to alternative crops instead of producing crops with a surplus.

B. **Other Agricultural Supports:** Include support tools for R&D activities, agricultural publications and marketing incentives. Also applicable within this scope are: special storage techniques support, quality standards support, market regulations support, organic production support, disposal support, crop processing support; other supports for certain inputs and agricultural basins support, etc.

C. **Agricultural Loans With Reduced Interest Rates:** This includes meeting the financial requirements of farmers with acceptable conditions; improvement of agricultural production; and availability of low-interest loans from Agricultural Credit Cooperatives and the Ziraat Bank (Agricultural Bank of Turkey) loans to real and legal persons (excluding public establishments and agencies) in order to increase productivity and quality.

D. **Import Policy Tools:** These tools cover customs taxes, control and protection measures for exports, tariff quotas, preferential trade practices and suspensions. The Ministry of Economy carries out these efforts.

E. **Export Policy Tools:** Among such tools are; supports provided to activities such as specialized fairs with international participation; supports for facilitating participation to fairs and exhibitions abroad; support for conducting market research; training, employment, patent, utility model certification and industrial design registry support; research and development support; support for setting up and running

offices and sales facilities and shops abroad; operation and brand promotion support and environmental cost supports.

F. **Agricultural Infrastructure Investments:** The General Directorate of Agricultural Reform, (under the Ministry of Food, Agriculture and Livestock), the General Directorate of State Hydraulic Works and Special Provincial Administrations are carrying out land consolidation, irrigation and open/closed drainage projects.

2.7.5. Physical Investments and Practices

There are two types of investments for greenhouse gas emission mitigation. The first investment type is comprised of direct expenditures or investments on greenhouse gas emission mitigation activities or on efforts to increase the capacity of sinks. Examples of such investments can be state subsidies on the use of biodiesel and on afforestation to store carbon, where economically valuable production activities cannot be carried out. Such investments are not widespread in Turkey; yet they are effective in terms of greenhouse gas mitigation and are costly investments.

The second type of investments is the one that are carried out by state agencies to indirectly mitigate greenhouse gas emissions to ensure development and sustainability. Examples to such investments are land consolidation, modernization of irrigation systems, organic agriculture and good agricultural practices.

Ongoing investments to support efforts for combating climate change in Turkey are as follows:

Land Consolidation (LC): A basic definition of Land Consolidation is to merge split properties without any infrastructure work. A broader definition of the term is to merge split properties in a way to include all services that relate to irrigation, drainage, transportation, soil and water protection measures as well as rural settlement requirements. LC in Turkey is still perceived and carried out in its most basic sense. Only in recent years, the General Directorate for Agricultural Reform has launched efforts to re-design Land Consolidation as a tool that would be used to solve other rural issues. LC in Turkey started in 1961 and continued until late 2008, as a result approximately 1 million ha of land was consolidated. Within the scope of the GAP Action Plan, in 2009-2010 LC was started on an additional 2 million hectares of land. These efforts are ongoing. At the same time, in addition to the above mentioned LC efforts in the GAP region LC work for another 450.000 ha started in other regions. Priority LC areas in Turkey, presently, add up to 14 million ha. Including ongoing projects, the size of irrigable land area is 3.5 million ha and these need to be consolidated, as well. In addition, in the 1 million ha portion of the total 5 million ha irrigation land, LC work has to be finalized and LC is also needed in the remaining 4 million ha.. There is another 5.5 million ha where non-irrigated agricultural activities are carried out. These are the areas that are not high-priority areas for LC (Category 3). Apart from these lands so far mentioned, there are other areas such as the mountain ranges and tea plantations in the Black Sea Region or the planted areas in the Mediterranean and Aegean regions. Although there is a need for LC in these regions, it was postponed due to practical challenges in the implementation LC in these regions. The related energy saving estimation following the finalization of all LC activities is given in Table 12.

Turkey's Agricultural Basins Project: The

Table 12: Energy Savings From Land Consolidation

Source of Savings	Amount	Unit
Fuel savings in transportation	25.0	lt/ha
Fuel savings from machinery work efficiency	25.0	lt/ha
Fuel savings total	50.0	lt/ha
Fuel savings total (when 7,5 million ha is completed)	375.0	Thousand tons
Presently consumed fuel in agriculture	1.5	Million tons
Amount of fuel saving	25.0	percent
Crop equivalent of fuel saving (wheat)	2.2	Million tons
Money equivalent of fuel saving	1.1	Billion TL

Source: *Küsek, 2010*

project was launched with the participation of local communities, to develop and implement environment-friendly agricultural projects along the production chain and to ensure integration of multidimensional agricultural practices with other sectors. Hence, the overarching objectives are; maximizing social welfare, ensure sustainability in agricultural activities, improve rural agricultural capacity in a way to increase the number of commercial opportunities for producers and to increase the yields of crops as a measure against climate change. In this regard, 30 agricultural production zones (agricultural inventory) were identified in line with the provisions of the Decree Law No. 2009/15173, using climate, soil and topography data where producers would be encouraged to produce their crops in the ecologically-right spots. For these basins, a database has been established and so far 527,782,613 data have been entered into the system. A decision-making support system was also designed using optimization methods. This support system will be used to support the identification of crop cultivation areas for each basin, amount of support for each crop in each basin and amount of exports and imports. With this project, the right crops will be planted in correct places and will be produced in the right amounts. As a result, greenhouse gas emissions will be mitigated through the protection of natural resources and minimization of energy consumption in agriculture.

Good Agricultural Practices: Good agricultural practices can be defined as all activities that need to be carried out to ensure an agricultural production system that is 'livable' in social terms, profitable and efficient in economical terms; and that protects human health as much as protecting animal health and welfare, and is environment-friendly. The Eurepgap Protocol marks the starting point of certification efforts for good agricultural practices in Turkey. In the fresh fruit and vegetable sector in which products are exported to Europe, good agricultural practices are carried out in compliance with the Eurepgap criteria, since 2003. Number of Eurepgap certified producers in Turkey was 3222 in 2006, and reached 6905 by the end 2007. Within Globalcap, Turkey increased its rank to 4th out of 85 countries in 2007 from 31st among the 41 countries in 2004.

Organic Agriculture Practices: The legal basis for organic agriculture was established with the Organic Agriculture Law No: 5262, which took effect in 2004 and enabled a rapid increase in organic agriculture. Organic agriculture lands cover only 0.43% of total agricultural land in Turkey. In 1985, organic agriculture focused on 8 crops, whereas today organic agriculture in Turkey covers a total of 385 raw and processed crops; 247 of which are raw products. Among the many crops that are produced using organic agriculture methods are hazelnuts, walnuts, pistachios, dried figs, dried apricots, dried raisin, beans, aromatic plants for medical purposes, cotton, berries and fresh fruits and vegetables.

ÇATAK - Environmentally Based Agricultural Land Protection Program: ÇATAK was launched in 2005 as a component of the ARIP Project (Agricultural Reform Implementation Project) that was supported by the World Bank. ÇATAK objectives are; to ensure the sustainability of natural resources; to promote appropriate tillage, irrigation and other cultivation measures; to mitigate the negative impacts of agricultural activities; to prevent erosion and to raise producers' awareness on links between agricultural activities and the environment. With a USD $9 million budget, the project was launched as a pilot practice in 2006-2008 on some 5000 ha; covering the following areas that are considered 'Wetlands of International Importance':

- Lake Seyfe - Kırşehir,
- Lake Kovada - Eğirdir/Isparta,
- Ereğli Reedbed - Konya,
- Sultan Sazlığı (Reedbed) - Kayseri.

Controlled use of fertilizers and manure was allowed in these areas. 130 farmers were supported in carrying out soil analyses (some 363.4 ha/3634 da) to fit their crops with the condition that they would not cultivate water-thirsty sugar beets; and fertilizers and manure were procured on the basis of these analyses.

Zero-Tillage or Reduced-Tillage Agriculture: Zero-tillage is direct sowing using planters, without any initial tillage. Zero-tillage production reduces tillage efforts; hence the energy required for agricultural activities would be less. Also, organic matter content of the soil would increase, leading, in return, to an increase in the soil's sink

capacity. The Ministry of Food, Agriculture and Livestock will provide 60TL/da support for three years for 25,000 da in different provinces.

Closed Drainage and Land Improvement Efforts: Drainage, in Turkey, is a problem observed in an area of 3 million ha as a result of wrong irrigation techniques and natural phenomena. Drainage problems also pave the way for other environmental problems such as high levels of ground waters, salinity and excessive amounts of sodium. Salinity and excessive amounts of sodium in Turkey, affect 1.5 million ha. This corresponds to 31% of all irrigated land. The General Directorate of Agricultural Reform and Special Provincial Administrations are carrying out closed drainage efforts in Turkey. One region where problems such as high ground water levels, salinity, excessive sodium and alkalinity are most drastically observed is the Harran Plain in Şanlıurfa. 700,000 ha of this area is problematic. About 30,000 ha out of the 700,000 ha are provided with closed drainage systems; and the ongoing work on 40,000 ha will have been finalized by 2012.

In addition, practices in compliance with the Soil Protection and Land Use Law No. 5403 and the Law on Agricultural Reform for Land Arrangement in Irrigation Zones No. 3083, as well as the modernization of irrigation systems and other efforts in line with the Pastures Law No. 4342 are ongoing.

2.7.6 Data and Information Systems

Under the leadership of the Ministry of Food, Agriculture and Livestock and other public institutions that work in the agriculture sector, carry out efforts to establish GIS systems and databases. Some examples are as follows:

Data and Information Management Systems Used by the Ministry of Food, Agriculture and Livestock are:

- Farmer Registry System
- Turkey's Agricultural Basins Database
- Soil Database
- Land Consolidation and Rural Infrastructure Database
- Rural and Agricultural Infrastructure Services Database: Village Inventory and Rural Transportation Database
- Land Cover and Land Use Maps (CORINE and STATIP work)
- MERA Information System
- Livestock Registry System
- Good Agricultural Practices Database
- Database for the Monitoring of Nitrate Pollution From Agricultural Activities (project ongoing)

Data and Information Management Systems Used by Other Institutions:

- Water Database, General Directorate of State Hydraulic Works
- Climatic Data, General Directorate of State Meteorological Services
- Technical Assistance for the Establishment of a Turkish Environmental Information Exchange Network -TEIEN, Ministry of Environment and Urbanization
- ILEMOD (Improvement of the Provincial Inventory Systems and Decision Making Support System), Ministry of Interior (project ongoing)

2.7.7 Research and Development

Research and development activities should be evaluated as efforts that are directly and indirectly related to climate change.

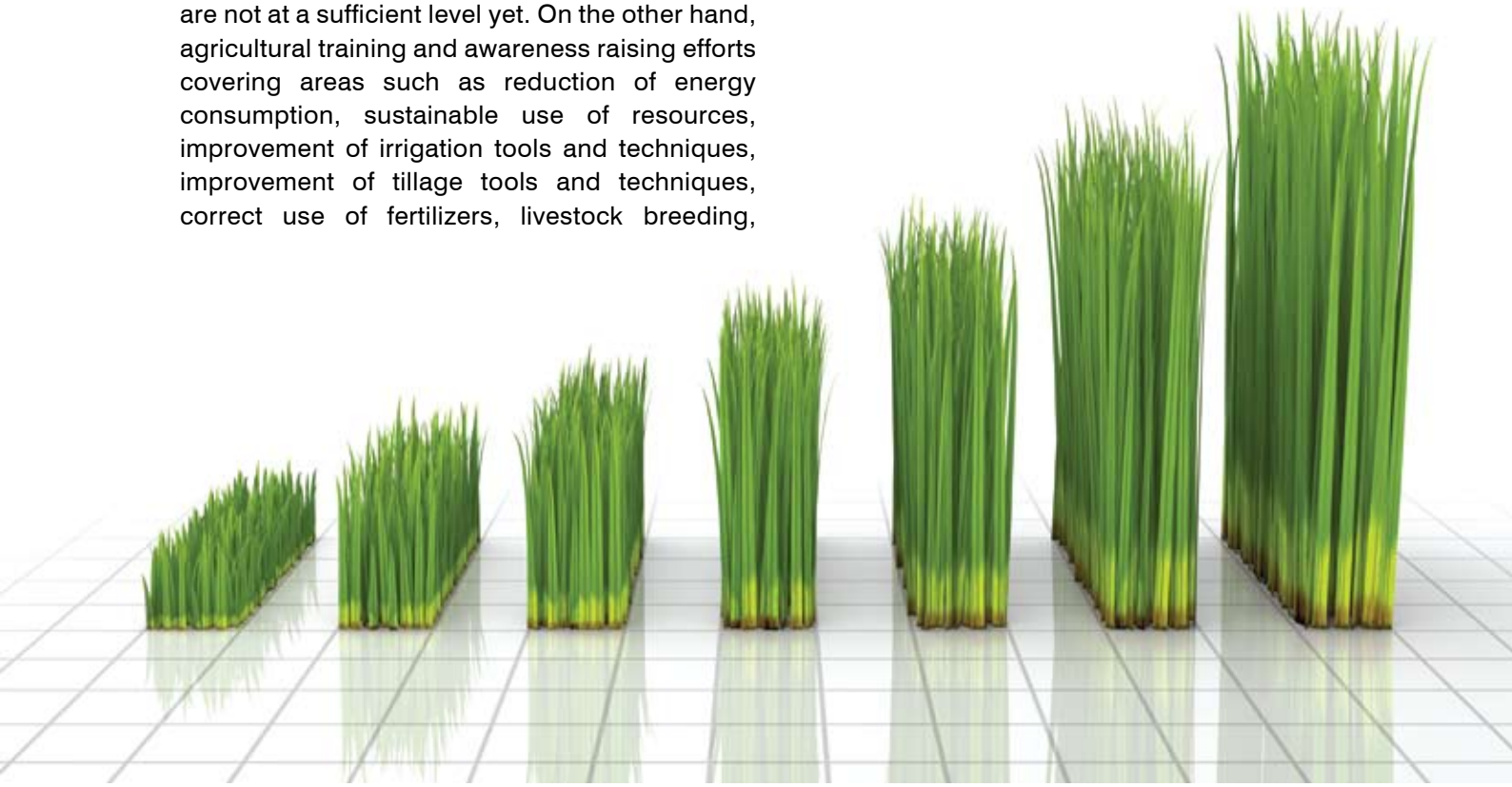
One of the most important R&D projects that focus on this issue in Turkey is the ICCAP Project *(Impact of Climatic Change on Agricultural Production in Arid Areas).* In addition to this large scale project, there are many other smaller scale projects. Also, especially on the issue of combating drought the Aridity Test Center was established in Konya, at the Bahri Dağdaş International Agricultural Research Institute, as the world's 3rd biggest and Turkey's first Drought Test Center, to carry out research and development activities on drought resulting from climate change. The center focuses on the impacts of aridity that has increased in recent years and on developing drought resistant species.

There are also R&D activities that *indirectly* relate to climate change. For this purpose, under the Ministry of Food, Agriculture and Livestock 58 research units/stations (8 centers, 17 basin research centers and 33 topic research centers) have been established to carry out research activities on a wide variety of issues covering crop production, livestock issues, soil and water. In these centers, R&D efforts focus on a variety of climate change related issues such as reduction of energy consumption, sustainable use of resources, improvement of irrigation tools and techniques, improvement of tillage tools and techniques, correct use of fertilizers, livestock breeding, manure management and stubble burning.

2.7.8 Education, Awareness Raising and Capacity Building

Agricultural training activities in Turkey are carried out in different fields by a variety of institutions such as universities, the Ministry of Food, Agriculture and Livestock and the General Directorate of TRT (Turkish Radio and Television); however, awareness raising and capacity building efforts on the impacts of climate change on agriculture as well as combating these impacts are not at a sufficient level yet. On the other hand, agricultural training and awareness raising efforts covering areas such as reduction of energy consumption, sustainable use of resources, improvement of irrigation tools and techniques, improvement of tillage tools and techniques, correct use of fertilizers, livestock breeding, manure management and stubble burning are closely –although indirectly- linked to climate change efforts. The Training activities realized following the drought in 2007 in particular have served for the development of awareness on the issue.

Also, other training programs to raise awareness on climate change were organized by the Ministry of Food, Agriculture and Livestock in cooperation with the FAO, for the Ministerial staff both at the central and provincial levels.



2.8.
LAND USE AND FORESTRY SECTOR

Within the scope of the UNFCCC, variations in greenhouse gas emissions from greenhouse gas sinks (forests, agricultural land, etc.), different land use patterns and land use-change are separately reported within the framework of LULUCF (Land Use, Land Use Change and Forestry). According to the definition on the official website of the General Directorate of Forestry, LULUCF is a 'comprehensive concept that aims to identify the impact of land use, and changes in the land use pattern by human intervention in time, on greenhouse gas emissions and mitigation of these emissions'.

Following the EEA's (European Environment Agency) decision on the identification of land use-changes in five-year intervals, the Ministry of Environment and Urbanization has finalized the CORINE (Coordination of Information on the Environment) project in 2006 using 2006 images. In the CORINE system, land use types are divided into two categories. These are:

- **Land Cover:** This represents land covered with biological or physical elements i.e. natural maquis land, natural rocky land, natural meadows, etc.
- **Land Use:** This represents land use patterns resulting from human impact i.e. agricultural lands, mown meadows, golf courses, etc.

Land use types identified according to CORINE are as follows:[17]

1. **Artificial land (surfaces):** Such areas are mostly covered with buildings and transportation networks. The share of artificial areas in the total surface area in Turkey is around 1.58% (CORINE Turkey, 2006).

   1.1. Settlements: Some 1.148% of the total surface area in Turkey.

   1.2. Industrial, Commercial and Transportation Areas: Some 0.229% of the total surface area in Turkey.

   1.3. Mining, Dumping and Construction Sites: These sites, just like other areas identified above, are also source of emission. These areas that constitute 0.141% of the total surface area of the country, where mining sites constitute some 0.091% and dumping sites constitute some 0.003%. In contrast to the small size of the land area (0.044%) they cover in Turkey, construction sites have a considerable impact on emissions.

   1.4. Non-agricultural Vegetative Land

2. **Agricultural Land:** This title covers both tillage land and pastures. The total of tillage land in Turkey is about 26 million ha. The total area of Turkey's agricultural land, including mown pastures and small natural areas remain within the cultivated lands, adds up to 33 million ha.

   2.1. Non-irrigated Farmland and Continuously Irrigated Land: In Turkey, the total area of non-irrigated farmland is 12 million ha excluding fallow lands. In these lands, wheat,

17 http://sia.eionet.europa.eu/CLC2006/CLC_Legeng.pdf

cereals, some oily seeds and plants such as sunflowers, vegetables and in areas with enough rain, orchards are grown. Total of irrigated land in Turkey is about 5.1 million ha Total of land area that is economically irrigable using modern technologies is about 8.5 million ha.

2.2. Paddy Fields: The total area of paddy fields in Turkey is 248.849 ha, which corresponds to 3‰ of Turkey's total land area and to 7.5‰ of farmlands; none of which is considerably large. Paddy fields mostly located around Edirne province where the climate is humid with extremely high average summer temperatures. These meteorological conditions increase the generation of methane comparing to colder regions. However, paddy fields can be cultivated in many regions of Anatolia, such as Çorum, Amasya, Malatya, Diyarbakır (Karacadağ), where humidity levels are lower.

2.3. Cultivated Agriculture: The total land area of cultivated agricultural fields is approx. 1 million ha. Cultivated agriculture fields are better conditioned in comparison to tillage land. Capacity can only be built through good agricultural practices.

2.4. Other Agricultural Land: This represents sloped and erosion-prone areas. That's why, in such places, there is great need for good agricultural practices.

3. **Forest and Natural Land:** Macquis, scrubs, weeds and open ranges with very few or no vegetation cover add up to 53% of the total surface area of Turkey. As of 2008, Turkey's total forest land was 21.36 million ha. Natural pastures that are also covered in this group are generally weak pastures that are related to agriculture. Natural pastures and meadows in Turkey is approx. 9 million ha. These pastures are mostly not-well managed, weak and are under the pressure of excessive grazing. These areas are presently weak but they can become important sinks when well managed. On the other hand, there is another 10 million ha of land identified as sparsely vegetated areas, which are either included in the forest property or not. These areas can be accounted as natural meadows since they are empty.

4. **Wetlands and Water Masses:** Marshes that cover some 3‰ of the total surface area in Turkey are important in terms of greenhouse gas emissions.

In this report, Section 2.8 covers forest land and forestry sector while agricultural land and other land use patterns are covered in Section 2.7.

Turkey's Forests

The total area of forests in Turkey in 2008 was 21.36 million ha. The total tree stock on this area is 1368 million m^3, with an annual increment of 37.41 million m^3. The first national forest resources inventory in Turkey was prepared in 1972. This inventory was not updated until 2004. In 32 years, there is an increase of 5% in forest area, 35% in tree stock, and 29% in the current annual volume increment rate. The reasons of this upward trend

Figure 17a: Changes in Turkey's Forests Between 1972 and 2004

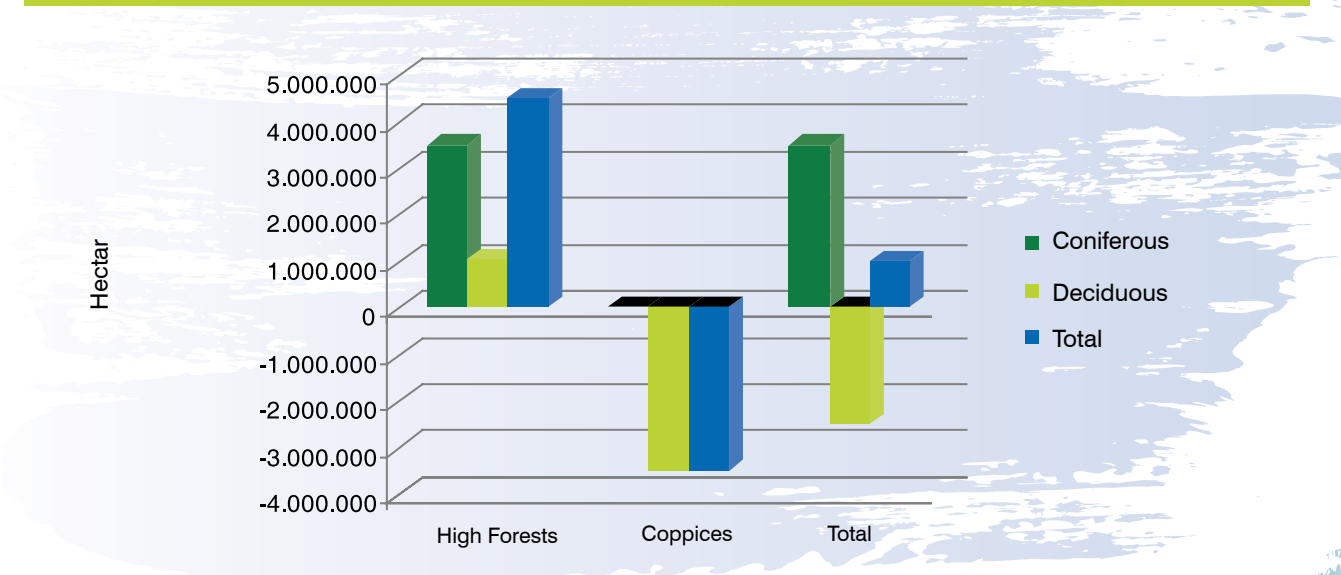


Figure 17b: Changes in Tree Stock

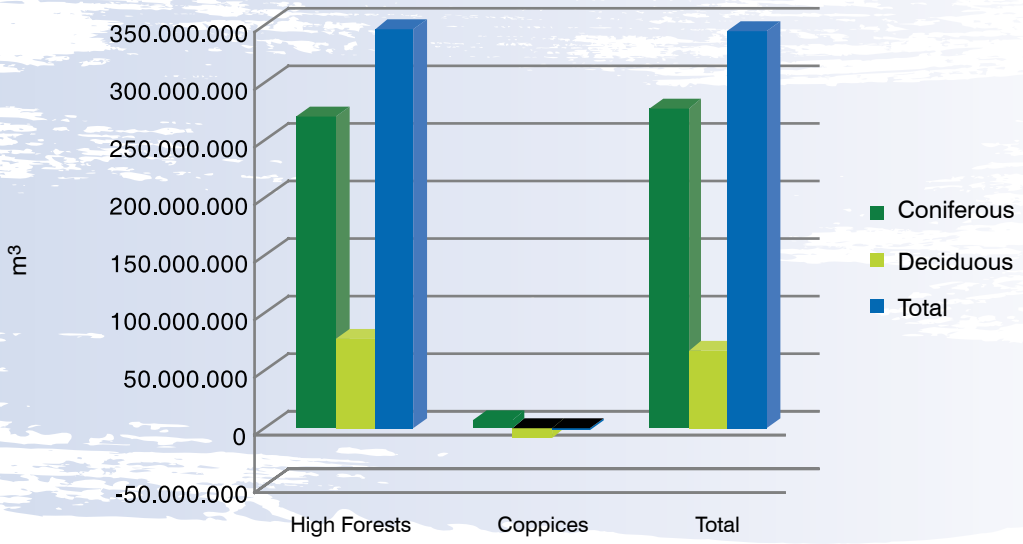
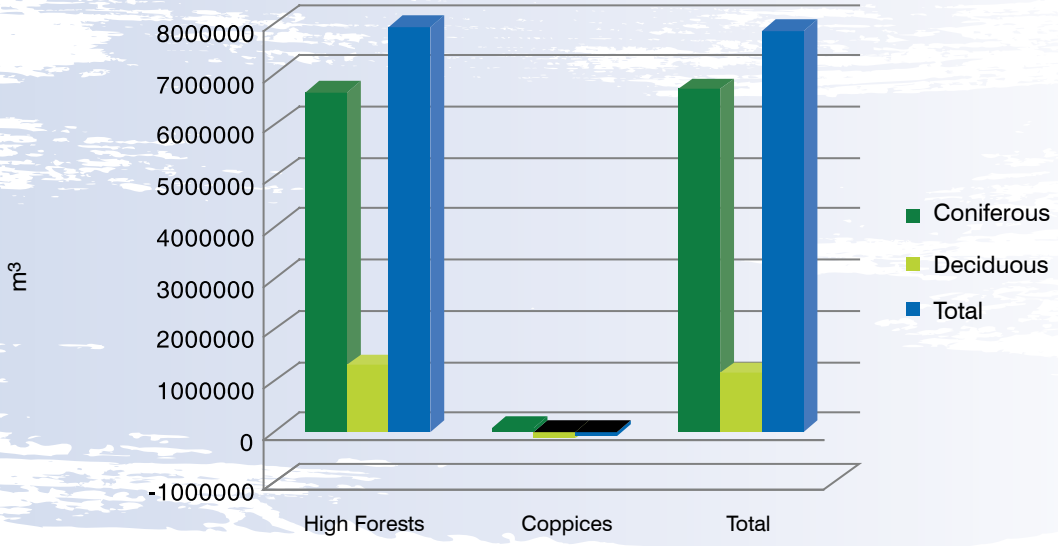


Figure 17c: Changes in Volume Increment

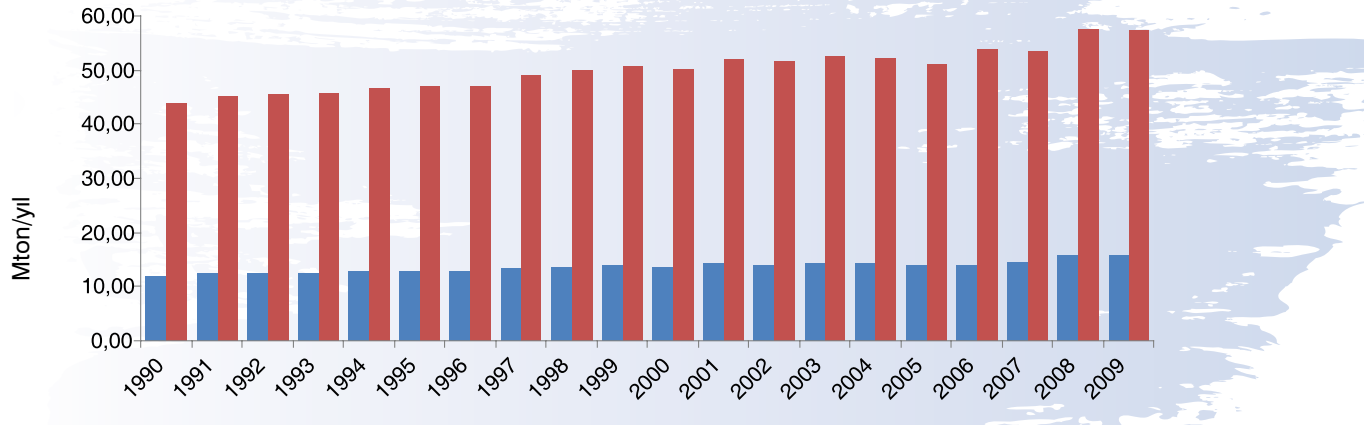


are migration from rural to urban areas, reduction of damages from grazing, bans on cutting trees on slopes and steep areas, using sustainable forestry management criteria and indicators, shifting coppices to groves, forestation in open and unfavorable areas, rejuvenation of old and scarce forest areas to have young and fresh stands with high increment and growth potentials (Asan, 2008).

Since the beginning of 2000s, Turkey's forests have been managed taking into account Sustainable Forestry Management criteria and indicators and a multi-purpose use pattern has been employed. However, before this date, forests were only used for production of round wood in varying diameters and qualities. Today, in addition to wood production, forests are also tended for their protective and service functions.

However, almost half of forests that cover 27% of Turkey's total surface area are unproductive. They have to be rehabilitated and protected. Around 15% of the Turkish population (some 9.5 million) lives in forest areas or in forest villages. Living standards of these local communities are well below the country average. Forest resources are vitally important for the livelihoods of these

Figure 18: Turkey's Forests (1990-2009): Annual Changes in the Carbon Stock and CO_2 Equivalent



Source: *TurkStat, 2011*

populations (General Directorate of Forestry, 2006).

The potential of the annual carbon sequestration of Turkey's forests rise steadily (see. Figure18). The net stock increment in 1990 was 12.02 Mton/year, reaching up to 15.64 Mton/year in 2009; leading to a similar increase in the carbon stock from 44.08 Mton/year to 57.36 Mton/year.

2.8.1. Strategies, Policies and Plans

The Ninth Development Plan highlights some important issues pertaining to forestry: effective protection of the natural forest ecosystem from forest fires, pests and other detrimental factors; balance in use-protection; improving biodiversity, gene sources, forest health, non-wood products and services and eco-tourism facilities; multi-purpose and efficient forest management; catchment-based industrial afforestation and afforestation for the protection of soil as well as improving public health and as prevention against desertification; rehabilitation efforts, better use of land through urban forestry and agro-forestry; improving/supporting private/individual afforestation efforts and public awareness raising (State Planning Organization, 2006:79).

Also in the Plan, it is indicated that despite many positive and forward steps in the forestry sector, there are still some setbacks. These problems can be listed as: lacking cadastre works and road infrastructure; limited number of national parks and similar protected areas; insufficient attention on non-wood products and services; insufficient forest tending efforts; limited size of annually afforested areas and insufficient level of eco-system training (State Planning Organization, 2006:32).

Besides the forestry sector is a part of the Development Plans, long-term plans for the sector are also prepared. In this regard; the sector has two Forestry Plans, each covering a 20-year period from 1973 to 1993 and from 1990 to 2009. However, in these plans there are no references to or information on greenhouse gas mitigation policies and actions.

A 'Forestry Sector Review´[18] with support from the World Bank was prepared concerning outstanding problems faced by the forestry sector. The study was finalized in 2001 and a long-term program was prepared for the Turkish forestry sector.

Preparations for Turkish National Forestry Program started in 2001 and completed in 2004. The program was developed by a joint effort of forest villagers, NGOs, academia, forestry sector, experts and related government agencies and was also supported by the FAO (Ministry of Environment and Forestry, 2007). Turkish National Forestry Program does not have a direct reference to any policies and strategies

[18] Turkish Ministry of Environment and Forestry-The World Bank (2001), Forestry Sector Review, Global Environmental Overlap Program, Ankara.

for climate change and forestry. However, it can be foreseen that actions and strategies for the expansion of forests, conservation of biodiversity and improving the welfare of forest villagers will in return multiply sinks in the forestry sector and reduce the amount of greenhouse gas emissions caused by the people in and around the forest areas.

The 'National Action Plan on Combating Desertification in Turkey' covers main policies and strategies on issues, sectors and their functions that are directly or indirectly linked to desertification and drought.

Policy documents mentioned above cover issues pertaining to combating desertification and erosion; protection and ensuring the sustainability of forest areas as well as water resources; improving the welfare of the forest villagers by supporting them economically and socially, increasing the public awareness on climate change; encouraging the use of renewable energy sources in lieu of fossil fuels and private afforestation activities.

On the other hand, energy policies that are based on use of fossil fuels and tourism and mining policies are conflicting with the existing policies on forestry. In forest land that are allocated to touristic and mining activities, the biomass is partially –if not entirely- wiped out, leading to a decrease of the amount and carbon binding performance of the sinks.

