Technical Assistance for
Developed Analytical Basis for Formulating Strategies and Actions towards Low Carbon Development

Project Identification No: EuropeAid/136032/IH/SER/TR
Contract No: TR2013/0327.05.01-01/001

Activity 1.1.1 Review and analysis of the status of the climate related strategies, policies, plans, and legislation (Status Report)

Ankara 2017
Project Title: Technical Assistance for Developed Analytical Basis for Formulating Strategies and Actions Towards Low Carbon Development

Service Contract No: TR2013/0327.05.01-01/001
Project ID No: EuropeAid/136032/IH/SER/TR
Project Value: € 3,865,010.00
Commencement Date: 29 May 2017
End Date / Duration: 29 May 2020 / 36 Months

Contracting Authority: Central Finance and Contracts Unit (CFCU), Ankara, Turkey

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This document has been produced with the financial assistance of the European Union and the Republic of Turkey.

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<th>Description</th>
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<tbody>
<tr>
<td>AFAD</td>
<td>Disaster and Emergency Management Authority</td>
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<tr>
<td>BAU</td>
<td>Business-As-Usual</td>
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<td>BEP</td>
<td>The Building Energy Performance</td>
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<tr>
<td>Bt</td>
<td>Billion tonnes</td>
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<tr>
<td>Btu</td>
<td>British thermal unit</td>
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<tr>
<td>CBRT</td>
<td>Central Bank of Republic of Turkey</td>
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<td>CCKP</td>
<td>Climate Change Knowledge Portal</td>
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<td>CDM</td>
<td>Clean Development Mechanisms</td>
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<tr>
<td>CFCs</td>
<td>Chlorofluorocarbons</td>
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<tr>
<td>CH₄</td>
<td>Methane</td>
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<tr>
<td>CO</td>
<td>Carbon monoxide</td>
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<tr>
<td>CO₂</td>
<td>Carbon dioxide</td>
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<tr>
<td>CO₂-eq</td>
<td>Carbon dioxide equivalent</td>
</tr>
<tr>
<td>COP</td>
<td>Conference of the Parties</td>
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<tr>
<td>DBT</td>
<td>Development Bank of Turkey</td>
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<tr>
<td>EESPD</td>
<td>The Energy Efficiency Strategy Paper</td>
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<tr>
<td>EIT</td>
<td>Economies in Transition</td>
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<tr>
<td>ESMAP</td>
<td>Energy Sector Management Assistance Programme</td>
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<td>ETS</td>
<td>Emission Trading Scheme</td>
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<td>EU</td>
<td>European Union</td>
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<tr>
<td>F-gases</td>
<td>Fluorinated gases</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GHG</td>
<td>Greenhouse gas</td>
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<td>GWh</td>
<td>Gigawatt hour</td>
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<tr>
<td>IEA</td>
<td>International Energy Agency</td>
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<tr>
<td>INDC</td>
<td>Intended Nationally Determined Contribution</td>
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<tr>
<td>IPA</td>
<td>Instrument for Pre-Accession Assistance</td>
</tr>
<tr>
<td>IPC</td>
<td>Istanbul Policy Center</td>
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<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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</table>
IPPC Integrated pollution prevention and control
IPPU Industrial Processes and Product Use
JI Joint Implementation
KENTGES Integrated Urban Development Strategy and Action Plan
Kt Kilo tonnes
LCE Low Carbon Economy
LEDS Low Emission Development Strategy
LULUCF Land Use, Land Use Change and Forestry
MAAP Multi Annual Action Programme for Environment and Climate Action
MoENR Ministry of Energy and Natural Resources
MoD Ministry of Development
MoFWA Ministry of Forestry and Water Affairs
MoFAL Ministry of Food Agriculture and Livestock
MoEU Ministry of Environment and Urbanization
MoSIT Ministry of Science Industry and Technology
MoTMC Ministry of Transport Maritime Affairs and Communication
mpc Marginal Propensity To Consume
MRV Monitoring Reporting Verification
Mt Million tonnes
N₂O Nitrous oxide
NADSAP National Agricultural Drought Strategy and Action Plan
NBSAP National Biodiversity Strategies and Action Plans
NCCAP National Climate Change Action Plan
NCCASAP National Climate Change Adaptation Strategy and Action Plan
NCCS National Climate Change Strategy
NDC Nationally Determined Contribution
NDMSP National Disaster Management Strategic Plan
NDP National Development Plan
NE Not estimated
NEC National Emission Ceilings Directive
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>NH₃</td>
<td>Ammonia</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<tr>
<td>NMVOC</td>
<td>Non-methane volatile organic compounds</td>
</tr>
<tr>
<td>NO</td>
<td>Nitrogen monoxide</td>
</tr>
<tr>
<td>NOₓ</td>
<td>Nitrogen oxides</td>
</tr>
<tr>
<td>OECD</td>
<td>The Organisation for Economic Co-operation and Development</td>
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<tr>
<td>ODS</td>
<td>Ozone-Depleting Substances</td>
</tr>
<tr>
<td>PJ</td>
<td>Petajoule</td>
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<td>PSBR</td>
<td>Public Sector Borrowing Requirement</td>
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<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
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<tr>
<td>SDG</td>
<td>Sustainable Development Goals</td>
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<tr>
<td>SO₂</td>
<td>Sulphur dioxide</td>
</tr>
<tr>
<td>SOP</td>
<td>The Sector Operational Programme</td>
</tr>
<tr>
<td>TCDD</td>
<td>Turkish State Railways</td>
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<tr>
<td>TFP</td>
<td>Total Factor Productivity</td>
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<tr>
<td>TurkStat</td>
<td>Turkish Statistical Institute</td>
</tr>
<tr>
<td>TUSIAD</td>
<td>Turkish Industry and Business Association</td>
</tr>
<tr>
<td>TWh</td>
<td>Terawatt hour</td>
</tr>
<tr>
<td>UCES</td>
<td>EU Integrated Environmental Approximation Strategy</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Program</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
</tr>
<tr>
<td>WEF</td>
<td>World Economic Forum</td>
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<tr>
<td>WFD</td>
<td>EU Water Framework Directive</td>
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<tr>
<td>WWF</td>
<td>World Wildlife Fund</td>
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<tr>
<td>YEKDEM</td>
<td>Renewable Energy Support Mechanism</td>
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1. Introduction

The concept of low carbon development has its roots in the UNFCCC adopted in Rio in 1992. In the context of this convention, low carbon development is now generally expressed using the term low emission development strategies (LEDS – also known as low emission development strategies, or low carbon growth plans). Though no formally agreed definition exists, LEDS are generally used to describe forward looking national economic development plans or strategies that encompass low emission and/or climate resilient economic growth (OECD, IEA, 2010).

The concept has been included in the negotiating texts under the UNFCCC since the run up to COP15 in Copenhagen in 2009 and is part of both the Copenhagen Accord (UNFCCC, 2009) and the Cancun Agreements (UNFCCC, 2011), which recognise that a LEDS is indispensable to sustainable development and that incentives are required to support the development of such strategies in developing countries. Though not clearly implied by the terminology, LEDS are understood to also include provisions to reduce vulnerability to climate change impacts (see Figure 1).

Outside of the UNFCCC, the concept has also gained recognition and support by world leaders, including at the Major Economies Forum in Italy in July 2009, where leaders

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2 modified from Mulugetta and Urban 2010; IDS 200
declared that their countries would prepare low carbon growth plans. A growing number of international organisations and consultancies have also been involved in low carbon development programs, including the UNDP, UNEP, the World Bank (including through its Energy Sector Management Assistance Program (ESMAP), ClimateWorks, the Climate Development Knowledge Network, the European Union and a variety of bilateral donors.

Overall, the various definitions of green growth, green economy, and low carbon development are generally consistent, both having sustainable development as their ultimate objective and being a means to reconcile the economic and environmental pillars, without ignoring social aspects (World Bank, 2012).

Most of the developed and developing countries already prepared their low carbon development strategies and road maps. Following Paris Agreement, low carbon development become even more important to ensure the required CO₂ reduction to stop global warming.

And in accordance with Article 4 of Paris Agreement, all Parties are invited to:

“Communicate, by 2020, to the secretariat mid-century, long-term low greenhouse gas emission development strategies in accordance with Article 4, paragraph 19, of the Agreement, and requests the secretariat to publish on the UNFCCC website Parties’ low greenhouse gas emission development strategies as communicated”

In the light of the global move, low carbon development has become high in the EU agenda and published EU 2050 Roadmap for low carbon development in 2011.

The expected benefits of the EU Low Carbon Roadmap 2050 on energy security include:

- Fuel savings: € 175 to 320 billion on average annually during 2010-2050 (compared to € 270 billion investments)
- Primary energy consumption about 30% below 2005 without negatively affecting energy services Making EU economy more energy secure:
- Halves imports of oil and gas compared to today
- Saving € 400 billion of EU oil and gas import bill in 2050, equivalent to > 3% of today’s GDP

- Safeguard against macro-economic impacts of future energy price hikes
- Air quality and health benefits: € 27 billion in 2030 and € 88 billion in 2050

The Indicative Strategy Paper for Turkey (2014-2020) has been adopted by the EU on 26/08/2014. The pre-accession instrument, namely IPA II covers the period from 2014 to 2020 and entered into force on 21/03/2016. The Indicative Strategy Paper for Turkey set up the bilaterally agreed priorities for Turkey in relation to the accession negotiations and Sector Operational Programme on Environment and Climate Action (2014-2020). The Climate Change is a cross-cutting high priority in these strategic documents, covering new IPA II period. Under the Action III of the “Multi Annual Action Programme for Environment and Climate Action (MAAP 2014-2016)” climate mitigation, adaptation, and low carbon development remains a high priority for Turkey, for IPA II period.

The objective of IPA II for this is to help Turkey to fully comply with EU environmental and climate change acquis upon accession requiring adoption of all relevant directives and legislation, including the necessary investments. One of the indicators to measure the progress towards this objective is a preparation of measures to mitigate and adapt to climate change, with convergence towards EU requirements and mainstreaming of climate change considerations into other sector policies.

This report analyses GHG emission trends for Turkey, sets long term macroeconomic outlook, reviews most important national and sectoral policy documents and provides a legislative assessment that gives an important illustration of Turkish low carbon development ambitions, the present status of policy implementation and target/goals achieved, including a comparison to the EU Climate acquis and related UN Sustainable Development Goals.

The report aims to provide a solid baseline for further climate change mitigation actions and to build the capacity of the Ministry of Environment and Urbanisation (MoEU) and its co-beneficiaries, to support a long-term low carbon development pathway for Turkey.

**1.1. Country Background**

Turkey boasts a unique diversity of geography, natural resources, settlement patterns and livelihoods. This diversity, when placed alongside the envisaged impacts of climate change, means that proper adaptation mechanisms and accessible finance sources to fund necessary mitigating measures must be found. This way, it should prove possibility to reduce Turkey’s vulnerabilities and improve the resilience of its natural resources, economic sectors and the society as a whole. A multi-faceted approach is needed which takes Turkey’s geographic, environmental, societal and economic specifications into account.
In 2012, Turkey adopted the National Climate Change Adaptation Strategy and Action Plan (NCCASAP, 2011), a long-term process which is set to be fully implemented by 2023. NCCASAP is basically composed of adaptation and mitigation sections. Under the adaptation section, main objectives and actions are listed regarding priority sectors in Turkey, namely water resource management, agriculture and food security, ecosystem services, biodiversity and forestry, natural disaster risk management and public health. However, as Turkey progresses through the implementation stages of NCCASAP, and continues to undergo monitoring and evaluation processes, challenges are emerging. Particular obstacles include the very broad definition of actions, lack of measurable, reportable and verifiable indicators and a lack of baseline assessment. These challenges highlight the need for NCCASAP to be updated in accordance with the EU Climate Change Adaptation Strategy. As explained in detail below, in order to achieve this aim, the expected consequences of climate change and Turkey’s particular environmental vulnerabilities will first be studied, and policy options for climate change adaptation at both the national and region/basin levels will then be elaborated. Subsequently, alternative financing mechanisms will be explored and priority investments will be determined, with a proposal to support capacity-building activities as part of a grant programme.

Chapter 27 on Environment and Climate Change of the National Action Plan for EU Accession (2016-2019) calls on Turkey to adopt legislation aimed at transposing the EU’s environment policy framework horizontally in order to improve coordination of work and continue capacity-building within Turkey’s administrative bodies at all levels.

The Multi-Annual Action Programme for Turkey on Environment and Climate Action (MAAP) (2014) assesses plans for adaptation to climate change among the fields that need to be supported by the programme in the context of alignment with the environmental acquis communautaire. As part of acquis-related institution-building activities, The MAAP lists the study of the effects of climate change, the elaboration of measures for adaptation at national and basin levels and public awareness and education in the field as among some of the initiatives which can be financed.

The Sector Operational Programme: Environment and Climate Action (2016) (SOP), acknowledges the vulnerability of economic activities and infrastructures to adverse impacts of climate change and calls for the preparation and implementation of

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adaptation measures at both national and basin levels. In the scope of *acquis*-related institution-building, SOP lists plans for adaptation to climate change as among the main intervention areas which need to be elaborated further and highlights the importance of institutional capacity building at both central and local levels in order to enhance resilience and promote climate action.

The EU Enlargement Strategy (2015) highlights the importance of continuing regional cooperation on environmental issues, focusing on flood prevention and water resourcing strategies, particularly with regard to trans-boundary river basins, and air pollution and nature protection in cross-border protected areas. Turkey’s New EU Strategy (2016) acknowledges that the EU accession process requires fundamental changes in all areas of daily life, from production to consumption, justice to security, health to education, agriculture to industry, and from energy to the environment.

1.2. International Process and Commitments

1.2.1. EU Accession and Transposition of EU Climate Policy (*EU Acquis*)

The EU Climate Change Policy is based on a long-term comprehensive policy framework and strategy, which includes three major elements:

- 2020 climate and energy package
- 2030 climate and energy framework
- 2050 low-carbon roadmap.