2.8.2. Legal Framework and Institutional Structure

Within the framework of the national legislation, the existing laws and regulations that are directly and indirectly related to emission mitigation within the context of combating climate change are listed below:

- Constitution 1982: Protection and Improvement of Forests (Art. 169), Protection of Forest Villagers (Art. 170)
- Environment Law, Law No: 2872, OG: 11.08.1983/18132
- Aquatic Products Law, Law No: 1380, OG: 04.04.1971/13799
- Pastures Law, Law No: 4342, OG: 28.02.1998/23272
- National Parks Law, Law No: 2873, OG: 11.08.1983/18132
- Law on Land Hunting, Law No: 4915, OG: 11.07.2003/25165
- Forestry Law, Law No: 6831, OG: 08.09.1956/9402
- Law on the Protection of Cultural and Natural Assets, Law No: 2863, OG: 23.07.1983/18113
- National Forestation and Erosion Control Mobilization Law, Law No: 4122, OG: 26.07.1995/22355
- Soil Protection and Land Use Law, Law No: 5403, OG: 19.07.2005/25880

These laws and affiliated regulations seem adequate in terms of providing the required legal basis considering the present situation with greenhouse gas mitigation. In some areas there are authority overlaps in the execution of the provisions of these laws and related regulations. Also, they are arranged independently from one another. These are the main reasons for gaps and problems faced during implementation.

These laws and affiliated regulations provide the necessary legal basis for greenhouse gas mitigation in the forestry sector. The problems occur in the implementation are mostly stemmed due to being some of the issues of these legislation related with the duties, authorities and responsibilities unclear and prepared independently from one another.

From the climate change perspective, the General Directorate of Forestry under the Ministry of Forestry and Water Works is the leading agency responsible for issues pertaining to forestry. The field of activity of the forestry sector related to climate change is a part of the CBCC's LULUCF working group responsibilities. The General Directorate of Forestry which is responsible to carry the activities of this group, is also preparing the annual inventory related with the LULUCF section of national communications and trying to implement the strategies for greenhouse gas mitigation in the forestry sector. GDF carries out these activities through the Climate Change and Bioenergy Working Group that is an in-house initiative. This working group, both makes calculations required in the LULUCF sections of

the national communications in cooperation with the Ministry of Food, Agriculture and Livestock, and also it especially monitors the international developments concerning LULUCF and REDD+ to technically assist the design of greenhouse gas emission mitigation policies for the forestry sector.

2.8.3. Finance

Presently available sources of finance for combating climate change in the forestry sector are as follows:

- Sources that are provided from the funds of GEF, World Bank or EU through the international institutions like FAO and UNDP,
- Bilateral projects and agreements with other countries,
- VCMs (Voluntary Carbon Markets),
- Other international financial sources available for Turkey as a result of post-2012 climate regime negotiations (ie. NAMAs)[19]

2.8.4. Economic Tools

Works on tax cuts and incentives for projects of forestation and nursery are ongoing.

2.8.5. Physical Investments and Practices

Anatolian Watersheds Project; Forestation and Erosion Control Mobilization Action Plan; other private afforestation efforts; the General Directorate of Forestry efforts on pellet production; national and international projects that are prepared by the Climate Change and Bioenergy Working Group of the General Directorate of Forestry for 'monitoring areal variations', and other efforts to implement other action plans on climate change, desertification and biodiversity are ongoing.

The most important projects that were designed and implemented within the scope of Turkey's National Forestry Program for the term 2004-2023 are; the 'National Forestation and Erosion Mobilization Action Plan' and International Cooperation Program to Monitor and Evaluate the Effects of Air Pollution on Forests (ICP Forests). Establishment of model areas within this program was completed in 2009. The project is now at the annual survey and evaluation phase.

Fertile forest areas store approximately five times more carbon than degraded forest areas. As envisaged in the National Forestation Action Plan, the Forestation and Erosion Control Mobilization Action Plan that was launched in 2008 will rehabilitate, and transform some 1,683,000 ha of degraded forest areas into fertile forests until 2012. According to the General Directorate of Forestry estimates, degraded forests that store some 41 million tons of carbon every year will be able to store 222 million tons of carbon when rehabilitated. As a result, following the completion of the National Forestation Action Plan, Turkey's carbon sink capacity will be increased by 10% reaching 2 billion 181 million tons (Asan, 2010b).

Half of Turkey's forests are degraded forests. One third of this land cannot be transformed into fertile forests because of natural and ecological reasons. Yet, still there is 7 million ha degraded forest areas waiting to be transformed into fertile forests. Even though this transformation, in some areas, naturally takes place as a result of migration of village populations to urban areas,in order to increase the carbon storage capacity of sinks per unit area, these areas need to be afforested as quickly as possible. Although, the National Forestation Action Plan is a good application for afforestation of such areas; it still covers only one third of the actual area. This demonstrates clearly the need for the availability of substantial financial resources.

2.8.6. Data and Information Systems

On the issue of availability of consistent and reliable quality data and information collection systems and databases for measurement, monitoring and reporting of greenhouse gas emissions in forestry sector; presently available resources and responsible agencies are as follows:

- ENVANİS (Management-based Forest Inventory Information System– the General Directorate of Forestry)

19 Since Turkey is an Annex-1 country, availability of NAMA finance mechanisms in the post-2012 period for Turkey has not been clarified yet. Negotiations regarding Turkey's status are ongoing

- Digitized Basin Improvement Studies– (General Directorate of Forestry)
- Directorate of Forestry)
- GIS-based Positional Forestry Information System - KORBİS (General Directorate of Forestry)
- Digitized Maps for Biodiversity Monitoring (Ministry of Forestry and Water Works)
- Seed and Gene Banks (General Directorate of Forestry)
- Coordination of Information on the Environment – CORINE Project Activity Reports/Outcomes (General Directorate of Forestry)
- Digitized Stand Maps and Other Statistical Data (General Directorate of Forestry)
- National Cooperation Program for Monitoring the Impacts of Air Pollution on Forests (ICP Forests) (General Directorate of Forestry)
- Fire Management Information System (General Directorate of Forestry)

2.8.7. Research and Development

Research and Development activities aiming to mitigate greenhouse gas emissions in the forestry sector can be listed as follows:

- Tree rehabilitation and pesticide research projects and other projects dealing with climate change carried out by Forestry Research Institutions;
- Research activities on climate change carried out by universities;
- NGO Efforts to combat climate change (Chamber of Forestry Engineers, Turkish Association of Foresters, Central Union of Turkish Forestry Cooperatives – OR-KOOP, etc.);
- Laboratories at universities and under Forestry Research Directorates.

2.8.8. Education, Awareness Raising and Capacity Building

Many training and awareness raising efforts have so far been carried out through numerous conferences, panels, workshops, symposiums and seminars organized by faculties of forestry at different universities, the General Directorate of Forestry and the Directorate of Forest Mapping and Photogrammetry. Within the scope of cooperation with agencies such as the FAO, UNDP and the Ministries of Environment and Urbanization, and Ministry of Forestry and Water Works, many workshops have been organized and there has been a considerable increase in the number of workshops in recent years.

2.9 ADAPTATION TO CLIMATE CHANGE

2.9.1. Impacts of Climate Change in Turkey

In the Fourth Assessment Report of the IPCC it is indicated that a 1˚C - 2˚C increase in temperatures in the Mediterranean basin will be observed, that aridity will be felt in an even wider area, and heat waves and the number of very hot days will increase especially in inland regions. For Turkey, on the other hand, the average increase in temperatures is estimated to be around 2,5°C - 4°C, reaching up to 5°C in inner regions and up to 4°C in the Aegean and Eastern Anatolia. The IPCC report and other national and international scientific modeling studies demonstrate that Turkey in near future will get hotter, more arid and unstable in terms of precipitation patterns.

Diminishing water resources, forest fires, drought, desertification and ecological degradation linked to these are the impacts of climate change that are evident in Turkey. Climatic forecasts that are carried out within the scope of the Joint Program on Enhancing the Capacity of Turkey to Adapt to Climate Change, also produced similar outputs to support other work, indicating noticeable temperature increases and a precipitation regime that can impact all economic sectors, all settlements and climate-related natural disaster risks. The latter, in other words, is the alteration of the water cycle. In diagrams below, these estimates are demonstrated for temperature and rain parameters and excessively hot days and excessively rainy day are consecutively given. An interpretation of this data would only emphasize an obvious impact of changes in temperature and precipitation patterns on closely related areas such as water resources, agricultural production, public health and natural disaster risks; and ecosystem services that provides raw materials for economic activities and that directly affect the amount and quality of basic inputs such as water, to production activities and cities.

Water Resources

Projections for the year 2100, suggest that precipitation will be observed instead of snowfall during wintertime as a result of increasing temperatures. Also, the snow cover would melt faster and join surface runoff. Also, changes in the annual frequency and impact of precipitation patterns would change. Shifting precipitation patterns from snowfall to rainfall and faster melting snow covers would lead to water shortages in elevated areas where urban and agricultural water requirements and supply are regulated on the basis of ‘the snow load’ throughout the year. And these shortages would hit at times when water demand is highest.

Such an alteration of the water cycle would lead to considerable changes in the supply and quality of water resources, and impact many climate-based sectors, including food production, where water is vital. Increasing temperatures in Turkey as a result of climate change would lead to increased summer temperatures, reduced winter precipitation (especially in the western

Figure 19: The Estimated Changes (%) In Winter (December-January-February) Precipitation in the Eastern Mediterranean Based On A2 Simulation of Models ECHAM5 and CCSM3

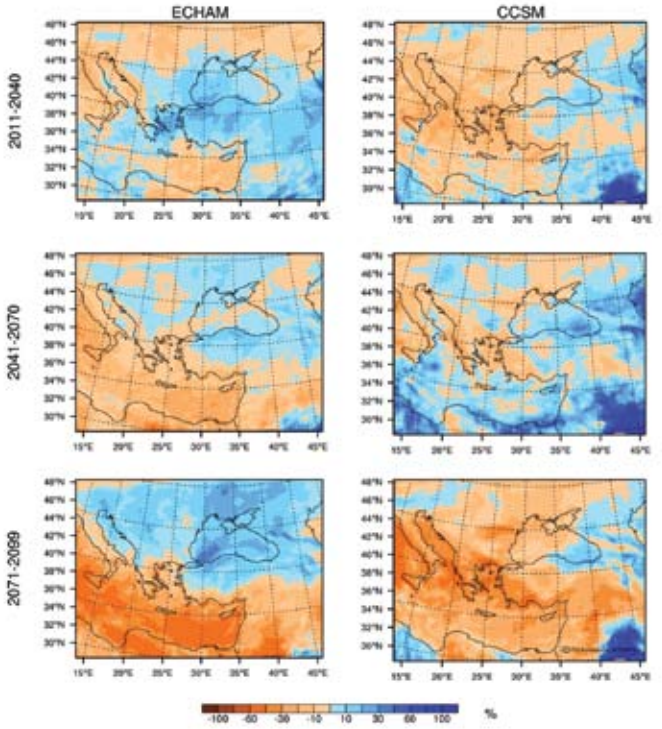


Figure 20: The Estimated Changes (°C) In Summer (June-July-August) Temperatures in the Eastern Mediterranean Based On A2 Simulation of Models ECHAM5 and CCSM3

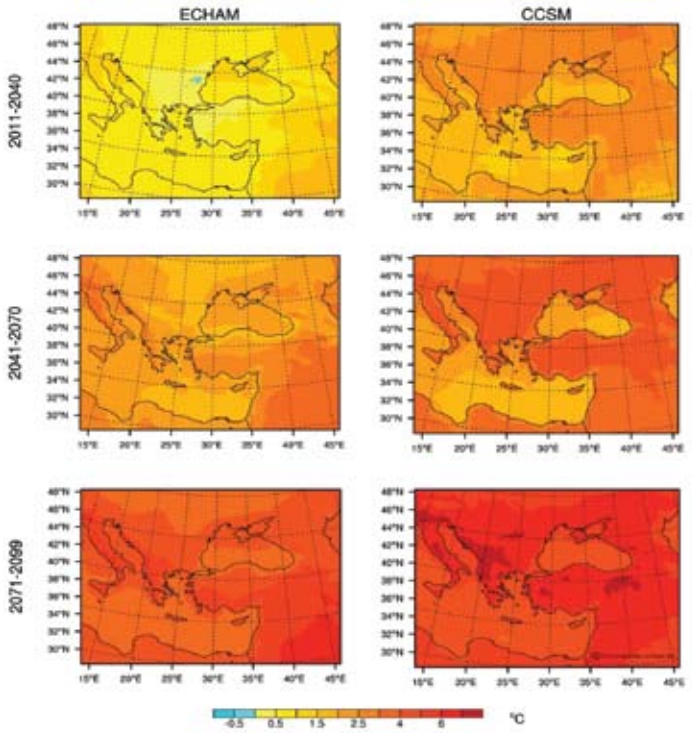


Figure 21: Estimate of Changes in the Number of Excessively Hot Summer Days (SU35) for 30-Year Periods Between 2011-2099 Using A2 Simulation in Models ECHAM5 and CCSM3

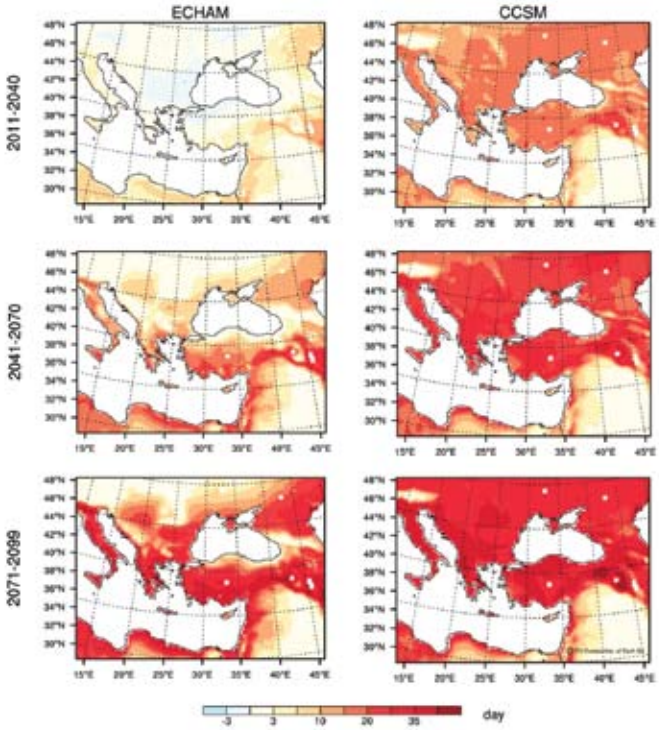
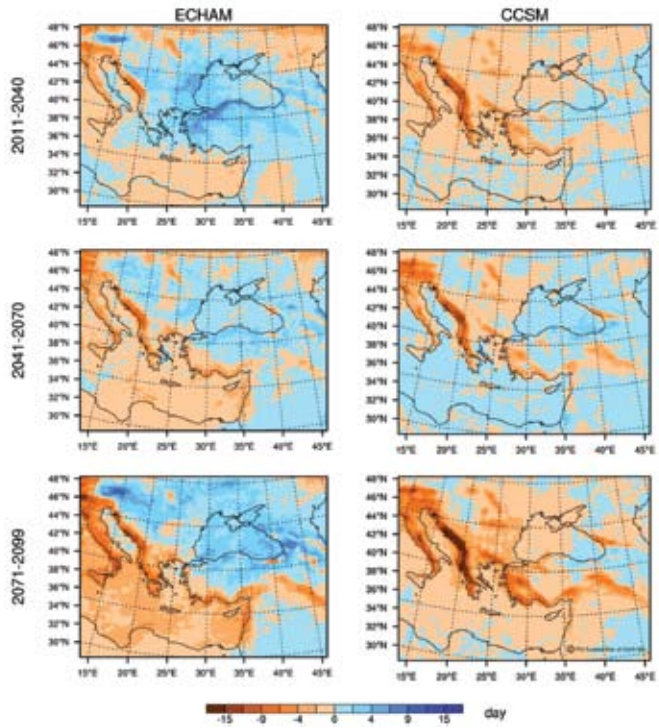


Figure 22: Estimate of Changes in the Number of Excessively Rainy Days (RR10) for 30-Year Periods Between 2011-2099 Using A2 Simulation in Models ECHAM5 and CCSM3



Source: *Enhancing the Capacity of Turkey to Adapt to Climate Change UN Joint Programme, 2011*

provinces), loss of surface waters, more frequent arid seasons, degradation of soil, erosion in coastal regions and floods all of which are direct threats to water resources.

Agriculture Sector and Food Safety

As said, climate change will lead to shifts in water cycle and temperatures; and to seasonal alterations. These changes will inevitably have direct impacts on the agriculture sector that is directly linked to and controlled by these systems. As a result of changes in temperature and precipitation patterns, impact area of agricultural pests will expand and number of species concerned will increase. Climate change will affect production, production sites and stockbreeding activities. The volume and frequency of these changes as well as the possibility of increased occurrence will lead to a higher risk of reduction in the agricultural yield. All these are directly related to food safety.

Impact of climate change on agriculture sector is pivotal for food safety because in Turkey agriculture is the priority sector for socio-economic reasons and it is where the population's food supply mostly comes from. As a result of impacts of climate change, amount of water for agriculture will diminish, quality of water will degrease, biodiversity and ecosystem services will not be protected, sustainable agricultural production patterns will change, pastures will degrade, stockbreeding activities will be affected and farmers will find themselves incapacitated in terms of adaptation to climate change; and all these will eventually risk food safety.

Climate change in Turkey is expected to lead to increasingly negative impacts on water and soil resources and rural development that are vital for food production and food safety. For example, in the Gediz and the Büyük Menderes basins in the Aegean coastline, a 50% reduction in surface waters is expected towards the end of this century, leading to severe water shortages in agriculture, settlement areas and industry. Also, as a result of increasing temperatures and decreasing water resources in the Mediterranean Region, tourism sector is expected to negatively affected.

These are the long-term impacts of climate change. Turkey is already striving to protect its vulnerable coastal regions and water resources and trying to adapt its agricultural activities to the existing climatic conditions.

Ecosystem Services, Biodiversity and Forestry

In addition to ever-growing losses in terrestrial and marine ecosystems, climate change will also result in loss of biodiversity. This will significantly affect species, ecosystems that are crucial for the society and related services. Ecosystems, humic soil that store carbon, wetlands and benthic zone have a direct role in regulating climate. It is also well known that salt marsh ecosystems and dunes provide protection against storms.

Climate change, probably along with other changes in forest health and fertility is already causing alterations in the geographical distribution of some tree species. Climate change, further increases the stress on sectors such as fishing and aqua-production; and as a result of climate change, there will be more coastal erosions and exorbitant impacts on coastal and marine ecosystems.

Natural Disaster Risk Management

The frequency, magnitude and nationwide geographical distribution of natural disasters like floods and drought triggered by the changes in the water cycle are expected to be increased. As mentioned above, increasing quantity of surface water in winter will necessitate additional measures against floods and improvement of the existing infrastructure. Similarly, there are regions where the impact of precipitation will increase. So, in rural and in urban areas there will be flood risks or existing level of risk will be higher.

According to the IPCC, a possible change in climate in the future will increase the frequency, the reach and duration of forest fires in Turkey, depending on the length and strength of the warm and arid seasons. Adaptation actions for forest fires are based on targets focusing on identification and mitigation of risks. Another dimension of impacts of climate change are forest fires and these are considered as yearlong dangers in the Mediterranean Basin, especially in the south. This increase is believed to lead to a widespread of invasive species, which in return will lead to increased forest fire reach.

Public Health

Changing climatic conditions will also have significant impacts on human health. This process has actually started. The more frequent extreme climate events become, the more diseases that are linked to weather conditions will be observed and deaths will increase. As shown in diagrams above, for example, an increase in the number of consequent very hot days will directly affect the elderly and acute health problems in people with chronic cardiovascular diseases. Also, the increased flood risk as a result of climate-change will also increase the risk of contagious diseases and affect geographical distribution of such diseases. Increasing human mobility through migration and tourism will promote disease-causing microorganisms, vectors and other diseases in new environments to where, due to rising temperatures, they will find new areas to live and new risks will arise. Moreover, climate change will also lead to serious risks such as contagious diseases transferred by pests such as zooneses.

Table 13 shows primary sector and region-specific impacts and demonstrates vulnerable sectors and regions against a negative impacts of climate change, leading to aridity, floods and self-igniting fires in Turkey.[20]

2.9.2. Strategies, Policies and Plans

Efforts to include impacts of climate change into economic development strategies and national development policies in Turkey are gaining pace. The Ninth Development Plan (2007-2013) and Annual Programs thereof include certain principles, targets and measures for some sectors.

Presently, strategies and policies regarding sectors such as agriculture, food, plant production, animal production, forestry, energy, health, industry, tourism, etc. that require measures for adaptation to climate change are

20 Turkey's 1st National Communication on Climate Change and other studies by the Ministry of Food, Agriculture and Livestock were used.

Table 13: Impacts of Climate Change and Vulnerable Sectors/Regions in Turkey

Impact	Force	Vulnerable Regions	Vulnerable Sectors/Themes
Changes in river/basin regimes	Low	All regions	Ecosystem services and biodiversity
Diminishing surface waters	Medium	Western Anatolia	Agriculture, water distribution network infrastructure
Increasing scarcity of water for use	High	İstanbul, Ankara, Aydın, Nevşehir, Bursa	Urban areas
	Medium	Afyon, İzmir, Kayseri, Muğla, Manisa	Agriculture, industry and energy
Flood	Medium	Black Sea and Southeastern Anatolia	Farmers, human health
Loss of soil/salinity	Low	The Mediterranean, Black Sea and the Aegean	Tourism, ecosystem services, biodiversity, marine products
Loss of soil quality	Medium	Southwestern Anatolia	Farmers, food safety, shallow lakes and wetlands
Coastal erosion	Low	Black Sea	Fisheries, unemployment
Degrading marine ecosystem	Low	The Mediterranean, Black Sea and the Aegean	Ecological services, biodiversity
Forest fires	Medium	Western Anatolia	Tourism, agriculture
Migrating species to survive	Low	The Mediterranean	Tourism, agriculture, food safety
Reduced agricultural productivity	Medium	The Mediterranean and the Aegean	Agriculture (employment), food safety
Reduced hydropower potential	Low	The Mediterranean	Energy, industry
Reduced aqua-production	Low	The Mediterranean	Agriculture, food safety, water distribution network

being developed. Policies to facilitate adaptation especially in the agriculture sector and legal, institutional and financial activities have been identified for vulnerable areas. However, these issues are not yet directly linked to adaptation to the impacts of climate change.

Strategies, policies, plans, and programs for the management of water resources targeting different fields/sectors do not directly cover climate change adaptation targets. In this context, some measures can be such as: development of non-conventional techniques for using water resources; increasing the number of research activities focusing on the management of irrigation efficiency that are based on estimations on increase in water demand as a result of climate change; developing high-quality crops that can survive on low-quality irrigation water; and developing other plant species that are resistant to aridity and salinity.

Many policies targeted by the agriculture sector indirectly consider adaptation to climate change as a supporting activity. Turkey is recently shifting to water efficient modern irrigation methods such as sprinkling and drip-irrigation where water loss is at a minimum from traditional irrigation methods. Work on financial support options to producers wishing to use these techniques is gaining pace.

In ecosystem services, biodiversity and forestry, a series of strategy documents, policies, programs and action plans were prepared especially after 2000 as a result of international commitments. The most outstanding ones are: Action Plan for Combating Desertification; Biodiversity Strategy and Action Plan; Afforestation and Erosion Control Mobilization Action Plan and the General Directorate of Forestry Strategic Plan.

In order to minimize the negative impacts of climate change on human health and to employ measures against possible risks, with the World Health Organization support, an action plan has been prepared Ministry of Health.

Many strategy documents[21], long-term policy programs[22] and action plans[23] that were prepared in Turkey in recent years mostly without explicitly mentioning climate change, include measures regarding the mitigation of emissions as well as adaptation to climate change.

In order to study the possible impacts of global climate change on water basins, there is a series of activities are ongoing in Turkey's socio-economically significant basins and catchments (Gediz, Büyük Menderes, Seyhan and Konya Basins). Yet, such efforts need to be multiplied and cascaded.

2.9.3. Legal Framework

In order to mobilize Turkey's capacity and to identify possible challenges for adaptation, national legislation including the constitution, laws and regulations was re-evaluated. Legal aspects of Turkey's 'Climate Change Adaptation Strategy' were studied under heading below:

- Natural disaster risk management
- Protection of biodiversity
- Water safety and security
- Food safety and security

Legislation that directly relates to adaptation to climate change can be seen in Table 14. In table 15, secondary legislation is given.

21 Agricultural Strategy, Strategy and Action Plan to Combat Agricultural Aridity, Rural Development Strategy and Action Plan, Energy Efficiency Strategy, etc.

22 Rural Development Program (IPARD), National Science and Technology Policies 2003-2023 Strategy Document (Vision for 2023), National Forestry Program, etc.

23 National Action Plan to Combat Desertification, GAP Action Plan, Biodiversity Strategy and Action Plan, Afforestation and Erosion Control Mobilization Action Plan, Waste Management Action Plan, Waste Water Treatment Action Plan, etc.

Table 14: Legislation Directly Related with Adaptation to Climate Change

Category	Legal Arrangements on Adaptation
Natural Disaster Risk Management	▪ Law on the Organization and Responsibilities of the Disaster and Emergency Management Department; Law No. 5902 ▪ Law on Measures to be Employed and Aid to be Provided In Case of Disasters Affecting General Living Conditions Law No. 7269 ▪ Coast Law; Law No. 3621
Protection of Biodiversity	▪ Environment Law; Law No. 2872 ▪ Forest Law; Law No. 6831. Regulation on the Execution of the Forest Cadastre Activities on the Basis of the Forest Law No. 6831 (15.07.2004) and Law to Promote Tourism; Law No. 2634 ▪ Law on Hunting on Land; Law No. (4915) ▪ Forest Management Regulation (05.02.2008) ▪ National Parks Law; Law No. (2873) ▪ Law on Measures to be Employed and Aid to be Provided In Case of Disasters Affecting General Living Conditions Law No. 7269 ▪ Agriculture Law; Law No. (5488) ▪ Pasture Law; Law No. (4342) ▪ Law on Seeds; Law No. (5553)
Water Safety and Security	▪ Environment Law; Law No. (2872) ▪ Environmental Impact Analysis (EIA) Regulation ▪ Regulation on the Protection of Wetlands (17.05.2005) ▪ Water Pollution Control Regulation (31.12.2004) ▪ Development Law; Law No. (3194) ▪ Law on the Use of Renewable Resources for Electricity Generation; Law No. (5346)
Food Safety and Security	▪ Law on the Amendment and the Ratification of the Amended Decree Law on Food Production, Consumption and Inspection; Law No. (5179) ▪ Biosecurity Law; Law No. (5977) ▪ Agriculture Law; Law No. (5488) and Agricultural Catchments Regulation (07.09.2010)

Table 15: Legislation Indirectly Related with Adaptation to Climate Change

Category	Legal Arrangements
Natural Disaster Risk Management	▪ Regulation on the Organization and Planning of First Aid Services in Case of Disasters (Council of Ministers: 88/12777 - 1.4.1988) ▪ Regulation on the Staffing Principles and Standards Applicable to Provincial Directorates of Disaster and Emergency and to Civil Defense and Search and Rescue Directorates
Protection of Biodiversity	▪ Constitution ▪ Decree Law on the Organization and Duties of the Ministry of Forestry and Water ▪ Decree Law on the Organization and Duties of the Ministry of Environment and Urbanization ▪ Law on the Amendment and Ratification of the Amended Decree Law on Duties of the General Directorate of Forestry ▪ National Afforestation and Erosion Control Mobilization Law ▪ Law on the Protection of Animals ▪ Regulation on the Execution of the Forest Cadastre Activities on the Basis of the Forest Law No. 6831 ▪ Regulation on the General Principles of Waste Management ▪ Circular No. 2007/28 by the Prime Ministry on the Afforestation Mobilization ▪ Draft Law On the Protection of Nature and Biodiversity ▪ Cadastre Law ▪ Regulation on Marking Wood Packages Used As Part of Phytosanitary Measures ▪ Regulation on Removal, Production and Trade of Natural Flower Bulbs ▪ Beekeeping Regulation ▪ Aquaculture Law ▪ Regulation on Water Products ▪ Regulation on Aquaculture ▪ Regulation On Fisherman Shelters ▪ Regulation on State Forestry Enterprise and the Revolving Fund
Water Safety and Security	▪ Constitution ▪ Law on Malaria Eradication ▪ Circular on the Identification of Closed Coves and Bays That are Considered As Vulnerable and Where Fisheries (Fish Farms) Cannot Be Established ▪ Circular on Wetlands
Food Safety and Security	▪ Constitution ▪ Veterinary Services, Plant Health, Food and Feed Law ▪ Organic Agriculture Law ▪ Law on the Protection of Improvers' Rights Regarding New Species of Plants ▪ Animal Protection Law ▪ Law on Agricultural Insurances ▪ Law on Soil Protection and Land Use ▪ Law on Agricultural Reform Regarding Land Arrangement in Irrigation Areas ▪ Law on the Organization and Duties of Agricultural and Rural Development Support Agency ▪ Law on Agricultural Producers' Associations ▪ Animal Feed Law ▪ Animal Health and Police Law ▪ Animal Improvement Law ▪ Statutory Decree Law on the Organization and Duties of the Ministry of Food, Agriculture and Stockbreeding ▪ Regulation on the Turkish Food Codex ▪ Regulation for the Monitoring and Control of Food Safety and Quality ▪ Regulation on Good Agricultural Practices ▪ Law on the Aid to be Allocated to Disaster-stricken Farmers

2.9.4 Institutional Structure

There are institutions and agencies that are directly and indirectly related to adaptation to climate change. Ministry of Environment and Urbanization is the focal point for the UNFCCC and is responsible as the CBCC secretariat. The General Directorate of State Hydraulic Works as a member to the CBCC is responsible for coordination of adaptation efforts is authorized mainly for the management of water resources for adaptation to climate change and carries out research activities on this issue as well as operates in coordination and cooperation with other bodies.

1. **Water Resources Management:** Development of strategies focusing on adaptation and sustainable water management (surface waters as well as ground waters); determination of needs in different sectors (potable water, industry, irrigation) to ensure balanced and realistic supply and demand; ensuring effective use of water resources and to minimize the stress of catchment-based immediate changes (aridity as well as floods) on water quality; improvement of dams (dams for potable water, industrial water, irrigation, hydropower and flood control dams); establishment of irrigation and drainage systems; water supply and improvement of water treatment plants.

2. **Agricultural and Food Safety:** Using water from catchment-scale agricultural irrigation activities (water economy in agriculture); identification of water resources that will be used for the provision of water within the scope of climate change; and handling agricultural and food safety under the light of the above.

3. **Natural Disaster Risk Management:** Designing water resources management and operation policies and plans in a way to establish a system/mechanism to ensure an optimal balance for risks from disasters (flood control, future-looking estimations).

4. **Basin Management:** Within the scope of adaptation to climate change; integrating assessments and existing as well as future operation policies for a basin-based water resources management to national and regional policies and supporting decision making mechanisms to serve this purpose.

5. **Natural Resources Management:** Identification and planning of water resources that supply water to wetlands; putting in place measures to supply water needed by wetlands (reservoirs etc.) in a way to ensure effective management and sustainability of ecosystem services; erosion and deposit (sedimentation) control.

Efforts to improve the resilience of forest ecosystems to climate change that are carried out by the General Directorate of Forestry are considered within the scope of adaptation to climate change. The General Directorate of State Meteorological Services, on the other hand, participates in efforts to clarify obscurities on the issue of adaptation to climate change. Also, the Disaster and Emergency Management Presidency carries out efforts concerning the likelihood of increasing disaster risks' as a result of climate change and related insurance work. These efforts are directly linked to adaptation.

Many activities carried out by the Ministry of Food, Agriculture and Livestock shall be considered within the framework of adaptation to climate change. Also, other ministerial departments carry out research on soil and water resources as well as other work on efficient use of sources of plant, animal and aqua- products; increasing efficiency; increasing the variety of products; agricultural insurance schemes, aridity action plans, food safety, combating animal and plant pests and diseases and prioritizing support to women farmers. All these efforts, again, are either directly or indirectly linked to climate change.

2.9.5. Finance

Although, indirect policies of finance and support mechanisms are available for adaptation to impacts of the climate change, there is still some room for the development of policies and mechanisms for effective implementation of NCCAP.

2.9.6. Economic Tools

Climatic conditions with their fast-changing and nebulous nature demand an evaluation of the impacts of climate change. As a matter of fact,

these impacts have to be considered as standard factors during the feasibility studies for such projects.

Existing and future investment plans, incentives and other economic tools for the five vulnerability areas that were so far identified and that would shape climate change adaptation efforts from now on will either directly or indirectly prepare the grounds needed for Turkey's adaptation to climate change. Taking the Climate Change Strategy and Action Plan as one of the sources to be used during the preparation of the Tenth Development Plan will further strengthen this process.

2.9.7. Research and Development

Increasing academic initiatives, research and development activities and the research for innovative technologies on the issue of adaptation to climate change would be the very first of the 'soft measures' to be taken for the planning of climate change adaptation process.

Turkey started working on regional climate projections to set the basis for impact assessment and adaptation efforts for climate change in 2005. Turkey's First National Communication further accelerated these efforts that are mainly carried out by the İTÜ Eurasia Institute of Earth Sciences. They were supported first by a TÜBİTAK KAMAG project, and later by another project as a part of the UN Joint Program on Enhancing the Capacity of Turkey to Adapt to Climate Change. Within the scope of the IPCC Fourth Assessment Report the results of some of the global climate models were studied and elaborated in more detail and in the end models with a scale of 150-200 km were downscaled to 27 km-scale. The results are available through a web interface (www.agora.itu.edu.tr).

Within the framework of the same program, Ministries of Forestry and Water Works, and of Food, Agriculture and Livestock coordinated efforts with METU on the development of an information management system on the impacts of drought and floods. The objective of these efforts was to have access to real-time meteorological data via an integrated system; to collect such data; to develop related software tools to collect and analyze such data and to design software and methods for emergency warning systems.

2.9.8. Education, Awareness Raising and Capacity Building

The Ministry of National Education plays a leading role in efforts to raise public awareness on the impacts of climate change and on adaptation to climate change.

Although some NGOs implemented some important projects focusing on the impacts of climate change on water resources, ecosystem services and agriculture, and although some of these projects are ongoing, Turkey still needs to strengthen participatory processes for adaptation to climate change.

In this context, within the scope of the UN Joint Program on Enhancing the Capacity of Turkey to Adapt to Climate Change, training programs were designed and put into practice in cooperation with universities and research institutes and awareness raising activities targeting the public as well as the staff of related state agencies were carried out.

3. NATIONAL CLIMATE CHANGE ACTION PLAN

3.1. THE VISION

National Climate Change Strategy for Turkey was approved by the Higher Planning Council and took effect in May 3rd 2010. The ***National Vision*** in this strategy is defined as follows:

"Turkey's national vision within the scope of "climate change" is to become a country fully integrating climate change-related objectives into its development policies, disseminating energy efficiency, increasing the use of clean and renewable energy resources, actively participating in the efforts for tackling climate change within its "special circumstances", and providing its citizens with a high quality of life and welfare with low-carbon intensity."

3.2. STRATEGIC TARGETS

Basic Principles of the National Climate Change Strategy are defined as follows:

"Turkey's primary objective within the scope of global combat against climate change is to participate in the global efforts that are carried out to prevent climate change, which is the common concern of humanity, and that are determined with common mind in cooperation with international parties in the light of objective and scientific findings, without compromising sustainable development efforts, based on the principle of common but differentiated responsibilities and within the framework of the special circumstances of our country."

In the Strategy Document, Turkey's ***Strategic Targets*** within the scope of basic principles are listed as follows:

- to integrate policies and measures for mitigating and adapting to climate change into national development plans, consistent with the UNFCCC principle of "common but differentiated responsibilities" and its special circumstances,
- to contribute to the global greenhouse gas emission mitigation policies and measures, within its own capacity, by limiting the rate of growth of national greenhouse gas emissions, without disrupting its development program aligned with sustainable development principles,
- to increase national preparedness and capacity in order to avoid the adverse impacts of global climate change and to adapt to these impacts; to share emerging experiences and knowledge from such efforts with other countries in the region; and to develop bilateral and multilateral joint research projects for mitigation and adaptation,
- to comply with the design and implementation of global strategic objectives of mitigation, adaptation, technology transfer and finance that accounts for responsibilities of the parties, and to take active role in international activities,

- to increase access to the financial resources required for undertaking mitigation and adaptation activities,
- to develop national research and development (R&D) and innovation capacities towards clean production and to establish national and international financial resources and incentive mechanisms aimed at increasing competitiveness and production in this area by taking into consideration our current technology and development levels,
- to facilitate climate change adaptation and mitigation activities by ensuring efficient and continuous coordination and decision making processes based on transparency, stakeholder participation, and a strong reliance on a science focus,
- to raise public awareness in support of changing consumption patterns in climate-friendly manner through joint efforts of all parties such as the public sector, private sector, universities and NGOs,
- to establish an integrated information management system in order to increase the flow and exchange of knowledge in national climate change efforts.

3.3. PURPOSES AND OBJECTIVES OF THE NCCAP

3.3.1 ENERGY

PURPOSE	OBJECTIVE
PURPOSE E1. Reducing energy intensity	OBJECTIVE E1.1. Reduce primary energy intensity by 10% compared to 2008 by 2015 as a result of implemented and planned policies and measures
	OBJECTIVE E1.2. Develop the capacity for energy efficiency by 2015
	OBJECTIVE E1.3. Support R&D activities on energy efficiency
	OBJECTIVE E1.4. Increase the amount of incentives given by MENR for energy efficiency applications by 100% until 2015
PURPOSE E2. Increase the share of clean energy in energy production and use	OBJECTIVE E2.1. Ensure that the share of renewable energy in electricity production is increased
	OBJECTIVE E2.2 Develop capacity by 2015 so as to increase utilization of renewable energy resources
	OBJECTIVE E2.3 Ensure technological development by 2020 for energy production from renewable energy resources
PURPOSE E3. Limit GHG emissions originating from use of coal in electricity production, by using clean coal technologies and taking efficiency-increasing measures	OBJECTIVE E3.1. Increase the average cycle efficiencies of existing coal-fired thermal power plants until 2023
PURPOSE E4. Reduce losses and illicit use in electricity distribution	OBJECTIVE E4.1. Reduce nationwide electricity distribution losses to 8% by 2023

3.3.2 BUILDING

PURPOSE	OBJECTIVE
PURPOSE B1. Increase energy efficiency in buildings	OBJECTIVE B1.1. Establish heat insulation and energy-efficient systems meeting standards in commercial and public buildings with usable areas larger than 10 thousand square meters and in at least 1 million residential buildings by 2023
	OBJECTIVE B1.2. Effective implementation of the Regulation on Energy Performance in Buildings (EPB) and other energy –efficiency regulations until 2017
	OBJECTIVE B1.3. Develop instruments that will provide the necessary financial support with regard to energy efficiency, renewable energy and EPB until the end of 2013
	OBJECTIVE B1.4. Issuing “Energy Performance Certificates” to all buildings until 2017
	OBJECTIVE B1.5 Decrease annual energy consumption in the buildings and premises of public institutions by 10% until 2015 and by 20% until 2023
PURPOSE B2. Increase renewable energy use in buildings	OBJECTIVE B2. 1. At least 20% of the annual energy demand of new buildings met via renewable energy resources as of 2017
PURPOSE B3. Limit greenhouse gas emissions originating from settlements	OBJECTIVE B3.1. Reduce greenhouse gas emissions in new settlements by at least 10% per settlement in comparison to existing settlements (which are selected as pilot and the greenhouse gas emissions of which are identified until 2015) until 2023

3.3.3 INDUSTRY

PURPOSE	OBJECTIVE
PURPOSE S1. Increase energy efficiency in the industry sector	OBJECTIVE S1.1. Making legal arrangements for energy efficiency and limitation of greenhouse gas emissions
	OBJECTIVE S1.2 Limiting GHG emissions originating from energy usage (including electrical energy share) in the industry sector
PURPOSE S2. Decrease the CO_2 equivalent intensity per GDP produced in the industrial sector until 2023	OBJECTIVE S2.1. Developing the financial and technical infrastructure for limitation of GHG emissions
	OBJECTIVE S2.2. Develop and use new technologies for limitation of GHG emissions in the industry sector until 2023
PURPOSE S3. Strengthen the capacity of the industry sector for combating climate change	OBJECTIVE S3.1. Building the information infrastructure for limitation of GHG emissions in the industry sector until 2015

3.3.4 TRANSPORTATION

PURPOSE	OBJECTIVE
PURPOSE U1.Developing an intermodal transport system and ensuring balanced utilization of transport modes in freight and passenger transport	OBJECTIVE U1.1. Increasing the share of railroads in freight transportation (which was 5% in 2009) to 15% and in passenger transportation (which was 2% in 2009) to 10% by 2023
	OBJECTIVE U1.2. Increasing the share of seaways in cabotage freight transportation (which was 2.66% in ton-km in 2009) to 10%, and in passenger transportation (which was 0.37% in passenger-km in 2009) to 4% as of 2023
	OBJECTIVE U1.3. Decreasing the share of highways in freight transportation (which was 80.63% in ton-km in 2009) below 60%, and in passenger transport (which was 89.59 in passenger-km in 2009) to 72% as of 2023
	OBJECTIVE U1.4. Preparing and putting in practice the “Transportation Master Plan” until 2023
PURPOSE U2: Restructuring urban transportation in line with sustainable transport principles	OBJECTIVE U2.1. Limiting emission increase rate of individual vehicles in intracity transport
	OBJECTIVE U2.2. Developing the necessary legislation, institutional structure and guidance documents until the end of 2023 for implementation of sustainable transport planning in cities
PURPOSE U3: Dissemination of the use of alternative fuels and clean vehicle technologies in the transport sector	OBJECTIVE U3.1. Making legal arrangements and building capacity to increase use of alternative fuels and clean vehicles until 2023
	OBJECTIVE U3.2. Taking local measures to encourage use of alternative fuel and clean vehicles in urban transport until 2023
PURPOSE U4. Increasing efficiency in energy consumption of transportation sector	OBJECTIVE U4.1. Limiting the energy consumption in transport until 2023
PURPOSE U5. Developing the information infrastructure in the transport sector	OBJECTIVE U5.1. Building a well-organized, reliable and sustainable information infrastructure with transport and travel data including GHG emission data, until the end of 2016

3.3.5 WASTE

PURPOSE	OBJECTIVE
PURPOSE A1. Ensure Effective Waste Management	OBJECTIVE A1.1. Reduce the quantity of biodegradable wastes admitted to landfill sites, taking year 2005 as a basis, by 75% in weight till 2015, by 50% till 2018 and by 35% till 2025
	OBJECTIVE A1.2. Establish integrated solid waste disposal facilities across the country, and dispose 100% of municipal wastes in these facilities, until the end of 2023
	OBJECTIVE A1.3. Finalize Packaging Waste Management Plans
	OBJECTIVE A1.4. Establish the recycling facilities foreseen within the scope of the Solid Waste Master Plan with the EU-aligned Integrated Waste Management approach
	OBJECTIVE A1.5. Termination of uncontrolled disposal of wastes 100% by 2023

3.3.6 AGRICULTURE

PURPOSE	OBJECTIVE
PURPOSE T1. Increase the sink capacity of the agriculture sector	OBJECTIVE T1.1. Determine and increase the quantity of carbon stock captured in the soil
	OBJECTIVE T1.2. Identifying and increasing topsoil and subsoil biomass
PURPOSE T2. Limitation of greenhouse gas emissions from agriculture sector	OBJECTIVE T2.1. Identify the potential GHG emissions limitation in agriculture sector
	OBJECTIVE T2.2. Decrease the increase rate of GHG emissions originating from vegetal and animal production
PURPOSE T3. Develop information infrastructure and capacity in the agriculture sector	OBJECTIVE T3.1. Build the information infrastructure that will meet the needs of the agriculture sector in adapting to and combating climate change

3.3.7 LAND USE AND FORESTRY

PURPOSE	OBJECTIVE
PURPOSE O1. Increase the amount of carbon sequestered in forests	OBJECTIVE O1.1. Increase the amount of carbon sequestered in forests by 15% of the 2007 value by 2020 (14,500 Gg in 2007, 16,700 Gg in 2020)
PURPOSE O2. Reduce deforestation and forest damage	OBJECTIVE O2.1. Reduce deforestation and forest damage by 20% of the 2007 values by 2020
PURPOSE O3. Limit the negative impact of land uses and changes such as forests, pastures, agriculture and settlements on climate change	OBJECTIVE O3.1.Integrate the climate change factor in land use and land use changes management strategies by 2015
	OBJECTIVE O3.2. Increase the amount of sequestered carbon as a result of agricultural forestry activities by 10% of the 2007 values by 2020
	OBJECTIVE O3.3. Identify the amount of sequestered carbon in pastures and meadows in 2012, and increase carbon stock 3% by 2020
	OBJECTIVE O3.4. Identify the existing carbon stock in wetlands in 2012, and maintain the level until 2020
	OBJECTIVE O3.5. Identify the quantity of carbon stored in settlement areas in 2012, and increase stored carbon 3% by 2020 through green planting
PURPOSE O4. Strengthen legal and institutional structure for combating climate change with regard to land use and forestry	OBJECTIVE O4.1. Make necessary legal arrangements for combating climate change with regard to land use and forestry by the end of 2013
	OBJECTIVE O4.2. Strengthen institutional capacity in institutions involved in land use and forestry on climate change by 2014

3.3.8 CROSSCUTTING ISSUES

PURPOSE	OBJECTIVE
PURPOSE Y1. Establish necessary infrastructure for a robust emission inventory	OBJECTIVE Y1.1. Monitoring and reporting of greenhouse gas emissions from key sources using at least Tier 2 methodologies as of the beginning of 2016
PURPOSE Y2. Develop policy for environmental protection, and strengthening implementation capacity in consideration of climate change and within the framework of sustainable development principles	OBJECTIVE Y2.1. Strengthening the existing information base for low-carbon development on the basis of sustainable development principles as of 2015
PURPOSE Y3. More effective utilization of financial resources for combating and adaptation to climate change	OBJECTIVE Y3.1. Strengthening the capacity to access financial resources for combating and adaptation to climate change until the end of 2013, ensuring more effective use of new funding resources until 2020
PURPOSE Y4. Optimum usage of emission trading mechanisms that contribute to cost-effective limitation of greenhouse gas emissions	OBJECTIVE Y4.1. Carrying out negotiations to ensure Turkey's participation in the most advantageous way into the existing and new global and regional carbon markets until 2013
	OBJECTIVE Y4.2. Carry out studies to establish the carbon market in Turkey by 2015
PURPOSE Y5. Ensuring coordination in climate change combating and adaptation activities to Increase effectiveness	OBJECTIVE Y5.1. Finalize legal arrangements on combating and adaptation to climate change until 2014
	OBJECTIVE Y5.2. Strengthen the institutional capacities of CBCC members with regard to combating climate change and adaptation until 2014
PURPOSE Y6. Carrying out Turkey's regional climate modeling studies and analyzing the effects of climate change	OBJECTIVE Y6.1. Developing analysis and impact assessment capacities until 2016 through climate observation, forecasting, and regional climate model studies
PURPOSE Y7. Develop R&D and innovation capacity for eco-efficiency with regard to combating climate change and adaptation	OBJECTIVE Y7.1. Strengthen R&D and Innovation capacity for clean production until 2014
PURPOSE Y8. Improve human resources with regard to combating climate change and adaptation to climate change	OBJECTIVE Y8.1. Inclusion of combating and adaptation to climate change in the academic programmes of universities as of end of 2012
PURPOSE Y9. Increase public awareness to change consumption patterns into climate-friendly manner	OBJECTIVE Y9.1. Make necessary arrangements in the education programmes until the end of 2012 so as to develop climate-friendly consumption patterns
	OBJECTIVE Y9.2. Organize public awareness raising campaigns for combating climate change until 2014

3.3.9 ADAPTATION

MANAGEMENT OF WATER RESOURCES	
PURPOSE	OBJECTIVE
PURPOSE US1. Integrating adaptation to the impacts of climate change into water resource management policies	OBJECTIVE US1.1. Ensure integration of adaptation to climate change into existing strategies, plans and legislation
PURPOSE US2. Strengthening water resources management capacity, interagency cooperation and coordination with regard to adaptation to climate change	OBJECTIVE US2.1. Increasing the institutional capacities of agencies and organizations that are authorized and related to management of water resources
	OBJECTIVE US2.2. Develop financing policies and practices
PURPOSE US3. Develop and expand R&D and scientific studies to ensure adaptation to the impacts of climate change in water resources management	OBJECTIVE US3.1. Strengthening existing systems and establishing new systems to monitor the effects of climate change
	OBJECTIVE US3.2. Identify the vulnerability of management of water resources and coastal zones to climate change, develop alternative adaptation actions, carry out periodical revisions based on monitoring results
PURPOSE US4. Integrated management of water resources and water basins for adaptation to climate change	OBJECTIVE US4.1. Planning basin-based development of water resources with a holistic approach that offers flexibility in meeting the changing consumption demands
	OBJECTIVE US4.2. Addressing urban water management from the perspective of adaptation to climate change
PURPOSE US5. Planning renewable energy resources taking into consideration the impacts of climate change and the sustainability of the ecosystem services oriented to increase resilience to climate change	OBJECTIVE US5.1. Planning hydraulic and geothermal energy resources from climate change adaptation perspective

AGRICULTURE SECTOR AND FOOD SECURITY	
PURPOSE UT1. Integrating climate change adaptation into the agriculture and food security policies	OBJECTIVE UT1.1. Reviewing existing strategy and action plans as well as legal arrangements from a perspective of adaptation to climate change
	OBJECTIVE UT1.2. Reviewing signed protocols between institutions from a perspective of adaptation to climate change
PURPOSE UT2. Developing and expanding R&D and scientific studies to identify the impacts of climate change on agriculture and to ensure adaptation to climate change	OBJECTIVE UT2.1. Developing and expanding R&D activities for effective crop, soil and water management
	OBJECTIVE UT2.2. Increasing the capacities and numbers of organizations carrying out R&D and scientific studies
	OBJECTIVE UT2.3. Developing a 'Soil and Land Database and Land Information System' taking into consideration the effects of climate change
	OBJECTIVE UT2.4. Conducting and monitoring disaster analysis for agricultural droughts
	Hedef UT2.5. Determining the socioeconomic impacts of climate change on the agriculture sector

AGRICULTURE SECTOR AND FOOD SECURITY	
PURPOSE	OBJECTIVE
PURPOSE UT3. Sustainable planning of water utilization in agriculture	OBJECTIVE UT3.1. Increasing the effectiveness of water management in agriculture
PURPOSE UT4. Protecting soil and agricultural biodiversity against the impacts of climate change	OBJECTIVE UT4.1. Protecting the physical, chemical and biological efficiency of soil against climate change impacts
	OBJECTIVE UT4.2. Protecting agricultural biological diversity and resources for adaptation to the impacts of climate change
	OBJECTIVE UT4.3. Completing land consolidation activities for the purpose of increasing agricultural efficiency in efforts to adapt to climate change
PURPOSE UT5. Developing institutional capacity and improving interagency cooperation in Turkey with regard to adaptation alternatives in agriculture	OBJECTIVE UT5.1. Strengthening interagency cooperation and developing the capacities of MFAL and its attached and affiliated organizations with regard to combating climate change and adaptation
	OBJECTIVE UT5.2. Increasing the awareness of the civil society on the effects of climate change on the agriculture sector and on the adaptation approaches

ECOSYSTEM SERVICES, BIODIVERSITY AND FORESTRY	
PURPOSE UO1. Integration of the climate change adaptation approach to ecosystem services, biodiversity and forestry policies	OBJECTIVE UO1.1. Reviewing the existing strategies in terms of adaptation to the impacts of climate change
PURPOSE UO2. Identifying and monitoring the impacts of climate change on biodiversity and ecosystem services	OBJECTIVE UO2.1. Identifying and monitoring the effects of climate change on the species in forest land
	OBJECTIVE UO2.2. Identifying the land use changes due to the impacts of climate change in forest land
	OBJECTIVE UO2.3. Monitoring the health of forest ecosystems
	OBJECTIVE UO2.4. Carrying out R&D activities oriented to identify and monitor the effects of climate changes in protected areas
	OBJECTIVE UO2.5. Taking into consideration the climate change adaptation activities in the socio-economic development of forest villagers, and thereby supporting rural development
	OBJECTIVE UO2.6. Identifying and monitoring the effects of climate change on the mountain, steppe, inland water, marine and coastal ecosystems and on the ecosystem services they provide, and developing measures for adaptation to climate change
	OBJECTIVE UO2.7. ntegrating climate change adaptation into the marine and coastal zone management framework
	OBJECTIVE UO2.8. Protection of forests against fires

NATURAL DISASTER RISK MANAGEMENT	
PURPOSE	OBJECTIVE
PURPOSE UA1. Identifying threats and risks for management of natural disasters caused by climate change	OBJECTIVE UA1.1. Identifying risks of natural disasters caused by climate change, such as floods, overflows, avalanches, landslides etc
	OBJECTIVE UA1.2. Reviewing the legislation on natural disasters caused by climate change, and determining implementation principles
PURPOSE UA2. Strengthening response mechanisms for natural disasters caused by climate change	OBJECTIVE UA2.1. Strengthening the capacities of local public organizations with regard to responding to natural disasters caused by climate change, and reaching the level of being able to make field exercises
	OBJECTIVE UA2.2. Establishing a community-based disaster management in combating disaster risks that may arise due to climate change
	OBJECTIVE UA2.3. Continuing the training activities that will increase public awareness and participation with regard to the disaster and risk impacts that may arise due to climate change

PUBLIC HEALTH	
PURPOSE UİS1. Identifying the existing and future effects and risks of climate change on public health	OBJECTIVE UİS1.1. Researching the effects of extreme weather events on public health
	OBJECTIVE UİS1.2. Researching and monitoring the link between climate change, communicable diseases and health risks, and determining possible measures
PURPOSE UİS2. Developing the capacity to combat risks originating from climate change in the national healthcare system	OBJECTIVE UİS2.1. Developing emergency response action plans in risky areas, and supplying the necessary infrastructure
	OBJECTIVE UİS2.2. Strengthening the capacities of health sector organizations against health risks arising due to climate change

CROSSCUTTING ISSUES IN THE CONTEXT OF ADAPTATION TO CLIMATE CHANGE	
PURPOSE UYK1. Ensuring adaptation to climate change on cross-cutting issues	OBJECTIVE UYK1.1. Integration of adaptation to climate change into national development plans, programs and policies
	OBJECTIVE UYK1.2. Developing and putting in place information, monitoring and evaluation systems that support decision-making processes
	OBJECTIVE UYK1.3. Realizing and putting in practice the financial arrangements necessary for implementation of the National Climate Change Strategy at the national, regional and local level
	OBJECTIVE UYK1.4. Organizing training, awareness-raising and informative activities to develop the capacity to combat and adapt to climate change
	OBJECTIVE UYK1.5. Developing R&D capacity with regard to climate change adaptation

3.4.

GREENHOUSE GAS EMISSION CONTROL ACTION PLAN

ENERGY SECTOR

PURPOSE E1. REDUCING ENERGY INTENSITY						
OBJECTIVE E1.1. Reduce primary energy intensity by 10% compared to 2008 by 2015 as a result of implemented and planned policies and measures						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area E1.1.1. Collecting sectoral energy data, identifying and evaluating benchmarking indicators	E1.1.1.1. Establishing a database encompassing all sectors and organizations for calculation and follow-up of energy indicators on sub-sector basis, making evaluations and preparing a roadmap so as to keep the database up-to-date	2012-2013	Capacity building	Regularly updated energy database, periodically published benchmarking indicators	EIE	MoTC, EECB member organizations, TURKSTAT, MEU, KOSGEB Universities, EECs and Relevant Sector Associations
	E1.1.1.2. Evaluating benchmarking indicators for efficiency on the basis of sub-sectors based on the obtained data and identifying year-based energy efficiency objectives	2013-2016	Capacity building	Benchmarking indicators, energy efficiency objectives	EIE	MENR, EECB member organizations, KOSGEB, Universities, EECs and Relevant Sector Associations
Action Area E1.1.2. Implementation of the GHG emission management approach for the energy sector	E1.1.2.1. Studying the emission control scenarios in energy sector	2012-2014	Capacity building for carbon aware growth	Cost/benefit analyses, official announcement of optimum cost low emission scenario by MENR	MENR	MENR and affiliated and related organizations, EMRA, Universities, Licensed Private Sector Investors, Professional chambers
	E1.1.2.2. Conducting a Technology Needs Assessment for GHG emissions control in the energy sector	2012-2014	Capacity building	Research reports, feasibility reports	MENR	MEU, MENR's affiliated and related organizations, MoD, Sector NGOs and Professional Chambers
	E1.1.2.3. Identifying the NAMA potentials on sub-sector basis and conducting an economic analysis	2012-2014		Identification of EE potential in sub sectors, Number of projects started within the scope of NAMAs	MENR	MENR, EECB Member organizations, Private Sector NGOs, KOSGEB
	E1.1.2.4. Preparing and implementing the Energy Efficiency Action Plan	2011-2012	Capacity building, Reduced energy imports, Increased competitiveness	Energy Efficiency Action Plan	EIE	EECB Member organizations and All other Public Organizations, KOSGEB, Private Sector NGOs
	E1.1.2.5. Conducting Cost/Benefit and emission impact analyses to achieve the objectives identified in strategy documents	2012-2015		Cost/benefit analysis reports	MENR	MENR, MoF, MoD, EECB Member organizations, Relevant NGOs
	E1.1.2.6. Identifying economic tools to reduce GHG emissions and increase energy efficiency and implementing them on pilot basis	2012-2015	Capacity building	Pilot projects on determined areas and sectors	MENR	KOSGEB, TTGV, Financial Institutions, All support program implementing organizations

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
OBJECTIVE E1.2. Develop the capacity for energy efficiency by 2015						
Action Area E1.2.1. Delivering trainings and raising awareness on energy efficiency	E1.2.1.1. Reviewing the existing legislation so as to increase the efficiency of energy efficiency consultancy (EEC) companies, supporting EECs and increasing their numbers	2011-2012	Capacity development	Amendment to the Energy Efficiency Regulation, licensed Energy Efficiency Consultant Firms	EIE	MSIT, MEU, KOSGEB, MENR, NGOs, Private Sector Organizations, UCTEA
	E1.2.1.2. Evaluating the awareness-raising activities using the "energy efficiency awareness index" method and announcing the results	2011 and onwards	Decrease in environmental pollution, Increased public awareness	Awareness index study results, change in consumer behaviors, decrease in energy consumption	EIE	MoNE, DA, Municipalities, Relevant Chambers of UCTEA, Private Sector NGOs
OBJECTIVE E1.3. Support R&D activities on energy efficiency						
Action Area E1.3.1. Increase financial resources allocated to R&D on energy efficiency by 100% of 2009 figures by 2015	E1.3.1.1 Developing a R&D strategy and establishing "Energy Sector R&D Projects Support Programme" (ENAR) guides	2011-2013	Technological development	R&D strategy, approval of new strategy by SCST, ratio of annual RER project support to annual R&D support, ENAR guides	MENR	MENR, MoF, MSIT, SCST, TUBITAK, KOSGEB, Members of TUBITAK Technology Platforms, Universities, Private Sector Research Teams, Private Sector NGOs
	E1.3.1.2. Providing R&D and innovation support to energy efficiency technologies that are not yet transformed into products and services	2012-2023	Know-how, Technological development, New entrepreneurship and employment opportunities	Number of R&D and innovation projects supported Number of patents	MENR	MENR, MoF, MSIT, SCST,TUBITAK, KOSGEB, Members of TUBITAK Technology Platforms, Universities, Private Sector Research Teams, Private Sector NGOs
	E1.3.1.3. Supporting pilot projects for genuine new products, methods or designs developed based on R&D results	2013-2023	Technological development, know-how, new entrepreneurship areas and new employment opportunities	Number of authentic products, methods or designs adapted to production	MENR	MSIT, MoF, UoT, EIE, TUBITAK, KOSGEB, EUAS, TEIAS, Distribution companies, TSFC, TEMSAN, University institutes, TOBB, UCTEA, NGOs

OBJECTIVE E1.4. Increase the amount of incentives given by EIE for energy efficiency applications by 100% until 2015						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area E1.4.1. Promotion and encouragement of energy efficiency investments	E1.4.1.1. Informing the sectors on the existing funding mechanisms for enabling energy efficiency	2011-2013	Capacity building	Catalogue, up-to-date website	MENR	MENR, MoF, UoT, TTGV, KOSGEB, UCTEA, TOBB, Financial Institutions, All support program implementing organizations, Consumer Associations
	E1.4.1.2. Carrying out studies to increase existing energy efficiency supports	2012-2013	Capacity building	Revised regulations	EIE	MENR, MoF, EECB Member organizations, KOSGEB, EECs, Relevant NGOs
PURPOSE E2. INCREASE THE SHARE OF CLEAN ENERGY IN ENERGY PRODUCTION AND USE						
OBJECTIVE E2.1. Ensure that the share of renewable energy in electricity production is increased						
Action Area E2.1.1. Utilization of hydroelectric energy potential and other renewable energy resources	E2.1.1.1. Utilizing entire technical and economic potential for hydroelectric energy on basin-basis, in consideration of economic, environmental and social conditions	2011-2023	Capacity building, effective energy and resource management	Increase in the amount of electricity production from HPPs	SHW	MENR, MEU, MFAL, EMRA, SMS, TBB
	E2.1.1.2. Launching pilot projects for pumped storage HPP technologies	2012-2015	New employment opportunities, energy security	Legal arrangements, development and realization of first pumped storage HPP project	MENR	SHW, EIE, EUAS, EMRA, Private Sector Producers
	E2.1.1.3. Taking an inventory of the existing solar collectors and conducting the cost/ benefit analyses; making and putting into effect legislative arrangements to spread the use of solar energy taking into consideration of the environmental factors	2011-2014	New employment opportunities	Solar collector inventory of Turkey, Cost/benefit analyses, number of utilized solar collectors	MEU	MENR, MSIT, TUBITAK, TSI, GAP, TOBB

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
	E.2.1.1.4.Preparing the cost/benefit based solar energy roadmap	2012-2015	Capacity building, effective energy and resource management	Cost/benefit analysis	EIE	MENR
	E.2.1.1.5 Developing a roadmap and developing a finance model for offshore wind energy	2011-2012	New employment opportunities, capacity building, effective energy and resource management	Financing models, research conclusions	EIE	MENR, UfMA, EUAS, EMRA
	E2.1.1.6. Building the necessary infrastructure so as to increase wind energy capacity and ensure good management	2011-2015		ensuring energy quality, more energy transfer and resource utilization	TEIAS	MENR, MoD, UT, EMRA
	E2.1.1.7. Reviewing the legislation on utilization of geothermal energy, and exploring opportunities for financial support	2011-2013		number of reviewed legislations	MTA	MENR, UoT, MIGEM, EIE, EMRA, Municipalities
	E2.1.1.8. Stepping up new researches on bio-fuels in view of energy contribution	2011-2013	New employment opportunities, technological development	Biomass road map	GTHB	MENR, Universities, Oil Seeds Producers and Cooperatives, Bio-fuel Producers, Liquid Fuel Sector Companies
	E2.1.1.9. Studying the technical and economic feasibility of utilization of biomass resources in existing coal plants	2011-2013	New employment opportunities, technological development, rural development, reduction of air pollution	Feasibility study final report	EUAS	MENR, MFAL, TUBITAK
OBJECTIVE E2.2 Develop capacity by 2015 so as to increase utilization of renewable energy resources						
Action Area E2.2.1. Inform and raise awareness of target groups on RES and climate change	E2.2.1.1. Supporting NGOs and local governments for development of RES projects	2011-2015	Decrease in local environmental pollution, raised public awareness	Project final reports, Number of projects for RES	DA	NGOs, Municipalities, Donor Organizations
	E2.2.1.2 Make legal arrangements for certification of renewable energy systems under 500 kW	2011-2015	Increase in added value for products and services using renewable energy	Legal arrangements, RES labels	EMRA	MENR, producers

OBJECTIVE E2.3. Ensure technological development by 2020 for energy production from renewable energy resources

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area E2.3.1. Developing and supporting R&D activities for renewable energy resources	E2.3.1.1. Conducting Technology Needs Assessment on renewable energy resources	2011-2014	Technological development	Technology needs analysis report	MENR	MSIT, MoF, UoT, EIE, TUBITAK, KOSGEB, EUAS, TEIAS, Distribution Companies, TSFC, TEMSAN, University Institutes, TTGV, TOBB, UCTEA, NGOs
	E2.3.1.2. Encouraging transfer of R&D results to production through economic instruments, and preparing the cost/benefit analyses	2011-2020	Technological development, new entrepreneurship areas and new employment opportunities	Cost/benefit analysis reports for R&D incentives	MENR	SCST, MSIT, MoF, KOSGEB, TTGV Universities, Private Sector Research Teams, TUBITAK Members of Technology Platforms, Sector Associations
	E2.3.1.3. Increasing the number of research and product projects carried out at universities or in technology development zones with regard to renewable energy and clean technologies for use of new technologies	2012-2016	Technological development, know-how, employment	Number of integrated projects and domestic products for RES	MENR	MSIT, MOF, MoD, TUBITAK, DA, University Institutes, Technology Development Zones
	E2.3.1.4. Making necessary legislative arrangements for product development so as to promote increased coordination between research organizations, provide financing facilities, and develop pre-competition cooperation activities	2012-2014		Publication of legislation in the Official Gazette	MENR	MSIT, MOF, MoD, TUBITAK, DA, University Institutes, Technology Development Zones
	E2.3.1.5. Setting up a Post-Project Support and Coordination Unit, which will ensure follow-up of projects and technology development and RES incubation zones in specific areas after support, so as to support domestic industry	2012-2015	New employment opportunities, know-how, technology, domestic equipment	Public-Private Sector cooperation initiatives and incubators	MENR	MSIT, MOF, MoD, EUAS, TUBITAK, KOSGEB, TTGV, TSFC, TEMSAN, DA, University Institutes, TOBB, Private Sector
	E2.3.1.6. Taking additional measures encouraging the use of electricity from solar and other renewable energy resources produced from small facilities below 500 kW, and making legislative arrangements on this matter	2011-2014	Technological development, capacity building	R&D results	MENR	EMRA, RI, Private Distribution Companies and Entrepreneurs
	E.2.3.1.7 Realising hybrid projects for efficient use of wind energy	2011-2016	Technological development, capacity development	Project results	EIE	MENR, Universities, RI

PURPOSE E3. LIMIT GHG EMISSIONS ORIGINATING FROM USE OF COAL IN ELECTRICITY PRODUCTION, BY USING CLEAN COAL TECHNOLOGIES AND TAKING EFFICIENCY-INCREASING MEASURES