The **2020 climate & energy package** is a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020. It was adopted in 2009 and has three main targets - 20% cut in greenhouse gas emissions (from 1990 levels), 20% of EU energy should be produced from renewables, and 20% improvement in energy efficiency. EU emissions trading scheme (ETS), binding annual national targets under the "Effort-sharing decision" and Renewable Energy Directive, measures for improving energy efficiency under Energy Efficiency Plan and Energy Efficiency Directive, and support to low carbon technologies under research & innovation programs are among major actions to implement the package.

The **2030 climate and energy framework** was adopted in 2014 and establishes three key targets for the year 2030:

- At least 40% cuts in greenhouse gas emissions (from 1990 levels)

5 [https://ec.europa.eu/clima/policies/strategies_en](https://ec.europa.eu/clima/policies/strategies_en)
- At least 27% share for renewable energy
- At least 27% improvement in energy efficiency

The 2030 framework has a binding target to decrease emissions in EU territory by at least 40% below 1990 levels by 2030 through reforming and strengthening EU emissions trading system (emissions cut by 43%, compared to 2005), and establishing enhanced individual binding targets for Member States, allowing to decrease emissions by 30%, compared to 2005).

The 2050 low-carbon economy roadmap suggests that:
- By 2050, the EU should cut greenhouse gas emissions to 80% below 1990 levels
- Milestones to achieve this are 40% emissions cuts by 2030 and 60% by 2040
- All sectors need to contribute
- The low-carbon transition is feasible & affordable.

Figure 2. Possible 80% cut in greenhouse gas emissions in the EU by 2050 (100%=1990)

The intermediate targets for Europe's emissions should be 40% below 1990 levels by 2030, and 60% below 1990 levels by 2040. The roadmap assumes that the transition to a low-carbon society is feasible and affordable, but requires innovation and significant investments - the EU would need to invest an additional €270 billion (or on average 1.5% of its GDP annually) till 2050.

Essential differences exist between roadmaps for main sectors, responsible for Europe's emissions, on the amount of reductions that can be expected.

The energy sector, which has the biggest potential for cutting emissions, can almost totally eliminate CO\textsubscript{2} emissions by 2050 through replacing fossil fuel generation capacities with renewable sources like wind, solar, water and biomass or other low-
emission sources like nuclear power plants or fossil fuel power stations equipped with carbon capture & storage technology. To implement this, strong investments are required in development of smart grids.

Emissions from transport could be reduced to more than 60% below 1990 levels by 2050 through further improvement of fuel-efficiency of petrol and diesel engines in short term and switching to plug-in hybrid and electric cars in the mid- to long-term.

Emissions from houses and office buildings can be drastically reduced – by around 90% in 2050. Implementation of passive housing technology in new buildings, refurbishing old buildings to improve energy efficiency, and replacing fossil fuels with electricity and renewables in heating, cooling & cooking will allow to reach strong improvement in energy performance.

Energy intensive industries could cut emissions by more than 80% by 2050 through introduction of new cleaner and more energy-efficient manufacturing technologies.

Despite anticipated global food demand growth, it is expected that agriculture will decrease emissions from fertilisers, manure and livestock and can contribute to the storage of CO$_2$ in soils and forests. Shift towards healthier diet with more vegetables and less meat can also reduce emissions.

As a candidate to EU, Turkey aims the harmonisation to EU climate policy and legislation (EU climate acquis) and important climate related measures have already been developed in GHG emission intensive sectors. At the same time, further efforts to implement the harmonised policy and legislation in compliance with EU legal documents are still needed.

1.2.2. UNFCCC process

Turkey became a party to UNFCCC in 2004 and ratified the Kyoto Protocol in 2009. Despite Turkey does not have emission reduction targets under the Kyoto protocol, national communication documents have been submitted by the government to the UNFCCC since becoming a party to the convention. Sixth National Communication on Climate Change was submitted in 2016. Turkey also carries out intensive works on subjects such as incentives to increase the use of new and renewable energy, accelerating the investments in public transport that cause less carbon emissions and increasing the energy efficiency to contribute to the works to fight against climate change and to reduce the greenhouse gas emissions. The country also makes efforts for the development of the voluntary carbon market and its integration to the compulsory markets.

The Government of Turkey signed the Paris Climate Agreement on 22 April 2016 during the signatory ceremony held in New York. However, the obligations of the Paris
agreement will only be binding for Turkey once the Turkish Parliament ratifies the new climate agreement. Within the context of new agreement, the Republic of Turkey announced a target, Intended Nationally Determined Contribution (INDC) of up to 21% decrease in emissions by 2030.

![Graph showing total greenhouse gas emissions from 2010 to 2030](image)

**Figure 3. Turkey Government’s official INDC GHG target until 2030**

### 1.2.3. Global Sustainable Development Goals

In 2015, countries adopted the 2030 Agenda for Sustainable Development and its seventeen Global Sustainable Development Goals (SDGs).

Governments, businesses and civil society together with the United Nations are mobilizing efforts to achieve the Sustainable Development Agenda by 2030. Universal, inclusive and indivisible, the Agenda calls for action by all countries to improve the lives of people everywhere. As indicated in the “Report on Turkey’s Initial Steps Towards the Implementation of the 2030 Agenda for Sustainable Development” (will be referred to as Turkey’s Agenda 2030 Report from this point onward) Turkey was identified among the top ten performers as measured by average annual rates of relative progress, especially when goals such as eradicating extreme poverty, reducing child mortality, improving maternal health, ensuring environmental sustainability (in areas such as the improvement of accessibility of drinking water and sanitation), are considered. As a direct result of these facts, transition to SDGs is declared to be based on the lessons learnt in the MDG process of Turkey. Turkey has first introduced the concept of sustainable development into 7th Development Plan in

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6 Sixth National Communication of Turkey, 2016, Ministry of Environmental and Urbanization (MoEU)
1996 after 1992 Rio Conference. During the last decade, outcomes of Rio+20 have been harmonized with 10th Development Plan that covers 2014-2018. One of the main principles of the 10th Development Plan is sustainable development and the Plan is based on a “human-centred development” approach. Turkey is currently in the stage of preparing long term vision of the 11th NDP. The vision provides the development perspective of the Plan by taking into account the international and national trends in development landscape and serves as the starting point for drafting the Plan itself. Turkey intends to take SDGs as one of the main inputs of the vision that 11th Development Plan will be based on. Although there are in full 17 SDGs we will focus on the SDG 8 and 13 in this report, to be consistent with the focus of the report.

**Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all**

Global SDG 8 explains that over the past 25 years the number of workers living in extreme poverty has declined dramatically, despite the lasting impact of the 2008 economic crisis and global recession. In developing countries, the middle class now makes up more than 34 percent of total employment – a number that has almost tripled between 1991 and 2015.

When we check the consistency of the 10th Development Plan with the SDG 8s it is reported that one of the main objectives of the 10th Plan is to accelerate the increase in welfare and ensure a high and stable growth with a long term perspective. The main strategy for high and stable growth is developing the private sector-led, open and competitive production structure. The main objective is to form a labour market in which decent job opportunities are provided to all segments of the society, skills of the labour force are upgraded and utilized effectively, gender equality and occupational health and safety conditions are ameliorated and flexicurity is embraced. Taking into account requirements of decent work, working conditions will be improved and wage productivity relationship will be strengthened in the implementation period of the Plan. Moreover, it is planned to eliminate children’s deprivation stemming from poverty, to increase the enrolment and participation of youth, especially girls, in education and employment. For a sustained, inclusive and sustainable economic growth, green growth approach is aimed to be ensured through exploiting potentials of environment friendly approaches in terms of new job opportunities, income sources, product and

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technology development in areas like energy, industry, agriculture, transport, construction, services and urbanization.

**Goal 13. Take urgent action to combat climate change and its impacts**

In the 10th Development Plan, the adapting and combatting climate change are indicated to be maintained in line with the principles of “common but differentiated responsibilities” and “respective capabilities” while considering national circumstances. By evaluating the effects of climate change and all activities in water catchments quantity and quality, measures for saving water, combatting drought and preventing pollution are the areas that were put emphasis between the years 2014-2018. It is known that Turkish Statistical Institute (TurkStat) will have the central role for the monitoring part of the 2030 Agenda based on global SDG indicators.

**1.3. Contribution of Stakeholders to the First Working Group Workshop**

At the outset, it is vital to engage with relevant stakeholders with a range of relevant knowledge and experience of national climate-related policies, plans, strategies and related legislation, as well as previous national studies. As part of this activity we have therefore initiated a working group (WG) drawn from across key bodies and departments in the climate change field.

On November 2nd, 2017, the first working group (WG1) workshop was held to inform the stakeholders about the initial findings regarding the Status Report and requesting their contribution to the topic.

In this first WG1 workshop the target was to provide information about the project and the initial findings related to the macroeconomic outlook and the identified policy documents to be reviewed.

The WG1 workshop was held at Holiday Inn Hotel, Ankara with the participation of over fifty attendees from the governmental institutions as well as financial and municipal organisations, such as Ministry of Forestry and Water Affairs (MoFWA), related departments of Ministry of Environment and Urbanization (MoEU), Ministry of Food Agriculture and Livestock (MoFAL), TurkStat, Kayseri Transportation Company, and Development Bank of Turkey (DBT). After providing information about the project and initial findings, the stakeholders were organized into sectoral working group round tables to collect their contributions. The following is a summary of the outcomes from these round tables:

**Contribution of Building Sector**

The Buildings round table (BR), in addition to above mentioned categories of participants was also attended by representatives of the General Directorate of
Renewable Energy, and the MoFWA. At the BR, the stakeholders have identified the following:

- **Green Certification Regulation for Sustainable Buildings and Settlements:** This Regulation will replace the Regulation on Certification of Sustainable Settlements with Sustainable Green Buildings dated 2014, will soon be in place. In this regulation, the Green Certification Commission, the certification bodies, the sustainability expert and the evaluation expert’s authority powers are defined.

- **National Energy Efficiency Action Plan:** This action plan covering the years 2017 to 2023 and covering the industrial, building, agriculture, transportation sectors and horizontal issues will be published following the approval of High Planning Board of the Ministry of Development (MoD).

- **The Building Energy Performance (BEP) Regulation** is crucial for achieving energy efficiency in the building sector and accordingly reducing greenhouse gas emissions. This requires that new buildings built from 2011 onwards under the BEP Regulation and the energy performances and greenhouse gas emissions of existing buildings after 2017 be introduced. The BEP Regulation was updated in 2010, 2011 and 2017. It is also noted at the WG1 that, based on the BEP regulation databases, the implementation of the regulation is observed to be slower than expected.

- **The Turkuaz Cities Project,** which is being carried out by the MoEU, is identified as an important study related to the current status in the building sector. This project aims to combat climate change in cities and includes preparation of guidance documents, co-operation with NGOs, dissemination efforts in municipalities and guidelines for the preparation of local climate change action plans.

- **The outputs of the Technical Assistance Project for Enhancing Energy Efficiency in Buildings,** that aims to tackle with the gaps and needs related to the legal and institutional framework for the energy efficiency of the existing and newly built buildings in Turkey and the outputs of the Technical Assistance Project to Support the Monitoring Mechanism of Turkey’s Greenhouse Gas Emissions, which aims for the establishment of a monitoring mechanism for greenhouse gas emissions in Turkey, to enable better target fulfilment of reporting requirements of UNFCCC are recommended to be considered.

In addition to these, some more recommendations related to barriers and implementation of policies have been shared during this WG1 workshop, but these are
found to be more relevant for other reports, that will be issued under Component 1, and therefore they are not presented in this section.

**Contribution of Waste Sector**

The Waste round table (WR) was held by representatives from the Climate Department, Municipal Waste Department and special wastes department of the MoEU, in addition to TurkStat, and DBT. At the WR, the stakeholders have identified the following:

- For the emissions related to the waste disposal, TurkStat uses the biannual data collected by industry and municipalities. In accordance with the IPCC guidelines, for carbon emissions calculations, data related to municipal and industrial wastes are collected. Waste emissions are calculated under four main headings: Solid waste storage, wastewater treatment and disposal, compost and biological treatment facilities, and incineration and flaring. A comprehensive improvement is expected in 2019 (especially for waste water data) in these guidelines.

Other important topics were discussed during the roundtable, including:

- Methane will be taken into consideration but not carbon dioxide.
- Regulation on the Sanitary Landfills for solid wastes, which has targets to reduce biodegradable waste, will also be revised.
- Packaging wastes are especially important to calculate avoided emissions.
- Solid waste has cross cutting effects, and if energy is obtained by burning and waste is burned in the cement plants, the emissions of the wastes are considered within industrial emissions and the collection trucks are considered under the transport.
- Within 22 documents, presented at the meeting, the National Waste Management Plan was pointed out to be replacing the waste strategy and action plan, this new document is advised to be taken into account.
- The National Recycling Strategy and Action Plan is recommended to be added to the documentation.
- Regarding the mitigation of waste sector, the positive effect of separate collection at source on carbon emissions was emphasized.
- The importance of calculating the actual capacities of the methane-holding plants and the energy-generating facilities that prevented the release of methane was considered.
Contribution of Agriculture Sector

The Agriculture round table (AR) was held by representatives from the MoFAL, MoFWA, TurkStat, and DBT. General discussion at the round table was on the evaluation of 22 policy documents proposed in Technical Proposal. The following is a summary of the AR discussions:

- The AR participants stated that these policies/strategies are imperative and play a significant role in mitigating GHG emissions and supporting low carbon development in Turkey. They also indicated that the main problem is the implementation phase of these policies and strategies.

- With regards to agriculture sector, in light of the AR participant’s suggestions, the additional documents, given below, should also be reviewed:
  - Organic Agriculture Strategic Plan (2012-2016)

- The AR participants suggested that some policies given in the list have already been completed, particularly, new versions of sector-based documents should be reviewed instead of old ones.