OBJECTIVE E3.1. Increase the average cycle efficiencies of existing coal-fired thermal power plants until 2023

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area E3.1.1. Rehabilitation of existing lignite power plants and disseminating the use of clean coal technologies	E3.1.1.1. Continuing maintenance, improvement and modernization works in existing electricity generation plants in order to increase efficiency and production capacity by using new technologies	2011-2020	Energy supply security, high quality energy, employment	Completion of improvement activities in power plants	EUAS	MENR, TKI, TTK, MTA, TUBITAK, PA, Private Sector Investors, Universities
	E3.1.1.2. Seeking clean technology usage, costs and implementation opportunities in existing power plants	2011-2014	New employment opportunities	Due diligence analysis containing cost/benefit analyses	EUAS	MENR, TKI, TTK, TUBITAK, PA, Private Thermal Power Plants, Universities
Action Area E3.1.2. Using clean coal technologies in new coal-fired power plants	E3.1.2.1. Engaging local actors (universities, organized industrial zones, Development Agencies, etc.) to ensure that clean coal technologies are used in small-reserve local power plants	2011-2023	New employment opportunities, know-how, technology	Establishment of Regional Coal Research Centres	MENR	MOF, TKI, EUAS, TTK, MTA, TUBITAK, Universities, Private Sector Delegates
	E3.1.2.2. Identifying the technical criteria for utilization of clean coal technologies in new power plants using domestic lignite, and taking measures to promote the implementation	2011-2015	Reduction of environmental pollution, improvement of air quality	Making legal arrangements regarding technical criteria for clean coal applications	MENR	MEU, TKI, EMRA, TUBITAK, TTK, MTA, TUSIAD, NGOs, Private Sector
Action Area E3.1.3. Promoting use of cogeneration and regional heating systems	E3.1.3.1. Ensuring full alignment with EU cogeneration regulations	2011-2014	Alignment with the EU	Publication of cogeneration regulation in Official Gazette	MENR	EMRA, TUBITAK, MEUA, Sectoral NGOs, Private Sector
	E3.1.3.2. Making known the incentives given for spreading high-efficiency cogeneration/tri-generation and regional heating practices	2011-2015	Raising Public awareness	Introductory guide	MENR	MoD, UoT, TOKI, EMRA, Municipalities, Sectoral NGOs, Private Sector
	E3.1.3.3. Making legal arrangements for disseminating utilization of residual heat, and carrying out information activities	2011-2015	Capacity building	Increase in residual heat utilization	MENR	EMRA, TUBITAK, Municipalities, Sectoral NGOs, Private Sector

PURPOSE E4. REDUCE LOSSES AND ILLICIT USE IN ELECTRICITY DISTRIBUTION						
OBJECTIVE E4.1. Reduce nationwide electricity distribution losses to 8% by 2023						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area E4.1.1. Improving technical infrastructure and preventing illicit use	E4.1.1.1. Taking necessary supportive measures to rehabilitate and strengthen distribution networks and move towards "Smart Grid" applications	2011-2016	Increase in economic life of coal reserves, decrease in imports	Specified reduction objectives on loss/illicit use achieved	MENR, EMRA	MENR, TEDAS, PA, LA, Private Distribution Companies
	E4.1.1.2. Increasing inspections to prevent illicit electricity use, and conducting activities on this issue	2011-2016	Rational utilization of resources, getting unrecorded energy consumption under record	Amount of reduction in illicit energy use	MENR, EMRA	Electricity Distribution Companies

BUILDING SECTOR

PURPOSE B1. INCREASE ENERGY EFFICIENCY IN BUILDINGS

OBJECTIVE B1.1. Establish heat insulation and energy-efficient systems meeting standards in commercial and public buildings with usable areas larger than 10 thousand square meters and in at least 1 million residential buildings by 2023

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area B1.1.1. Identifying energy efficiency potential and priorities in order to ensure heat insulation and energy-efficient systems in buildings	B1.1.1.1. Preparing a database containing energy consumption data for building subsectors, and developing benchmarking indicators	2011-2014	Capacity building	Database, benchmarking indicators	MENR	MEU, MoF, MIA, MoNE, TURKSTAT, TOKI, PSA, Municipalities
	B1.1.1.2. Identifying the technical specifications of model buildings set forth for building typologies	2011-2017	Capacity building	Model Building technical specifications	MEU	MENR, MOF, MIA, TURKSTAT, LA
	B1.1.1.3. Identifying short, medium and long-term targets for ensuring energy efficiency in buildings by comparing existing buildings against model buildings	2011-2018	Capacity building	Benchmarking indicators, report on energy efficiency objectives in the buildings	MEU	TOKI, LG, NGOs, Professional Chambers
	B1.1.1.4 Developing action plan to increase energy efficiency in existing buildings	2011-2014		Action Plan on Energy Efficiency in the Buildings	MEU	MoF, MIA, EIE, LA, TOKI, NGOs, Relevant Professional Chambers, Private Sector Organizations
	B1.1.1.5. Finalizing the cost-benefit analyses of measures taken to ensure energy efficiency	2011-2014		Energy Efficiency Measures Cost-Benefit Analysis Report	MEU	MSIT, MoCT, Relevant Associations, Relevant Professional Chambers, Material Producers and Sellers, Private Sector Organizations
	B1.1.1.6. Assessing the building materials and technologies available on the market in terms of energy efficiency	2011-2014	Increased competitiveness	Market analysis report	MEU	MENR, MSIT, MoCT, TSE, TURKAK, TUBITAK, Universities, Relevant Associations, Relevant Professional Chambers, Material Producers and Seller, Private Sector Organizations
	B1.1.1.7 Identifying R&D priorities and areas to be supported for development of building materials and technologies to increase energy efficiency	2011-2014		R&D Needs Assessment Report, list of research areas to be promoted for energy efficient technologies and products	MEU	MENR, MSIT, MoCT, MoD, TURKAK, TSE, TUBİTAK, Universities, Relevant Associations, Relevant Professional Chambers, Material Producers and Sellers, Private Sector Organizations

OBJECTIVE B1.2. Effective implementation of the Regulation on Energy Performance in Buildings (BEP) and other energy –efficiency regulations until 2017

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area B1.2.1. Improving and strengthening the BEP Regulation to ensure use of heat insulation and efficient energy systems in buildings	B1.2.1.1. Reviewing and, if necessary, revising the minimum requirements and criteria related to building technical systems specified in the BEP Regulations	2011 -2014		Proposal package for improvement of technical building systems and criteria provided for in current legislation, cost/benefit analysis reports for suggested technical system modifications, publication of required regulation amendments in the Official Gazette	MEU	MENR, MIA, TSE, Universities, Sectoral Associations, Professional Chambers
	B1.2.1.2. Analyzing 25% threshold specified in the BEP Regulation for improvements in the modification of existing buildings, and preparing a technical report including cost/benefit analyses for improvement conditions for existing buildings	2011 -2014	Improved life quality, decrease in energy consumption costs per household	Technical report containing cost/ benefit analysis	MEU	MENR, MIA, TSE, Universities, Sectoral Associations, Professional Chambers
	B1.2.1.3. Identifying and making the necessary changes in the related legal arrangements to support the implementation of the BEP Regulation (Property Ownership Law, Municipalities Law, Building Inspection Regulation etc.)	2011 -Sustained		Publication of the amendments in other laws and regulations made in line with BEP Regulation in the Official Gazette	MEU	MENR, MoF, MSIT, MoCT, MIA, TSE, Universities, Sectoral Associations, Professional Chambers
	B1.2.1.4. Conducting a technical assessment including cost/benefit analyses to upgrade Energy Performance Certificate (EPC) classification ranges (TS 825 – lowering the U values of building components per years), and ensuring coordination in revising the BEP and TS 825	2011 -Sustained		Technical report containing cost/ benefit analysis, publication of revised BEP Regulation in the Official Gazette	MEU	TSE, MENR, TUBITAK, Universities, Sectoral Associations, Professional Chambers
	B1.2.1.5. Establishing the “Integrated Building Design Approach” and “Zero-Emission (Sustainable) Building” criteria; integrating them into the BEP Regulation if deemed necessary	2012-2015		Technical report/guide containing Integrated Building Design Approach and Sustainable Building Criteria, publication of revised BEP Regulation in Official Gazette	MEU	MENR, TSE, TUBITAK, Sectoral Associations, Professional Chambers

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area B1.2.2. Increasing the capacity of MEU regarding the BEP Regulation and other energy efficiency applications	B1.2.2.1. Conducting a needs analysis to develop the institutional capacity of MEU	2011-2012	Capacity building	Institutional capacity and needs report	MEU	
	B1.2.2.2. Training the MEU personnel as implementers and trainers in BEP Regulation applications, measures and equipment for energy efficiency in buildings	2011-2012		Number of trainings delivered to MEU personnel	MEU	MENR, TUBITAK, Universities, Professional Chambers, Sectoral NGOs, International Organizations
	B1.2.2.3. Assigning and training a team to supervise the regulated EPCs	2011 and onwards	Increased confidence in EPC in real estate market	Technical infrastructure established, number of trainings, number of survey experts	MEU	MENR, TSE, TUBITAK, Universities, Sectoral Associations, Professional Chambers
Action Area B1.2.3. Increasing the capacity of other relevant organizations regarding the implementation of the BEP Regulation and other energy efficiency applications	B1.2.3.1. Training the sector practitioners of the BEP Regulation	2011 and onwards	Capacity building	Number of trainees	MEU	MENR, LA, TBB, Universities, MMO, Sectoral NGOs, Professional Chambers, IEC firms, Building Inspection Firms, EEC firms
	B1.2.3.2. Authorising EECs and increasing their capacities in terms of Energy Performance Contract practices and building energy efficiency studies	2011 and onwards	Capacity building	Number of designated EECs, number of energy performance contracts in buildings	MENR	MEU, UCTEA, EECs, Organizations designated/licensed for EE services
	B1.2.3.3. Organizing periodical trainings to increase the competence of MEU provincial directorates, municipalities, building inspection companies and chambers with regard to building inspections	2011 and onwards	Increased confidence in EPC in real estate market, acceleration of EE building transformation	Number of trainings organized for the building inspection personnel of Provincial Directorates of the MEU, municipalities, building inspection companies and professional chambers, and the number of participants	MEU	MENR, UCTEA, Universities, Sectoral NGOs, Relevant sector participants
	B1.2.3.4. Making legislative amendments, if deemed necessary, to increase the effectiveness of the building inspection system	2011-2013		Effective inspection system, Amendment of Building Inspection Regulation and related legislation and publication in Official Gazette	MEU	
	B1.2.3.5. Increasing effectiveness of Building Energy Management system standardization; aligning the relevant legislation (EE Law and regulations) with the Energy Management Standard (16001 EN-ISO 50001) and implementing it in commercial and residential buildings	2011 -2015	Increase in green employment opportunities	Amendment of EE Regulation and publication in Official Gazette, at least 100 commercial and public buildings with 16001 EN-ISO 50001 certificates	MENR	MEU, TSE, UCTEA, EECs

OBJECTIVE B1.3. Develop instruments that will provide the necessary financial support with regard to energy efficiency, renewable energy and BEP until the end of 2013						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area B1.3.1. Providing necessary financing with regard to energy efficiency, renewable energy and BEP in order to increase energy efficiency in buildings	B1.3.1.1. Ensuring coordination to build dialog and cooperation with national and international financial organizations	2011 and onwards	Better channelling of international funds for EE and RES	Alternative finance models, cooperation protocols	UoT	MEU, MENR, MoF, MoD, Financial Organizations, Private Sector Organizations, EECs
	B1.3.1.2. Researching, promoting and disseminating finance models that encourage investments necessary for energy efficiency measures in buildings	2011 -2015		Website for announcement of finance models, funds, benefits and requirements	MENR	MoF, UoT, TBB, UCTEA, Financial Organizations , Private Sector Organizations, EECs, Consumer Associations
OBJECTIVE B1.4. Issuing "Energy Performance Certificates" to all buildings until 2017						
Action Area B1.4.1. Strengthening necessary infrastructure to issue "Energy Performance Certificates" to all buildings	B1.4.1.1. Monitoring and registering the certificates to be given to existing and new buildings by MEU, inspecting the implementation of the BEP Regulation and other energy efficiency practices through random inspections	2011 -2017		Number of registered EPCs, number of inspections	MEU	MENR, Professional Chambers, EECs
	B1.4.1.2. Developing a method for periodic inspection of the mechanic systems of buildings (central heating systems, HVAC systems), making designations for inspections and carrying out inspections	2011 -2017		Publication of related Communiqué in Official Gazette, number of licensed/designated inspection firms/inspectors, number of inspections	MEU	Professional Chambers, private audit/inspection companies, EECs

OBJECTIVE B1.5. Decrease annual energy consumption in the buildings and premises of public institutions by 10% until 2015 and by 20% until 2023

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area B1.5.1. Reducing the annual energy consumption of the buildings and premises of public institutions	B1.5.1.1 Building databases for public buildings, identifying the buildings with highest energy consumption.	2011 - 2013	Improvement in public information system	Building and Energy Database for Public Buildings	MENR	MEU, MIA, MoF, TOKI, TURKSTAT, LA, Public Institutions and Organizations
	B1.5.1.2. Ensuring coordination for gradually issuing EPCs for all public buildings	2011 - 2017	Improvement in public information system	Issuing EPCs for top 100, 1.000, 10.000 energy consuming buildings gradually	MEU	MENR, TOKI, Public Institutions and Organizations, EECs
	B1.5.1.3. Issuing a Prime Ministry Circular for determination of threshold values for EPC for old and new buildings, determination of an energy efficiency improvement strategy for public buildings based on such EPC threshold value and ensuring necessary allocation	2011 -2018	Improvement in public information system	Strategy and Plan for Improvement of EE in Public Buildings, Prime Ministry Circular	MEU	MIA, MoD, TOKI, LA, Public Institutions and Organizations
	B1.5.1.4. Commissioning public institutions to carry out energy surveys, determining the necessary budget for improvements, preparing feasibility reports and submitting them to the MoF and MoD	2011 -2015		Survey reports, feasibility reports	All public institutions	MENR, MEU, MoD
	B1.5.1.5. Carrying out preliminary works and studies for making amendments in the Public Procurement Law so as to improve public buildings within the framework of Energy Performance Contracts of EECs	2011 -2012	Saving in operational budgets of public buildings	Suggestions for modifications on Public Procurement Law	MoF	MENR, MEU, PPA
	B1.5.1.6. Carrying out preparatory works for implementation of the Green Procurement Programme to ensure purchase of more efficient equipment, vehicle and buildings in public institutions	2011 -2013	Decrease in public expenditure, market transformation for EE devices	Amendment of Public Procurement Law and publication thereof in the Official Gazette	MoF	MENR, MIA, PPA, TOKI, LA, Public Institutions and Organizations
	B1.5.1.7. Appointing energy managers for public buildings consuming 250 toe or more energy or that are larger than 10 thousand sqm, so as to increase the effectiveness of energy management practice in public buildings	2011 -2011	Savings in operational budgets of public buildings	Number of appointed energy managers, number of public buildings with an Energy Management Standard Certificate	MENR	Public Institutions and Organizations, Professional Chambers, EECs

PURPOSE B2. INCREASE RENEWABLE ENERGY USE IN BUILDINGS

OBJECTIVE B2.1. At least 20% of the annual energy demand of new buildings met via renewable energy resources as of 2017

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area B2.1.1. Promoting use of renewable energy in buildings	B2.1.1.1.Developing a feasibility report format to assess the cost effectiveness of renewable energy in buildings	2011 -2014		Implementation of feasibility format, publication of related communiqué in the Official Gazette	MENR	MEU, MENR, EMRA
	B2.1.1.2. Making new arrangements to ensure use of renewable energy in buildings, including the following: ■ Introducing maximum energy demand and maximum carbon dioxide emission limitation for buildings, and encouraging use of renewable energy resources in this scope, ■ Imposing administrative sanctions on buildings exceeding the maximum CO_2 emission values, ■ Encouraging the use of heat insulation and efficient equipments and systems, ■ Seeking sustainability as a condition for licensing commercial buildings larger than 10.000 m^2 and detached luxury residences and integrated residences, and spreading the practice gradually to other buildings, ■ Encouraging and spreading in situ energy production; encouraging and spreading use of renewable energy resources and systems such as air, soil or water-source heat pumps, cogeneration and micro cogeneration in order to meet the heating, cooling, ventilation, sanitary hot water, electricity and lighting needs of buildings either fully or partially	2011 -2015	New employment opportunities, clean environment, conservation of energy resources, decrease in external dependency in energy	Publication of new legal arrangements in the Official Gazette, number of buildings providing at least 20% of their energy needs from RES	MENR	MENR, MEU, EMRA, TEDAS and Private distribution companies, Sectoral NGOs
Action Area B2.1.2. Spreading in situ energy production in housing estates	B2.1.2.1.Implementing zone heating, cogeneration and/or micro-cogeneration applications to meet the energy demands of buildings for heating, cooling and other energy purposes in new housing estates	2011 -2014		Zone heating and cogeneration and/or micro-cogeneration applications in housing estates	TOKI	MEU, MENR, MSIT, MoCT, EMRA, TUBITAK, UCTEA, Universities, Private Sector Organizations, Design and building inspection firms

PURPOSE B3. LIMIT GREENHOUSE GAS EMISSIONS ORIGINATING FROM SETTLEMENTS

OBJECTIVE B3.1. Reduce greenhouse gas emissions in new settlements by at least 10% per settlement in comparison to existing settlements (which are selected as pilot and the greenhouse gas emissions of which are identified until 2015) until 2023

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area B3.1.1. Identifying the effect of land use on greenhouse gas emissions on settlement basis (identifying the holistic effects of all relevant sectors on settlement basis)	B3.1.1.1. Creating databases in relevant sectors for increasing energy efficiency in buildings in selected pilot cities/regions, conducting analyses to determine holistic effects	2011-2014	Effective use of public investment, energy and water resources, comprehensive administrative system	Database, analysis report	MEU	MIA, MoTC, MENR, TURKSTAT, TOKI, LA, TBB, Universities, Relevant NGOs
Action Area B3.1.2. Developing policies and legal arrangements for energy-efficient and climate-sensitive settlement/ building, and implementing them through pilot projects	B3.1.2.1. Developing energy-efficient and climate-sensitive planning and settlement principles and criteria for different climatic zones; preparing a guide for effective implementation of sustainable urban plans	2011-2014	Capacity building, increase in life quality, sustainable settlements, increase in employment opportunities	Publication of sustainable urban settlement guide and delivering them municipalities	MEU	MoTC, MIA, MoD, Provincial Bank, LA, Universities, Relevant NGOs
	B3.1.2.2. Developing and implementing urban settlement plans covering sustainability elements such as land use, ecology, transportation, water management, gray water, green/white roofs etc, using lifecycle cost evaluation methods, within the framework of pilot projects	2011-2014	Sustainable settlements, ensuring effectiveness/ efficiency in material, water, land and energy use, increase in life quality	Sustainable urban settlement plans for pilot zones, number of new model settlements/ districts/building complexes/ neighbourhood units developed/constructed by means of national and international energy efficiency methods	MEU	TOKI, TBB, Provincial Bank, Municipalities, Universities, Relevant NGOs, Professional Chambers
	B3.1.2.3. Identifying principles and procedures for energy-efficient, climate-sensitive, sustainable urban settlement planning and, using the results of pilot projects, transferring the outputs to the physical development planning legislation so as to put sustainable urban plans into practice	2015-2016	Efficiency in material, water, land use, increase in level of health, prosperity and life quality, sustainable settlements	Publication of legal arrangements regarding sustainable urban settlement in Official Gazette	MEU	TBB, LA, Universities, NGOs, Professional Chambers
	B3.1.2.4. Preparing action plan for combating and adaptation to climate change within the scope of three pilot municipalities that can be models with aspects such as population, economic activity etc, also taking into consideration the potential to be affected by climate change, and presenting them to other municipalities	2012-2014		Action plan for combating and adaptation to climate change within the scope of three pilot municipalities and contribution of stakeholders, climate change action plan introduction and preparation seminars for all greater cities and their central municipalities	Pilot Municipalities	MEU, TBB, Universities, Relevant NGOs
	B3.1.2.5.Preparation of physical development plans in the form of climate-sensitive settlement plans by local governments	2013-2015	Effective use of public resources (decrease in the number of demolished/ reconstructed buildings due to wrong planning during initial investment and after investment)	Number of local administrations preparing sustainable settlement plans	LA	MEU, Provincial Bank, Universities, UCTEA's Relevant Professional Chambers

INDUSTRY SECTOR

PURPOSE S1. INCREASE ENERGY EFFICIENCY IN THE INDUSTRY SECTOR						
OBJECTIVE S1.1. Making legal arrangements for energy efficiency and limitation of greenhouse gas emissions						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area S1.1.1. Revising existing legislation and making new legal arrangements	S1.1.1.1. Ensuring coordination between the legislations issued by different authorities with regard to limitation of greenhouse gas (GHG) emissions and increasing energy efficiency	2011-2016	Alignment with the EU	Publication of revised regulation in Official Gazette	MEU	CBCC Members, Sector Associations, NGOs
	S1.1.1.2. Making necessary legal arrangements for energy efficiency and limitation of GHG emissions	2011-2016	Alignment with the EU	Publication of new regulation in Official Gazette	MEU, EIE	MENR, MSIT, Sector Associations, NGOs
OBJECTIVE S1.2. Limiting GHG emissions originating from energy usage (including electrical energy share) in the industry sector						
Action Area S1.2.1. Incentivizing, spreading and registering energy efficiency investments in the industry sector	S1.2.1.1. Developing, spreading and registering Efficiency Enhancing Projects in the industry sector	2011-2012	Improvement of competitiveness	Number of supported projects	MENR	MSIT, EECB Members, NPC, NGOs
	S1.2.1.2. Developing voluntary collaborations related to energy efficiency	2011-2016	Improvement of competitiveness, Dissemination of international funds	Declarations, cooperation agreements	EIE	MENR, MSIT, NPC
	S1.2.1.3. Exploring financing models for transforming energy efficiency projects into investment	2011–2023	Decreased foreign dependency in energy, increased improvement of competitiveness	Research reports	UoT	MENR, MSIT, EECB Members, MoD, KOSGEB
Action Area S1.2.2. Increasing energy efficiency in SMEs	S1.2.2.1. Providing SME's with information, training and consultancy support on energy efficiency and limitation of GHG emissions	2011–2016	Capacity building, Improvement of competitiveness	Training materials and website, study guides, good practices guide, number of supported SMEs, Number of beneficiaries	KOSGEB	MSIT, MENR, MoD, TOBB, NGOs
	S1.2.2.2. Supporting implementation of energy efficiency by developing financing models for SMEs	2012–2023	Improvement of competitiveness	New financing models, increased funding possibilities	KOSGEB	MSIT, MENR, UoT, Financial institutions
	S1.2.2.3. Developing Efficiency-Enhancing Projects and voluntary agreement supports for SMEs	2011–2023	Capacity development, improvement of competitiveness	Number of supported SMEs	KOSGEB	MENR, MSIT, MoD, NPC, Relevant NGOs

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area S1.2.3. Increasing energy efficiency in energy intensive sectors	S1.2.3.1. Making national and international comparisons on energy efficiency by conducting energy studies	2011–2014	Improvement of competitiveness	Study reports, comparison reports	MENR	MSIT, MEU, MoD, NPC, TUSIAD, TOBB, TMMOB, NGOs, Private Sector Organizations
	S1.2.3.2. Developing and implementing Demonstration projects that have high energy efficiency	2012–2016	Improvement of competitiveness	Demonstration Projects	Private Sector Organizations	MSIT, MEU, MENR, MoD, NPC, KOSGEB, TUSIAD, TOBB, NGOs
	S1.2.3.3. Preparing a guide for industrial sectors in the area of technology transfer on energy-efficiency and good practices	2011–2016	Improvement of competitiveness	Technology transfer guide	MSIT	MEU, MENR, MoD, KOSGEB, TUBITAK, TOBB, TUSIAD, UCTEA, TTGV, NGOs, Private Sector Organizations
	S1.2.3.4 Identifying energy saving potential and sectoral energy efficiency targets in energy-intensive sectors	2011–2016	Improvement of competitiveness	Average specific energy consumption in energy-intensive sectors	MENR	MoF, MSIT, MEU, MoD, TUBITAK, TOBB, TUSIAD, NGOs, Private Sector Organizations
	S1.2.3.5. Integrating support of investment projects that have high energy saving potential into development plans	2014–2016	Improvement of competitiveness	Available financing possibilities in the market	MoD	MEU, MENR, TUBITAK, TUSIAD, TOBB, NGOs, Private Sector Organizations

PURPOSE S2. DECREASE THE CO_2 EQUIVALENT INTENSITY PER GDP PRODUCED IN THE INDUSTRIAL SECTOR UNTIL 2023						
OBJECTIVE S2.1. Developing the financial and technical infrastructure for limitation of GHG emissions						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area S2.1.1. Promoting voluntary agreements for reducing the intensity of greenhouse gas emissions	S2.1.1.1. Concluding voluntary agreements on limitation of GHG emissions with relevant sectors	2011–2014	Improvement of competitiveness, Alignment with the EU	Implementation methods and flow charts, Declarations, cooperation agreements	MEU	MSIT, MENR, MoD, KOSGEB, TUSIAD, TOBB, UCTEA, NGOs, Private Sector Organizations
	S2.1.1.2. Exploring access to financial instruments required for limiting GHG emissions	2012–2014	Improvement of competitiveness, capacity building	Cost/benefit analyses, research reports	UoT	MSIT, MENR, MEU, MoD, KOSGEB
	S2.1.1.3. Supporting the development of projects containing technological improvements under voluntary agreements and sharing the project results with the public	2013–2018	Improvement of competitiveness, alignment with the EU, information society, new employment opportunities	Seminars, conferences	MSIT	MEU, MENR, MoD, KOSGEB, TSE, TUSIAD, TOBB, UCTEA, TTGV, NGOs, Private Sector Organizations
Action Area S2.1.2. Support transition to low-carbon intensity in the industrial sub-sectors	S.2.1.2.1. Including topics on transition to low-carbon intensity in the strategy documents of sectors	2014–2016	Capacity building, alignment with the EU	Action plans	MSIT	MEU, MENR, MoD, KOSGEB, TUBITAK, TUSIAD, TOBB, UCTEA, NGOs, Private Sector Organizations
	S.2.1.2.2. Conducting studies on low-carbon intensity in industry at existing and future incubation and technology centres	2012–2014	Improvement of competitiveness, macroeconomic stability, new employment opportunities	Number of active organizations in technology development zones and new employment opportunities	MSIT	MEU, MENR, MoD, KOSGEB, TUBITAK, TUSIAD, TOBB, UCTEA, NGOs, Private Sector Organizations
	S2.1.2.3. Conducting studies on developing financing models for transition to low-carbon development	2011–2013	New employment opportunities, Improvement of competitiveness	Cost/benefit analyses, necessary arrangements for financial models	MoD, UoT	MoF, MSIT, MEU, MENR, MFAL, KOSGEB

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area S2.1.3. Reducing the carbon footprint in enterprises and products (with priority given to devices specified in Article 7 of the Energy Efficiency Law)	S2.1.3.1. Calculating carbon footprint of products and enterprises in the industry sector, and developing an action plan for reducing the carbon footprint	2011 – 2015	Improvement of competitiveness, capacity development, alignment with the EU, policy-making capacity	Increased number of enterprises calculating their carbon footprints, number of products with carbon footprint	Private Sector Organizations	MEU, MENR, MSIT, KOSGEB, TSE, TUSIAD, TOBB, UCTEA, NGOs
OBJECTIVE S2.2. Develop and use new technologies for limitation of GHG in the industry sector until 2023						
Action Area S2.2.1. Support R&D and technology transfer activities on low GHG emission technologies in the industry sector	S2.2.1.1. Conducting a Technology Needs Assessment (TNA) on limitation of GHG emissions in the industry sector	2012–2014	Capacity building	Sector-based TNA reports, using outputs under UNFCCC	MSIT	MEU, MENR, MoD, KOSGEB, TUBITAK, TUSIAD, TOBB, TTGV, UCTEA, NGOs, Private Sector Organizations
	S2.2.1.2. studying for determination of climate change under the scope of priority areas in the industry-related R&D supports given by the MSIT	2011–2014	Improvement of competitiveness	Number of projects on climate change and support sizes	MSIT	MEU, MENR, MoD, KOSGEB, TUBITAK, TUSIAD, TOBB, UCTEA, NGOs, Private Sector Organizations
	S2.2.1.3. Sharing with the public the good practice examples for low-GHG emission technologies in the industry sector	2014–2018	Improvement of competitiveness	Increased rate of good practice examples, conferences, seminars	MSIT	MEU, MENR, MoD, KOSGEB, TUBITAK, TUSIAD, TOBB, UCTEA, NGOs, Private Sector Organizations

PURPOSE S3. STRENGTHEN THE CAPACITY OF THE INDUSTRY SECTOR FOR COMBATING CLIMATE CHANGE

OBJECTIVE S3.1. Building the information infrastructure for limitation of GHG emissions in the industry sector until 2015

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area S3.1.1. Providing the sector with technical support on renewable energy, energy efficiency, clean production and combating climate change	S3.1.1.1. Developing guidebooks on combating climate change and organizing congresses/seminars/workshops in the industrial sub-sectors	2014 - 2020	Capacity building	Guidebooks, congresses, seminars, workshops	MSIT	MEU, MENR, MoD, KOSGEB, NCP, TSE, TUSIAD, TOBB, UCTEA, NGOs, Private Sector Organizations
	S3.1.1.2.Providing information for industrial sectors	2011 – 2020	Capacity building	Number of activities	MSIT	MEU, MENR, MoD, KOSGEB, TUSIAD, TOBB, UCTEA, NGOs, Private Sector Organizations
Action Area S3.1.2. Strengthen the capacity for developing energy management systems	S3.1.2.1. Preparing guidance documents and organizing training seminars on the ISO 50001/EN 16001 Energy Management Standard	2011 – 2015	Capacity building	Number of seminars and attendees, guidance documents	TSE	MSIT, MEU, MENR, MoD, KOSGEB, TURKSTAT, DA, TUSIAD, TOBB, UCTEA, NGOs, Private Sector Organizations
	S3.1.2.2. Training of sectoral experts on energy management systems	2012 – 2014	New employment opportunities	Addition to Energy Manager training	MENR	MSIT, MEU, MENR, MoD, KOSGEB, TURKSTAT, DA, TUSIAD, TOBB, UCTEA, NGOs, Private Sector Organizations
	S3.1.2.3. Promoting and disseminating the supports provided to SMEs within the scope of the existing regulation	2012 – 2014	Improvement of competitiveness	Amount of annual support	KOSGEB	MSIT, MEU, MENR, MoD, TSE, Private Sector Organizations
	S3.1.2.4. Reporting the effect of energy management results on limitation of GHG	2013 – 2015		Addition to annual reports	MENR	MSIT, MEU, MoD, TURKSTAT, TSE, KOSGEB, TUSIAD, TOBB, UCTEA, NGOs, Private Sector Organizations
	S3.1.2.5. Designating energy managers in all enterprises above 1000 TOE	2011 -2015	New employment opportunities	Increased number of energy managers	MENR	MSIT, MEU, MENR, UCTEA, NGOs, Private Sector Organizations
	S3.1.2.6. Establishing the Industry Climate Change Technology Platform	2013 -2014	Capacity building	Establishment of the Platform	TOBB	MEU, MENR, MSIT, MoD, TURKSTAT, KOSGEB, TUSIAD, UCTEA, NGOs, Private Sector Organizations

TRANSPORTATION SECTOR

PURPOSE U1. DEVELOPING AN INTERMODAL TRANSPORT SYSTEM AND ENSURING BALANCED UTILIZATION OF TRANSPORT MODES IN FREIGHT AND PASSENGER TRANSPORT

OBJECTIVE U1.1. Increasing the share of railroads in freight transportation (which was 5% in 2009) to 15% and in passenger transportation (which was 2% in 2009) to 10% by 2023

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U1.1.1. Improving the infrastructure and superstructure of railroads	U1.1.1.1 Renewing the existing railroad network, raising its standards and completing its electrification and signalling	2011-2023	Decrease in dependence on foreign resources (oil)	New line ratio defined	TCDD	MoF, MoTC, MoD, MoE, UoT
	U1.1.1.2. Constructing 10,000 km high-speed train railroad lines and 5,000 km conventional railroad lines until 2023	2011-2023	Decrease in dependence on foreign resources (oil), Decrease in traffic density on highways	Completion of planned length of lines	MoTC, TCDD	MoF, MoD, MoE, UoT
	U1.1.1.3. Conducting feasibility studies on core network "extensions" determined in TINA studies	2012-2014	Decrease in dependence on foreign resources (oil)	Feasibility reports	MoTC, TCDD	MoD
	U1.1.1.4. Renewing the existing rolling and running stock park	2012-2023	Decrease in traffic density on highways, Increase in efficiency and safety	Activation of new running stock and rolling stock	TCDD	MoD, MoE, UoT
Action Area U1.1.2. Developing combined transportation and increasing the effectiveness of the role of railroads in passenger and freight transportation	U1.1.2.1. Increasing the number of logistic centres	2011-2014	Decrease in traffic density on highways	Number of logistic centres	TCDD	MoTC, MoD, MoE, UoT
	U1.1.2.2. Constructing junction lines to strengthen connection and integration of railroads with ports and organized industrial zones	2014-2023	Decrease in traffic density on highways	Connections and junction lines	MoTC, TCDD	MoD, MoE, UoT, UfMA
	U1.1.2.3. Planning new railroad investment projects in a complementary to airways, ports and highways	2014-2023	Decrease in dependence on foreign resources (oil)	Increased use of railroads	MoTC	MoTC, MoD, UoT, UfMA, DHMI, TCDD, KGM, DGCA

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U1.1.3. Increasing the passenger transport service quality in railways	U1.1.3.1. Implementing operational approaches that shortens journey time and ensures delivery of prompt and comfortable services	2012-2016	Decrease in traffic density on highways	Guidelines for good operational practices, in-service personnel training, performance evaluation guides, increase in number of passengers	TCDD	MoTC, MoD
	U1.1.3.2. Improving information and online purchase services regarding tariffs, train schedules and ticket sales	2012-2014	Decrease in traffic density on highways, Economic gains	User-friendly website, increase in informative materials and methods	TCDD	MoD
	U1.1.3.3.Building alternative transport lines enabling passenger transport to railway main stations in greater cities	2014-2023	Decrease in traffic density	Investments and arrangements for alternative transport lines	Municipalities	MoD
OBJECTIVE U1.2. Increasing the share of seaways in cabotage freight transportation (which was 2.66% in ton-km in 2009) to 10%, and in passenger transportation (which was 0.37% in passenger-km in 2009) to 4% as of 2023						
Action Area U1.2.1. Improving the maritime transport infrastructure	U1.2.1.1 Improving technology, infrastructure and standards in existing ports	2014-2016	Decrease in traffic density on highways	Advanced technology and infrastructure investments in ports	UfMA	MEU, MoD, DLH, TURKLIM
	U1.2.1.2. Construction of new ports to the locations identified within the scope of the Transportation Master Plan based on the Transportation Shore Structures Master Plan, with the build-operate-transfer (BOT) model	2014-2016	Decrease in traffic density on highways	Maps showing new port locations, increasing the share of private sector in investments	MoTC	MEU, MoD, UfMA, PA
Action Area U1.2.2. Renewing and improving the fleet used in maritime transportation	U1.2.2.1. Strengthening the marine trade fleet with new ships, new machinery and equipment, and increasing the number of ships	2014-2016	Decrease in traffic density on highways	New ships purchased for the trade marine fleet, modifications in machinery, increase in number of ships	UfMA	MoTC, MoD
	U1.2.2.2.Increasing the number of ro-ro ships in lines where there is demand, for use in freight, passenger and vehicle transportation	2014-2016	Decrease in passenger, freight and vehicle density on highways	Increased number of ro-ro ships, increased share of maritime transportation	UfMA	MoTC, MoD
	U1.2.2.3. Implementing modern operation techniques in ports	2014-2016	Decrease in passenger, freight and vehicle density on highways	In-service trainings on state of the art operation techniques, operation directives	UfMA	MoTC, MoC, TCDD, TURKLIM

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U1.2.3. Developing the infrastructure of seaways in line with the combined transportation approach, and integrating maritime transport with other modes	U1.2.3.1 Establishing combined and intermodal transportation infrastructure, and building transfer/transhipment terminals between modes	2015-2023	Decrease in passenger, freight and vehicle density on highways	Connection and new transfer terminals	MoTC	MoD, MoE, UfMA, TCDD, KGM, DGCA, DHMI
Action Area U1.2.4. Supporting maritime transport	U1.2.4.1. Supporting cabotage transportation by developing tax incentives	2012-2014	Decrease in passenger, freight and vehicle density on highways	Arrangements including incentive measures	UfMA	MoTC, MoF
OBJECTIVE U1.3. Decreasing the share of highways in freight transportation (which was 80.63% in ton-km in 2009) below 60%, and in passenger transport (which was 89.59 in passenger-km in 2009) to 72% as of 2023						
Action Area U1.3.1. Adopting the intermodal corridor approach in highway planning	U1.3.1.1. Preparing integrated route plans by conducting social, environmental and economic analyses, so as to support combined transport	2011-2023	Decrease in dependency to foreign resources (oil), Decrease in traffic density on highways	Regulations, guidelines, trainings	MoTC	MoD, UfMA, KGM, TCDD
Action Area U1.3.2. Identifying suitable economic instruments to shift the intense freight and passenger traffic on highways to different transport modes	U1.3.2.1. Conducting demand elasticity researches on taxes, pricing and fines	2012-2023	Decrease in dependency to foreign resources (oil), Decrease in passenger, freight and vehicle density on highways	Final reports, cost/benefit analyses	MoTC	MIA, MoF, MoD, UfMA, KGM, TCDD, TUBITAK, Municipalities, Universities, Private sector organizations, NGOs
	U1.3.2.2. Increasing the effectiveness of audits and fines concerning over-capacity loading and minimum transport prices in passenger and freight transportation	2015-2016	Decrease in passenger, freight and vehicle density on highways, Decrease in dependence on to foreign resources (oil), Alignment with the EU	Arrangements on regulating fines, increased number of auditors	MoTC	MoF, MIA, UfMA, DGCA, KGM, Private sector organizations, NGOs

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U1.3.3. Making use of the developments in the information and communication technologies and smart transport systems in highways	U1.3.3.1. Conducting R&D studies to develop smart transport systems	2012-2016	Improvement of national industrial and technological capacity	R&D final reports	MoTC	MoD, KGM, TUBITAK, Universities Private sector organizations
	U1.3.3.2. Establishment of Main Traffic Management System Centre	2014-2018	Decrease in traffic accidents and cost of lost time in traffic	Commercialization of new technologies	MoTC	MIA, Provincial Directorates of Security (Traffic), Municipalities
OBJECTIVE U1.4. Preparing and putting in practice the "Transportation Master Plan" until 2023						
Action Area U1.4.1. Carrying out the works for preparation of the "Transportation Master Plan"	U1.4.1.1. Making forward-looking projections for the transportation sector by calculating the GHG emission limitation options, mitigation potentials and costs	2011-2023	Building capacity for low carbon growth	Results of cost/benefit analyses	MoTC	MEU, MoTC affiliated and related organizations, Universities, Private Sector
	U1.4.1.2. Integrating purposes and objectives of low-carbon economy into the Transportation Master Plan	2013-2023	Capacity building	Integrated Transportation Master Plan	MoTC	MoD, Private sector organizations, Universities
	U1.4.1.3. Preparing the "Transportation Master Plan"	2013-2023	Alignment with the EU	Approved Transportation Master Plan, economic analyses	MoTC	MoF, MIA, MSB, MSIT, MoCT, MCT, MFAL, MENR, MEU, MoD, MoTC affiliated and related organizations, Municipalities, NGOs, Universities

PURPOSE U2. RESTRUCTURING URBAN TRANSPORTATION IN LINE WITH SUSTAINABLE TRANSPORT PRINCIPLES						
OBJECTIVE U2.1. Limiting emission increase rate of individual vehicles in intracity transport						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U2.1.1. Developing and improving public transport services	U2.1.1.1 Delivering in-service training to sector employees so as to increase service quality	2012-2016	Improvement of access/ transportation possibilities for all segments of the society	In-service trainings, operation guides, customer satisfaction metering and monitoring system	Municipalities	NGOs, Consumer Unions
	U2.1.1.2. Making necessary investments and operational arrangements for urban highway, seaway, railway and rail system transportation	2014-2016	Improvement of access/ transportation possibilities for all segments of the society	Assessment report, feasibility studies	MoTC, Municipalities	MoD, TCDD, NGOs, Administration for Disabled People
	U2.1.1.3 Integrating mass transport systems with each other and other urban transport modes	2013-2016	Improvement of public services, Improvement of access/ transportation possibilities for all segments of the society, Less traffic jams	Integrated public transport plan, increase in use of public transport	Municipalities	MoTC, MoD, TCDD, NGOs, Private Sector, Administration for Disabled People
	U2.1.1.4 Arranging the ticket system in public transport in a way that will increase number of users	2013-2016	Less traffic jams	Cost/benefit analyses for price arrangements, common ticket and card applications, public information, legal arrangements	Municipalities	MoTC, MoD, TCDD, NGOs, Private Sector Consumer Unions
	U2.1.1.5. Ensuring that all new development proposals such as housing or business areas, are located on the main public transport routes that can provide effective public transportation services	2014-2016	Improvement of access/ transportation possibilities for all segments of the society	Guidelines	Municipalities	MoTC, MEU, TOKI

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U2.1.2. Development and improvement of bicycle and pedestrian transport	U2.1.2.1. Establishing citywide bicycle road networks (bicycle roads or lines), bicycle parking areas, smart bicycle/ bicycle stations	2014-2016	Improvement of access/ transportation possibilities for all segments of the society	Increased bicycle road network, increased capacities of bicycle parking areas	Municipalities	NGOs
	U2.1.2.2. Creating automobile-free pedestrian ways and areas in city centres, ensuring pedestrians can reach everywhere within the urban road network	2014-2016	Improvement of access/ transportation possibilities for all segments of the society	Automobile-free pedestrian ways and areas in city centres, easy-to-use urban road network for pedestrians	Municipalities	MIA, Administration for Disabled People, NGOs
	U2.1.2.3. Implementing urban planning approaches to turn pedestrian and bicycle trips into attractive alternatives	2014-2016	Improvement of access/ transportation possibilities for all segments of the society, Alignment with the EU	Standards and guidelines for public transport, bicycle and pedestrian access in planning and design	Municipalities	MEU, MoD, Administration for Disabled People, Universities, NGOs
	U2.1.2.4. Promoting the “Slow city” (Slowcity) concept, implementing practices in this line	2014-2020	Realization of sustainable city concept and applications	Increase in the number cities getting “Slow city” certificate	Municipalities	MEU, NGOs
Action Area U2.1.3. Implementing travel demand side management techniques that discourage use of automobiles in travels to city centre	U2.1.3.1. Effective supervision of on-road vehicle parking in urban centres, using existing parking lot capacity for short-duration parking, implementing deterrent pricing policies and installing smart parking lot systems	2014-2020	Decrease of the cost of time loss in traffic	Directive on operation principles and procedures for commercial parking lots in urban centres, legislative rearrangement on roadside parking, increase in parking prices	Municipalities	MEU, GDS, NGOs
	U2.1.3.2. Evaluating the practices for limiting automobile entrance to city centers	2015-2020	Additional income for local administrations	Assessment report	Municipalities	NGOs
Action Area U2.1.4. Making arrangements and inspections to reduce vehicle density in traffic	U2.1.4.1. Ensuring that taxis wait only at taxi stops, and imposing sanctions and inspections on commercial vehicles travelling idly in traffic in the city	2013-2014	Reduced cost of time loss in traffic	Regulation for inspections and sanctions for commercial vehicles	GDS	Municipalities, NGOs
	U2.1.4.2. Making arrangements so that heavy goods vehicles can enter the city only between specific hours, within the scope of intracity logistics	2013-2014	Reduced cost of time loss in traffic	Legal arrangements	Municipalities	GDS

OBJECTIVE U2.2. Developing the necessary legislation, institutional structure and guidance documents until the end of 2023 for implementation of sustainable transport planning in cities						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U2.2.1. Reviewing and restructuring the existing legislation	U2.2.1.1. Preparing and putting in practice the Urban Transport Law and regulations	2012-2014	Application of sustainable transportation approaches in cities	Legal arrangements	MIA, MoTC	MEU, MoD, BB, GDS, NGOs, Municipalities
	U2.2.1.2. Making legislative arrangement that will make it mandatory to prepare and approve urban transport plans as integrated with zoning plans and environmental plans	2012-2014	Improvement of life quality, Efficient use of resources	Legal arrangements	MoTC (Regulations on transport plan), MEU (Regulations on zoning plans	MEU, MoD, DA, Governorships, Municipalities, NGOs
	U2.2.1.3. Making legislative arrangement that will make traffic impact assessment mandatory for all plan changes, by amending the "Regulation on Principles of Plan Changes"	2012-2014	Prevention of noise and air pollution arising from traffic intensity	Legal arrangements	MEU	MoTC, MIA, MoD, NGOs, Municipalities
	U2.2.1.4. Including bicycle road plan and pedestrian plan in the Transportation Master Plan and Zoning Plans by making amendments in the relevant regulations	2012-2014	Contribution to human health	Legal arrangements	MoTC (Regulations on transport plan), MEU (Regulations on zoning plans)	MIA, MoD, Municipalities, NGOs
	U2.2.1.5. Reviewing and revising the "Regulation on Principles and Procedures to Increase Energy Efficiency in Transport" to include measures on pedestrian transport, in view of suggestions aiming at speeding up traffic flow and the feasibility of the transport master plan	2011-2015	Application of sustainable transportation approaches in cities	Amendments to the regulations	MoTC	MEU, EIE, Municipalities, NGOs

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U2.2.2. Institutional restructuring for urban transport	U2.2.2.1. Establishing an Urban Transport Unit that makes, steers and supervises policies for sustainable urban transport planning and management, and that has responsibility at the national level	2012-2016	Application of sustainable transportation approaches in cities	Establishment of envisaged institutional structure	MIA, MEU	MoTC, MoD, Municipalities, NGOs, Universities
	U2.2.2.2. Preparation of the Urban Transport Strategy at the national level by the Urban Transport Unit together with an independent committee composed of relevant public and private sector representatives, local governments, scientists and experts	2013-2023	Application of sustainable transportation approaches in cities	Urban Transport Strategy Document	MIA, MEU	MoTC, MoD, NGOs, Universities
Action Area U2.2.3. Preparing guidance documents that will guide urban transport practices	U2.2.3.1. Preparing guides to be distributed to all local governments on transport planning, rail system investment planning, travel demand management, obstacle-free/ universal design for pedestrian transport	2013-2023	Application of sustainable transportation approaches in cities, Efficient use of public resources	Guidance documents	MoTC	MIA, MEU, MoD, NGOs, Municipalities, Universities

PURPOSE U3. DISSEMINATION OF THE USE OF ALTERNATIVE FUELS AND CLEAN VEHICLE TECHNOLOGIES IN THE TRANSPORT SECTOR						
OBJECTIVE U3.1. Making legal arrangements and building capacity to increase use of alternative fuels and clean vehicles until 2023						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U3.1.1. Making regulations on limitation of CO_2 emissions in new automobiles, foreign-flagged freight and passenger ships	U3.1.1.1. Integrating into national legislation the EU Directive 443/2009/EC on "Reduction of CO_2 Emissions from light-duty vehicles"	2012-2015	Alignment with the EU	Legal arrangements	MSIT, MoCT	MEU, MoF, MoTC
	U3.1.1.2. Integrating into national legislation the EU Directive 2009/33/EC on the "promotion of clean and energy-efficient road transport vehicles" which stipulates sanctions to ensure preference of vehicles with the lowest emission and highest energy efficiency in the purchase of public transport vehicles	2012-2014	Application of sustainable transportation approaches in cities	Legal arrangements	MEU, Relevant public institutions and organizations	MoF, MoTC, MIA, MSIT, MoCT, MoD, Municipalities, NGOs
	U3.1.1.3. Making the legal arrangements that will make it mandatory to use low-sulphuric fuel for freight and passenger ships visiting our ports	2012-2014	Alignment with the EU, Reduced sea pollution	Legal arrangements	UfMA	MoF, MEU, MoTC, MFA
Action Area U3.1.2. Developing a taxing and pricing system based on limiting greenhouse gas emissions in motor vehicles	U3.1.2.1. Examining examples of low-toll passage practices and surveying their feasibility for Turkey	2013-2014	Technological development, Capacity development	Study report	KGM	MoTC, TUBITAK, Universities
	U3.1.2.2. Initiating studies on regulations in the taxing system to reduce GHG emissions from motor vehicles	2020-2023	Reduced air pollution	Legal arrangements	MoF	MoTC, MSIT, MoCT, NGOs
	U3.1.2.3. Offering low-toll passage opportunities to vehicles with low GHG emission in motorway and bridge toll fees	2015-2020	Reduced air pollution	Implementation of differentiated tariffs	KGM	MoF, MoTC, MEU, NGOs
	U3.1.2.4. Promoting alternative fuels and clean vehicles by making arrangements in the tax legislation within the framework of currently implemented economic programme and budget policies	2020-2023	Alignment with the EU, Promotion of the technology development national capacity	Legal arrangements	MoF	MoTC, MSIT, MoCT, MoD, TUBITAK, Universities, NGOs, Private sector organizations
	U3.1.2.5. Developing incentive methods and mechanisms to encourage vehicle fleets owned by public agencies, organizations and private companies to create fleets with clean fuel and clean vehicle technologies	2020-2023	Achieving sustainable development objectives, Improving public health	Increase in the number of vehicles using alternative fuel and clean vehicle	MoTC, MoF, MSIT, MoCT	All public and private sector organizations with vehicle fleets

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U3.1.3. Developing the capacity of the transportation sector to combat climate change	U3.1.3.1. Setting up a platform where all sector stakeholders can work together on limitation of GHG emission increase in the transportation sector and adaptation of the transport infrastructure to the impacts of climate change	2012-2013	Improving coordination in planning	Protocol on Platform Partnership	MoTC	MoD, all relevant sector actors
Action Area U3.1.4. Making legislative arrangements for our international airways and seaways with regard to emissions trading	U3.1.4.1. Making legal arrangements for monitoring GHG emissions from international air and sea transportation and creating a registry system; increasing the capacities of relevant public organizations	2012-2014	Alignment with the EU, Airways and seaways prepared for emission trading system	Legal arrangements, effective and recorded civil aviation and maritime sector reports and calculations	MEU	MoTC, DGCA, DHMI, UfMA
	U3.1.4.2. Informing and increasing calculation capacities of maritime and airline companies engaged in international transportation about developments regarding emissions trading originating from international transportation within the scope of the IMO and ICAO	2012-2014	Capacity development, Economic gains	Calculation guides, training seminars	MoTC	MEU, DGCA, UfMA, Chamber of Shipping and representatives of relevant sectors
OBJECTIVE U3.2. Taking local measures to encourage use of alternative fuel and clean vehicles in urban transport until 2023						
Action Area U3.2.1. Increasing the use of alternative fuel and clean vehicle technologies in public transportation	U3.2.1.1. Determining and putting into practice the strategy of bus and minibus fleets with regard to vehicles with low-carbon emissions	2015-2023	Development of new technologies	Increase in the number of vehicles using clean fuel in public transport busses and minibuses	Municipalities	MoTC, MEU, MoF, MENR, MoD, Private sector organizations
	U3.2.1.2. Adopting and putting into practice the strategy to introduce age limit for public transport vehicles	2015-2023	Improvement of service quality	Legal arrangements on withdrawal of old vehicles from traffic, in the Official Gazette	Municipalities	MoTC
Action Area U3.2.2. Encouraging use of clean fuel and clean vehicle technologies by private automobile users and commercial fleets in urban transportation	U3.2.2.1. Establishing charging stations for electric automobiles in cities	2015-2023	Decrease in dependence on foreign resources (oil)	Charging stations for electric automobiles	Municipalities	MoTC,MEU, MSIT, MoCT, MENR
	U3.2.2.2. Offering free or low-priced parking areas to clean fuel and clean vehicle users in urban centres	2015-2023	Decrease in dependence on foreign resources (oil)	Legislative arrangement	Municipalities	

PURPOSE U4. INCREASING EFFICIENCY IN ENERGY CONSUMPTION OF TRANSPORTATION SECTOR

OBJECTIVE U4.1. Limiting the energy consumption in transport until 2023

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U4.1.1. Spreading use of vehicles with high energy efficiency in land, sea, air transport	U4.1.1.1. Supporting R&D studies on clean fuel and vehicle technologies in the production of land, sea, air vehicles that have high energy efficiency	2012-2023	Innovation and competitiveness	R&D projects final reports	MoTC	MSIT, MoCT, MENR, TUBITAK, Municipalities, Universities, NGOs
	U4.1.1.2 Creating incentive mechanisms in production of land, sea, air vehicles that have high energy efficiency, supporting investments	2012-2023	Innovation and competitiveness	Legal arrangements	MoTC, MoF, MSIT, MoCT	Public institutions and Private Sector
Action Area U4.1.2. Decreasing the demand to travel in the city by widespread use of information and communication technologies	U4.1.2.1. Spreading the existing practices which allow electronic payment of taxes, fines and bank payments, etc.	2012-2020	Decreasing travel demand	Widespread promotion of the practices	Prime Ministry	MoTC, MENR, other related public institutions, Private sector organizations
	U4.1.2.2. Including strategies and objectives on holding meetings via video conference methods in public workplaces in the strategic plans of public institutions	2013-2020	Decreasing travel demand	Revised strategies, providing technical equipment for video conferences	Public institutions, Private sector organizations	MoTC, MENR
	U4.1.2.3. Giving information and trainings and encouraging the academics on increasing distance learning opportunities in universities via “smart classroom” practices	2014-2020	Decreasing travel demand	Assessment and needs reports	Universities	CoHE
Action Area U4.1.3. Developing and implementing climate-sensitive urbanization and transport strategies with high energy efficiency	U4.1.4.1. Preparing and implementing a climate-sensitive urban transport strategy with high energy efficiency by selecting pilot cities	2013-2018	Application of sustainable transportation approaches in cities	Starting model practices in pilot cities, sharing the results nationwide	MoTC, MIA	MEU, Municipalities, Universities, NGOs
	U4.1.4.2. Supporting R&D on “Smart Transport Systems” and “Traffic Management” practices, and establishing Smart Transport System Centres	2013-2015	Increase in sector efficiency	R&D final reports, transport corridors using Smart Transport System	MoTC, KGM, Municipalities	TUBITAK, Universities, NGOs
	U4.1.4.3. Identifying the impacts of smart transport, super/sub structures in the city, OGS and OKS on limiting GHG emissions	2014-2018		Evaluation reports	MoTC, Municipalities	MIA, KGM, DG Local Administration, Universities

PURPOSE U5. DEVELOPING THE INFORMATION INFRASTRUCTURE IN THE TRANSPORT SECTOR						
OBJECTIVE U5.1. Building a well-organized, reliable and sustainable information infrastructure with transport and travel data including GHG emission data, until the end of 2016						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area U5.1.1. Strengthening the information infrastructure for freight and passenger transport	U5.1.1.1. Making surveys to establish transport databases in urban transport at the local level, and developing codes that will enable collecting comparative data	2011-2014		Transport and Travel Survey results report	Local Authorities	TurkStat, Provincial Directorates of Security, Private sector organizations
	U5.1.1.2. Collecting, computerizing, monitoring and evaluating real and reliable transport data in passenger and cargo transportation in all sectors by building the necessary infrastructure	2011-2016		Periodically updated data base	MoTC, MENR, UfMA, DHMI	MEU, MoTC affiliated and related organizations, TurkStat, DGCA, KGM, EMRA, Maritime Trade Organization Airline companies, relevant NGOs, Private sector organizations
	U5.1.1.3. Conducting research and creating statistical data on use of alternative fuels in passenger and freight transportation	2011-2016		Periodically published statistical reports, monitoring system, periodically published statistical reports	MENR	MoTC, KGM, EMRA
	U5.1.1.4. Limiting GHG emissions by using Warm Mix Asphalt instead of Bitumen Hot Mix in road covering	2011-2016		Periodically updated data base	MoTC, KGM, Municipalities	MEU, TUBITAK, TurkStat, Universities
	U5.1.1.5. Keeping data and statistics on emission data of all vehicles used in passenger and freight transportation, developing strategies to limit emissions	2011-2016		Periodically updating statistical reports	MoTC	MSIT, MoCT, UfMA, TCDD, DHMI, DGCA, KGM
	U5.1.1.6. Examining all transport lines in terms of GHG emissions and ensuring the data is recorded as Measurable, Reportable and Verifiable	2012-2016		Periodically updating statistical reports, with MRV data	MoTC	MSIT, MoCT, UfMA, TCDD, DHMI, DGCA, KGM


METAL
GLASS
PLASTIC
APER

PURPOSE A1. ENSURE EFFECTIVE WASTE MANAGEMENT						
OBJECTIVE A1.1. Reduce the quantity of biodegradable wastes admitted to landfill sites, taking year 2005 as a basis, by 75% in weight till 2015, by 50% till 2018 and by 35% till 2025						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area A1.1.1. Preparation and implementation of Integrated Waste Management Plans (IWMP) by Municipalities/ Municipality Unions	A1.1.1.1. Taking an inventory of park-garden and organic wastes, carrying out recycling activities, and integrating them into IWMP	2011–2020	Reduction of biodegradable waste amount, ensuring sustainability, protection of natural resources, alignment with the EU	Inventory report of organic wastes and wastes from parks, gardens, disposal report of organic wastes and wastes from parks, gardens	Municipalities, Municipality Unions	MEU
	A1.1.1.2. Optimizing the solid waste collection, transportation and disposal system to minimize distances, setting up transfer stations to regions where the distance for transporting wastes to the disposal facility and the transportation conditions are not favourable, and incorporating them into the IWMP	2013–2020	Human health, contribution to the economy, ensuring sustainability, protection of natural resources, alignment with the EU	Waste collection and transportation route optimization study results, number of transfer stations	Municipalities, Municipality Unions	MEU
Action Area A1.1.2. Strengthening the institutional structure of Waste Management Unions	A1.1.2.1. Assigning sufficient number of personnel for effective implementation of the IWMP	2011–2020	Human health, employment ensuring sustainability	Number personnel designated to waste management, rate of achieving IWMP objectives	Municipalities, Municipality Unions	MIA
	A1.1.2.2. Giving trainings and purchasing machinery-equipment to strengthen technical capacity (personnel and technological infrastructure) for effective implementation of the IWMP	2011–2020	Ensuring sustainability, protection of natural resources	Number of annual activity reports, procured machineries and equipments, trainings provided to personnel	Municipalities, Municipality Unions	MEU , Private Sector Organizations, Designated organizations
Action Area A1.1.3. Developing institutional capacity for monitoring and supervision of IWMP practices	A1.1.3.1. Integration of the data and information system that will be developed to ensure effective monitoring and supervision of IWMP practices into the Environmental Information System (EIS)	2013–2016	Alignment with the EU	Development of software system, operation of EIS in a sustainable manner, regular reporting of verifiable data as of 2018	MEU	
	A.1.1.3.2. Establishing an effective monitoring and supervision mechanism for management of wastes	2011–2016	Establishment of an efficient inspection mechanism, a smoothly operating waste management system	Monitoring and inspection reports	MEU	Municipalities, Municipality Unions, Private Sector Organizations
	A1.1.3.3. Increasing the number and capacity of the technical personnel that will be assigned to monitor and inspect waste management activities	2011–2020	Effective implementation of legislation alignment studies	Increasing number and capacity of technical personnel	MEU	Universities, Private Sector Organizations, Designated organizations

OBJECTIVE A1.2. Establish integrated solid waste disposal facilities across the country, and dispose 100% of municipal wastes in these facilities, until the end of 2023						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area A1.2.1. Developing the capacity of solid waste disposal facilities via waste management in conformity with national legislation and the EU acquis	A1.2.1.1. Making the landfill site operation plan in accordance with the provisions of the Regulation on Landfills	2011–2017	Protection of human health, contribution to the economy, ensuring sustainability, protection of natural resources, alignment with the EU	Operation plans in conformity with the legislation	Municipalities, Municipality Unions	MEU
	A1.2.1.2. Providing hands-on operational training to the technical personnel working at landfills	2011–2020	Protection of human health, contribution to the economy, ensuring sustainability, protection of natural resources, alignment with the EU	Number of trainings, number of personnel with training certificates	MEU	Municipalities, Municipality Unions, Universities, Private Sector Organizations
Action Area A1.2.2. Utilization of the landfill gas	A1.2.2.1. Calculating the landfill gas created on the site, and assessing the necessary systems with a feasibility study	2011–2017	Protection of human health, contribution to the economy, ensuring sustainability, protection of natural resources, alignment with the EU	Landfill gas management plan, application investments	Municipalities, Municipality Unions	MEU
	A1.2.2.2.Collecting the landfill gas (biogas) created in the suitable sections of the covered areas of landfill sites and ensuring their use in energy generation	2013–2020	Protection of human health, contribution to the economy, ensuring sustainability, protection of natural resources, alignment with the EU	Number of active gas collection and flaring systems in landfill areas	Municipalities, Municipality Unions	MEU
	A1.2.2.3. Examining and comparing thermal disposal technologies and other disposal technologies in view of greenhouse gases in greater cities, and including them in feasibility reports	2015–2023	Protection of human health, contribution to the economy, ensuring sustainability, protection of natural resources, alignment with the EU	Greenhouse gas emission benchmarking reports regarding disposal methods	Greater City Municipalities	MEU

OBJECTIVE A1.3. Finalize Packaging Waste Management Plans						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area A1.3.1. Effective implementation of source-separated collection of wastes	A1.3.1.1. Conducting R&D studies for source-separated waste collection practices	2011–2023	Protection of human health, contribution to the economy, ensuring sustainability, protection of natural resources, alignment with the EU	R&D reports	MEU	Municipalities, Designated organizations, Marketers, Licensed Packaging Waste Collection and Sorting Facilities, Recycling Facilities and NGOs
	A1.3.1.2. Carrying out training, promotion and awareness-raising activities on source-separated waste collection, within the framework of a plan	2011–2020	Protection of human health, contribution to the economy, ensuring sustainability, protection of natural resources, alignment with the EU	Training materials and trainings, publicity and awareness campaigns, number of trained persons	MEU, Municipalities, Municipality Unions, Designated organizations	Designated organizations, Marketers, Licensed Packaging Waste Collection and Sorting Facilities, Recycling Facilities and NGOs
	A1.3.1.3. Developing an effective monitoring and inspection mechanism for waste management	2011–Time Periodkli	Capacity development	Work program and reporting guidelines for monitoring and inspection system, monitoring and inspection reports, number of firms being monitored and inspected	MEU	Municipalities, Designated organizations, Marketers, Licensed Packaging Waste Collection and Sorting Facilities, Recycling Facilities and NGOs
OBJECTIVE A1.4. Establish the recycling facilities foreseen within the scope of the Solid Waste Master Plan with the EU-aligned Integrated Waste Management approach						
Action Area A1.4.1. Increasing the number of compost and biomethanisation plants	A1.4.1.1. Establishing compost and biomethanization facilities across Turkey for organic wastes, parks-gardens and marketplaces wastes, vegetal and animal wastes, etc.	2013–2023	Reduction in the amount of stored biodegradable waste	Number of installed facilities	Municipalities, Municipality Unions, SPA	MEU, MFAL, Sector related to waste, NGOs
	A1.4.1.2. Conducting studies to generate renewable energy from all waste sources (i.e. domestic wastes and other municipal wastes) that have an energy value	2011–2020	New employment opportunities, technological development	Waste-to-energy potential analysis report	Municipalities, Municipality Unions	MoF, MEU, MENR, MFAL
	A1.4.1.3. Ensuring that local governments benefit from incentives for implementation of waste management systems	2013–2023		Number of municipalities receiving incentives	Municipalities, Municipality Unions	MEU

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area A1.4.2. Supporting the waste reduction policy	A1.4.2.1. Making necessary arrangements for active operation of recycling facilities for waste reduction	2011–2020	Human health, contribution to the economy	Legal arrangements	MEU	Municipalities, Municipality Unions, NGOs
	A1.4.2.2 Increasing the effectiveness of economic instruments based on the polluter pays principle (determining domestic solid waste disposal tariffs in accordance with the regulations)	2011–2014	Human health, contribution to the economy	Number of municipalities collecting disposal fee	Municipalities, Municipality Unions	MoF, MEU, Court of Accounts
	A1.4.2.3 Organizing campaigns and public awareness-raising activities regarding waste minimization	2011–2020	Protection of human health, contribution to the economy, protection of natural resources	Number of campaigns, seminars and advertorial programs	Municipalities, NGOs	MEU
OBJECTIVE A1.5. Termination of uncontrolled disposal of wastes 100% by 2023						
Action Area A1.5.1. Rehabilitation of uncontrolled waste sites	A1.5.1.1. Preparing and implementing the rehabilitation projects (landfill leachate and landfill gas management, etc.)	2016-2023	Protection of human health, contribution to the economy, ensuring sustainability, protection of natural resources, alignment with the EU	Rehabilitation projects	Municipalities, Municipality Unions	MEU
	A1.5.1.2. Establishing an effective monitoring and inspection mechanism for rehabilitation of uncontrolled waste sites	2016–2020	Capacity development	Work program and reporting guides for monitoring and inspection system, monitoring and inspection reports, number of inspected and monitored wild landfill areas	MEU	Governorships, Municipalities, Municipality Unions

PURPOSE T1. INCREASE THE SINK CAPACITY OF THE AGRICULTURE SECTOR						
OBJECTIVE T1.1. Determine and increase the quantity of carbon stock captured in the soil						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area T1.1.1. Disseminating sustainable agriculture techniques that also take into consideration adaptation to climate change	T 1.1.1.1. Determining the carbon stock captured in the soil through sampling method	2012-2014	Management and protection of natural resources	Maps for retained amount of carbon in soil	MFAL	MEU
	T 1.1.1.2. Developing the Land Parcel Identification System	2011-2014	Improvement in natural resources management	GIS related to parcels, database	MFAL	MEU, DGAR, Governorships
	T 1.1.1.3. Effective control and prevention of stubble burning and burning of other produce wastes, and encouraging techniques for ploughing on stubble	2012 and onwards	Improvement in natural resources management, economic gains	Reports and sanctions for stubble-burning cases, legal arrangements to prevent stubble-burning	MFAL	SPA, Farmer Unions
	T 1.1.1.4. Identifying appropriate crop rotation according to regions and training the farmers	2012 and onwards	Economic gains, healthy and sustainable food production	Trainings given to farmers Increase in organic substance contents of the soil	MFAL	Governorships, CAE, Water-user organizations
	T 1.1.1.5. Improving use of organic and green fertilizer, exploring and spreading use of vegetal wastes as green fertilizer	2012 and onwards	Improvement in natural resources management, sustainable food production, economic gains	Increasing use of organic fertilizer, assessment and research reports	MFAL	Governorships, CAE, Water-user organizations
	T 1.1.1.6. Spreading use of technical devices used on low tillage or no-tillage farming, increasing R&D studies	2011 and onwards	Improvement in natural resources management, energy saving	Reports on organic substance content of soil, energy saving	MFAL	Governorships, Universities, CAE