- Along with the evaluation of 22 policy documents, discussion at the AR was focussed on existing adaptation and GHG mitigation strategies in agriculture sector, especially on most important ones, such as enteric fermentation, agricultural soils, and manure management.

- The participants stated that an awareness campaign for livestock facilities and farmers to change animal dietary habits and to prevent intensive activity of enteric fermentation would make a significant contribution to low emission strategies.

- The biggest emission share of agricultural soils was identified as using inorganic fertilizers. One of the essential measures to reduce emission sources by agricultural soils was identified as a decrease in the use of inorganic fertilizer and encourage using organic fertilizers such as livestock manure, and sewage sludge after anaerobic treatment processes.

- The consensus on reducing GHG emissions from manure management was around obtaining biogas energy from livestock manure.

- Academic studies related to low carbon strategies should also be reviewed to reach useful contribution for the sake of the project.
Besides direct impacts on carbon emissions from the agriculture sector, indirect impacts such as food losses should be taken into consideration. Food losses during transportation and storage along the way to the end consumer is also identified as a significant problem in terms of emerging GHG emissions during the production. On this issue, measures including improvement of transportation and storage conditions, increasing awareness of end consumer regarding conscious consumption was also discussed.

- The 6th National Communication Reports of the countries that have similar climate condition with Turkey were recommended to be reviewed in terms of learning about policies and measures implemented in other countries.

**Contribution of Transportation Sector**

The Transportation round table (TR) was attended by the Turkish State Railways (TCDD), and Kayseri Transportation company in addition to DBT experts. Following is a summary of the TR discussions:

- National Transportation master plan was identified as a fine strategy paper for the sector. It was also indicated that ultimate goal is to decrease the road transportation and increase the rail and marine transportation.

- Sectoral experts mentioned presence of the trend related percentile targets, and added that year 2014 and 2015 targets were partially achieved.

- At the Kayseri Metropolitan scale an improvement, such as use of gross consumption model with third party transporters and re-adjustment of routes at public transport was documented, which saves 20 km daily fuel consumption and in emissions.

- The “KENTGES” reporting mechanism is identified as a source for climate change actions, related to public transportation.

- Intelligent integrated public transportation is mentioned in all relevant public documents, but its implementation was criticised not to be passed down to all local municipalities.

- The 10th Development plan was identified as a source for green transportation policies.
2. GHG Emission for Turkey: Trends and Projections

2.1. GHG Emissions Trends

Turkey, as an Annex I party to the United Nations Framework Convention on Climate Change (UNFCCC), reports annually on greenhouse gas (GHG) inventories. The latest GHG inventory submission contains national GHG emission/removal estimates for the period of 1990-2015.

According to the latest GHG inventory\textsuperscript{8} of Turkey, total GHG emissions were 475.1 Mt of CO$_2$ equivalents (CO$_2$-eq) excluding the LULUCF sector and 411.0 Mt CO$_2$-eq including the LULUCF sector in 2015. This represents 122\% and 123.7\% increase as compared to 1990 level respectively.

In overall 2015 GHG emissions without LULUCF, the energy sector had the largest portion with 71.6%. The energy sector was followed by the industrial processes and other product use (IPPU) sector with 12.8%, the agriculture with 12.1% and the waste with 3.5%.

There is an increasing trend in emissions in the period from 1990 to 2015 for all sectors. Emissions from energy sector increased by 153.1\% as compared to 1990. The increase in emissions from IPPU sector was 156.2\%, and there were 28.1\% and 52.2\% increase in agriculture and waste sectors emissions respectively.

http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/10116.php
Growing economy, population growth, and urbanization are the main drivers of the GHG emissions in Turkey. As shown in Figure 5, total and net GHG emissions trends are similar to the trend in GDP for 1990-2015 periods. There is an increasing trend in the total emissions over the period 1990-2015. However, for year 1994, 1999, 2001 and 2008 GHG emissions decreased due to economic crisis in those years. GHG emissions decreased by 2.7%, 0.4%, 6.3% and 0.8% respectively as compared to the previous year for that period.

Figure 4. GHG emissions by sector, 1990-2015

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9 World Bank (popular indicators)
GHG emissions per capita\textsuperscript{10} shows a similar increasing trend as total GHG emissions (Figure 6). CO\textsubscript{2} equivalent emissions per capita increased to 6.07 tonnes in 2015 from 3.88 tonnes in 1990.

\textsuperscript{10} TurkStat (statistical indicators), https://biruni.tuik.gov.tr/gosterge/?locale=tr
Population was 56.47\textsuperscript{11} million in 1990 and it reached 78.74\textsuperscript{12} million in 2015. Urban population increased while the rural population declined between 1990 and 2015. Proportion of urban population was 59\% in 1990, while it was 92.1\% in 2015. Urban population growth and urbanization have a significant effect on the increased demand for housing, energy, and transportation.

Table 1. Turkey's Population for Selected Years

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>56 473 035</td>
<td>67 803 927</td>
<td>73 722 988</td>
<td>78 741 053</td>
</tr>
<tr>
<td>Urban</td>
<td>33 326 351</td>
<td>44 006 184</td>
<td>56 222 356</td>
<td>72 523 134</td>
</tr>
<tr>
<td>Rural</td>
<td>23 146 684</td>
<td>23 797 743</td>
<td>17 500 632</td>
<td>6 217 919</td>
</tr>
</tbody>
</table>

Total primary energy supply was 2200 PJ in 1990 and increased to 5407 PJ in 2015 (with 146\% increase).\textsuperscript{13} The share of fossil fuels in total primary energy supply was 82\% in 1990, and 88\% in 2015. The share of renewables, on the other hand, was in the range of 9-18\%. During 1990-2015, share of natural gas in total primary energy supply...
supply increased considerably - from 5% to 31%, while the share of oil decreased from 46% to 30%. The share of coal decreased from 30% to 27%, and share of renewables decreased from 18% to 12%. Primary energy supply is given in figure 7.

![Primary energy supply, 1990-2015](image)

**Figure 7. Primary energy supply, 1990-2015**

Fuel combustion emissions are the major source of Turkish anthropogenic GHG emissions. Total emissions from the energy sector for 2015 were 340 Mt CO₂-eq and 99% of that amount is related to fuel combustion. Energy industries were the main contributor of energy sector GHG emissions with 40.3%. It is followed by transport sector with 22.3%, manufacturing industries with 16.9%, residential and commercial/institutional sector with 16.4% and, agriculture/forestry/fishing sector with 2.9%.
Contribution of gases to the total CO\textsubscript{2} equivalent emissions without LULUCF is given in figure 9. There are increasing trends in CO\textsubscript{2} equivalent emissions of each gas. CO\textsubscript{2} emissions increased by 158.7\% as compared to 1990. CH\textsubscript{4}, N\textsubscript{2}O and F-gases emissions increased by 24.7\%, 39.6 \% and 897.5\% respectively (Table 2).

Figure 9. GHG Emissions by gas, 1990-2015

The highest portion of the total GHG emissions without LULUCF is CO\textsubscript{2} emissions. The share of CO\textsubscript{2} emissions in total CO\textsubscript{2}-eq emissions risen from 69\% in 1990 to 81\%
in 2015. The share of \( \text{CH}_4 \) emissions fell from 19% to 11% and share of \( \text{N}_2\text{O} \) emissions fell from 11% to 7% in the same period. The share of F-gases emissions on the other hand increased from 0.3% to 1.5% (Figure 10).

\[ \text{Figure 10. Contribution of gases in total GHG emissions, 1990,2015} \]

\( \text{CO}_2 \) emissions mainly originated from energy and IPPU sectors. In 2015, the highest portion of total \( \text{CO}_2 \) emissions was from energy sector with 86.1%. The remaining 13.6% originated from IPPU and 0.2% from agriculture. \( \text{CO}_2 \) emissions from energy increased from 126 Mt to 330 Mt between 1990-2015 (163% increase). \( \text{CO}_2 \) emissions from industrial processes increased 139% as compared to 1990 and reached to 52.3 Mt in 2015 (Table 2).

\[ \text{Table 2. GHG emissions by individual gases, 1990-2015} \]

<table>
<thead>
<tr>
<th>GHG</th>
<th>Year</th>
<th>Energy</th>
<th>Industrial processes and product use (IPPU)</th>
<th>Agriculture</th>
<th>Waste</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{CO}_2 ) (kt)</td>
<td>1990</td>
<td>125 801</td>
<td>21 907</td>
<td>460</td>
<td>27.4</td>
<td>148 195</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>201 534</td>
<td>25 544</td>
<td>617</td>
<td>22.9</td>
<td>227 719</td>
</tr>
<tr>
<td></td>
<td>2010</td>
<td>276 856</td>
<td>44 549</td>
<td>645</td>
<td>6.0</td>
<td>322 057</td>
</tr>
<tr>
<td></td>
<td>2015</td>
<td>330 280</td>
<td>52 336</td>
<td>811</td>
<td>0.5</td>
<td>383 427</td>
</tr>
<tr>
<td>Change from 1990 (%)</td>
<td>162.5</td>
<td>138.9</td>
<td>76.2</td>
<td>-98.0</td>
<td>158.7</td>
<td></td>
</tr>
<tr>
<td>( \text{CH}_4 ) (kt)</td>
<td>1990</td>
<td>264</td>
<td>1.4</td>
<td>1 000</td>
<td>384</td>
<td>1 650</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>305</td>
<td>1.6</td>
<td>873</td>
<td>513</td>
<td>1 692</td>
</tr>
<tr>
<td></td>
<td>2010</td>
<td>441</td>
<td>2.0</td>
<td>952</td>
<td>654</td>
<td>2 049</td>
</tr>
<tr>
<td></td>
<td>2015</td>
<td>241</td>
<td>2.3</td>
<td>1 220</td>
<td>593</td>
<td>2 058</td>
</tr>
<tr>
<td>Change from 1990 (%)</td>
<td>-8.7</td>
<td>58.1</td>
<td>22.0</td>
<td>54.6</td>
<td>24.7</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>6.5</td>
<td>3.6</td>
<td>65</td>
<td>4.9</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>
Methane emissions mainly originated from agriculture activities and waste sector. In 2015, methane emissions were 2.06 Mt. 59.43% of total CH$_4$ emissions are from agriculture, 28.8% from waste, and 11.8% from energy and IPPU sectors. Over the period 1990-2015, CH$_4$ emissions generally increased in all sectors, excepting energy sector. The increase in CH$_4$ emissions as compared to 1990 was 22.0% in agriculture sector, 54.6% in waste sector, and 58.1% in IPPU sector. Increase in emissions from agriculture was mainly related to enteric fermentation and manure management. Waste sector methane emissions increased in parallel to the increase in amount of managed waste. CH$_4$ emissions from energy sector decreased by 8.7% as compared to 1990 due to decrease in underground coal production.

The main source of N$_2$O emission is agriculture sector. In 2015, N$_2$O emissions were 0.11 Mt. 78.4% of N$_2$O emission was from agricultural activities, 11.2% from energy, 6.1% from waste and 4.3% from IPPU sectors. The increase in N$_2$O emissions, as compared to 1990, was 34.80% in agriculture sector, 39% in waste sector, and 91% in energy sector. N$_2$O emissions were mainly related to the use of fertilizers in agricultural soils, fuel combustion and waste water treatment and discharge.

The only source of F-gases is IPPU sector. F-gases emissions have increased 897.5% during 1990-2015 and reached to 6.9 Mt CO$_2$-eq. The main contributor of total F gas emissions is the substitution of ozone depleting substances (ODS) by HFCs gases and SF$_6$ emissions from electrical equipment.
2.2. **Indirect GHG Emissions**

Emissions of CO, NO\textsubscript{x}, NMVOC, and SO\textsubscript{2} have also influence on climate change. Table 3 shows the indirect GHG emissions.\textsuperscript{8} CO emissions were 2.35 Mt, NO\textsubscript{x} emissions were 0.88 Mt, NMVOC emissions were 1.02 Mt and SO\textsubscript{2} emissions were 1.9 Mt in 2015. Energy sector was the main source of CO, NO\textsubscript{x}, and SO\textsubscript{2} emissions and responsible from 99% of the emissions. NMVOC emissions are mainly from agriculture and energy sector. The largest portion of NMVOC emissions is from agriculture with 41% and from energy with 29%.

<table>
<thead>
<tr>
<th>Table 3. Indirect greenhouse gas emissions, 1990-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>----------</td>
</tr>
<tr>
<td>NO\textsubscript{x}</td>
</tr>
<tr>
<td>CO</td>
</tr>
<tr>
<td>NMVOC</td>
</tr>
<tr>
<td>SO\textsubscript{2}</td>
</tr>
</tbody>
</table>

2.3. **GHG Emissions Projection**

Turkey submitted its Intended Nationally Determined Contribution (INDC) to UNFCCC in 2015. The INDC target of Turkey is” …up to 21 percent reduction in GHG emissions from the business as usual level (BAU level) by 2030…” .

GHG emissions projection studies were conducted to determine INDC target. Base year for projection was 2012. Two scenarios: Business-As-Usual Scenario and Mitigation Scenario was used in the emission projection. Key assumptions used for the GHG emission projection is given in Table 4.\textsuperscript{6}

<table>
<thead>
<tr>
<th>Table 4. Key assumptions used in the projections</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameter</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Population (in thousand)</td>
</tr>
<tr>
<td>Population growth (%) (annual)</td>
</tr>
<tr>
<td>GDP growth rate (%) (annual)</td>
</tr>
</tbody>
</table>

Turkey’s annual GDP growth was 2.10% in 2012, and it is projected to reach 4% by 2030. Population has increased by more than 30% from 1990 to 2012 and reached
75.6 million. Turkey’s energy demand has been increasing by 6-7% each year. Electricity demand in 2030 will reach 580 TWh under the business-as-usual scenario. Business-as-usual scenario projects that GHG emissions up to 2030 with no mitigation measures. In mitigation scenario, emissions for 2012-2030 were projected based on mitigation measures from various policy papers and strategic documents. The plans and policies considered to be implemented for mitigation scenario are listed below for each sector.