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area T1.1.2. Increasing the effectiveness of soil management	T 1.1.2.1. Preparing and presenting to users up-to-date soil maps at international standards	2012–2016	Improvement in natural resources management, economic gains	Soil database and related maps	MFAL	MEU, Governorships, Universities
	T 1.1.2.2. Preparing and publishing Turkey's erosion risk map	2012–2014	Protection of soil and water resources	Erosion risk map	MFAL	MEU, Governorships, Universities
	T 1.1.2.3. Preparing and publishing Turkey's coastal areas erosion risk map	2012–2014	Protection of soil and water resources	Maps of risky areas	MEU	MFAL, SPA, Universities
	T 1.1.2.4. Monitoring soil pollution and land deteriorations	2012 and onwards	Protection of soil and water resources	Inventory of soil problems, up-to-date soil maps	MFAL	MEU, TURKSTAT, Governorships, Universities
Action Area T1.1.3. Increasing the effectiveness of pasture management	T 1.1.3.1. Completing "Pasture Information System"	2011–2018	Improvement in natural resources management, economic gains, healthy and sustainable food production	Completed "Pasture Information System"	MFAL	MEU, Governorships
	T 1.1.3.2. Establishing an effective pasture management system	2013–2018	Sustainable natural resource management, healthy production of animal source food	Related legal arrangements, pasture management plans integrated with in-forest pasture management plans	MFAL	MEU, DGF, Governorships, CAE, Farmers
	T 1.1.3.3. Monitoring pasture capacities and efficiency, identifying and implementing alternatives that will help water balance and increase productivity in pastures	2012 and onwards	Sustainable use of natural resources, healthy production of animal source food	Periodic reports published, alternatives developed to increase productivity	MFAL	MEU, Governorships

OBJECTIVE T1.2. Identifying and increasing topsoil and subsoil biomass

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area T1.2.1. Completing the irrigation infrastructure	T 1.2.1.1. Mapping planted agricultural lands in accordance with the ages and types of planted trees, thereby determining the subsoil and topsoil biomass	2011–2013		Maps of planted agricultural products	MFAL	MEU, Governorships, CAE
	T 1.2.1.2. Enabling irrigation in economically irrigable lands in line with existing ecosystem	2012–2020	Increasing agriculture production potential	Increased irrigated areas	SHW	MFAL, Governorships, Water-user organizations
	T 1.2.1.3. Expanding the agricultural support programme for "Modernization of Infield Irrigation Systems "	2011–2015	Sustainable use of soil and water resources, protection of water ways and wetlands	Investments in pressurized irrigation systems for infield irrigation, decreased in-parcel erosion	MFAL	SHW, Governorships, Water-user organizations, Ziraat Bank
	T 1.2.1.4. Making necessary legal and technical arrangements so that water is charged based on the amount of water used rather than the size of land irrigated	2012 and onwards	Sustainable use of soil and water resources	Publication of legal arrangement in Official Gazette, technical guidelines	SHW	MFAL, SPA, Water-user organizations, Ziraat Bank, Cooperatives
	T 1.2.1.5. Training members of irrigation unions and co-ops and increasing financing resources so as to spread use of pressure irrigation system	2012 and onwards	Improvement in natural resources management, economic gains, energy saving	Training seminars	MFAL	SHW, Governorships, Water user organizations
	T 1.2.1.6. Building a structure under which services oriented to spreading pressure irrigation can be executed under MFAL	2012–2020	Sustainable and environmentally friendly use of soil and water resources	Start of operation of the established unit	MFAL	
	T 1.2.1.7. Completing works for transition to closed pipe systems	2012–2020	Economic gains, protection of natural resources	Closed pipe systems	MFAL	SHW, Governorships
Action Area T1.2.2. Improving agricultural infrastructure	T 1.2.2.1 Making legislative arrangements to prevent division of farmlands and completing land consolidation works	2012–2020	Improvement in agricultural infrastructure, energy savings, economic gains	Increasing average parcel size	MFAL	MoF, SHW, Governorships
	T 1.2.2.2. Completing infield development services	2012–2023	Economic gains	Increasing soil fertility, records of land consolidations	MFAL	SHW, Governorships
	T 1.2.2.3. Establishing a banking system for agricultural lands	2013–2015	Increasing competitiveness, energy saving	Establishment of land banking system, increase in sizes of farming enterprises	MFAL	MoF, MoD, SHW, BRSA, Governorships

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area T1.2.3. Enabling management of vegetative production	T 1.2.3.1. Planning agricultural production on the basis of agricultural basins, and channelling agricultural supports in line with these plans	2011 and onwards	Effective use of natural resources, economic gains	Agricultural production plans, related legal arrangements	MFAL	MoF, MoD, UoT, SHW, Governorships
	T 1.2.3.2. Establishing "Domestic Organic Seed Bank"	2012 and onwards	Effective use of natural resources, prevention of environmental pollution, economic gains	"Domestic Organic Seed Bank"	MFAL	MoF, MoD, UoT, DGF
	T 1.2.3.3. Carrying out necessary supporting, monitoring and evaluation activities to increase, spread and protect perennial cultivation where suitable and necessary	2011 and onwards	Effective use of natural resources, economic gains	Mapping of perennial tree plantation areas, monitoring system	MFAL	MEU, Governorates, CAE
	T 1.2.3.4. Developing environment-friendly methods in combating disease and pests, training farmers to disseminate their use	2011 and onwards	Effective use of natural resources, prevention of environmental pollution, economic gains	Numbers of provided trainings and trained farmers	MFAL	MoD
	T 1.2.3.5. Building the legal and institutional structure for management of natural meadows and other non-use areas, and preparing action plans to vegetate these areas	2013 and onwards	Improvement of natural resources, economic gains	Related legal arrangement, action plans	MFAL	MoD
	T 1.2.3.6. Disseminating precision agriculture techniques	2012–2020	Sustainable use of natural resources, decreasing agricultural inputs, energy saving	Seminars for farmers	MFAL	MEU, Governorships, Universities

PURPOSE T2. LIMITATION OF GREENHOUSE GAS EMISSIONS FROM AGRICULTURE SECTOR						
OBJECTIVE T2.1. Identify the potential GHG emissions limitation in agriculture sector						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area T2.1.1. Identifying and assessing the options for GHG emissions limitation in agriculture sector	T 2.1.1.1. Identifying the emission sources and sink capacities in the agriculture sector	2012–2014	Capacity development	Periodical assessment reports	MFAL	MEU, TURKSTAT
	T 2.1.1.2. Identifying emission limitation alternatives in the agriculture sector and calculating their costs	2012–2015		Emission limitation potential and cost	MFAL	MEU, DGF
OBJECTIVE T2.2. Decrease the increase rate of GHG emissions originating from vegetal and animal production						
Action Area T2.2.1. Limiting GHG emissions originating from vegetative production	T 2.2.1.1. Preparing Turkey's fertilizer consumption inventory, spreading analysis-based fertilizer use	2013 and onwards	Decreasing energy use in agriculture, healthier food production	Fertilizer consumption inventory, needs analysis report, trainings to the technical personnel, new laboratory equipments	MFAL	TURKSTAT, Governorships, Farmer Unions, Farmers, CAE
	T 2.2.1.2 Strengthening the infrastructure of Soil and Fertilizer Analysis Labs	2013 and onwards	Increasing effectiveness in analyses, healthier food production	Trainings to the technical personnel, new laboratory equipments	MFAL	MoD, Governorships, Universities
	T 2.2.1.3. Increasing utilization of animal-sourced fertilizer and training farmers on this subject	2013 and onwards	Decreasing energy use in agriculture, healthier food production	Farmer trainings regarding fertilizer usage	MFAL	Governorships, Farmer Unions, Farmers, CAE
	T 2.2.1.4. Integrated planning with "Turkey Agriculture Basins Production and Support Project" for rice production areas and establishing support mechanisms for implementation	2013 and onwards	Environmental gains	Rice cultivation shifted to proper rice fields, trainings, training materials	MFAL	Governorships

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area T2.2.2. Limiting GHG emissions from animal production	T 2.2.2.1. Establishing the necessary support/ incentive programme to spread pasture-based animal husbandry	2013 and onwards	Food security	Periodical publications on sustainable pasture management	MFAL	MEU, DGF Governorships
	T 2.2.2.2. Identifying feed ratios and training farmers to reduce methane gas from enteric fermentation	2013 and onwards	Prevention of environmental pollution	Report on correct feed rations, trainings for farmers	MFAL	TUBITAK, Universities
	T 2.2.2.3. Identifying measures to ensure animal production with high genetic performance for meat and milk production	2012-2014	Food security	Legal arrangements	MFAL	MoD
	T 2.2.2.4. Preparing training programmes for management and use of animal-sourced fertilizers and establishment of biogas production facilities	2012 and onwards	Prevention of environmental pollution, economic gains, renewable energy generation	Farmer training programs	MFAL	MENR, EIE, Livestock cooperatives
Action Area T 2.2.3. Limiting GHG emissions originating from energy consumption in agriculture	T 2.2.3.1. Making legal arrangements to balance electricity production by ensuring that electro-pumped irrigations are done in the hours during which nationwide energy consumption is at the lowest	2012-2018	Economic gains, decreasing environmental pollution	Legal arrangement, farmer training programs, utilization of required technologies	MFAL	EIE, EMRA, GAP, Governorships, Universities
	T 2.2.3.2. Exploring on regional basis the opportunities for using renewable energy in agriculture	2012 and onwards	Economic gains, decreasing air pollution	Installation of renewable energy generation systems	MFAL	MSIT, MENR, MFAL, GAP, DA, Universities
	T 2.2.3.3. Preparing production plans to minimize distances between crop cultivation areas and markets, and ensuring integration thereof with basin-based production planning project	2012 and onwards	Energy gain, economic gains, decreasing air pollution	Production plans	MFAL	Producer unions
	T 2.2.3.4. Providing mechanisms and financing facilities that will encourage use of high-tech engines with low fuel consumption	2012-2014	Economic gains, decreasing environmental pollution	Financing opportunities for farmers	MFAL	MSIT, TarmakBir

PURPOSE T3. DEVELOP INFORMATION INFRASTRUCTURE AND CAPACITY IN THE AGRICULTURE SECTOR						
OBJECTIVE T3.1. Build the information infrastructure that will meet the needs of the agriculture sector in adapting to and combating climate change						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area T3.1.1. Building the infrastructure and capacity for monitoring and evaluating the impacts of climate change	T 3.1.1.1. Conducting and recording phenological observations to monitor the impacts of climate change	2011-2013	Contributions on sustainable food production	Principles and guidelines regarding the observations, records and publications on phenological observation results	MFAL	MEU, SMS
	T 3.1.1.2. Completing the "Agriculture Information System" that includes all existing and planned agricultural inventories	2012-2013	Improvement in natural resources management, economic gains on agriculture sector	Complete and up-to-date database	MFAL	All ministries, Local Administrations, NGOs
	T 3.1.1.3. Identifying and monitoring the carbon content in soil	2012 and onwards		Carbon content monitoring network	MFAL	MEU, DGF
	T 3.1.1.4. Developing institutional capacity with regard to combating climate change in the agriculture sector	2012 and onwards		Organizational infrastructure with clear job and authority descriptions	MFAL	MEU, DGF

LAND USE and FORESTRY SECTOR

PURPOSE O1. INCREASE THE AMOUNT OF CARBON SEQUESTERED IN FORESTS

OBJECTIVE O1.1. Increase the amount of carbon sequestered in forests by 15% of the 2007 value by 2020 (14,500 Gg in 2007, 16,700 Gg in 2020)

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area O1.1.1. Identifying carbon sequestration opportunities in forestry sector	O1.1.1.1. Identifying the carbon sequestration potential in forests and making the relevant cost analyses	2012-2015	Cost optimization	Potential sinks report	DGF	MEU, MFAL
	O1.1.1.2. Establishing a afforestation monitoring system and integrating it to the Forest Inventory and Monitoring System	2011-2013	Increasing capacity and effectiveness	Integrated monitoring system	MEU	DGF
	O1.1.1.3. Identifying the carbon sequestration potentials of the maquis and steppes lands, which spread across wide areas in Turkey	2011-2014	Eco-system services	Assessment report	DGF	MEU
	O1.1.1.4. Identifying the industrial plantation areas for wood production, and the production capacities of these areas as well as the tree species to be used	2011-2014	Added value to forestry sector	Assessment report	DGF	MEU
	O1.1.1.5. Making an assessment to estimate the greenhouse gas removal potential that may arise in LULUCF reporting of the Kyoto Protocol	2011-2012		Assessment report	DGF	MEU, MFAL, TURKSTAT
	O1.1.1.6. Identifying the potential of forestry activities to benefit from UNFCCC and KP instruments (carbon markets, REDD+ etc.), and their respective carbon sequestration potential	2011-2012	Potential benefits from voluntary carbon markets	Assessment report	DGF	MEU
	O1.1.1.7. Evaluating the results of the 2008–2012 afforestation Action Plan in terms of carbon sequestration, preparing and implementing a new action plan for 2013 and beyond	2012-2013	Erosion control, new employment opportunities for forest villagers	Assessment report, Afforestation Action Plan(2013-2017)	MEU	DGF
	O1.1.1.8. Making an assessment on keeping records of the sectors and utilization areas where the cut timber is transferred and used	2013-2020	Sectoral benefits	Registration system	MSIT, MFAL	DGF
	O1.1.1.9. Ensuring that energy forestry activities are science based, and determining the potential for energy forestry in our country	2011-2016	Increasing renewable energy resources	Assessment report or final report	DGF	Universities
	O1.1.1.10. Developing and implementing models on carbon cycle and sinks	2012-2015		Usable models	DGF	MFAL, TUBITAK, Universities

PURPOSE O2. REDUCE DEFORESTATION AND FOREST DAMAGE

OBJECTIVE O2.1. Reduce deforestation and forest damage by 20% of the 2007 values by 2020

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area O2.1.1. Increasing technical precautions in combating forest damage	O2.1.1.1 Effectuate a system or arrangement that will ensure rapid coordination between DGF and TSMS with regard to various forestry activities (cutting, fires, winds etc)	2011-2013	Sustainable management of natural resources	Meteorological data system able to provide forest-oriented services	DGF	MEU, SMS
	O2.1.1.2 Collecting meteorological data in forest areas and publishing them regularly	2013-2020	Protection of forest areas	Regular publishing	SMS	DGF
	O2.1.1.3 Including risk preparation/prevention necessary for combating forest fires occurring due to climate change within the scope of local/regional planning activities	2011-2020	Better forest products and Eco-system services, Improved forest fire fighting capabilities	Needs assessment report for more effective fire fighting	DGF	MEU
	O2.1.1.4. Establishing a monitoring system that will facilitate and guide combat against forest damage; integrating it to the proposed Forest Inventory and Monitoring System	2011-2013	Information based decision making	Integrated monitoring systems	DGF	Forestry Research Directorates
	O2O2.1.1.5. Developing new methods and techniques to increase effectiveness in combating disease and pest damage	2011–2020	Healthier forest eco-systems, better forest products and eco-system services	Needs analysis report	DGF	Forestry Research Directorates, Universities
Action Area O2.1.2. Ensuring public training, awareness rising on climate change and protection of forests, and public participation in the management of natural resources	O2.1.2.1. Educating forest villagers on the importance of forests and protection of forests in combating climate change	2011-2020	Increasing knowledge level of forest villagers	Training programs	DGF	MFWW
	O2.1.2.2. Delivering training and awareness raising activities for forest villages, especially among women, on ensuring heat insulation and economical use of energy	2011-2020	Increased rural life quality	Training activities in villages	DGF	MFWW, MEU, MFAL

PURPOSE O3. LIMIT THE NEGATIVE IMPACT OF LAND USES AND CHANGES SUCH AS FORESTS, PASTURES, AGRICULTURE AND SETTLEMENTS ON CLIMATE CHANGE						
OBJECTIVE O3.1. Integrate the climate change factor in land use and land use changes management strategies by 2015						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area O3.1.1. Conduct studies on detection of land use and changes in land use	O3.1.1.1. Submitting research projects on the assessment of the impact of forests and other land uses on water quality, quantity and regime to TUBITAK	2011-2015	R&D capacity development	Project final reports, at least 2 projects on this subject	MFAL, DGF	Universities, public institutions and organizations
	O3.1.1.2. Developing a decision support mechanism for classification of land use in accordance with IPCC standards, and for monitoring the changes	2011-2015	Improved land management	Base maps, regularly updated maps	DGF	MFWW, MFAL
	O3.1.1.3. Revising the legal arrangements on preventing misuse of absolute and irrigated farming areas, and conducting other technical studies	2011-2015	Protection of agricultural lands	Preparation of relevant maps	MFAL	MFWW, SPA
	O3.1.1.4. Revising the national information systems monitoring the changes in land use types, and the compiled data; comparing them to the data required within the scope of international processes (UNFCCC, UNCCD, UNCBD etc.) and identifying the new data required; collecting and recording these data, and entering them in a GIS-based database	2012 and onwards		Regularly updated GIS based database	DGF (For forest areas), MFAL (For agricultural lands), Municipalities (In municipal borders)	MFWW, Universities
	O3.1.1.5.Developing carbon sequestration factors for required locations in Turkey in accordance with land use types; preparing guidelines to enable calculation of GHG emission inventory using the Tier-2 method; and ensuring the necessary capacity building	2012-2014	Capacity building	National sink factors, calculation guidelines, seminars for municipalities	DGF (For forest areas), MFAL (For agricultural lands), Municipalities (In municipal borders)	TURKSTAT
OBJECTIVE O3.2. Increase the amount of sequestered carbon as a result of agricultural forestry activities by 10% of the 2007 values by 2020						
Action Area O3.2.1. Increasing the amount of sequestered carbon as a result of agricultural forestry activities	O3.2.1.1. Encouraging energy forestry in lands that are not ecologically or economically suitable for agricultural use	2013-2020	High socio-economic gain	Physical development	DGF	MFWW, Universities
	O3.2.1.2. Preparing the necessary technical and administrative guideline to increase the number of short-rotation coppice enterprises	2013-2020	High socio-economic gain	Technical and administrative directive	DGF	MFWW, Universities

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
OBJECTIVE O3.3. Identify the amount of sequestered carbon in pastures and meadows in 2012, and increase carbon stock 3% by 2020						
Action Area O3.3.1. Accelerate pasture improvement activities within the scope of combating climate change	O3.3.1.1. Preparing and implementing an action plan on the rehabilitation of pasture areas in forests	2011-2017	Healthy animal sourced food production	Action plan, pasture improvement projects	DGF	MFAL, MFWW
	O3.3.1.2. Conducting preliminary evaluation studies that take into consideration the biodiversity, wildlife, hydrology and carbon sequestration role of aforestation or forest improvement activities in external or marginal pasture lands or in the clearings inside forests	2011-2015	Conservation of bio-diversity	Related legal arrangement	DGF, MFAL	MFWW
OBJECTIVE O3.4. Identify the existing carbon stock in wetlands in 2012, and maintain the level until 2020						
Action Area O3.4.1. Speeding up efforts to combat erosion, sedimentation and deforestation	O3.4.1.1.Identifying the existing carbon stock in wetlands	2011–2013		Carbon stock of wetlands	MFAL	MFWW, DGF, SHW
	O3.4.1.2. Establishing a desertification monitoring and evaluation system based on climate monitoring and modelling studies, long-distance images and data obtained in situ	2012–2015	Consolidating land management	Periodically published monitoring and assessment reports	DGF	MFWW, MFAL, DGF, Universities
	O3.4.1.3. Carrying out basin rehabilitation studies with a participatory approach to prevent erosion and sedimentation and to ensure sustainable use in basins and water resources	2012–2015	Protection of water resources	Assessment reports, water basin protection and management plans	MFWW	MFAL, MENR, MoTC, MSIT, MoCT SHW, DGF, EMRA, TUBITAK, Universities
	O3.4.1.4. Conducting an evaluation study to quantify and prevent carbon loss through erosion and sedimentation	2013–2015		Study final report	MFAL, MFWW, DGF, SHW	MEU, TUBITAK, Universities, NGOs
Action Area O3.4.2. Take measures for protection and improvement of wetlands	O3.4.2.1. Making necessary changes in legislation to prevent wetland drainage	2011-2014	Conservation of natural resources and bio-diversity	Related legal arrangement	SHW	MFWW, MFAL, Municipalities
	O3.4.2.2. Increase the number of studies to restore dried wetlands into wetlands	2011-2015	Increase in economic assets	Projects, areas converted back to wetlands	SHW	MFWW, MFAL, Municipalities
	O3.4.2.3. Installing a monitoring system for wetlands and protected areas, and integrating it to Land Inventory and Monitoring System	2011-2015	Protection of natural resources	Integrated wetland monitoring system	MFWW	MFAL, SHW
	O3.4.2.4. Finalising management plans for identification and improvement of the current situations of all wetlands	2011-2020	Conservation of natural resources and bio-diversity	Wetland development plans	MFWW	MFAL, SHW
	O3.4.2.5. Conducting the necessary scientific and technical studies to put new areas, which are underrepresented in the national protected areas system and which are important in terms of carbon sequestration and adaptation, under protection by giving priority to sea and coastal areas and rivers	2011-2014	Information based decision making, Protection of natural resources	Scientific and technical research final reports	MFWW	MFAL, Universities

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area O3.4.3. Conducting studies for the protection of peat lands located inside or adjacent to wetlands	O3.4.3.1. Taking necessary legal measures to eliminate excessive turf use in sapling planting	2011-2015	Protection of natural resources	Related legal arrangement	DGF	MFWW
	O3.4.3.2. Strengthening the protection statuses of peatlands in consideration of their high carbon sequestration characteristics	2011-2015	Protection of natural resources	Publication of the list of peat lands given protection status in the Official Gazette	MFWW	
	O3.4.3.3. Making legal arrangements to restrict turf production to keep at 2012 levels	2011-2013	Protection of natural resources	Related legal arrangement	MFWW	MFAL, DGF, SHW
OBJECTIVE O3.5. Identify the quantity of carbon stored in settlement areas in 2012, and increase stored carbon 3% by 2020 through green planting						
Action Area O3.5.1. Increasing the carbon stocks by supporting projects that take into account ecological approaches and recycling in urban design and landscaping	O3.5.1.1. Identifying the sequestered carbon in settlement areas	2011-2015		Calculation method, inventory	MFAL	MEU, MFWW, Universities, Municipalities
	O3.5.1.2. Increasing the capacity of local governments to prepare and implement projects on the protection and development of urban forests and other green areas	2011-2015	Positive impact on air quality, increase in urban life quality	City forest development projects	DGF, Municipalities	MEU, MFWW, MIA, SHW, TBB, Universities,
	O3.5.1.3. Making necessary legal arrangements to ensure inclusion of ecologic elements in stream improvement activities undertaken by municipalities	2011-2015	Increase in urban life quality	Related legal arrangement	Municipalities	MEU, MFWW, Universities
	O3.5.1.4. Preventing channelling in order to increase water quality and carbon sequestration in streams where risk of flooding is not high, and supporting practices that encourage restoration of streams with botanical elements	2011-2015	Increase in urban life quality	Stream restoration projects	Municipalities	MEU, MFWW, Universities
	O3.5.1.5. Promoting settlement practices that infiltrates rainwater to soil, such as roof gardens and permeable coatings, and rainwater recycling systems	2011-2013	Increase in urban life quality	Preparation and publication of technical guides	Municipalities	MEU, MFWW, Universities

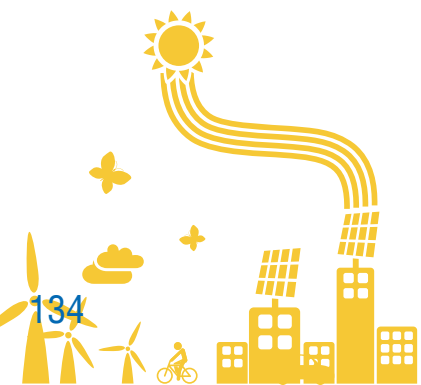
PURPOSE O4. STRENGTHEN LEGAL AND INSTITUTIONAL STRUCTURE FOR COMBATING CLIMATE CHANGE WITH REGARD TO LAND USE AND FORESTRY

OBJECTIVE O4.1. Make necessary legal arrangements for combating climate change with regard to land use and forestry by the end of 2013

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area O4.1.1. Making and implementing the necessary legal arrangements on combating climate change in the Law no. 6831 on Forests	O4.1.1.1. Changing the definition of forests in the legislation, in line with the criteria set forth in the LULUCF definition	2011-2015		Related legal arrangements	MFWW	DGF, Universities
	O4.1.1.2. Adding the "purpose" clause which includes combating climate change among main purposes, in the Law no. 6831 on Forests	2011-2014		Publication of the amendment in Official Gazette	MFWW	DGF, Universities
	O4.1.1.3. Making necessary amendmends related to carbon markets in the forest legislation	2011-2015		Publication of the amendment in the Official Gazette	MFWW	DGF, Universities
Action Area O4.1.2. Strengthening the existing legal structure related to combating climate change	O4.1.2.1. Evaluating the role of the private afforestation policy in combating climate change; making necessary legal arrangements to solve the problems encountered in private afforestation practices outside of forests areas and to encourage private afforestation	2011–2014	Increase in life quality	Related legal arrangement	MFWW	DGF
	O4.1.2.2. Reviewing the legislation regulating the allocation of forest areas to non-forestry operations; revising the legal arrangements that may cause harm to forest areas	2011–2014	Protection of natural resources	Publication of the amendments in the Official Gazette	MFWW	DGF
	O4.1.2.3. Including the norms that will guide working on river basin basis in the legislation	2011–2015	Protection of natural resources	Publication of the amendment in the Official Gazette	MFWW	DGF
	O4.1.2.4. Finalizing the activities on integration of climate change to forest management plans	2011–2015	Capacity development	Publication of the amendment in the Official Gazette	MFWW	DGF
	O4.1.2.5. Reviewing the legislation regulating various land uses (pasture, forest, settlement, wetlands, etc) within the context of their relation to greenhouse gas emissions and sinks , and developing an effective system on monitoring, audits and enforcement	2011–2015	Capacity development	Publication of the amendment in the Official Gazette	MFWW	MFAL, DGF
	O4.1.2.6. Eliminating the gaps in the legislation to prevent the conflict of authorities between units with regard to the operation and management of research and gene preservation forests	2011–2015	Protection of natural resources	Publication of the amendment in the Official Gazette	MFWW	DGF

OBJECTIVE O4.2. Strengthen institutional capacity in institutions involved in land use and forestry on climate change by 2014

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area O4.2.1. Strengthening the institutional capacity on climate change in institutions related to land use and forestry	O4.2.1.1. Restructuring the Climate Change and Bio-Energy Working Group established under the DGF to include other relevant groups (water, biodiversity etc.)	2011-2014	Capacity development	Establishment of a unit responsible for eco-system services	DGF	
	O4.2.1.2. Assessing the training needs of the new unit and all the forestry organization with regard to adaptation to climate change, carbon sequestration and Eco-system services; developing and implementing capacity-building programmes	2011-2015	Capacity building	Training needs assessment report, training materials	DGF	Forest Provincial Organization
	O4.2.1.3. Establishing a techno park focusing on forestry, and ensuring that forestry is included in the scope of existing techno parks	2011-2015	Improvement of R&D capacity	Legal arrangement on techno parks	DGF	MFWW, Universities



PURPOSE Y1. ESTABLISH NECESSARY INFRASTRUCTURE FOR A ROBUST EMISSION INVENTORY

OBJECTIVE Y1.1. Monitoring and reporting of greenhouse gas emissions from key sources using at least Tier 2 methodologies as of the beginning of 2016

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y1.1.1. Developing systems for data collection, recording, reporting and monitoring of greenhouse gas emissions in conformity with the Kyoto Protocol and the UNFCCC	Y1.1.1.1. Monitoring and reporting of greenhouse gas emissions in all sectors	2012–2016	Capacity building	Annual greenhouse gas emission report	MEU	CBCC members, TURKSTAT, TSE, EİE, UCTEA, TTGV, Private Sector Organizations, NGOs
	Y1.1.1.2. Periodic evaluation of sector based greenhouse gas inventories by CBCC member organizations	2012–2016		Periodic evaluation report	MEU	CBCC members, TURKSTAT, KOSGEB, EİE, TSE, NGOs, Private Sector Organizations
Action Area Y1.1.2. Strengthening cooperation in preparation of greenhouse gas emission inventory	Y1.1.2.1. Establishing infrastructure for generating, collecting and registering measurable, verifiable and reportable data in a database, for monitoring and assessment of greenhouse gas emissions in all sectors	2012-2014	Capacity building	Greenhouse gas emission database	MEU	CBCC members, TURKSTAT
	Y1.1.2.2. Making legal arrangements for monitoring greenhouse gas emissions and emission inventory, to: ■ identifying focal points for national inventory in all institutions and building an information network for reporting ■ defining the duties and responsibilities of the private sector ■ making arrangements in the legislation on confidentiality of information ■ and clarifying the effective dates of each of the above	2011–2012	Capacity building	Publish relevant legal arrangements in the Official Gazette	MEU	CBCC member organizations, Private Sector Organizations, Public Institutions

PURPOSE Y2. DEVELOP POLICY FOR ENVIRONMENTAL PROTECTION, AND STRENGTHENING ENFORCEMENT CAPACITY IN CONSIDERATION OF CLIMATE CHANGE AND WITHIN THE FRAMEWORK OF SUSTAINABLE DEVELOPMENT PRINCIPLES

OBJECTIVE Y2.1. Strengthening the existing information base for low-carbon development on the basis of sustainable development principles as of 2015

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y2.1.1. Determining cost curves of GHG emission limitation options in sectors	Y2.1.1.1. Identifying GHG emission control potentials and cost curves at the national level by evaluating sectoral greenhouse gas emission data and processes, identifying cost-effective greenhouse gas control methods for all sectors	2011–2013	Efficient use of resources, Information based decision making	Cost curves	MEU	CBCC member organizations
	Y2.1.1.2. Preparing the sectoral projections until 2020 for all greenhouse gas emission sources	2012–2013		Sectoral emission projections	CBCC member organizations	
	Y2.1.1.3. Conducting cost/benefit analyses in greenhouse gas emitting sectors	2011–2014		Cost-benefit analysis reports	MoD	CBCC member organizations
	Y2.1.1.4. Conducting impact analyses to evaluate the economic, social and environmental impacts of sectoral low-carbon development strategies	2013–2015		Impact analysis reports	MEU	CBCC member organizations
	Y2.1.1.5. Conducting the regulatory impact assessment and sectoral impact assessment for the entire acquis under relevant sectoral chapters that must be transposed for the alignment with the EU that can be associated with combating climate change	2011–2016	Alignment with the EU	Impact Assessment Reports	CBCC member organizations	MEUA, MoD, relevant Private Sector Organizations
	Y2.1.1.6. Assessing the climate change in terms of competitiveness and identifying the priority sectors to be affected	2011–2013	Improvement of competitiveness	Evaluation reports	MoE	CBCC member organizations, relevant Private Sector Organizations
Action Area Y2.1.2. Developing mechanisms for monitoring and assessment to track indicators related to combating climate change	Y2.1.2.1. Revising and determining necessary legal arrangements for mandatory monitoring and reporting of GHG emissions for all investments to be made	2012-2014	Information based decision making	Amendments made in the EIA and Environmental Permits Regulations	MEU	
	Y2.1.2.2. Building a national system for monitoring, registering and evaluating the plans, programmes, strategies and projects for limitation of greenhouse gas emissions	2011-2014	Information based decision making	Reporting and impact assessment guides	MEU	CBCC member organizations, TURKSTAT, TSE, Private Sector Organizations
	Y2.1.2.3. Monitoring and evaluating the effect of sectoral economic instruments on the limitation of greenhouse gas emissions	2015-2020	Information based decision making	Periodical Monitoring and Evaluation reports	MEU	CBCC member organizations

PURPOSE Y3. MORE EFFECTIVE UTILIZATION OF FINANCIAL RESOURCES FOR COMBATING AND ADAPTATION TO CLIMATE CHANGE

OBJECTIVE Y3.1. Strengthening the capacity to access financial resources for combating and adaptation to climate change until the end of 2013, ensuring more effective use of new funding resources until 2020

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y3.1.1. Increasing the capacity of institutions, mainly SMEs and municipalities, to access funding resources for climate change combating and adaptation actions, allocating funds to this end for public institutions from the public budget	Y3.1.1.1. Training experts to enable project development in the quality and detail level required for access to international funding resources	2011-2013	New employment opportunities	Training materials, Training seminars, Number of experts raised	MEU	KOSGEB, Municipalities, Unions of Municipalities, Banks
	Y3.1.1.2. Identifying NAMAs that can benefit from financial resources other than carbon markets	2011-2013	New employment opportunities	NAMA projects	CBCC members	
	Y3.1.1.3. Pursuing projects on limiting GHG emissions and adaptation to climate change in public investment programming	2013 and onwards	Contribution to sustainable development	Number of supported projects	MoD	Relevant public agencies and organizations

PURPOSE Y4. OPTIMUM USAGE OF EMISSION TRADING MECHANISMS THAT CONTRIBUTE TO COST-EFFECTIVE LIMITATION OF GREENHOUSE GAS EMISSIONS

OBJECTIVE Y4.1. Carrying out negotiations to ensure Turkey's participation in the most advantageous way into the existing and new global and regional carbon markets until 2013

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y4.1.1. Conducting necessary analyses for integration into carbon markets	Y4.1.1.1. Carrying out negotiations for Turkey's participation in the new mechanisms in the most advantageous way (as host country) after 2012, exploring opportunities for bilateral cooperation agreements with countries	2011-2015	Increase in financial resources	Turkey's share from the carbon market	MEU, MFA	CBCC members, Carbon Markets Working Group
	Y4.1.1.2. Developing the NAMA portfolio for Turkey that will be benefiting from carbon markets	2011-2015	Increase in financial resources, Increase in employment	Number of NAMAs developed and funded every year	MEU	CBCC members, Carbon Markets Working Group

OBJECTIVE Y4.2. Carry out studies to establish the carbon market in Turkey by 2015

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y4.2.1. Analyzing sectoral carbon reduction potentials and making legal and institutional arrangements for establishment of the National Carbon Market	Y4.2.1.1. Identifying key sectors for the carbon markets, identifying the greenhouse gas emission reduction potential in these sectors	2012-2015	Creation of economic value	Carbon reduction potential	MEU	CBCC members, Carbon Markets Working Group
	Y4.2.1.2. Make legislative arrangements to enable public institutions regulatory and supervisory role in the emission trading system	2011–2015	Capacity development	Publication of legal arrangement in the Official Gazette	MEU	CBCC members, Carbon Markets Working Group, CMB, Istanbul Gold Exchange, ISE, TurkDEX, Takasbank
	Y4.2.1.3. Developing the existing structure and building new structures to enable carbon assets to be traded with maximum economic value and have their values increased	2012–2013	Creation of new financial resources	Completing institutional structuring, delivering training to personnel, increase in the market value of Turkey's carbon assets	MEU	CBCC members, Carbon Markets Working Group, CMB, Istanbul Gold Exchange, ISE, TurkDEX, Takasbank
	Y4.2.1.4 Begin infrastructure development for establishment of the National Emission Trading System	2014-2015	Creation of economic value	Evaluation reports, impact analysis reports	MEU	CBCC members, Carbon Markets Working Group, CMB, Istanbul Gold Exchange, ISE, TurkDEX, Takasbank
	Y4.2.1.5. Making legal arrangements for certification of carbon emission reduction originating from phase-out activities of substances that deplete the ozone layer and their disposal	2012-2013	Creation of economic value	Publication of legal arrangement in the Official Gazette, number of carbon certificates	MEU	Relevant Certification Companies
Action Area Y4.2.2. Increasing public awareness in terms of carbon markets	Y4.2.2.1. Carrying out activities to increase awareness in carbon markets in Turkey	2011 and onwards	Creation of new financial resources	Promotional materials, Promotional activities	MEU	CBCC members, Carbon Markets Working Group
	Y4.2.2.2. Providing support to stakeholders necessary to identify, develop, market and manage carbon projects	2011-2013	Capacity building	Training of stakeholders, identified carbon projects, number of firms and projects entering the carbon market	MEU	CBCC members, Carbon Markets Working Group

PURPOSE Y5. ENSURING COORDINATION IN CLIMATE CHANGE COMBATING AND ADAPTATION ACTIVITIES TO INCREASE EFFECTIVENESS

OBJECTIVE Y5.1. Finalize legal arrangements on combating and adaptation to climate change until 2014

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y5.1.1. Incorporating provisions on combating and adaptation to climate change in the relevant legislation	Y5.1.1.1. Reviewing the existing legislation in terms of combating climate change and adaptation and making the necessary amendments	2013-2014	Utilization of sustainable resources	Publication of legal arrangement in the Official Gazette	MEU	CBCC members
	Y5.1.1.2. Making legal arrangements to define coordination-related role and responsibilities of the Ministry of Environment and Urban Planning with regards to climate change	2012-2013	Effective use of resources in public sector	Publication of legal arrangement in the Official Gazette	MEU	CBCC members
	Y5.1.1.3. Defining in the laws on establishment of CBCC members and/or relevant public institutions the roles and responsibilities related to combating climate change and adaptation	2012-2013	Effective use of resources in public sector	Publication of modified legislation in the Official Gazette	CBCC member organizations	Associated and affiliated Organizations of CBCC members
Action Area Y5.1.2. Creating an M&E mechanism for NCCAP	Y5.1.2.1. Making a legal arrangement defining the procedures, roles and responsibilities with regard to monitoring and evaluation of the implementation of NCCAP	2012-2023	Capacity development	Publication of legal arrangement in the Official Gazette	MEU	CBCC members
	Y5.1.2.2. Periodically monitoring and evaluating the implementation of NCCAP, revising if necessary	2012-2023	Capacity development	NCCAP monitoring and evaluation report	MEU	CBCC members

OBJECTIVE Y5.2. Strengthen the institutional capacities of CBCC members with regard to combating climate change and adaptation until 2014						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y5.2.1. Increasing the capacities of CBCC members with regard to combating and adaptation to climate change	Y5.2.1.1. Establishing units on climate change within CBCC members and their affiliated and associated organizations	2011-2012	Capacity building	Number of new units under public institutions that are CBCC members and their associated and affiliated organizations	CBCC members	Associated and affiliated Organizations of CBCC members
	Y5.2.1.2. Indentifying the training needs of CBCC members on climate change, developing and implementing capacity-building programmes	2011-2014	Capacity building	Training Requirements Evaluation Report, training materials, trainings	CBCC members	MEU
	Y5.2.1.3. Ensuring continuity of delegation members participating in UNFCCC meetings, ensuring integration of new delegates into the process	2012-2014	Capacity building	Training materials and trainings, negotiation teams	CBCC members	MEU

PURPOSE Y6. CARRYING OUT TURKEY'S REGIONAL CLIMATE MODELING STUDIES AND ANALYZING THE EFFECTS OF CLIMATE CHANGE

OBJECTIVE Y6.1. Developing analysis and impact assessment capacities until 2016 through climate observation, forecasting, and regional climate model studies

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y6.1.1. Developing the climate observation capacity	Y6.1.1.1. Expanding the meteorological observation capacity, strengthening it in terms of equipment and human resources	2011-2014		Results of meteorological observations in new areas published	SMS	
	Y6.1.1.2. Collecting data for creating continuous and periodic climatologic observation series, quality control and archiving in the database	2011 and onwards		Up-to-date, comprehensive database	SMS	
Action Area Y6.1.2. Carrying out regional climate model studies	Y6.1.2.1. Using different regional climate models to generate Turkey's future climate scenarios	2011-2020		Climate scenarios obtained for different climate models	SMS	TUBITAK, Universities
	Y6.1.2.2. Producing regional climate scenarios for different emission scenarios	2011-2020		Regional climate projections made for Turkey according to different emission scenarios	SMS	TUBITAK, Universities
	Y6.1.2.3. Sharing the results of the regional climate model studies with relevant organizations, to serve as inputs in research and planning activities	2011-2020	Preventing negative effects of disasters and climate change	Final reports of regional climate model studies published and disseminated	SMS	

PURPOSE Y7. DEVELOP R&D AND INNOVATION CAPACITY FOR ECO-EFFICIENCY WITH REGARD TO COMBATING CLIMATE CHANGE AND ADAPTATION

OBJECTIVE Y7.1. Strengthen R&D and Innovation capacity for clean production until 2014

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y7.1.1. Integrating combating climate change into the national R&D strategies	Y7.1.1.1. Approving and putting in practice the R&D strategies determined for energy, water and food security issues by SCST and supporting related projects	2011-2016	Improvement in competitiveness, new employment opportunities, increase in exports	R&D strategy on energy, water and food security subjects, number of supported projects	TUBITAK	SCST members
	Y7.1.1.2. Identifying sector based R&D needs with regard to climate change, and preparing strategies in identified areas	2011-2016	Improvement of R&D capacity	Report on R&D needs areas and rationales, relevant SCST decision	Relevant sectors and organizations	CBCC members, TTGV
	Y7.1.1.3. Monitoring the conformity of the R&D strategies to be identified with regard to combating climate change and adaptation to climate change with current R&D strategies	2012-2020	Effective utilization of public resources	Monitoring and Evaluation reports	TUBITAK	SCST and CBCC members
Action Area Y7.1.2. Supporting R&D studies on combating climate change	Y7.1.2.1. Developing a financial mechanism under the responsibility of Ministry of Forestry and Water Works to support R&D studies on combating climate change and adaptation to climate change	2013–2014	Improvement of R&D capacity	DG Forest R&D support mechanism enabled, increase in the number of supported projects	DGF	MoF, MoD, Private Sector Organizations
	Y7.1.2.2 Identifying funding needs for R&D in all sectors	2011–2012	Improvement of R&D capacity	R&D financial support resources	Relevant Organizations	CBCC members, other organizations providing R&D support
	Y7.1.2.3. Building international cooperation to develop new technologies on combating climate change and adaptation to climate change	2011–2020	Improvement of R&D capacity	Number of projects run via international cooperation	TUBITAK	CBCC members
	Y7.1.2.4. Strengthening the research and technology development capacities of universities and research centres with regard to combating climate change and adaptation to climate change, establishing new research centres	2014–2015	Improvement of R&D capacity	Research centres	TUBITAK	CBCC members, other organizations providing R&D support
	Y7.1.2.5. Establishing an “Eco-efficiency Centre” to provide information, training and consulting services to producers and consumers	2011–2014	Efficient use of resources	Eco-efficiency centre starting operation	MSIT, MoCT	CBCC members, MoF, MoD, KOSGEB, NPC, EIE, TTGV

PURPOSE Y8. IMPROVE HUMAN RESOURCES WITH REGARD TO COMBATING CLIMATE CHANGE AND ADAPTATION TO CLIMATE CHANGE

OBJECTIVE Y8.1. Inclusion of combating and adaptation to climate change in the academic programmes of universities as of end of 2012

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y8.1.1. Inclusion of topics on combating and adaptation to climate change in the university curricula, mainly in engineering, law, international relations, economy and natural sciences departments	Y8.1.1.1. Identifying the need for academicians in universities on climate change, and strengthening the academic faculty	2011-2020	Development in human resources, new working areas, increase in green employment	Number of academics	CoHE	MEU, MoD, SCST, TUBA, TOBB, Universities
	Y8.1.1.2. Creating undergraduate and graduate programmes on climate change in relevant departments	2011-2013	Improvement of human resources, new working areas, increase in green employment, Improvement in competitiveness	Graduate programmes opened on climate change, number of theses written, number of courses opened on climate change	CoHE	Universities
Action Area Y8.1.2. Developing programmes for intermediate staff in technical education institutions	Y8.1.2.1. Including the topics on adaptation to climate change and techniques and technologies for greenhouse gas management such as energy efficiency, energy saving, effective building design and applications in the curriculum of vocational high schools	2012-2012	Increase in green employment	Revised course programs	MoNE	MEU, Public institutions

PURPOSE Y9. INCREASE PUBLIC AWARENESS TO CHANGE CONSUMPTION INTO CLIMATE-FRIENDLY PATTERNS						
OBJECTIVE Y9.1. Make necessary arrangements in the education programmes until the end of 2012 so as to develop climate-friendly consumption patterns						
Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y9.1.1. Including topics related to combating and adaptation to climate change in formal education programmes	Y9.1.1.1. Integrating topics such as consumption habits, energy efficiency, climate change etc in the curricula of preschool education	2011-2013	Contribution to sustainable development, reduction in environmental pollution, increase in quality of life	Revised course programs, training materials	MoNE	CBCC members, NGOs, media
Action Area Y9.1.2. Adding new modules to personal car driving training	Y9.1.2.1. Instructing on eco-driving techniques within the training scope	2011–2023	Capacity building	Addition of foreseen topics in education programmes	MoNE	MoTC, Universities, Private Sector Organizations

OBJECTIVE Y9.2. Organize public awareness raising campaigns for combating climate change until 2014

Action Area	Actions	Time Period	Co-Benefits	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
Action Area Y9.2.1. Raising public awareness on the role of individuals with regard to climate change and creating reliable information channels to change consumption patterns	Y9.2.1.1. Increasing the capacities of public relations and public information units of relevant CCCB members	2012-2013	Capacity development	Training programs	MEU	CBCC members
	Y9.2.1.2. Developing a campaign strategy with the participation of all stakeholders for public communication and awareness-raising campaigns on climate change	2011-2012	Capacity development	Public communication and awareness-raising strategy	MEU	CBCC members, MoNE, TRT, Municipalities, Unions of municipalities, Media organizations, NGOs, Private Sector Organizations
	Y9.2.1.3. Organizing awareness-raising campaigns with the participation of the media, NGOs and community leaders, in line with the public communication and awareness-raising strategy	2011 and onwards	Contribution to sustainable development	Training materials, training programs, conferences, seminars, audio and visual media programs	MEU	CBCC members, TRT, other Media organizations, NGOs, Union of Municipalities, Private Sector Societies and Unions
	Y9.2.1.4. Including issues of combating climate change and adaptation to climate change within priority support areas and supporting the awareness-raising activities of local NGOs and local governments	2012-2020	Contribution to sustainable development	Number of supported projects of NGOs and municipalities	CBCC members	MIA, DA, Municipalities and NGOs
	Y9.2.1.5. Raising public awareness on emission limitation and climate adaptation matters within the framework of the social responsibility activities of the private sector	2012-2020	Contribution to sustainable development	Social responsibilities projects	Private sector societies and unions	MEU
Action Area Y9.2.2. Building the infrastructure to enable public institutions to share the information on greenhouse gas emission with the public	Y9.2.2.1. Tracking the carbon foot prints of the activities of public institutions, issuing periodical reports thereof and sharing them with the public	2014-2020	Capacity building	Carbon foot print reports	MEU	All public institutions

3.4.

ACTION PLAN ON ADAPTATION TO CLIMATE CHANGE

ACTION PLAN ON ADAPTATION TO CLIMATE CHANGE

MANAGEMENT OF WATER RESOURCES

PURPOSE US1. INTEGRATING ADAPTATION TO THE IMPACTS OF CLIMATE CHANGE INTO WATER RESOURCE MANAGEMENT POLICIES				
OBJECTIVE US1.1. Ensure integration of adaptation to climate change into existing strategies, plans and legislation				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
US1.1.1. Incorporating measures to tackle the impact of climate change on water resources in the Development Plans and Programmes	2011-2013	Development of plans and programmes including the measures	MoD	Relevant public institutions and organizations
US1.1.2. Establishing an institution for holistic management of water resources, which will have sole responsibility on underground and surface water allocation and quality	2011-2013	Making the institutional arrangements	Prime Ministry	MENR, MFAL, MFWW, MoD, SHW, GAP, MTA, Provincial Bank, Municipalities
US1.1.3. Identifying the gaps, overlapping or contradictory aspects in duties, powers and responsibilities of authorised/relevant institutions present in the water legislation with regard to combating climate change and making the necessary revisions	2011-2013	Entering into force of the water law	SHW	
US1.1.4. Revising institutional and sectoral strategy plans (industry, agriculture, energy, tourism, urban, drinking water) of organizations involved in water management with the scope of combating climate change	2011-2013	Inclusion of impacts of climate change in sector strategies	MFWW	MENR, MSIT, MEU, MoCT, MFAL, MCT, SHW, Provincial Bank, LA
US1.1.5. Revising the Industry Strategy Document of Turkey in terms of water efficiency practices in the industry	2014-2020	Increased water efficiency	MSIT	MoD, TTGV, TOBB
US1.1.6. Identifying economic instruments, in accordance with water utilization purposes, in consideration of socioeconomic conditions and the principles of user pays- polluter pays so as to ensure effective and efficient utilization of water	2011-2015	Economical use of water	MoD	MFAL, MoF, MFWW, SHW, LA
US1.1.7. Orientation of water user organizations by relevant institutions within the framework of irrigation businesses taking into account the impacts of climate change	2011-2013	Improvement of local capacity	SHW	SPA, LA, NGOs
US1.1.8.Orienting KÖY-DES service areas to irrigation services	2011-2013	Strengthening practices at local level	Governorships	SPA

PURPOSE US2. STRENGTHENING WATER RESOURCES MANAGEMENT CAPACITY, INTERAGENCY COOPERATION AND COORDINATION WITH REGARD TO ADAPTATION TO CLIMATE CHANGE				
OBJECTIVE US2.1. Increasing the institutional capacities of agencies and organizations that are authorized and related to management of water resources				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
US2.1.1. Strengthening the capacity of the Water Quality Management Steering Committee	2011-2015	Alignment with the EU acquis	MFWW	MIA, MFA, MoH, MFAL, MSIT, MENR, MCT, MoD, MEUA
US2.1.2. Building water quality observation and assessment capacity, establishing a database and strengthening institutional structure	2011-2015	Ensuring sustainability for the management of water resources	MFWW	MoH, MFAL, MEU, SHW, SEPA, EIE
US2.1.3. Strengthening the capacities of relevant institutions to enable conducting detailed surveys to identify water potentials, utilization purposes , consumptions and classifications	2011-2015	Ensuring sustainability for the management of water resources	SHW	MFWW, MFAL, SEPA, SPA, LA
US2.1.4. Training and informing irrigation unions and farmers about conscious and sufficient water use	2011-2013	Improvement of local capacity	Governorships (Provincial Directorates of MFAL)	SPA, LA, Unions, Cooperatives, NGOs
OBJECTIVE US2.2. Develop financing policies and practices				
US2.2.1. Continuing planning of closed system irrigation investments in necessary and suitable locations, with national and international funds	2011-2013	Advanced sprinkling and drop-irrigation infrastructure	SHW	MFAL, Water User Organizations
US2.2.2. Giving incentives to promote private investments regarding irrigation (construction and operation of facilities)	2012-2014	An effective incentive mechanism	SHW	MoF, MoD, MoE, UoT, TOBB
US2.2.3. Promoting via economic instruments the treatment of waste water for its use in agriculture and industry sectors	2011-2020	Adaptation to increased water demand, rising prices of alternative natural water resources, and emerging clean production technologies	MoD	MoF, MoE, UoT, TOBB
US2.2.4. Promoting manufacturing and use of household and industrial equipment with low water consumption	2014-2020	Increased market share of low water consuming equipment	MSIT	MoF, TOBB
US2.2.5. Supporting projects aiming at recycling of process and cooling waters in priority sectors with high water consumption; increasing pilot implementations	2011-2014	Amount of water saved	MSIT	MoD, TTGV, TOBB
US2.2.6.Preparing “sectoral eco-efficiency (clean production)” guides for water efficiency in the industry, promoting pilot practices	2012-2014	Guides	NPC	MSIT, TTGV, TOBB

PURPOSE US3. DEVELOP AND EXPAND R&D AND SCIENTIFIC STUDIES TO ENSURE ADAPTATION TO THE IMPACTS OF CLIMATE CHANGE IN WATER RESOURCES MANAGEMENT				
OBJECTIVE US3.1. Strengthening existing systems and establishing new systems to monitor the effects of climate change				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
US3.1.1. Developing hydrological drought studies	2014-2020	Hydrological drought assessment system	SHW	MFAL, SMS
US3.1.2. Conducting research and evaluations so as to integrate the impacts of climate change into water resource planning activities	2011-2015	Impact assessment reports	SHW	MFAL, SPA
US3.1.3. Making projections of sectoral water demand in basins taking climate scenarios into account	2011-2020	Projections taking into account the climate change scenarios	TUBITAK	SMS, SHW, Universities, RI
OBJECTIVE US3.2. Identify the vulnerability of management of water resources and shores to climate change, develop alternative adaptation actions, carry out periodical revisions based on monitoring results				
US3.2.1. Identifying hydrological, social, economic and environmental vulnerabilities in river basins and sub-basins (including natural disasters), developing and implementing adaptation actions	2011-2020	Basin action plans	SHW	MFAL, MoD, DEMP, LA, SPA, DA
US3.2.2. Identifying the vulnerability of underground water resources to climate change, developing and implementing adaptation actions	2011-2020	Impact assessment reports	SHW	LA, SPA, DA, Irrigation Unions
US3.2.3. Identifying the vulnerability risks (including natural disasters) of shores (including banks of rivers, natural and man-made lakes) to climate change, developing and implementing adaptation actions	2011-2015	Vulnerability reports, adaptation action plans	MFWW, MEU	MFAL, MFWW, UfMA, SEPA, LA
US3.2.4. Formulating, developing and disseminating innovative alternative solution that increase adaptation capacity to climate change	2011-2015	Innovative solution models	MFWW	MEU, MSIT, MFAL, SHW, TUBITAK, TTGV

PURPOSE US4. INTEGRATED MANAGEMENT OF WATER RESOURCES AND WATER BASINS FOR ADAPTATION TO CLIMATE CHANGE				
OBJECTIVE US4.1. Planning basin-based development of water resources with a holistic approach that offers flexibility in meeting the changing consumption demands				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
US4.1.1. Developing Integrated River Basin Management plans taking into account ecosystem services and impacts of climate change	2012-2020	Adaptation to climate in management of water resources	SHW	MFAL, MFWW, DGF, SHW, LA
US4.1.2. Taking the impacts of climate change into consideration in existing and planned "Basin Protection Action Plans" and "Maps of Protected Areas", and making the necessary revisions	2012-2020	Increased efficiency in water basin protection	MFWW	SEPA, SHW
US4.1.3. Stepping up erosion and sedimentation control projects in all basins, especially in dam and pond basins	2012-2020	Increasing effective water storage opportunities	SHW	DGF, GM
US4.1.4. Preventing illicit use of underground water resources in basins, and raising public awareness on this matter	2012 and onwards	Awareness raising activities, protection of water resources	SHW	MFAL, MoNE, LA, NGOs
OBJECTIVE US4.2. Addressing urban water management from the perspective of adaptation to climate change				
US4.2.1. Planning scale enlargement in management of metropolitan areas (big cities, greater city municipalities) taking into consideration of climate change	2012 and onwards	Climate-adapted urban management	MoD	MEU, LA
US4.2.2. Ensuring integrated water management and planning in settlements	2011-2023	Rational management of water resources in settlements	SHW	MEU, LA, Local organizations of the ministries
US4.2.3. Separating sewage and rainwater collection systems in settlements	2011-2020	Efficient use of water resources in the cities	LA	MEU, MFWW, SHW, Provincial Bank
US4.2.4. Reuse of water collected and treated in settlements	2011-2020	Efficient use of water resources in the cities	LA	MEU, MFWW, SHW, Provincial Bank
US4.2.5. Developing a pricing policy taking of socioeconomic conditions into consideration so as to increase efficient water use in cities, making legislative arrangements	2011-2020	Efficient use of water resources in the cities	LA	MEU, MFWW, Provincial Bank
US4.2.6. Identifying water losses and illicit water use in cities and taking measures to reduce the loss-illicit use rate, expanding the SCADA system nationwide	2011-2023	Considerable reduction in water loses	LA	MEU, MFWW, Provincial Bank, Governorships, Local organizations of the ministries
US4.2.7. Ensuring that the consumers are provided with potable water	2011-2023	Efficient water consumption	LA	MEU, MFWW, Provincial Bank, Governorships, Local organizations of the ministries

PURPOSE US5. PLANNING RENEWABLE ENERGY RESOURCES TAKING INTO CONSIDERATION THE IMPACTS OF CLIMATE CHANGE AND THE SUSTAINABILITY OF THE ECOSYSTEM SERVICES ORIENTED TO INCREASE RESILIENCE TO CLIMATE CHANGE

OBJECTIVE US5.1. Planning hydraulic and geothermal energy resources from climate change adaptation perspective

Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
US5.1.1. Taking the impacts of climate change in addition to environmental, economic and socio-cultural impacts into consideration in site selection and planning of HPPs	2011-2015	Inclusion of climate change parameters among site selection and planning criteria	SHW	MENR, MFWW, MEU, SMS, EIE, EMRA, TUBITAK, Universities, TOBB
US5.1.2. Reviewing the Law no. 5686 on Geothermal Resources and Natural Mineral Waters in line with the impacts of climate change and the adaptation approach	2011-2015	Prevention of loss of surface water quality	MTA	MENR, Governorships, SPA, Provincial Bank, LA

AGRICULTURE SECTOR AND FOOD SECURITY

PURPOSE UT1. INTEGRATING CLIMATE CHANGE ADAPTATION INTO THE AGRICULTURE AND FOOD SECURITY POLICIES				
OBJECTIVE UT1.1. Reviewing existing strategy and action plans as well as legal arrangements from a perspective of adaptation to climate change				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UT1.1.1. Reviewing the Rural Development Strategy and Plan in line with the Climate Change Strategy and Action Plan	2012-2013	Revised plan and strategy	MFAL	MFWW, MoD
UT1.1.2. Integration of the impacts of climate change into the "Strategy and Action Plan for Combating Agricultural Drought" in terms of water resources, food security, natural disaster risks, ecosystem services and human health	2011-2015	Integrated strategy and plan	MFAL	MFWW, LA, SPA, Governorships
UT1.1.3. Reviewing existing legal to ensure adaptation to climate change, and preparing new legislation	2011-2015	Revision of relevant legislation, preparation of new legislation	MFAL	MFWW, MEU, SHW, SMS, SEPA
UT1.1.4. Integrating producer support activities (including agricultural basins production and support model) into climate change adaptation strategies	2012-2013	Revision of relevant strategies	MFAL	MoD
OBJECTIVE UT1.2. Reviewing signed protocols between institutions from a perspective of adaptation to climate change				
UT1.2.1. Revising the Afforestation Cooperation protocol signed between MFWW, SHW and DGF within the framework of climatic impacts	2011-2012	Revised cooperation protocol	DGF	SHW, MFWW
UT1.2.2. Revising the Afforestation Protocol under the Action Plan for Combating Erosion between MEFU and MFAL, within the context of the impacts of climate change	2011-2012	Revised cooperation protocol	MFAL	MFWW

PURPOSE UT2. DEVELOPING AND EXPANDING R&D AND SCIENTIFIC STUDIES TO IDENTIFY THE IMPACTS OF CLIMATE CHANGE ON AGRICULTURE AND TO ENSURE ADAPTATION TO CLIMATE CHANGE				
OBJECTIVE UT2.1. Developing and expanding R&D activities for effective crop, soil and water management				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UT2.1.1. Conducting analysis on the impacts of climate change on the agriculture sector	2013-2015	Impact analysis reports	MFAL	TUBITAK, Universities, RI
UT2.1.2. Carrying out research and applications to ensure adaptation of plants to climate change, with the help of new possibilities offered by biotechnology and the existing genetic diversity	2011-2015	Model practices	MFAL	TUBITAK, Universities, RI
UT2.1.3. Identifying and monitoring the possible changes in agricultural yield, production and area information due to climate change,	2011-2015	Complete and up to date database	MFAL	TUBITAK, Universities, RI
UT2.1.4. Reassessment of the local value and efficiency of genetic diversity existing within cultivate crops in terms of livelihoods of farmer, within the context of adaptation to climate change	2011-2015	Model practices	MFAL	TUBITAK, Universities, RI
OBJECTIVE UT2.2. Increasing the capacities and numbers of organizations carrying out R&D and scientific studies				
UT2.2.1. Developing the capacities of research institutes and other scientific institutions under MFAL, modernizing laboratory infrastructures	2011-2015	Modern and adequate laboratory network	MFAL	
UT2.2.2. Establishing climate change research centres in vulnerable regions	2011-2015	Establishment of research centres	MFAL	MoD, SHW, GAP, RI
UT2.2.3. Updating all the data collected by Agricultural Drought Crisis Centre on land assets, water resources and climate and incorporating it into the climate change information management system	2011-2015	Up to date data	MFAL	SPA, Governorships
UT2.2.4. Improving the capacity in crop production estimation studies carried out by using climate, land use and vegetation density data for the purpose monitoring the impacts of drought	2011-2015	Improved technical infrastructure and human resources	MFAL	

OBJECTIVE UT2.3. Developing a 'Soil and Land Database and Land Information System' taking into consideration the effects of climate change				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UT2.3.1. Addressing climate change impacts in existing Soil and Land Database and Land Information System studies	2011-2013	Complete and up to date data base	MFAL	MFWW, MEU
UT2.3.2. Completing soil survey, inventory and mapping studies while taking the effects of climate change into consideration	2011-2015	Soil inventory and maps	MFAL	MFWW, MEU
UT2.3.3. Carrying out activities for building a Drought and Flood Information System	2011-2015	Complete and up to date information management system	MFAL, SHW, SMS	MFWW, MEU
UT2.3.4. Reviewing the national information systems monitoring the changes in land use types and the compiled data, and identifying, collecting, recording and registering into the database any new data required within the framework of international processes	2011-2013	Complete and up to date data base	DGF	MFAL, MFWW, MEU
OBJECTIVE UT2.4. Conducting and monitoring disaster analysis for agricultural droughts				
UT2.4.1. Including agricultural drought in disaster management activities and making the necessary analyses	2013-2014	Defining agricultural drought as a disaster	MFAL	DEMP
UT2.4.2. Strengthening the capacities of provincial drought crisis centres, and developing crisis management plans	2011-2013	Crisis plans established in provinces	MFAL	Governorships, SPA
OBJECTIVE UT2.5. Determining the socioeconomic impacts of climate change on the agriculture sector				
UT2.5.1. Identifying the disparities between poverty levels in agricultural basins	2012-2015	Assessment report	MFAL	TURKSTAT
UT2.5.2. Delivering training on agricultural production techniques for adapting to the effects of climate change to women farmers and/or incorporating these trainings into the already existing training activities	2011-2015	Training of female farmers	MFAL	Governorships, SPA
UT2.5.3. Identifying with priority the economic, social and environmental effects in regions that will be more heavily affected from agricultural drought due to climate change	2011-2013	Situation analysis reports	MFAL	MoD

PURPOSE UT3. SUSTAINABLE PLANNING OF WATER UTILIZATION IN AGRICULTURE				
OBJECTIVE UT3.1. Increasing the effectiveness of water management in agriculture				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UT3.1.1. Promoting water efficient processes in agricultural industry	2011-2015	Development of efficient processes	MFAL	MSIT
UT3.1.2. Promoting crop types suitable for climate and water availability in agricultural basins	2011-2015	Using appropriate crop types	MFAL	LA, SMS, Irrigation unions
UT3.1.3. Reducing water losses in the agriculture sector	2011-2015	Decrease in water losses	MFAL	SHW, Irrigation unions
UT3.1.4. Developing irrigation and water management systems specific to the local conditions	2011-2015	Water management systems specific to localities	MFAL	SHW, Irrigation unions

PURPOSE UT4. PROTECTING SOIL AND AGRICULTURAL BIODIVERSITY AGAINST THE IMPACTS OF CLIMATE CHANGE				
OBJECTIVE UT4.1. Protecting the physical, chemical and biological efficiency of soil against climate change impacts				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UT4.1.1. Developing classification standards for protection, improvement and efficient use of soil and lands, monitoring such practices and ensuring land use in consideration of capability classes	2011-2013	Standards developed, model practices	MFAL	
UT4.1.2. Studying soil humidity regimes according to climate change impacts	2012-2015	Impact assessment reports	MFAL	
UT4.1.3. Implementation of advanced harvesting systems, and development of agricultural forestry	2012 and onwards	Model practices	MFAL	
UT4.1.4. Ensuring use of new and technological systems in irrigation and water management	2011-2015	Water saving, model practices	MFAL	

OBJECTIVE UT4.2. Protecting agricultural biological diversity and resources for adaptation to the impacts of climate change				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UT4.2.1. Developing innovative and appropriate agriculture techniques oriented to ensure adaptation to climate change and sustainability of natural resources	2011-2015	Model practices	MFAL	MFWW
UT4.2.2. Researching the climate change impacts on agricultural products the gene resources of Turkey	2012-2015	Research reports	MFAL	RI
UT4.2.3. Carrying out R&D studies to determine and monitor the effects of climate change on cattle, sheep and goat husbandry	2013-2015	Research reports	MFAL	TUBITAK, RI, Universities
UT4.2.4. Carrying out R&D studies to determine and monitor the effects of climate change on aqua-farming	2013-2015	Research reports	MFAL	TUBITAK, RI, Universities
OBJECTIVE UT4.3. Completing land consolidation activities for the purpose of increasing agricultural efficiency in efforts to adapt to climate change				
UT4.3.1. Prioritizing land consolidation practices in regions with flood risk	2011-2013	Records on land consolidations, increase in average parcel sizes	MFAL	SHW
UT4.3.2. Conduct technical and financial studies to integrate climate change adaptation indicators in land consolidations	2011-2013	Relevant technical reports	MFAL	MFWW, DGF, SHW
UT4.3.3. Completing land consolidation and other in-field development services to increase in-parcel irrigation efficiency	2011-2013	Model practices	MFAL	SHW, SPA, NGOs, Farmer organizations, Irrigation unions