**Electricity Generation Sector;**
- Increasing capacity of production of electricity from solar power to 10 GW until 2030,
- Increasing capacity of production of electricity from wind power to 16 GW until 2030,
- Tapping the full hydroelectric potential,
- Commissioning of a nuclear power plant until 2030,
- Reducing electricity transmission and distribution losses to 15% at 2030,
- Rehabilitation of public electricity generation power plants,
- Establishment of micro-generation, co-generation systems and production on site at electricity production.

**Industrial Sector;**
- Reducing emission intensity with the implementation of National Strategy and Action Plan on Energy Efficiency,
- Increasing energy efficiency in industrial installations and providing financial support to energy efficiency projects,
- Making studies to increase use of waste as an alternative fuel at the appropriate sectors.

**Transportation Sector;**
- Ensuring balanced utilization of transport modes in freight and passenger transport by reducing the share of road transport and increasing the share of maritime and rail transport,
- Enhancing combined transport,
- Implementing sustainable transport approaches in urban areas,
- Promoting alternative fuels and clean vehicles,
- Realizing high speed railway projects,
- Increasing urban railway systems,
- Achieving fuel savings by tunnel projects,
- Scraping of old vehicles from traffic,
- Implementing green port and green airport projects to ensure energy efficiency,
- Implementing special consumption tax exemptions for maritime transport.

Residential and Commercial Buildings Sector;
- Constructing new residential buildings and service buildings as energy efficient in accordance with the Energy Performance of Buildings Regulations,
- Creating Energy Performance Certificates for new and existing buildings to control energy consumption and GHG emissions and to reduce energy consumption per square meter,
- Reducing the consumption of primary energy sources of new and existing buildings by means of improved design, technological equipment, and building materials, as well as through development of financial mechanisms that promote the use of renewable energy sources (loans, tax reduction, etc.),
- Dissemination of Green Building, passive energy, zero-energy house design in order to minimize the energy demand and to ensure local production of energy.

Agriculture Sector;
- Fuel savings by land consolidation in agricultural areas,
- Controlling the use of fertilizers and implementing modern agricultural practices,
- Supporting the minimum tillage methods.

Waste Sector;
- Disposing wastes to managed landfill sites,
- Reuse, recycle and use of other processes to recover secondary raw materials, to utilize as energy source or to remove wastes,
- Recovering energy from waste by using processes such as material recycling of wastes, bio-drying, bio-methanization, composting, advanced thermal processes or incineration,
- Recovery of methane gas from landfill gas, produced by managed and unmanaged landfill sites,
- Utilization of industrial wastes as an alternative raw material or alternative fuel in other industrial sectors, through industrial symbiosis approach,
- Conducting relevant studies to utilize wastes generated from breeding farms and poultry farms,
- Rehabilitation of unmanaged waste sites and ensuring wastes to be deposited at managed landfill sites.

Removals:
- Increasing sink areas and preventing land degradation,
- Implementing Action Plan on Forestry Rehabilitation and National Afforestation Campaign.

Greenhouse gas emissions for 1990-2012 and projected emissions up to 2030 are given in table 5, and emissions with sectoral details for each GHG are presented in table 6.

**Table 5. Sectoral GHG emissions projection**

<table>
<thead>
<tr>
<th></th>
<th>GHG Emissions</th>
<th>Business-As Usual Scenario</th>
<th>Mitigation Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>132</td>
<td>159</td>
<td>214</td>
</tr>
<tr>
<td>IPPU</td>
<td>31</td>
<td>34</td>
<td>36</td>
</tr>
<tr>
<td>Agriculture</td>
<td>42</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>LULUCF</td>
<td>-30</td>
<td>-30</td>
<td>-36</td>
</tr>
<tr>
<td>Waste</td>
<td>14</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>188</td>
<td>219</td>
<td>275</td>
</tr>
</tbody>
</table>
Table 6. GHG emissions projection by gas

<table>
<thead>
<tr>
<th></th>
<th>GHG Emissions</th>
<th>Business-As Usual Scenario</th>
<th>Mitigation Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHG emissions without LULUCF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO₂</td>
<td>154</td>
<td>184</td>
<td>239</td>
</tr>
<tr>
<td>CH₄</td>
<td>47</td>
<td>48</td>
<td>51</td>
</tr>
<tr>
<td>N₂O</td>
<td>17</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>HFCs</td>
<td>NO</td>
<td>NO</td>
<td>1</td>
</tr>
<tr>
<td>PFCs</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>SF₆</td>
<td>NE</td>
<td>NE</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>250</td>
<td>311</td>
</tr>
<tr>
<td>GHG emissions including LULUCF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO₂</td>
<td>124</td>
<td>154</td>
<td>203</td>
</tr>
<tr>
<td>CH₄</td>
<td>47</td>
<td>48</td>
<td>51</td>
</tr>
<tr>
<td>N₂O</td>
<td>17</td>
<td>16</td>
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<td>NO</td>
<td>1</td>
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<tr>
<td>PFCs</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Total</td>
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</table>

In business-as-usual scenario, emissions from energy consumption are projected to increase by 27.3 Mt CO₂-eq per year for 2012-2020 and by 40.5 Mt CO₂-eq per year for 2020-2030. Projected total GHG emissions with LULUCF for 2020 and 2030 are 673, and 1175 Mt CO₂-eq, respectively.

Under the mitigation scenario, based on an implementation of policies listed above, the greatest relative mitigation will happen in the waste sector - up to 23.2% by 2030. Policies such as rehabilitation of unmanaged waste disposal sites and recovery of methane gas from landfill gas will play a major role in mitigation. In the energy sector there will be mitigation up to 21.8% by 2030. Renewables and nuclear power policy will contribute significantly in mitigation in the energy sector. Also, implementation of urban transformation projects in residential-commercial sector and adoption of transformation programs in industry sector will help the mitigation of greenhouse gases in those sectors. For LULUCF sector, Turkey aims to increase its forestland to 30% (23,400,000 ha) by 2023 which will rise removal of greenhouse gases by 80% in 2030. Figure 11 shows GHG emissions projection resulting from these two scenarios.
Figure 11. GHG emissions projection
3. Setting Macroeconomic Outlook for Predefined Term (2053)

This chapter provides a macroeconomic overview for the Turkish economy from a point of view of her climate change policies. The framework will be a dynamic one, entailing an overview of the existing trends in detail as well as a projection of the broad macroeconomic aggregates, new technologies implementation, and an educated projection of the GHG emission pathways into the next several decades.

This chapter is composed of mainly three sections. Section 3.1 provides a summary of the macroeconomic setting of Turkey. Section 3.2 assesses the GHG emissions and investigates on the arsenal of policy measures, current and future. In section 3.3 projections of the future pathways of macro aggregates for both the global economy at large and also for Turkey are provided.

3.1. Summary of Turkish Macroeconomic Development

The Turkish economy is well advanced and can be considered a functioning market economy.\(^\text{14}\) However, Turkey experienced relatively volatile growth performance during the 1990s. IMF programme of early 2000 was openly designed to promote “expansionary fiscal contraction”. Indeed, annual growth rate averaged 7.6% over 2002-2006. It was driven by a massive inflow of foreign capital.

Turkey has a GDP growth primarily dependent on the household consumption, a growth model not oriented on a supply side. At a closer look on the production side, the share of the manufacturing sector has declined from 22.3% in 1998 to 17.1% in the second quarter of 2017 (annualised). This loss in the share of the manufacturing sector seems to be compensated by the rise in the shares of the construction and housing sectors. These sectors are pushed forward by several factors, including some significant government support to large size housing projects.

High growth of the construction sector creates the risks of hiding some weaknesses in the economy. For example, although there is a rising fixed capital formation elevated by the strong performance of the construction sector, it is observed that the machinery and investment expenditures are in fact declining when the impact of the construction sector is excluded.

Data underscore that low and medium-low technology sectors constitute 90% of the enterprises, 78% of the employees and 72% of the production in the manufacturing sector. There is a considerable gap in value added by the employees in lowest and

\(^\text{14}\) EU Regular Report on Turkey (COM(2016) 715 final)
the highest technology levels. Accordingly, one employee in high-technology delivers more value added than the total of what one employee in low-tech sector together with one employee in the medium-low technology sector deliver. Yet the discussions in the country does not revolve around the quality of the growth but rather focus more on the headline growth.

Except for a few years, Turkish economy almost traditionally posts current account deficit. Energy deficit takes the largest part due to the high share of the imported resources. Indeed, non-energy balance stands rather limited when compared to the energy deficit. Meanwhile, the falling global oil prices create a partial relief by limiting the energy bill of the country while the dependence on the resource itself is of course unchanged.

In addition to the energy dependency of the country, Turkey’s technology deficit and saving deficit also add structural weakness to the current account deficit. A study by the Central Bank of Republic of Turkey (CBRT) shows that the widening of the technology deficit when combined with increasing global competition in low and medium-low technology production activities, Turkey’s structural current account deficit sets to get wider (Kara, Sarikaya, 2013)\textsuperscript{15}. Regarding the savings, an international comparison will tell us that Turkey stands almost at the midpoint of the scale. With recently released national income statistics, we see that Turkey’s saving rate stands at 25.06\% as of June 2017, what is roughly one percent of improvement compared to a decade ago.

Yet when the balance between the savings and the investment is checked, we see that Turkey’s chronic problem of posting saving deficit and being dependent on external savings continues. This also confirms that Turkey’s GDP performance is highly dependent on and correlated to foreign capital inflows.

So far heaving up the anchor on the back of the abundant global liquidity, Turkey’s financing need created only temporary difficulties. In times of high-risk appetite, Turkey’s current account deficit and related financing need are tolerated but it carries the risk of turning into a market-negative news piece as soon as the headwinds start.

When we look at the financing picture, direct investments are losing steam while the long-term corporate borrowings of the corporate banks are coming down with the rollover ratios recently falling below 100\%. Portfolio investments are moderate but risks are clearly on the downside for 2018. As we have noted, the share of the current

account deficit in GDP has been on a declining path since 2011. Any weakening in the financing prospect of the country will pressure currency and the rates as Turkey has only limited resources in terms of her net international reserves.

Manufacturing sector’s dependence on imported material sails around 40-50%, while a good mass of the consumption appetite also fuels imports through the demand for automobiles and technological products. Indeed, growth periods of the Turkish economy are typically marked with high imports and the contribution of the net exports to the GDP is usually negative during these episodes.

Europe has been traditionally the most important trading partner of Turkey mainly due to geographical proximity and administration of the Customs Union. This is good while European economy goes through a recovery period. Compound leading indicators are promising for an improvement in the European demand conditions, which will be supportive for the Turkish exporters. Meanwhile, latest weakening in Turkish Lira might also serve as a window of opportunity creating a price advantage for Turkish products. Therefore, export demand might partially compensate the expected gradual weakening in the domestic demand in the coming years.

Fiscal discipline lied in the core of the economy program that was announced, following the twin crises of 2000 and 2001. The government kept its promises to the IMF program and the tight fiscal jacket helped to pave the way for the private sector to be the pioneer of growth. The decrease in public borrowing requirement helped the private domestic credit channels while also assisted to attract foreign capital and elevated the growth performance.

From 2012 to 3rd Quarter 2017, 6 million new people were added to the labour force and labour force participation ratio came up by 6.2 percentage point from 47.6% to 53.7%. Yet the increase in the employment rate was limited to 4.5 percentage points. Said in another way, a number of unemployed people are by 1.2 million higher in 3rdQ 2017 when compared to 2012. The OECD data show that Turkey has the highest number of youth who are not in employment, education or training. High youth unemployment and low labour force participation of the women, stand as leading structural culprits in the labour market. These weaknesses also point to the fact that Turkey’s economic policies have to be shaped pro-growth in the period ahead in an attempt to facilitate more employment.

World Economic Forum (WEF) ranks Turkey as 53rd in the world according to the Global Competitiveness Index as of 2017, pointing at a meaningful improvement, when compared to its rank of 61 in 2010.

As a result, when considering environmental and climate economics, one needs to consider that Turkey has an economic environment highly dependent on foreign
savings inflow. Thus, it is an attractive emerging market with structural weaknesses such as a volatile growth rate highly dependent on consumption but not on supply and manufacturing. Turkey has a young population with a great appetite to decrease technology deficit and Turkey has high unemployment rates with a significant share of this young population. In addition to this Turkey is highly dependent on imported primary energy resources, and it is open to trade and has EU as the primary trade partner.

3.2. Environmental Policy and Economics of Climate Change

As it was described in Chapter 2, in 2015, Turkey’s per capita GHG emissions stand at around 6 tonnes CO$_2$-eq, while its total CO$_2$-eq emissions per $GDP$ (in constant USD) reach to 0.524 kg CO$_2$-eq. Accordingly, Turkey displays relatively lower figures in emissions in comparison to the world and OECD averages. However, Turkey is cited among the top five countries that show the fastest rate of growth of aggregate CO$_2$-eq emissions. Turkey’s CO$_2$-eq emissions increased from 214 Mt in 1990 to 475 Mt in 2015 (recording a cumulative increase of 122%). This suggests that Turkey will be on a divergent trend against many of the emerging market developing economies as well as the world averages over the next decades.

![Total GHG increase percentages between 1990 - 2013](http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=18744)

**Figure 12.** Turkey’s GHG emission increase percentages reference to 1990 CO$_2$ emissions.$^{16}$

As it was mentioned in Chapter 2, according to TurkStat (2017), CO$_2$ emissions from the energy sector have more than doubled since 1990 and are expected to continue

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$^{16}$ modified from [http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=18744](http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=18744)
to rise significantly in the medium and long-term, closely following the growth in energy demand (See Figure 4 and 7 in Chapter 2). Thus, the energy sector has been the main contributor to total GHG emissions, accounting for 71.6%, followed by industrial processes (12.8%), agriculture (12.1%), and waste (3.6%) in 2015.