PURPOSE UT5. DEVELOPING INSTITUTIONAL CAPACITY AND IMPROVING INTERAGENCY COOPERATION IN TURKEY WITH REGARD TO ADAPTATION ALTERNATIVES IN AGRICULTURE				
OBJECTIVE UT5.1. Strengthening interagency cooperation and developing the capacities of MFAL and its attached and affiliated organizations with regard to combating climate change and adaptation				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UT5.1.1. Increasing the climate change adaptation capacities and effectiveness of boards and committees responsible for agricultural drought management	2011-2015	Trainings, Institutional infrastructure with defined job descriptions and responsibilities	MFAL	CBCC, ARDSI
UT5.1.2. Setting up a climate change unit within MFAL and its attached and affiliated organizations	2011-2012	Institutional infrastructure with defined job descriptions and responsibilities	MFAL	
UT5.1.3. Developing and implementing capacity building programmes for climate change in MFAL and provincial offices	2011-2015	Training needs analysis Training programs Capacity building programs	MFAL	
UT5.1.4. Carrying out cooperation activities with international organizations in the area of adaptation to the impacts of climate change on the agriculture sector	2011-2015	Cooperation agreements	MFAL	
UT5.1.5. Increasing existing capacity for flood and drought early warning systems	2011-2013	Effective early warning systems	MFAL, SHW, SMS	DGF
OBJECTIVE UT5.2. Increasing the awareness of the civil society on the effects of climate change on the agriculture sector and on the adaptation approaches				
UT5.2.1. Informing the local stakeholders in the agriculture sector about alternative crop patterns	2011-2013	Capacity building programs	MFAL	LA, NGOs, Unions, Cooperatives
UT5.2.2. Increasing the awareness and capacities of unions and cooperatives with regard to climate change impacts and adaptation	2011-2013	Capacity building programs	MFAL	LA, NGOs, Unions, Cooperatives
UT5.2.3. Raising the awareness of Provincial/ District Drought Damage Assessment Commissions, Provincial Crisis Centres and Provincial Drought Investigation Commissions on adaptation to climate change impacts	2011-2013	Awareness programs	MFAL	
UT5.2.4. Increasing the accessibility of early warning and climate information	2012-2015	Accessible early warning and information system	MFAL, SMS, SHW	

ECOSYSTEM SERVICES, BIODIVERSITY AND FORESTRY

PURPOSE UO1. INTEGRATION OF THE CLIMATE CHANGE ADAPTATION APPROACH TO ECOSYSTEM SERVICES, BIOLOGICAL DIVERSITY AND FORESTRY POLICIES

OBJECTIVE UO1.1. Reviewing the existing strategies in terms of adaptation to the impacts of climate change

Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UO1.1.1. Revising the National Forestry Programme (2004–2023) and DGF Strategic Plan (2010–2014) for adaptation to climate change impacts	2011-2013	Revised plan and program	DGF	MFWW, MoD, NGOs
UO1.1.2. Preparing regional strategies on adaptation to climate change in protected areas	2011-2015	Regional strategies	MFWW	MCT, DGF, SEPA
UO1.1.3. Integrating and spreading adaptation to climate change into the existing planning for selected/priority protected areas	2011-2015	Plans for protected areas including adaptation to climate change	MFWW	
UO1.1.4. Determination of water resources feeding wetlands, and developing planning studies	2012-2015	Effective and sustainable water resources planning	MFWW	
UO1.1.5. Preparing regional strategies for natural and cultural heritage areas with regard to adaptation to climate change	2012-2015	Regional strategies	MFWW, MCT	

PURPOSE UO2. IDENTIFYING AND MONITORING THE IMPACTS OF CLIMATE CHANGE ON BIOLOGICAL DIVERSITY AND ECOSYSTEM SERVICES				
OBJECTIVE UO2.1. Identifying and monitoring the effects of climate change on the species in forest land				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UO2.1.1. Identifying and monitoring the impacts of climate change on forestry activities, forest ecosystems and species	2011-2013	Impact assessment reports	DGF	
UO2.1.2. Identifying the effects of the temperature increase and change in precipitation regime due to climate change on forest ecosystems and species	2011-2015	Impact assessment reports	DGF	MFAL
UO2.1.3. Conduct researches to minimize climate risks in agricultural-forestry activities	2011-2015	Research reports	MFAL	DGF
UO2.1.4. Integration of data related to natural disasters such as floods, overflows, avalanches, landslides etc, into the Forest Inventory and Monitoring system.	2011-2015	Early warning system integrated to Land Monitoring System	DGF	MFAL, MFWW, MEU, SMS
UO2.1.5. Allocation of more funds to projects on climate change and forest-pasture-agriculture ecosystems, from existing R&D funding sources, and mainly from the R&D support mechanisms of the DGF,	2011-2015	final Project reports, number and size of financed projects	DGF	MFWW, MFAL, SHW, TUBITAK, Municipalities, Universities
OBJECTIVE UO2.2. Identifying the land use changes due to the impacts of climate change in forest land				
UO2.2.1. Identifying the land transformed into meadows, pastures and grasslands in forest land	2012-2015	Stocktaking reports	MFWW, DGF	MFAL, Governorships, SPA
UO2.2.2. Identifying sites transformed from forest land into settlement land (housing areas)	2011-2015	Stocktaking reports	DGF	MFWW, MEU, Governorships, SPA, LA
UO2.2.3. Identifying sites transformed from forest land into wetlands	2012-2015	Stocktaking reports	DGF	MFWW
UO2.2.4. Identifying sites transformed from forest land into agricultural lands	2012-2015	Stocktaking reports	DGF	MFAL
UO2.2.5. Identifying sites transformed from forest land into other land types	2012-2015	Stocktaking reports	DGF	Governorships, SPA

OBJECTIVE UO2.3. Monitoring the health of forest ecosystems				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UO2.3.1. Measuring the effects of atmospheric pollution, climate change and other factors on forests and evaluating the findings by 2014	2011-2014	Impact analysis and assessment reports	DGF	Universities
UO2.3.2. Identifying the effect of the afforestation activities carried out on the degraded forests classified as forest and allocated to DGF, and on properties of the Ministry of Finance that are not classified as forests, on natural environment	2011-2015	Impact analysis and assessment reports	DGF	MoF
UO2.3.3. Ensuring that European applications on the Forest Ecosystems monitoring Tier I and Tier 2 Programme are carried out in an integrated way with the National Forest Inventory	2011-2013	Integrated system	DGF	Universities
OBJECTIVE UO2.4. Carrying out R&D activities oriented to identify and monitor the effects of climate changes in protected areas				
UO2.4.1. Identifying the species, ecosystems and processes that will be affected from climate change in protected areas	2011-2013	Vulnerability analysis	MFWW	Universities
UO2.4.2. Ensuring effective management against the impacts of climate change on protected areas systems	2012-2015	Effective management	MFWW	MoF, MoD, TUBITAK
UO2.4.3. Identifying climate adaptation strategy and actions in order to support the livelihoods of the local people in protected areas; conducting relevant cost/benefit and cost-effectiveness analyses, and diversification of livelihoods	2012-2015	Assessment reports, livelihood work plans	MFWW	MoF, DGF
UO2.4.4. Developing monitoring systems on the impacts of climate change in protected areas	2011-2015	Monitoring system	MFWW	SMS, SHW, RI, Universities
OBJECTIVE UO2.5. Taking into consideration the climate change adaptation activities in the socio-economic development of forest villagers, and thereby supporting rural development				
UO2.5.1. Determining the socioeconomic effects of climate change on forest villagers	2011-2013	Assessment report	DGF	MFWW, Governorships
UO2.5.2. Diversifying the livelihood activities of forest villagers, and shifting to other activities if necessary, so as to ensure minimization of the risks of climate change on their livelihoods	2011-2015	Livelihood work plans	DGF	MFWW, Governorships

OBJECTIVE UO2.6. Identifying and monitoring the effects of climate change on the mountain, steppe, inland water and seashore ecosystems and on the ecosystem services they provide, and developing measures for adaptation to climate change				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UO2.6.1. Assessing the effects of user sectors, which have direct negative effects on ecosystems, so as to ensure the sustainability of the resilience of ecosystems to climate change	2012-2015	Impact assessment analyses	MFWW	MEU
UO2.6.2. Conducting R&D studies to identify and monitor the effects of climate change on mountain ecosystems (indicative species, sensitive ecosystems)	2012-2015	Research reports	DGF	
UO2.6.3. Conducting R&D studies to identify and monitor the effects of climate change on steppe ecosystems (indicative species, sensitive ecosystems)	2012-2015	Research reports	DGF	
UO2.6.4. Conducting R&D studies to identify and monitor the effects of climate change on inland water ecosystems (wetlands, peatlands, lakes, rivers) (indicative species, sensitive ecosystems)	2012-2015	Research reports	DGF	
UO2.6.5. Conducting R&D studies to identify and monitor the effects of climate change on marine ecosystems (indicative species, sensitive ecosystems)	2012-2015	Research reports	DGF	
UO2.6.6. Conducting R&D studies to identify and monitor the effects of climate change on natural, cultural and visual landscapes	2012-2015	Research reports	DGF	
UO2.6.7. Taking climate change into consideration in addition to the ecosystem integrity and biodiversity of the localities, in ecosystem assessment studies of HPPs planned on small rivers	2012-2015	Research reports	SHW	MENR, MFWW, MEU, EIE, TEIAS, TEDAS, MTA, SMS, TUBITAK-MRC, GDLRC, Universities
UO2.6.8. Piloting sustainable integrated peatland management and rehabilitation practices	2012-2015	Research reports	MFWW	
UO2.6.9. Identifying priority protected areas by matching the results of the climate change model studies carried out at national level, with areas that are important in terms of biodiversity	2012-2015	Research reports	MFWW	TUBITAK, NGOs, Universities

OBJECTIVE UO2.7. Integrating climate change adaptation into the marine and coastal zone management framework				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UO2.7.1. Taking the climate change impacts into consideration in ballast water management	2012-2015	Revised regulation	MEU	UfMA, LA
UO2.7.2. Adding climate change adaptation into integrated studies in marine and coastal areas	2012 and onwards	Integrated management plans	MEU	MFWW, LA
UO2.7.3. Controlling developments that reduce the resistance of marine and coastal ecosystems to climate change in shore settlement planning	2012 and onwards	Shore settlements zoning plan, Other planning documents	MEU	MFWW, LA
OBJECTIVE UO2.8. Protection of forests against fires				
UO2.8.1. Identifying and monitoring the impacts of climate change on forest fires, and incorporating the data onto fire risk maps	2011-2013	Assessment reports, fire risk maps, monitoring system	DGF	DGF Regional organizations, Governorships
UO2.8.2. Including necessary risk preparation/ prevention against forest fires caused by climate change within the scope of local/regional planning activities	2011-2013	Revised planning processes	DGF	DGF Regional organizations, Governorships
UO2.8.3. Increasing preventive measures in combating forest fires, improving existing early warning systems	2011-2013	Effective early warning systems	DGF	DGF Provincial organizations, Governorships

NATURAL DISASTER RISK MANAGEMENT

PURPOSE UA1. IDENTIFYING THREATS AND RISKS FOR MANAGEMENT OF NATURAL DISASTERS CAUSED BY CLIMATE CHANGE				
OBJECTIVE UA1.1. Identifying risks of natural disasters caused by climate change, such as floods, overflows, avalanches, landslides etc				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UA1.1.1. Preparing disaster, hazard and risk maps for floods, landslides, etc., that will be the basis for risk management processes against the impacts of climate change, and integrating these maps into land use plans	2011-2015	Risk maps	MEU, SHW, DEMP	MFWW, SMS, LA, Governorships
UA1.1.2. Preparing implementation and audit guides related to flood, landslide risk mitigation and management plans	2011-2015	Relevant plans and guides	SHW, DEMP	
UA1.1.3. Developing disaster management plans for sectors affected from natural disasters caused by climate change	2011-2020	Management plans	DEMP	MFAL, MFWW, MEU, SHW, SMS, Universities
UA1.1.4. Establishing, spreading and developing monitoring, forecast and early warning systems for natural disasters caused by climate change	2011-2013	Installing relevant systems (flood, overflow, early warning etc), Making early warnings, risk maps	SHW, SMS, DEMP	MFWW, MEU, Governorships, Universities , Municipalities
UA1.1.5. Identifying the social, economic and environmental impacts of natural disasters caused by climate change	2011-2015	Impact analysis reports	DEMP	MFWW, MEU, MFAL, DGF, Universities
OBJECTIVE UA1.2. Reviewing the legislation on natural disasters caused by climate change, and determining implementation principles				
UA1.2.1.Developing and ensuring the enforcement of the necessary legislation to protect ecosystems and to identify the natural structures that reduce the effects of natural disasters occurring due to climate change,	2013-2015	Relevant legal arrangements	MFWW	MEU, MFAL,DGF, DEMP
UA1.2.2. Carrying out studies to disseminate private and public insurance mechanisms across all economic sectors and citizens	2013-2015	Increase in the use of insurance mechanisms	DEMP	MoF, MoE, UoT
UA1.2.3. Developing and ensuring the enforcement of the legislation on the structural effects of natural disasters caused by climate change	2013-2015	Legal arrangements	Relevant institutions/ organizations	MEFU, SHW, DEMP

PURPOSE UA2. STRENGTHENING RESPONSE MECHANISMS FOR NATURAL DISASTERS CAUSED BY CLIMATE CHANGE				
OBJECTIVE UA2.1. Strengthening the capacities of local public organizations with regard to responding to natural disasters caused by climate change, and reaching the level of being able to make field exercises				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UA2.1.1. Developing the workforce/technical capacities of the local organizations of relevant authorities	2011-2015	Training and infrastructure	DEMP	Governorships, LA, NGOs
UA2.1.2. Developing coordination between provincial offices at the local level	2011-2015	Carrying out joint projects	DEMP	Governorships, LA, NGOs
OBJECTIVE UA2.2. Establishing a community-based disaster management in combating disaster risks that may arise due to climate change				
UA2.2.1. Identifying and developing the capacities of relevant agencies and organizations covering all administrative levels at the local level, including mukhtar offices, with regard to risk mitigation, emergency response and post-disaster short and long term recovery approaches and practices	2011-2015	Training needs analysis, trainings, capacity building programs	Governorships	DEMP, LA, NGOs, Village Service Unions
UA2.2.2. Developing and distributing implementation guides and procedures on disaster risk reduction, emergency response and post-disaster short and long term recovery approaches and practices; and delivering the related trainings	2011-2015	Disaster management guides and procedures, training programs	Governorships	DEMP, LA, NGOs, Village Service Unions
UA2.2.3. Improving exchange of information, experience and infrastructure through ensuring interagency coordination at the local level	2011-2015	Partnerships, joint projects	Governorships	DEMP, LA, NGOs, Village Service Unions
OBJECTIVE UA2.3. Continuing the training activities that will increase public awareness and participation with regard to the disaster and risk impacts that may arise due to climate change				
UA2.3.1. Carrying out awareness-raising activities for all segments of the society	2011-2020	Awareness raising activities	DEMP	Governorships, LA, NGOs, Village Service Unions
UA2.3.2. Carrying out joint activities with relevant NGOs	2011-2020	Joint projects	DEMP	Governorships, LA, NGOs, Village Service Unions

PUBLIC HEALTH

PURPOSE UİS1. IDENTIFYING THE EXISTING AND FUTURE EFFECTS AND RISKS OF CLIMATE CHANGE ON PUBLIC HEALTH				
OBJECTIVE UİS1.1. Researching the effects of extreme weather events on public health				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UİS1.1.1. Monitoring and evaluating the present and future effects on public health of extreme weather events such as heat waves, hurricanes, floods and drought, based on climate projections	2011-2020	Impact assessment reports and monitoring systems	MoH	Governorships
UİS1.1.2. Installing and spreading early warning systems and giving emergency warnings to reduce the effects of extreme weather events on public health	2011-2020	Emergency warning reports, Early warning systems	Governorships	MoH, Universities
OBJECTIVE UİS1.2. Researching and monitoring the link between climate change, communicable diseases and health risks, and determining possible measures				
UİS1.2.1. Researching and following up the existing and future relationship between communicable diseases and climate change	2011-2015	Research reports	MoH	MFAL, MFWW, Governorships
UİS1.2.2. Identifying the risky areas in terms of public health, and determining the measures to be taken	2011-2015	Map of public health risks arising due to climate change	MoH	LA
UİS1.2.3. Establishing Tropical Diseases Diagnosis Laboratories at the regional level, or strengthening the infrastructures of some of the public health laboratories to this end in some provinces	2011-2015	Strengthened diagnosis and response infrastructure	MoH	Governorships

PURPOSE UİS2. DEVELOPING THE CAPACITY TO COMBAT RISKS ORIGINATING FROM CLIMATE CHANGE IN THE NATIONAL HEALTHCARE SYSTEM

OBJECTIVE UİS2.1. Developing emergency response action plans in risky areas, and supplying the necessary infrastructure

Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UİS2.1.1. Developing and implementing pilot programmes in the areas of epidemics and emergency health risks	2011-2015	Repeatable and scalable model studies	MoH	Governorships
UİS2.1.2. Raising the awareness of "National Medical Rescue Teams (UMKE)" on adaptation to the impacts of climate change	2011-2013	Emergency response teams strengthened in the area of climate change risks, including disasters and communicable diseases	MoH	Governorships
UİS2.1.3. Increasing the competence and practical capabilities of mobile health teams of Provincial Health Directorates in risky areas, with regard to infectious (communicable) diseases	2011-2015	Reduction of communicable disease risks at the local scale	MoH	Governorships
UİS2.1.4. Cooperating with international organizations and countries working on the effects of climate change on public health	2011-2015	Exchange of knowledge and experience through joint projects/activities	MoH	International organizations
UİS2.1.5. Preparing and disseminating guides describing what citizens and agencies should do in the event of possible infectious diseases,during extreme weather events, and delivering periodic trainings	2011 and onwards	Public health guides	MoH	Governorships, LA, Universities, public and private hospitals, university hospitals

OBJECTIVE UİS2.2. Strengthening the capacities of health sector organizations arising health risks arising due to climate change

Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UİS2.2.1. Carrying out capacity-building activities on health risks arising from climate change, for health professionals working at protective health services /family health system	2011-2015	Capacity building activities	MoH	MFWW, DGF, Governorships
UİS2.2.2. Announcing the "Ministry of Health - Climate Change Adaptation Programme" nationwide	2011-2013	Communication campaigns	MoH	MFWW, DGF, Governorships
UİS2.2.3. Establishing Ministry of Health "Disaster Coordination Centres" in areas that may be affected from climate	2011-2015	Effective health coordination infrastructure	MoH	Governorships
UİS2.2.4. Ensuring coordination and cooperation between related agencies and organizations with regard to climate-sensitive disasters and the health risks they will create	2011-2015	Partnerships, joint projects	MoH	DEMP, Governorships, Universities, NGOs, Public and private hospitals, University hospitals
UİS2.2.5. Strengthening the treatment and control (including vaccination programmes and vector control) and evidence-based protection, including integrated health observation and surveillance of vector-borne (transmitted by a carrier) and zoonose (transmitted from animals to humans) diseases, and infectious diseases	2011-2020	Strengthened public health monitoring and decision system	MoH	Public and private hospitals, University hospitals
UİS2.2.6. Researching/monitoring the effectiveness of possible adaptation measures to be taken in the health sector for the protection from the effects of climate change, including early warning, strengthened disease observation, information systems and other public health measures	2011-2020	Strengthened public health monitoring and decision-making system	MoH	Public and private hospitals, University hospitals
UİS2.2.7. Researching/monitoring the common benefits of mitigation/adaptation measures, negative impacts and the adaptation costs	2011-2020	Strengthened public health monitoring and decision-making system	MoH	MEU, Universities
UİS2.2.8. Strengthening observation and preparedness level with regard to water availability, water quality and hygiene in urban and rural areas	2011-2015	Water and hygiene monitoring system and measures and information guides	MoH	Governorships, Municipalities
UİS2.2.9. Identifying the health risks that may occur due to population increase in climate-vulnerable zones and in areas located on migration routes, and increasing the capacities of health organizations in these areas	2011-2015	Research reports, capacity development activities	MoH	Governorships, Universities, International organizations
UİS2.2.10. Cooperating with countries and national and international organizations working in areas that may affect human health due to climate change such as migration movements, international trade and tourism	2011-2015	Possible disease prevalence at regional scale with exchange of knowledge and experience, Improving international measures	MOH	Governorships, Universities, International organizations

PURPOSE UYK1. ENSURING ADAPTATION TO CLIMATE CHANGE ON CROSSCUTTING ISSUES				
OBJECTIVE UYK1.1. Integration of adaptation to climate change into national development plans, programs and policies				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UYK1.1.1. Dynamic examination of the possible impacts of climate change on general macroeconomic variables (growth, income, employment, etc.) and reflection of the findings in national strategies/policies and plans	2011-2015	Impact analysis reports, revised regulations, plan	MoD, MoF	
UYK1.1.2. Identifying, on sectoral basis, the opportunities and bottlenecks that climate change will create, and integrating findings into sectoral policies and development plans	2011-2015	Revised sector policies	MoD	Relevant institutions/ organizations
OBJECTIVE UYK1.2. Developing and putting in place information, monitoring and evaluation systems that support decision-making processes				
UYK1.2.1. Inclusion of indicators on the effects of climate change in the Official Statistics Programme	2011-2013	Updated program	TURKSTAT	
UYK1.2.2. Inclusion of climate change data in TEIEN	2012-2015	Updated system	MEU	MFAL, SMS, SHW, DGF
OBJECTIVE UYK1.3. Realizing and putting in practice the financial arrangements necessary for implementation of the National Climate Change Strategy at the national, regional and local level				
UYK1.3.1. Strengthening the capacities of development agencies with regard to financing of climate change adaptation projects, and including in support programmes the climate change adaptation issues that may emerge in line with local needs	2011-2013	Calls from support programmes including climate change adaptation matters	MoD	DA
UYK1.3.2. Conducting integrated cost/benefit analyses that take into consideration the Mitigation-Adaptation synergy	2011-2013	Analysis reports, determination of priority actions	MoD	Relevant institutions/ organizations
UYK1.3.3. Conducting climate change impact analyses in sectors and determining the adaptation costs	2011-2015	Impact analysis reports	MoD	Relevant institutions/ organizations

OBJECTIVE UYK1.4. Organizing training, awareness-raising and informative activities to develop the capacity to combat and adapt to climate change				
Actions	Time Period	Outputs and Performance Indicators	Responsible/ Coordinating Organization	Relevant Organizations
UYK1.4.1 Delivering basic training on Turkey's situation and adaptation to the impacts of climate change in the in-service trainings of all ministries	2011-2014	In-service training programs	Relevant ministries	
UYK1.4.2 Ensuring participation in the climate change adaptation process, and preparing programmes to raise public awareness	2011-2014	Programmes	MEU	CBCC, Universities
OBJECTIVE UYK1.5. Developing R&D capacity with regard to climate change adaptation				
UYK1.5.1. Carrying out projects to identify the "national research area" that will provide support and infrastructure for climate change adaptation	2011-2015	Research reports	TUBITAK	MEU, SHW, DGF, Universities
UYK1.5.2. Increasing debate forum and certification programmes on climate change adaptation in universities, adding relevant courses to undergraduate and graduate programmes, and encouraging research/ doctorate programmes	2011-2015	Courses and programmes	CoHE	Universities
UYK1.5.3. Supporting initiatives concerning adaptation to climate change in the industrial R&D activities of the private sector	2011-2020	Model studies	MSIT	TUBITAK

4. MONITORING AND EVALUATION

Activities to be carried out for the NCCS and NCCAP monitoring and evaluation system are as follows:

- Identify improvements achieved during the implementation of actions and projects under NCCAP; record, analyze and report these achievements
- Produce data and information to support the success, effectiveness and sustainability of activities foreseen to combat climate change, and to improve these actions and implementations based on such data and information
- Identify challenges and problems concerning implementation mechanisms and processes in a timely fashion and to provide solutions
- Under the light of new data and information collected, re-evaluate and update NCCAP –if necessary.

In line with actions set out in the NCCS, and in order to monitor and appraise the NCCS and NCCAP a Strategy and Action Plan Monitoring and Steering Committee will be established under the Climate Change Coordination Board (CBCC). Also, a Climate Change Monitoring and Appraisal Working Group to report to this Board will be formed. This Committee will include representatives from the CBCC and these representatives will be authorized to take decisions. The working group, on the other hand, will have a representative from all other working groups under the CBCC and one representative from respective units of agencies taking part in climate change efforts.

The working group will be responsible to report to and inform the Monitoring and Steering Committee on the outcomes of monitoring and appraisal activities on an annual basis. The Committee will convene once every year and the meeting outputs will be submitted to parties' perusal at the CBCC meeting.

The Ministry of Environment and Urbanization will carry out the secretarial work for the Committee and the working group. First of all, The Ministry will prepare drafts of the reporting format as the basis of all monitoring reports and submit them to the CBCC for evaluation and approval. Within the framework of the approved format, an on-line system will be established to ensure collection of data and information on NCCAP actions.

The working group will be responsible to provide the Committee with annual reports with detailed information on desired actions as well as achievements thereof. Working group will provide these annual reports in the desired format, and in a timely manner. As a result, a CBCC decision covering the duties of respective agencies will be taken regarding the operation of the system.

Information to be provided by the Committee at the CBCC meeting will include aspects below:

a) Achievement status

b) Achievements and setbacks encountered during implementation

c) An appraisal and recommendations regarding solutions.

Finally, following the appraisal, CBCC views and recommendations will be officially forwarded to related bodies as determined by the Ministry of Environment and Urbanization. Within the framework of CBCC recommendations, respective agencies will prepare plans for required modifications in actions or in the overall implementation and these views will be submitted to the perusal of the Ministry of Environment and Urbanization.

BIBLIOGRAPHY

Ankara Metropolitan Municipality, EGO General Diretorate (2010), Information on Intercity Distribution of Transportation for 2008, Information provided by the EGO GD to NCCAP Project

Asan, Ü. (2008), Forestry Info, previously unpublished lecture notes, İstanbul

Asan, Ü. (2010a), "Reduction of CO_2 Emission Possibilities in the Forestry Sector and Estimation of Carbon Stock Changes Between the Years 2010 and 2020 in the Forests of Turkey", IUFRO 7.01 Conference on Adaptation of Forest Ecosystems to Air Pollution and Climate Change (22-25 Mart 2010), Antalya

Asan, Ü. (2010b), "Potential of Criteria and Indicators of SFM for utilization in Improving Adaptation in Forestry to Climate Change", Workshop presentation, Workshop on Climate Change Impacts on Forest Management in Eastern Europa and Central Asia, FAO, 14-16 April 2010, Sopron-Hungary.

Under secretariat of State Planning Organization of the Prime Ministry (SPO) (2006), 9th Development Plan (2007-2013), SPO, Ankara

TURKSTAT, Prime Ministry (2010), Regional Statistics, www.tuik.gov.tr Access Date: June 2010

TURKSTAT, Prime Ministry (2011), Turkey Greenhouse Gas Inventory 1990-2009 - Annual Report for Submission under the Framework Convention on Climate Change, http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php Access Date: April 2011

Ministry of Public Works and Settlement (2009), Urban Technical Infrastructure and Transportation Commission Report at the Urbanization Congress, Ankara

16th Conference of Parties to the UNFCCC [UNFCCC PC 16] (2011), Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010, http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf Access Date: March 2011

UNDP and UNIDO (2010), Improving Energy Efficiency in Industry in Turkey, GEF Project Document

REC Turkey (2008), An A-Z Guide to Climate Change, and Prepared by: Y. Arıkan, G. Özsoy, REC Turkey, Ankara

Ministry of Environment and Forestry (2006a), Integrated Environmental Adaptation Strategy of the EU, (UÇES) (2007-2013), http://www.sp.gov.tr/documents/ABEntegreCevreUyumStratejisi.pdf Access Date: June 2010.

Ministry of Environment and Forestry (2006b), Turkey CORINE 2006 Map

Ministry of Environment and Forestry (coordinating agency) (2007), 1st National Report of the Republic of Turkey on Climate Change Within the Scope of the UNFCCC, Ministry of Environment and Forestry, Ankara

Ministry of Environment and Forestry (2008), Waste Management Action Plan 2008-2012, http://www.cygm.gov.tr/CYGM/Files/EylemPlan/atikeylemplani.pdf

Ministry of Environment and Forestry (2009), National Reports by the Sustainable Development Commission: Waste Management

Ministry of Environment and Forestry (2011), "Packaging and Packaging Waste Statistics – 2008", Packaging Bulletin, No: 5, http://atikyonetimi.cevreorman.gov.tr/atikyonetimi/Files/2008_yili_ist.pdf Access Date: May 2011

Ministry of Environment and Forestry and UNDP Turkey (2010), NCCAP Strategic Framework Report, Previously Unpublished Report, Development of Turkey's Climate Change Action Plan Project, http://wikiidep.cevreorman.gov.tr/index.php/%C3%87%C4%B1kt%C4%B1lar

General Directorate of Forestry, Ministry of Environment and Forestry (2003), National Forestry Program for Turkey (2004-2023).

General Directorate of Forestry, Ministry of Environment and Forestry (2006), Forestry Assets, a report, Ankara.

Elker, C. (1999), "What to Do with These Cars?", 2nd National Urban Infrastructure Symposium, Declarations Book, Chamber of Civil Engineers, TMMOB, Ankara, p.177-191.

Energy Market Regulatory Authority (2011) Electricity Market Report 2010, http://www2.epdk.org.tr/Belgeler/ElektrikPiyasasiRaporu2010.pdf Access Date: June 201

Ministry of Energy and Natural Resources (2010a), Blue Book, http://www.enerji.gov.tr/yayinlar_raporlar/Mavi_Kitap_2010.pdf Access Date: April 2011

Ministry of Energy and Natural Resources (2010b), 2008 General Energy Balance (Original Units) http://www.enerji.gov.tr/EKLENTI_VIEW/index.php/raporlar/raporVeriGir/46124/2 Access Date: May 2011.

Ministry of Energy and Natural Resources (2011), 2009 General Energy Balance, http://www.enerji.gov.tr/duyurular/2009_yili_genel_enerji_dengesi.pdf Access Date: April 2011.

ENVEST Planners Consortium [ENVEST] (2005a), Ministry of Environment and Forestry, Technical Assistance for the Planning of High Cost Environmental Investments (EHCIP) Investment Plan for Landfill Directive, Ankara

ENVEST Planners Consortium [ENVEST] (2005b), Ministry of Environment and Forestry, Technical Assistance for the Planning of High Cost Environmental Investments (EHCIP), Directive-specific Investment Plan for Directive No. 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture, Ankara

Ministry of Energy and Natural Resources, General Directorate of Electrical Power Resources, Survey and Development Administration (2008), Energy Efficiency in Electric Motor Systems

En-Ver Motor Movement, http://www.eie.gov.tr/duyurular/EV/EnVer_motor_hareketi/EnVer_motor_hareketi.html Access Date: March 2011

European Local Transport Information System [ELTIS] (2009), Istanbul Clean Fuels/Clean Vehicles Project, http://www.eltis.org/study_sheet.phtml?study_id=2084&lang1=en

Gerçek, H. and Demir, O. (2008), Urban Mobility in Istanbul, PlanBleu, İstanbul.

Global Wind Energy Council [GWEC] (2011), Global Wind Report, 2nd ed., April 2011, http://www.gwec.net/fileadmin/images/Publications/GWEC_annual_market_update_2010_2nd_edition_April_2011.pdf Access Date: April 2011

Intergovernmental Panel on Climate Change [IPCC] (2007], IPCC Forth Assessment Report: Climate Change 2007, Cambridge, United Kingdom and New York, USA.

International Energy Agency [IEA] (2007), Tracking Industrial Energy Efficiency and CO_2 Emissions, IEA, Paris

International Energy Agency [IEA] (2009), Energy Technology Transitions For Industry - Strategies for the Next Industrial Revolution, IEA; Paris

International Energy Agency [IEA] (2010), 2010 Key World Energy Statistics, IEA, October 2010, Paris

International Transport Forum [ITF] (2010), Transport CO_2 Emissions http://www.internationaltransportforum.org/statistics/CO_2/index.html Access Date: May 2011

Küsek, G. (2010), “Impacts of Land Consolidation Actions on Farmers’ Income and Investments”.

Organization for Economic Cooperation and Development [OECD] (2008), OECD Environmental Performance Reviews: Turkey. OECD Publishing, Paris.

Stern, N. (2007), The Economics of Climate Change - The Stern Review, Cambridge University Press, Cambridge, United Kingdom

TMMOB Chamber of Civil Engineers – İstanbul Branch Office (2009), Numeric Data Brochure; İstanbul Intercity Transports, İstanbul

TMMOB Chamber of Mechanical Engineers (2010), Energy Outlook: Turkey, CMM, March 2010, Ankara

Turkish Industry and Business Association (2007), Harmonization with the EU Acquis in Industry TÜSİAD, İstanbul

Scientific and Technological Research Institute of Turkey (2010), 2011-2016 Human Resources Strategy and Action Plan for Science and Technology, Ankara.

Turkish Grand National Assembly (2008), TGNA Report on Climate Change and Water Management, Ankara.

General Directorate of Turkish State (2010), Statistics Yearbook, 2005-2009, http://www.tcdd.gov.tr/home/detail/?id=305 Access Date: March 2011

Electricity Transmission Company of Turkey (2011), Turkey’s Electricity Statistics, www.teias.gov.tr Access Date: April 2011

World Energy Council [WEC] (2010), Energy Efficiency: A Recipe for Success, WEC, London

Ministry of Environment and Urbanization
General Directorate of Environmental Management
Department of Climate Change