Besides, Turkey ranks the second (after Korea) in terms of the growth rate of GHG emissions during the period 1990-2012 among the OECD countries (Figure 13). Almost half of the OECD economies have experienced negative percentage changes in their emissions during the same period.

![Figure 13. Changes (%) in total GHG emissions of OECD countries, 1990–2012](image)

As such, these trends reveal that Turkey has not yet decoupled its economic growth from rising energy use, a process that has been underway in advanced economies for

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more than two decades. In fact, Aşıcı (2015)\textsuperscript{18}, provides strong evidence that "the economic growth path taken in the 2003-2009 period has gradually become both more energy and pollution-intensive as compared to the 1995-2002 period" (Aşıcı, 2015)\textsuperscript{18}. Some of the reasons beyond the increase of pollution intensity are due to domestic fiscal policy. A recent modelling work by Acar and Yeldan (2016)\textsuperscript{19} studied the effect of fiscal subsidies on coal on aggregate CO\textsubscript{2} emissions and found that elimination of these subsidies could have reduced GHG emissions by 5.5% over the base run trajectory through 2015-2030.

Turkey’s total CO\textsubscript{2}-eq emissions are at 475.1 Mt as of 2015. As shown in Figure 4 of Chapter 2, the aggregate emissions and its sectoral distribution over 1990-2014 exhibit a rapid expansion of the energy combustion in total GHG emissions can be easily identified. Out of the total 467.6 Mt of CO\textsubscript{2} emissions in 2014, 339 Mt are estimated to be derived from fossil fuel combustion for energy production. Industrial processes also expand their share over this period with an added 62.8 Mt of GHG emissions.

As indicated above, taxation of energy inputs had been the main policy norm across the OECD. Environmental taxes average around 2.5% as a ratio to the aggregate GDP across the OECD countries, yet with significant divergences ranging from 0.5% in Mexico, and 0.9% in the USA to 3.7% in Turkey, 3.8% in the Netherlands, and 4.7% in Denmark. Figure 14 gives a snapshot of the relationship between the burden of the environmental taxes and the average gains in CO\textsubscript{2} abatement for the OECD countries over the last two decades.


The extensive set of observations with continued positive trends in carbon emissions, in spite of the tax burden, is suggestive of the fact that without the accompanying technological innovations the gains in emission abatements will be rather small. Figure 15 is affirmative of the caution laid by many scholars that there is significant path dependence across the emitters globally. Consequently, without additional resort to target innovations that could break the chain of path dependence, reliance on taxation and market prices alone does not suffice in succeeding viable reductions in emissions. The burden of environmental taxes in Turkey stands at a significant rate, reaching 4% of the GDP across the last decade. Yet, this burden does not seem to have much of an effect on CO₂ reduction, with a secular rise in aggregate emissions at a rate of almost 5% per annum over 1990-2014.
Existing energy and environmental policies in Turkey

Turkey is facing the challenges of ensuring a cost-competitive energy supply for its population and the industrial sectors and ensuring energy security. Although the country does not have a specific national energy strategy plan, the MoENR created Institutional Strategic Plans covering the periods 2010-2014 and 2015-2019 respectively. The common objectives of the corresponding Plans include the following:

- Securing energy supply, by giving priority to domestic resources; increasing the share of renewable energy resources within the energy supply; increasing energy efficiency, making the free market conditions operate fully and providing for the improvement of the investment environment; and providing the diversity of supply sources in the area of oil and natural gas.
- Enhancing Turkey’s influence in the area of regional and global energy by turning the country into an energy hub and terminal, using the geo-strategic position effectively within the framework of regional cooperation processes.
- Minimizing the negative environmental impacts of energy and natural resource-related activities;
- Increasing the contribution of natural resources sector into the national economy, increasing the production of industrial raw materials, metal and non-metal mineral reserves and providing for their utilization on a national scale.
- Increasing the effectiveness of the management of energy and natural resources and being the pioneer and supporter of innovation in the area of energy and natural resources.

Turkey’s climate change policies are set out in the National Climate Change Strategy (2010-2023) and the National Climate Change Action Plan (2011-2023). The former identifies actions against climate-related outcomes and sets carbon intensity reduction targets and an emissions reductions target for CO₂ from the energy sector (-7 percent by 2020 compared to 1990 level).

The most up-to-date official document that sets out Turkey’s national emissions reduction target is the INDC document submitted to the UNFCCC Secretariat on 30 September 2015 prior to the COP21 meeting in Paris. In this document, Turkey’s national circumstances are provided, and its status as a country with special circumstances, a status recognized by the decision no. 1/CP.16 of the UNFCCC’s Annex 1, is emphasized. The document states that Turkey defines its emissions reduction and adaptation strategies within this framework. In this document, which is intended to be implemented in the 2012-30 period, Turkey declares its commitment to reduce the 1,175 Mt of CO₂-eq GHGs predicted under the mitigation scenario to 929
Mt of CO$_2$-eq by 2030 with a reduction rate of 21% (see Figure 3). It is stated that, by this means, an important step will have been taken towards low carbon development with a view to achieving the 2°C target at the global level.\(^2\)

The INDC Declaration also cites certain plans and policies to be adapted for emission-intensive sectors (See Section 2.3 for a list of these policies). The Declaration includes no data or projections regarding the emissions reductions that these policies and measures are expected to deliver in comparison to those predicted under the BAU scenario in the 2021-30 period.

### 3.3. Projections on Future Pathways of Macro Aggregates and Energy Outlook

#### 3.3.1. Underlying Contours of the Global Economy

Projections by the OECD over the long duration of the global economy indicate that the current 90 trillion world gross output will reach to more than 210 trillion US dollars (in 2010 purchasing parity prices) by 2040. The US Energy Information Administration’s (US IEA)\(^2\) 2017 Energy Outlook indicates that under the reference case average GDP in the non-OECD will grow by 3.8% per annum from 2015 to 2040, as compared to 1.7% of the OECD. Accordingly, over the past quarter of a century, world economic growth has been led by the non-OECD countries, and this had accompanied a strong demand for energy sources. Over 1990-2015, the real rate of GDP grew by 4.9% in the non-OECD countries; compared with 2.1% for the OECD. In the future, the difference in the economic growth rates between the two group of countries is expected to narrow, as economic growth in the non-OECD will mature and moderate. This will likely to accompany a transition from reliance on energy-intensive industries to services, thereby alleviating pressures on energy acquisition.

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\(^{20}\) Republic of Turkey Intended Nationally Determined Contribution (INDC)  
US EIA projections reveal that among the OECD countries Australia and New Zealand combines have the fastest economic growth. GDP growth in that region is expected to grow by 2.6% per annum from 2005 to 2040. In contrast, Japan has the slowest rate of growth with an average of only 0.2% per annum. This is allegedly due to declining population and overall ageing. In contrast, China is expected to attain an annual rate of 4.3% in GDP growth between 2015 and 2040. This will mean a considerable slowing down, though, as China had reached a rate of growth of 9.6% per annum over the last decade. Overall, India is expected to overcome China and lead the pack of non-OECD countries with an expected 5% average rate of growth into the 2040s.

22 OECD Statistics and US Energy Information Administration, 2017
Figure 17. Average Annual % Change in GDP in OECD and non-OECD countries\(^\text{22}\)

The world is very much under the innovative guidance and expansion of the US and other major economies situated at the core of the global economy. OECD data reveals over the second decade of the 21st-century productivity growth has slowed down considerably in the US and in other core group of economies. The average rate of growth in total factor productivity (TFP) has slowed down from 2.2% over 2000-2010 to 0.2% in 2010-2016 in the US. Japan’s rate of TFP growth slowed down from 1.4% to 0.3%, and Germany’s slowed from 1.2% to 0.6% across the same periods. The deceleration in France and UK factor productivity growth had been similarly substantial (see Figure 18).
Broadly speaking, global geographical adjustments are very diverse. United Nations Conference on Trade and Development (UNCTAD) data document\textsuperscript{24} states that in comparison to the 1970s’ decade, Asia and sub-Saharan Africa are expected to maintain their state of growth in output and employment; whereas the developed economies and the Latin American countries will suffer from a slowdown. Labour productivity had been accelerating in the Asian countries while the developed economies had experienced slower attainments in labour productivity. Part of this story is related to the decline in the share of manufacturing in both employment and overall value added. This phenomenon, known as de-industrialization, is actually a common characteristic of the global economy irrespective of the regional attributes.

The divergence of investment priorities away from industry towards speculative finance has taken its toll on fixed investments in the real sphere of the global economy, industry in particular. The overall trend of decline in fixed investments across many countries is observed to be one of the ‘stylized facts’ of the first two decades of the 21\textsuperscript{st} century.

The deceleration of the fixed investment expenditures was, not surprisingly, part of the factors explaining one of the greatest enigmas of the global current times: an overall tendency for the rate of productivity to fall. As data from the OECD and the UNCTAD report the average labour productivity in the industrial sectors, in particular, is outright negative in many countries over the great recession era, an observation that seems to be persistent into the third decade of the 21st century. Industrial labour productivity

\textsuperscript{23} OECD Statistics and Penn World Tables

growth is reportedly nil in Latin America, while East Asia reports sustained, and yet significantly volatile, rates of labour productivity growth.

The tendency towards de-industrialization entails partially a movement from labour-intensive manufacturing to capital and technology-intensive robotics. As manufacturing output is becoming a more and more process of innovation and robotics-based production processes, employment of labour in manufacturing dwindles down. As of 2015, UNCTAD (2017) reports that installed stocks of industrial robots reached to 1,632 million units, with developed economies displaying ownership of these stocks by 58.7%.

It is often argued that robots will likely replace labour employment. A study cited in UNCTAD (2017) provide evidence on the robot intensity (number of robots per 10,000 workers). This is a strong ratio in Korea and Japan indicating the intensity of robotics in these Asian countries. Robot intensity is also high in countries like Sweden, Germany and USA, countries with relatively large automatized manufacturing. Turkey has also a fair rate of intensity at 25 robots per 10,000 manufacturing workers employed (Figure 19).

Figure 19. Robot intensity in manufacturing
According to OECD study (OECD, 2014),²⁵:

- The rate of growth of the global economy will slow down from an annualized average of 3.6% over 2014-2030 to 2.7% over 2030-2060.

- Among the OECD developed economies, the annual rate of growth is projected to slow down from 2.4% over 2014-2030 to 0.5% in 2060.

- Global GHG emissions from industrial processes and burning of fossil fuels will double over the course of the next 50 years and will rise from a total of 48,700 Mt to 99,500 Mt in 2060.

- As a result of the consequent changes in the climatic conditions Asia and Far East Asia will likely experience losses in output production and incomes ranging 1.5 to 5 percent.

- Sources of growth will tend to shift from physical capital accumulation to human capital-led technologies based on research and development and innovation. Gaps between physical (pure) labour and trained/skilled labour employment opportunities and remunerations will widen out.

- These developments will tend to deepen the social fragilities and income differentiation across the globe, leading to possible sources of social unrest and violence over 2014-2060.

**3.3.2. Global Energy Outlook**

International Energy Agency reports that energy use worldwide will grow by one third over the next three decades until 2040. This will be mostly an Asia-driven demand where energy demand will rise by 1,000 Mt in China and by 1,100 Mt in India over 2015-2040. In contrast, EU energy demand will fall by 15% over the same period.

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Overall summary of regional energy demand under the reference case versus low and high economic growth scenarios show that world energy demand will increase substantially. In the reference case world energy consumption will total 736 quadrillion Btu in 2040 – 262 quadrillion Btu of this magnitude will be captured by the OECD countries, while the rest 475 quadrillions Btu will be that of the non-OECD countries (see Figure 21).

Figure 20. Change in energy demand in selected regions, 2014-2040

Figure 21. World energy consumption in three economic growth cases.

26 International Energy Agency
The industrial sector will likely continue to place added pressures and account for the largest share of energy consumption through 2040 according to the USA Energy Information Administration data (see Figure 22). The industrial sector, as comprised of mining, manufacturing, agriculture, and construction will account more than 50% over the 2015-2040 period. World industrial sector energy use will increase by 18% over this period reaching 280 quadrillions Btu by 2040.

Figure 22. World Energy Consumption by End-Use Sector

Even though the industrial sector remains the largest contributor to global energy demand, other sectors increase their demand as well. Transportation sector increases its energy demand by 1% and the demand rises by 1.1% per annum in the buildings sector.

Due to the uncertainty associated with the trajectory of world energy prices, The US EIA narrates the low oil price case where the price of North Sea Brent crude in 2016 dollars reaches 43 $/barrel by 2040, compared with 109 $/barrel in the reference case and 226 $/barrel in the high oil price case.

Based on similar trends the World Bank commodity forecasts reveal that price of coal (Australia) will stabilize around 60 dollars while the average price of crude oil will be on the level of 70 dollars (World Bank, 2017).²⁷

Worldwide, the amount of energy used per dollar GDP has declined steadily across the developed world. In particular, the amount of CO₂ emissions associated with energy consumption has generally declined in the OECD countries since 2008. In the non-OECD countries, declines in energy intensity remain strong in the first 10-15 years according to “reference case” of the US-EIA, as many of the larger economies in that group will likely start to shift production into less energy-intensive industries and services together with a tendency towards digitalization and robots-driven manufacturing, as discussed above.
By types of fuel, the world energy-related CO\(_2\) emissions are projected to rise by approximately 45 Bt until 2040. 17 Bt of this will be the responsibility of coal, despite the expected stabilization of coal demand in the 2020s. The expansion due to CO\(_2\) emissions due to the utilization of liquid and gas forms of oil will drive this path strongly (Figure 25).

3.3.3. Turkey: Macroeconomic and Population Projections

The Ministry of Development (MoD) publishes its short-term forecasts with its Medium-Term Program. The latest Medium-Term Programme providing projections for 2018-2020, and it sets a 5.5 % per annum growth rate as its target; to be mainly backed by investments in productive sectors and based on productivity increases. As such, Turkey’s official 2023 target of finding a place among the biggest 10 economies globally, a target growth rate of 5% per annum in real terms is the typically pronounced target for the overall economy. For the “official” path we have taken the current
planned rate of growth as 5% per annum and maintained it over 2015 through 2050 (Figure 26).

![Turkey: GDP Projections, Billions 2010 Liras](image)

**Figure 26. Turkey GDP Projections till 2050 based on the latest medium term program’s official path.**

Accompanying the 5.5% per annum target for the GDP growth for 2018-2020 period, there are also the targets for the major macroeconomic variables, including inflation rate going down to 5%, unemployment rate decreasing to 9.6% and current account deficit reducing to 3.9% of GDP.

Official growth projections mainly rely on increased productivity targets. Hence, the most significant variable is the assumption on the rate of productivity growth. Studies indicate that, similar to the global core, Turkey is also experiencing a recession in its productivity performance. Data from The Conference Board Total Economy Database, January 2013\(^{28}\), indicate that the Turkish TFP growth had been stagnant since 2008. This has come after three rounds of expansionary spurts experienced over 1963-1976; 1982-1987; and finally over 2002-2008 (Figure 27).

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As a compliment, we further consider the population projection for Turkey as it is reported by TurkStat (Figure 28). Turkey’s population (except from international migrations that may be significant) will reach up to 94 million in 2045-2050, and start to taper off towards 89 million by 2075.
Figure 29. Average Unemployment rate projections\textsuperscript{29}

4. Review of Existing Turkish Legal and Political Framework on Climate Action and Low Carbon Development

Over the years, Turkey has developed a well-established legal framework for dealing with environmental issues. This framework is now also better aligned with the international concerns regarding climate change. The MoEU developed a detailed strategic plan for mitigating the impacts of climate change and assigned specific actions to be taken by each relevant public body.

4.1. Historical background

Protection of environment was first recognised as a priority issue for the Government of Turkey with its 3rd Five-Year Development Plan in 1973. The Plan recognised the preceding need for protecting the environment while ensuring the adequate supply of water to households, agricultural users and industry. In 1978 the Prime Ministry Undersecretariat for Environment was founded as an extension of a state ministry responsible for the coordination of all national and international activities concerning the environment, which in August 1991 was replaced by the Ministry of Environment. The Environmental Law of 1982, which came into force in 1983 and considers the environment as a whole, is not only to prevent and eliminate environmental pollution, but also to allow the management of natural resources and the land. According to the basic principles that govern the application of Environmental law, as stated in the Constitution, citizens as well as the state bear responsibility for the protection of the environment. Legislative acts on Air Quality (1986), Water Pollution Control (1988), Control of Solid Waste (1991), EIA (1992), Control of Medical Waste (1993), Toxic Chemical Substances and Products (1993), and Hazardous Waste regulation (1993) have been adopted subsequently. The Environmental Law - which was started to be implemented in 1983 and last amended in 2006 - aims to harmonise its regulations with EU standards and to improve its enforcement. This Law outlines Turkey's environmental policy in general terms and it embraces the “polluter pays” principle. Secondary regulations have been issued on air quality protection, air pollution control, landfill, integrated waste management, waste water, chemicals, noise management, ozone depleting substances and Monitoring of GHG emissions to further boost the Law's implementation.

Turkey adopted its first National Environmental Action Plan in 1998, introducing the measures to address the challenge to be met by Turkey in reversing the environmental degradation experienced by a number of urban and industrial areas and by its natural resource base (e.g. erosion and coastal damage). With an idea of environmental protection as part of its Constitution, Turkey has made significant advances in the 1990s. Turkey has also benefited from some positive structural...
changes (change in energy mix, privatisation of heavily polluting State-owned enterprises and industrial restructuring).

Within the scope of this chapter, we present a general overview on Turkey’s current status of regulatory framework (policy documents, strategy papers, legislations) relevant to climate change and abatement of national GHG emissions of different sectors with the focus on transportation, agriculture, waste and buildings sectors.

4.2. Mapping of Regulatory Framework (Policy documents, Strategy Papers, legislations) relevant to Climate Change and Low Carbon Development in Turkey

To analyse the regulatory framework on climate change, documents are grouped in two categories: “Policy Documents and Strategy Papers” and “Legislative Documents”. In the “Policy Documents and Strategy Papers” category, the documents have been classified as “multi-sectoral” and as “sector-specific”. In “Legislative Document” category; documents are classified as “legislative structure” and “institutional structure” and legislative structure documents have been reviewed in the “directly applicable” and “directly relevant” categories. Indirectly applicable and indirectly relevant legislative documents have been just named and listed.

The foundations of Turkey’s policies regarding climate change were laid with the 8th Five Year Development Plan. In 2000, the Climate Change Special Expertise Commission Report was published within the context of the 8th Development Plan. The 9th and 10th Five Year Development Plans have added objectives for development of the process. While it was stated that the studies for the process of being a party to UNFCCC would be carried out in the 8th Five Year Development Plan, it was also stated that regulations would also be carried out in the energy efficiency field for the reduction of GHG emissions. As foreseen in 9th Five Years Development Plan, another step has been to fight against climate change and a “National Climate Change Action Plan” (NCCAP) showing the policies and measures for greenhouse gas reduction in accordance with Turkey’s conditions was prepared. The 10th Five Year Development Plan, which was prepared most recently and which is still in effect, clearly states that the “green growth” concept is taken as a basis in order to reach sustainable development targets. The chronological evolution of environmental institutional structure of Turkey that led the country to the development of today’s climate policies and strategies is given in the following Figure 30.
4.2.1. Policy Documents and Strategy Papers

Since 2010 Turkey has successfully developed a significant number of national strategies in response to the EU and other important international policies and agreements. Policy and strategy documents do not directly regulate the sectors, and the targets defined in these documents can be considered as a guidance to associated ministries. However, the credentials and the targets mentioned under these documents are significant due to their influences on the overall “climate change” policy.

Policies that have influence over several sectors and/or institutions are considered as cross-cutting policies and others, which referred to specific sectors are identified with their sectors (Table 7).

Table 7. List of Policy Documents and Strategy Papers Relevant to Climate Change

<table>
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<td>National Climate Change Strategy (NCCS)</td>
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<td>3</td>
<td>National Climate Change Action Plan (NCCAP)</td>
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<td>4</td>
<td>National Climate Change Adaptation Strategy and Action Plan</td>
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ETS Document
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<th>The Energy Efficiency Strategy Paper</th>
<th>2010-2023</th>
<th>Cross-cutting</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Transport and Communication Strategy Document</td>
<td>2011-2023</td>
<td>Transportation</td>
</tr>
<tr>
<td>8</td>
<td>National Smart Transportation Systems Strategy Document and its Action Plan</td>
<td>2014-2023</td>
<td>Transportation</td>
</tr>
<tr>
<td>9</td>
<td>National Waste Management and Action Plan</td>
<td>2016-2023</td>
<td>Waste</td>
</tr>
<tr>
<td>10</td>
<td>Waste Water Treatment Action Plan</td>
<td>2015-2023</td>
<td>Waste</td>
</tr>
<tr>
<td>12</td>
<td>Turkish Industrial Strategy Document</td>
<td>2011-2014</td>
<td>Industry</td>
</tr>
<tr>
<td>13</td>
<td>Food Agriculture and Livestock Strategic Plan(s)</td>
<td>2013-2017 and 2018-2022</td>
<td>Agriculture</td>
</tr>
<tr>
<td>15</td>
<td>Integrated Urban Development Strategy and Action Plan (KENTGES)</td>
<td>2010-2023</td>
<td>Cross-cutting</td>
</tr>
<tr>
<td>16</td>
<td>Strategic Plan of Ministry of Forestry and Water Affairs</td>
<td>2013-2017</td>
<td>LULUCF, Agriculture</td>
</tr>
<tr>
<td>18</td>
<td>National Biodiversity Strategy and Action Plan</td>
<td>2007</td>
<td>Agriculture</td>
</tr>
<tr>
<td>19</td>
<td>River Basin Protection Action Plans</td>
<td>2013-2023</td>
<td>Waste</td>
</tr>
<tr>
<td>20</td>
<td>National Disaster Management Strategic Plan</td>
<td>2013-2017</td>
<td>Cross-cutting</td>
</tr>
</tbody>
</table>

**The 10th Development Plan (2014-2018)**

The 10th Development Plan, covering the 2014-2018 period, is significant as the term “Green Growth” was first introduced to Government Policies. 10th Development Plan of Turkey (2014-2018) in paragraphs 62, 900, 1032, and 1041 refers to the global importance of “green growth” concept and introduces the concept in areas like energy, industry, agriculture, transport, construction, services and urbanization under climate change policies. Moreover “Green Growth” is also recognized as a new R&D area with high economic potential with new employment opportunities.

According to the Plan, Turkey’s progresses towards sustainable development shall be assessed according to the “common but differentiated responsibilities” and “respective
capacities” principles. Moreover, in this Plan, pollution prevention efforts, protection and sustainable usage of natural resources, and biodiversity conservation are considered as priorities. Climate change and its impacts over different sectors of economy are recognized. As such, the line of Article 72 of the Development Plan, mentions the importance of local energy resources and underlines the importance of increasing the use of lignite, nuclear power and renewable energy sources as well as energy efficiency measures. In addition, the line of 793 indicates that local coal will be used for the electricity generation. The importance of renewable energy and efficient usage of energy are also stressed as key issues. As mentioned earlier, in the line 1041 the plan states “Green growth opportunities in areas such as energy, industry, agriculture, transportation, construction, services and urbanization will be evaluated and new business areas, R&D and innovation that provide environmentally sensitive economic growth will be supported”.

All of these strategic directions mentioned in the Plan are vital to understand Turkey’s perspective on sectors that have an impact on GHG emissions and in terms of climate change and low carbon development for the period planned and beyond.

**National Climate Change Strategy (NCCS) (2010-2023)**

The National Climate Change Strategy Document (NCCS), covering the 2010-2023 period, was prepared with the coordination of the former Ministry of Environment and Forestry with a wide variety of relevant stakeholders (including CBCC members, related public and private sector representatives, universities and NGOs) and approved by Higher Planning Council on May 3, 2010. It is one of the main policy documents which is developed in order to contribute to global efforts to reduce the impacts of climate change, taking into account Turkey’s own special circumstances and capacity.

In the NCCS national climate change vision is defined as: “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”. The strategic goals such as “To initiate the organizational

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32 National Climate Change Strategy (2010 - 2023), Ministry of Environmental and Urbanization
restructuring on climate change in concerned institutions; to establish the necessary infrastructure so that the greenhouse gas emissions inventories can be developed in a sounder manner; to develop climate change policies in cooperation with all stakeholders” are listed.

Additionally, the NCCS includes a set of objectives to be implemented in the short term (within one year), the mid-term (undertaken or completed within 1 to 3 years), and long term (undertaken over a 10-year period). It also guides the actions (such as energy efficiency measures, usage of renewable sources, transportation type) for GHG emission reduction in the energy, transportation, industry, waste, land use, agriculture and forestry sectors to tackle climate change during the period 2010-2020. Sector specific climate change strategies defined under NCCS can be tabulated as follows (Table 8):

### Table 8. Sector specific Climate Change Strategies Defined in the NCCS

<table>
<thead>
<tr>
<th>Sector</th>
<th>Short term</th>
<th>Medium term</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short term</td>
<td>Energy efficiency measures in buildings</td>
<td>Energy management standards for buildings</td>
<td>Energy intensity levels will be decreased to 2004 levels by 2020</td>
</tr>
<tr>
<td>Energy certificate for buildings and increasing the renewable energy usage in buildings</td>
<td>Increasing low and zero GHG emission technologies (clean coal, nuclear, renewable energy)</td>
<td>Share of renewable will be 30% in 2030.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Usage of alternative fuels</td>
<td>GHG emissions from electricity generation will be decreased 7% compared to reference scenario by 2020.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Energy efficiency measures in thermal and hydro power plants</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Transportation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short term</td>
<td>Maritime and lake transport will be supported for short distances.</td>
<td>Increasing share of railways and maritime for passenger transportation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase usage of cycling and pedestrian access in the cities.</td>
<td>Fuel switch to decrease CO₂ and NOx emissions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improving public transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Usage of alternative fuels</td>
<td>Supporting aviation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Smart transportation system and R&amp;D for the decreasing fuel usage by improving standards of the roads.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Energy efficiency measures.

#### Industry

<table>
<thead>
<tr>
<th>Short term</th>
<th>Medium term</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Mentioned</td>
<td>Energy studies for the installations that consume energy more than 5000 TOE</td>
<td>Incentives for clean production, climate friendly and innovative technologies</td>
</tr>
<tr>
<td></td>
<td>Heat recovery, engine speed control and cogenerations systems will be encouraged in the industry</td>
<td>Energy efficiency measures.</td>
</tr>
<tr>
<td></td>
<td>Encouraging the use of alternative raw materials and fuel in industry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R&amp;D studies and technology transfer will be encouraged.</td>
<td></td>
</tr>
</tbody>
</table>

#### Waste

<table>
<thead>
<tr>
<th>Short term</th>
<th>Medium term</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harmonization of legislation governing municipal wastes will be finalized by the end of 2010.</td>
<td>The amount of waste reuse and recovery will be increased within the framework of the Waste Action Plan (2008-2012).</td>
<td>Waste management hierarchy of source reduction, reuse, recycling, and recovery shall be implemented more efficiently.</td>
</tr>
<tr>
<td></td>
<td>104 sanitary landfill facilities will be established and 76% of municipal was</td>
<td>The amount of organic substances transferred to the sanitary landfills will be reduced, and biodegradable wastes will be used in energy generation or composting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Landfill gas will be captured and used for energy generation directly or after being processed; and if these gases cannot be used for energy generation, they will be burned.</td>
</tr>
</tbody>
</table>

#### Agriculture

<table>
<thead>
<tr>
<th>Short term</th>
<th>Medium term</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rational fertilizer use will be promoted; carbon emissions will be limited by using modern techniques for irrigation, soil cultivation, pesticide use, etc.; and organic agriculture drought-tolerant plants and certified seed production will be supported and expanded.</td>
<td>Not Mentioned</td>
<td>Strategies for mitigation and adaptation to climate change in settlements shall be developed together with procedures and principles for planning and housing. Measures shall be taken in order to reduce urbanization pressures on rural and natural areas.</td>
</tr>
</tbody>
</table>
the application of fertilizers consistent with the soil analysis results will be ensured. Techniques will be developed to increase carbon absorption in soil; agricultural producers shall be encouraged to adopt such techniques. Agricultural biomass and agricultural forestry activities will be expanded as energy resources.

In agriculture, mitigation and adaptation strategies reinforce each other.

**National Climate Change Action Plan (NCCAP 2011-2023)**

The National Climate Change Action Plan (NCCAP), is the main national strategy that identifies sectoral climate actions to reduce GHG emissions and to increase climate resilience for Turkey in order to meet national INDC targets. NCCAP is prepared within the framework of NCCS, Development Plan and other national policies and strategy documents. This document, published in July 2011, includes strategic principles and goals on greenhouse gas emissions reductions and adaptation to climate change for the period of 2011-2023. It lays down cross-sectorial mitigation measures from short to long term, including provisions for cross-cutting issues for data collection, reporting, monitoring, and verification. The NCCAP sets clear objectives for both mitigation and adaptation aspects of climate change. It was prepared on the basis of the sectors specified both in Annex-A of the Kyoto Protocol and UNFCCC National Communication and GHG Inventory reporting formats and includes the goals and actions on energy, buildings, transportation, industry, waste, agriculture, land use and forestry, climate change adaptation and cross-cutting issues. The plan emphasizes “disseminating energy efficiency, increasing the use of clean and renewable energy resources, actively participating in the efforts for tackling climate change within Turkey’s special circumstances and providing its citizens with a high quality of life and welfare with low-carbon intensity.” NCCAP identifies short, medium and long-term goals under eight topics (energy, industry, forestry, agriculture, buildings, transportation, and waste and climate change adaptation).

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http://www.dsi.gov.tr/docs/iklim-degisikligi%C4%B1depeng.pdf?sfvrsn=2
Within the NCCAP, purposes and objectives are mentioned for each topic separately and these sectoral objectives can play a role in the formulation of “low carbon development” strategy. Some of the sectoral objectives that are listed in NCCAP were reviewed at the end of Chapter 2, and they are not repeated here.

In the NCCAP, greenhouse gas emission control actions are identified specifically for each sector. Some of these actions are listed as follows:

- Identifying key sectors for the carbon markets, and identifying the GHG reduction potential in the relevant sectors;
- Making legislative arrangements to enable public institutions regulatory and supervisory role in the emission trading system;
- Developing the existing structure and building new structures to enable carbon assets to be traded with maximum economic value and have their values increased;
- Beginning infrastructure development for establishment of the National Emission Trading System;
- Carrying out activities to increase awareness in carbon markets in Turkey;
- Providing support to stakeholders necessary to identify, develop, market and manage carbon projects.

National Climate Change Adaptation Strategy and Action Plan (NCCASAP 2011-2023)

National Climate Change Adaptation Strategy and Action Plan sets cross-sectoral mitigation measures from short-term to long term. The action plan identifies provisions related to cross-cutting issues for data collection, reporting, monitoring and verification. The focus is on five priority areas that are of importance to Turkey in setting up necessary institutional reporting requirements arising from international obligations.

These five priority areas are identified by technical/scientific studies and by participatory processes. These are namely: i) water resources management, ii) agriculture and food security, iii) natural disasters risk management, iv) ecosystem services, biodiversity and forests, and v) public health. “The purpose” and “objectives” are listed and below defined for each field and actions are listed below (Table 9).
Table 9. Purpose and objectives for cross cutting issues in adaptation

<table>
<thead>
<tr>
<th>Cross-cutting Issues in Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Integration of adaptation to climate change into national development plans, programmes and policies</td>
</tr>
<tr>
<td>Developing and putting in practice information, monitoring and evaluation systems that support decision-making processes</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
</tr>
<tr>
<td>Organizing training, awareness-raising and informative activities to develop the capacity to combat and adapt to climate change</td>
</tr>
<tr>
<td>Developing R&amp;D capacity with regard to climate change adaptation</td>
</tr>
</tbody>
</table>

**Strategic Plan of Ministry of Environment and Urbanization (2015-2017)**

The Plan provides clear policy objectives and actions for the period of 2015-2017 to contribute to long term sustainable development objectives. It also composes a baseline for the studies to support low carbon development actions in line with NCCAP. In the plan, the risks are determined and the solutions are developed to handle these risks, as well as the purposes and targets are evaluated. For example, under target 2.7, “the development of a monitoring system for waste water and chimney gas emissions” is mentioned. Under Target 3.3 Energy efficiency in buildings is emphasized and 10% of energy savings and decreasing of carbon emissions are listed among the targets. Reports shall be prepared within the framework of National emission inventory and moreover to prevent and/or mitigate the emissions derived from industry that causes air/water/land pollution, an integrated environment pollution control and stopping system shall be started.

**Integrated Urban Development Strategy and Action Plan (KENTGES (2010-2023))**

Integrated Urban Development Strategy and Action Plan (KENTGES) was adopted in 2010 for the period of 2010-2023. KENTGES sets principles, strategies and actions for providing healthy, balanced and liveable urban areas, as well as structural solutions for urbanization and provides a roadmap for national and local governments for urbanization and planning. Plan mentions studies and actions to be performed at central and local levels regarding transport, housing and land supply, disasters, natural and cultural assets, climate change, life quality, social policies and participation.

In the Plan, the main principles and values regarding climate change and sustainable development are: (i) Paying attention to ecological balance in natural resource use; (ii)
Ensuring healthy, safe, and quality environment, free from natural and technological disasters and risks; (iii) Improving use of a sustainable transportation systems as well as use of renewable energy resources; (iv) Paying attention to environmental, natural and ecological equality; (v) Encouraging methods to decrease impacts of consumption patterns on natural and cultural environment in settlements. KENTGES is a cross cutting strategy document in terms of low carbon and sustainable development as cities contribute the majority of total greenhouse gas emissions and no reduction will occur without major changes in cities including (a) increasing urban density (b) improving urban design to avoid sprawl, (c) improving city public transit (d) changing building practices (e) and changing sources of energy.


The Instrument for Pre-accession Assistance (IPA) is the instrument used by EU to support reforms with financial and technical assistance. The Strategy Paper for Turkey (the Strategy Paper) sets out the priorities for EU financial assistance for the period 2014-20 to support Turkey on its path to accession. It provides clear policy guidelines and financial support in the line with the EU accession priorities in the areas of climate change, sustainable development and low carbon development.

In the Strategy Paper, Turkey is defined as “one of the largest greenhouse gas emitters, who have not yet put forward a greenhouse gas emissions reduction target”, and Turkey’s needs to align its climate change policies with relevant EU policies is stressed. Efforts, which will be needed in areas relating to environment and climate change are detailed under chapter 27 of the paper.

Paper envisages activities that will focus on strengthening the institutional capacity to design, implement and monitor mitigation policies, as well as on improving capacity for transition to low carbon economy in Turkey in line with the expected EU 2030 climate and energy framework with particular attention to greenhouse gas emission reduction activities identified in the NCCAP.

Additionally, according to the paper “Turkey is located in one of the area that is most vulnerable to climate change impacts, with risks to agricultural production, water supply, natural resources, ecosystems, public health, and consequent damage to livelihoods. Turkey is also affected by natural disasters; population settlement patterns are also affected, exacerbating unsustainable urban development. Adaptation to these

34 https://ec.europa.eu/neighbourhood-enlargement/instruments/overview_en
conditions requires Turkey to build resilience, strengthen its disaster risk management and emergency response capacities, and develop sustainable urbanization practices”.

Paper mentions that considerable efforts will be needed to address the climate change challenge and to move towards a low-carbon and climate-resilient economy. For example; the energy sector is mentioned as the largest contributor to total national greenhouse gas emissions. The objectives of IPA II assistance in the energy sector are defined as improving Turkey’s interconnectivity and integration with European electricity and gas markets, promoting energy efficiency and renewable energies in line with the EU resource efficiency and climate action targets and improving the nuclear safety regulatory and operational framework in line with EU standards. Promotion of the renewable energy and energy efficiency measures include: harmonizing renewable energy and energy efficiency legislation with the EU acquis; monitoring and reporting on energy savings and greenhouse gas emissions; and raising awareness and disseminating information on energy efficiency targeted to industry, commerce and households as the important actions in the energy sector.

For the transport sector IPA II aims to develop sustainable, low-carbon, intelligent and safe transport in line with EU standards. The sector’s resource efficiency and the optimization of the transport network seemed as being crucial.

**The Strategic Plan of the Ministry of Energy and Natural Resources (2010-2019)**

As a roadmap for energy policies in Turkey, The Strategic Plan of the Ministry of Energy and Natural Resources targets “providing the highest contribution to national welfare by utilizing energy and natural resources in the most efficient and environmentally-conscious manner.” Even though targets defined in the plan could not be achieved, they are important due to direct impact of the energy sector emissions on climate change. Some targets in the document are listed as follows:

- to have a strong and reliable energy infrastructure. In order to achieve this target, natural gas storage will be increased.
- to reach an optimum resource diversity by increasing local coal usage, renewable energy shares and decreasing the natural gas usage in electricity production increasing the local crude oil production and exploration of new local coal source mines.
- energy efficiency measures with privatization and modernization of the state owned power plants, using more efficient street lightings, decreasing loss and illegal consumption and expanding regional heating systems.
The Energy Efficiency Strategy Paper (2010-2023)

Energy efficiency policies are important for combating with climate change because they are “Supporting energy efficiency policies focused on removing non-financial barriers that hamper the uptake of often cost-effective measures which are an essential part of a policy mix aiming at low-cost decarbonisation.” In addition, Energy Efficiency Strategy Paper is of importance because, on the one hand, energy is the major source of GHG emissions, and, on the other hand, the developed strategies directly influence GHG emissions in the other sectors.

The Energy Efficiency Strategy Paper (EESP), which sets a long-term target of 20% reduction in energy intensity by 2023, compared to 2011 figures, was approved by Turkey’s High Planning Council on February 27, 2012. The document provides a roadmap of energy-efficiency actions for all sectors of Turkey by defining responsibilities for institutions, by and to increasing collaboration between NGOs and the private sector and identifies measurable, concrete policy activities necessary for reaching the targets.

The EESP describes seven strategic purposes and corresponding strategic targets with the focus on the industry, the electricity system, private/public buildings, electrical products, and transport.

Table 10. Strategic purposes and targets in EESP

<table>
<thead>
<tr>
<th>Strategic purposes and targets in the EESP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose 1</strong></td>
</tr>
<tr>
<td>To reduce energy intensity and energy losses in industry and services sectors.</td>
</tr>
<tr>
<td><strong>Target</strong></td>
</tr>
<tr>
<td>• The reduction targets for each industry will be determined in collaboration with the sectors but shall be at least 10% for each sub sector, within the 10 years after publication of the document.</td>
</tr>
<tr>
<td><strong>Purpose 2</strong></td>
</tr>
<tr>
<td>To decrease energy demand and carbon emissions of the buildings; to promote sustainable environment friendly buildings using renewable energy sources.</td>
</tr>
<tr>
<td><strong>Target</strong></td>
</tr>
<tr>
<td>• In year 2023 the heat insulation and energy efficient heating systems providing current standards shall be existed in all commercial and service buildings having total usage area of more than 10,000 m²</td>
</tr>
<tr>
<td>• At least one fourth of (1/4) building stock in 2010 shall be made as sustainable buildings by the year 2023.</td>
</tr>
<tr>
<td><strong>Purpose 3</strong></td>
</tr>
<tr>
<td>To provide market transformation of energy efficient products.</td>
</tr>
<tr>
<td><strong>Target</strong></td>
</tr>
<tr>
<td>• The market transformation of lamps, refrigerators and electrical motors over the minimal energy efficiency classes shall be completed until the end of 2012, however, market transformation of heating/cooling systems and other energy efficient products shall be accomplished in parallel to the EU implementations.</td>
</tr>
<tr>
<td>Strategic purposes and targets in the EESP</td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td><strong>Purpose 4</strong></td>
</tr>
</tbody>
</table>
| **Target** | • The total average cycle efficiency of the coal thermal power plants including waste heat recovery installations shall be increased to 45% by the year 2023.  
• Some measures about the subject of demand side management shall be developed for decreasing the electrical energy intensity at least 20% until 2023. |
| **Purpose 5** | To reduce unit fossil fuel consumption of motorized vehicles, to increase share of public transport in road, maritime and rail transport and to prevent unnecessary fuel consumption in urban transport |
| **Target** | • The small vehicles carrying passenger and load (M1/N1 category) shall meet the provisions of secondary legislation which would be designed in the direction of the EU legislation related to CO\textsubscript{2} emissions and transport master plans in metropolitan cities shall be prepared and put into force.  
• The use of bio-fuels obtained from biomass sources or synthetic fuels in transport shall be promoted. |
| **Purpose 6** | To use energy effectively and efficiently in public sector. |
| **Target** | • Annual energy consumption in the public buildings and facilities shall be decreased 10% by 2015 and 20% by 2023. |
| **Purpose 7** | To strengthen institutional capacities and collaborations, to increase use of state-of-art technology and awareness activities, and to develop financial mechanisms except public financial institutions. |
| **Target** | • The institutional structure, capacity and mutual cooperation of implementing organizations shall be strengthened until the end of 2012.  
• The number of certified energy managers shall be increased up to at least 5,000 persons and the number of energy efficiency consultancy companies with specific sectoral experiences shall be increased up to 50 companies by end of 2015.  
• The number of original design and/or product, which would be commenced to be manufactured based on domestic R&D results, shall be at least 50 by 2023 in the areas of energy efficiency and renewable energy resources.  
• The awareness and encouragement activities carried on as part of the “National Energy Efficiency Movement” shall be promoted with the collaboration of public sector, private sector and NGOs.  
• In the context of creating sustainable financing mechanisms for energy efficiency and renewable energy projects besides existing public support, activities for establishment of carbon trading and carbon market infrastructure shall be completed within eighteen (18) months as of the publication date of the document. |

**The Turkish Industrial Strategy Document (2011-2014)**

The Turkish Industrial Strategy Document (2011 - 2014), which has a sub-section on the environment and contains climate change relevant objectives, was prepared by
the Ministry of Science, Industry and Technology (MoSIT) and approved in December 2010. The document 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. In the document, the overall objective is stated as the following:

“Increasing the competitiveness and efficiency of Turkish Industry and expediting the transformation to an industry structure which has more share in world exports, where mainly high-tech products with high added value are produced, which are produced by qualified labour and are sensitive to the environment and the society”.

GHG emission from the industry represents an important part of the total GHG emissions in Turkey and this Strategy Document, by presenting principles of sustainable development for Turkish industry, shows implementation of environmental policies and proposes transition strategies. From this point of view, under the 254th line of the Document, Low Carbon Economy (LCE) concept is defined as “economy where a minimum of emission of greenhouse gas (particularly carbon dioxide) into the biosphere can be achieved”. Additionally, importance of transition to a “zero carbon society” and implementation of economic models, based on renewable energy and energy efficiency, producing energy and raw materials by using low emission technologies in many sectors such as production, agriculture, transportation and electricity production are stressed:

- The possible effects of climate change and the international agreements and protocols regarding this subject on Turkish Industry will be determined and the harmonization process of Turkish Industry with international 116 regulations will be designed accordingly. Hence, the international negotiation processes regarding post-2012 climate regime will be monitored and a position suitable for Turkey’s conditions will be determined.

- Transition to a low carbon economy and clean production processes in industry will be promoted and informative activities regarding this subject will be focused on. For this purpose, moving the industry to production zones enabling them to produce with organized infrastructure facilities will be encouraged and the greenhouse gas emissions will be controlled, monitored and reported.

- Implementation of eco-efficiency programs, which comply with clean production; focus on business excellence and environmental excellence together by dealing with sustainable development; combining economic growth and environmental performance together, and also increasing competitiveness of enterprises by producing high quality products and services in accordance
with adoption of efficient use of resources and environment-friendly production principles, will be implemented throughout the country.

- Regulatory Impact Assessment will be done in order to determine the implementation processes of regulations which will come into force in the next term related with all environmental action plans.


The amount of total greenhouse gas emissions from transport sector is increasing rapidly and it is expected that it will continue to increase in the future. Moreover, transportation sector is the second largest GHG emitter (as a whole) taking part in the second tier after energy. Within this frame, Transport and Communication Strategy Document (2011 - 2023), prepared by Ministry of Transport, Maritime Affairs and Communications (MoTMC) aims to develop a more sustainable transport system. The report is important for reviewing the reflection from the perspective of low carbon development.

2023 and 2030 targets of transport sector are compatible with this document and the sixth national communication of Turkey to the UNFCCC.

**Targets defined for the transport sector:**

**Specific Targets until 2023:**

- Increasing the share of railways in freight transport (which was 5% in 2009) to 15% and in passenger transport (which was 2% in 2009) to 10% by 2023;
- Decreasing the share of roads in freight transport (which was 80.63% in tonne-km in 2009) below 60%, and in passenger transport (which was 89.59 in passenger-km in 2009) to 72% as of 2023;
- Increasing the share of maritime in freight transport (which was 2.66% in 2009) to 10% and in passenger transport (which was 0.37% in 2009) to 4% by 2023;
- Increasing the share of aviation in freight transport (which was 0.44% in 2009) to 1% and in passenger transport (which was 7.82% in 2009) to 14% by 2023.

**Specific Targets until 2030:**

- Ensuring balanced utilization of transport modes in freight and passenger transport by reducing the share of road transport and increasing the share of maritime and rail transport;
- Enhancing combined transport;
- Implementing sustainable transport approaches in urban areas;
- Promoting alternative fuels and clean vehicles;
- Realizing high speed railway projects;
- Increasing urban railway systems;
- Achieving fuel savings by tunnel projects;
- Scraping of old vehicles from traffic;
- Implementing green port and green airport projects to ensure energy efficiency;
- Implementing special consumption tax exemptions for maritime transport.


National Smart Transportation Strategy Document (2014-2023) and Its Action (2014-2016) were adopted by the MoTMC in 2014. In the document the vision is mentioned as “Turkey in full integration both internally and internationally, where all transportation services are conducted and oriented by means of information and communication technologies”. The general purpose to reach that vision is defined as “utilizing information and communication technologies in all transport modes to attain a fully integrated, safe, effective, efficient, innovative, human-oriented, environmentally friendly, sustainable and smart transport network”. Strategic objectives are listed and the necessary actions to be successful for achieving these objectives are specifically explained. One of the strategic objectives enclosed in this list under (5) is to decrease emissions and fuel consumption by road transport that accounts higher portion of GHG emission from transportation sector. Concerning this objective, two actions are identified: a) development of smart transport systems to reduce fuel consumption and GHG emissions b) to provide emission reduction solutions in intercity transport.


Waste Water Treatment Action Plan that is prepared by the MoEU for the term of 2015-2023, aims at increasing waste water treatment plant investment and envisages construction of new plants, in accordance with EU accession priorities.

The action plan covers the following actions until 2023;
- New waste water treatment plants to be constructed, with definition of types and initial investment costs of these treatment plants,
- Existing waste water treatment plants that will be renovated and transformed, their types and costs,
- Necessary new sewer systems and initial investment costs,
- Obsolete sewer systems that are required to be renovated and their costs, Operation costs and financing sources for these plants.

The plan mentions the importance of “clean production” concept and stresses the need of adding the environmental issues to the designing plans. It states advantages of clean production such as “decreasing of waste and emissions in their source”. Moreover, by means of “clean production”, which aims usage of less electricity consumption, having better quality treated waste water, using of new technologies that causes less waste in the waste water treatment, it is possible to contribute to low carbon development. This plan is important since it will provide future projection on waste water treatment and emissions related to waste water.


10th Development Plan which is prepared by the MoD for the period of 2014-2018 designates policies concerning protection of environment. As stated in the Plan, for mitigating the negative effects of the emissions, waste management issue becomes important.

National Waste Management and Action Plan is prepared by the MoEU for the term of 2016-2023 serves for this purpose. Within the framework of the Plan are the following measures; analysing of current status of the waste management in the 81 cities; collecting of waste according to its source separately, recycling and reclamation by different methods and developing of disposal methods are targeted. At same time, determination of “sustainable waste management strategy” is aimed. Plan covers, current status of waste management, the necessary steps to be developed and improved, projection for population and waste. Additionally, in the Plan emission charges are listed as one of the economic tool for waste management.


River Basin Protection Action Plan was converted to Management Plan in 2014 by Ministry of Forestry and Water Affairs. River Basin Management Plan is one of the most important tools for effective water management in Turkey prepared by the General Directorate of Water Management for 25 river basins in Turkey in accordance with the EU Water Framework Directive “in order to ensure the conservation and development of water resources. Various water quality models are being used and
different water qualities that will be attained under various precautionary scenarios are being analysed through models and discussed with stakeholders in order to identify the necessary measures to be taken in the context of these river basin plans for raising our basins’ surface and ground water resources to desired quality levels”.


Usage of sources increases rapidly and because “waste” and “emissions” increase accordingly. This makes “the recycling” concept important. National Recycling Strategy Paper and Action Plan was prepared by the Ministry of Science, Industry and Technology and entered into force after being published in the Official Gazette dated 03.12.2014 for the purpose of “finding solutions to recycling problems and reach sustainable recycling system and effective structure”. The main purpose of the document is composing of production and consumption culture that is respectful to the environment and human being; where the sources are used effectively and “recycling” is an indispensable part for the economy. The document envisages 5 target and 54 actions. Under this Plan registration of waste production and establishment of efficient control system is mentioned as one of the targets and as the action part it requires establishment of online monitoring and control system, which are important for low carbon development.

**Food Agriculture and Livestock Strategic Plan (2013-2017)**

“Competitiveness and sustainability, together with globalization have become the prominent concepts for the future of the agriculture” but “global climate change threatens the security of supply and agricultural production strategies of the countries. In parallel with those changes and developments, food security policies are proposed that offer sufficient agricultural production, sustainability, development, and preservation of ecological balance”.

The Strategic Plan of the MoFAL for the period of 2013-2017 includes the following goals:

- **Strategic Goals and Strategies**
  - To increase cooperation among local producer, organizations,
  - To establish producer organization national network,
  - To offer support through local producer organizations,
  - To utilize agricultural (fishery) products on-site, and to increase their added value
- **The Agricultural Infrastructure and Rural Development**
  - To raise knowledge level of the producers;
• To let cooperatives, unions, and other producer organizations to be established;
• To inspect and support cooperatives, unions, chambers, producer organizations and their affiliates;
• To take required measures in order to ensure that the activities thereof are concluded in accordance with the law

With the objective of environmentally friendly plant production with high public health considerations under objective 3, a number of actions related to reduce “the environmental impacts” such as promoting environmentally friendly farming techniques, encouraging research on climate change impacts on plant production, supporting EU approximation on agriculture are listed. It is an important document for modelling activities on agriculture.


The main target in combating with agricultural drought is increasing the public awareness to plan sustainable agricultural water usage and during the period in which drought doesn’t exist, to take all necessary measures for the future and for the crisis period applying effective combating programs to lessen the effects of drought. This strategy sets important priority objectives related to climate change and mitigation of drought risk in the agriculture. For example, under 5.1 of the Plan measures have been identified to manage drought risk and crisis such as support research on climate change impact on drought and water.

**Strategic Plan of Ministry of Forestry and Water Affairs (2013-2017)**

Strategic Plan of Ministry of Forestry and Water Affairs is prepared by Ministry of Forestry and Water Affairs for the period 2017-2021 and it has replaced the Strategic Plan for 2013-2017. By this Plan, taking into consideration the shortcomings of the previous Plan; increasing of efficiency and activity level is targeted. Moreover, opportunities and threats concerning Ministry tasks are determined through internal and external participants. By the external participants, “Climate change”, “Industry, energy and transportation policies”, “awareness on protection of nature” are mentioned as the subjects that may affect the activities of the MoFWA in the middle and long term. Moreover, in the Report, actions which enable to reduce GHG emissions by supporting low carbon development by means of combating desertification, better management of water resources, afforestation are defined. These are, for instance: monitoring, evaluating and reporting of desertification and effects of climate change; land use situations and change in the flora and carbon emission storage; preparation of policies and strategies with relevant Institutions and Authorities that work on combating desertification and adaptation to climate change;
determination of effects of climate change to water sources, flood and drought and development as well as implementation of necessary measures adopted. Some of the Strategies with the possibility to convey the “low carbon development” results listed in the Plan are as follows:

- Collaboration with other Institutions and Authorities by taking leading role for minimaxing the negative effects of the climate change on the nature
- Preparing of Flooding Damage and Risk Reports and developing of the necessary measures
- Establishment of National Water System
- Adaptation of legislation on water, biodiversity and protection of nature
- Developing of activities, publications, education etc. for the purpose of increasing the awareness of the society on forest, water, protection of nature, biodiversity, combating on desertification

**National Biodiversity Strategy and Action Plans (2007-)**

Biodiversity and ecosystem services help us to adapt to and mitigate climate change but, on the other hand, climate change damages biodiversity. “Peatlands, wetlands, soil, forests and oceans as playing a crucial role in absorbing and storing carbon, help to protect us from climate change and cutting future emissions of greenhouse gases through maintaining healthy ecosystems and biodiversity, is possible. Convention on Biological Diversity, signed in 1992, is one of the important international legislation on conservation of the biological diversity, the sustainable usage of its components and fair and equitable sharing of its benefits from the use of genetic resources. Turkey has been a Party to this Convention since 1996. National Biodiversity Strategies and Action Plans (NBSAPs) are the principal instruments for implementing the Convention at the national level. The last version of the NBSAPs published in 2007 and the updating study of NBSAP is being continued by the MoFWA. This document is of importance due to learn the taken measures to protect and to maintain the biodiversity and ecosystems that play important role for the sustainable development policies and climate change adaptation and low carbon management actions. NBSAPs covers Agricultural Biological Diversity, Mountain and Forest Biological Diversity issues and unplanned and intensive urbanization; unplanned and intensive industrialization, false water management besides climate change are accepted as the common threats before Biological Diversity and Ecosystem.

**National Basin Management Strategy (2014-2023)**

Changes in land use increases greenhouse emissions and effects on local climate conditions. Basin management is of importance within this concept. In Turkey,
National Basin Management Strategy (2014-2023) was accepted with the decision of Higher Planning Council dated 13.06.2014 and numbered 2014/11. The NBMS is “a critical component of a strong integrated natural resource management policy framework and strategy that prioritizes the needs of Turkey that is compatible with EU environmental and water management standards especially EU Water Framework Directive (WFD). Additionally, it is a key component of adapting to climate variability and change, with potentially significant mitigation co-benefits in the form of reduced GHG emissions and provision of carbon sinks.” It helps to identify priority investments and institutional arrangements, including regulatory and economic incentives, and participatory measures in watershed rehabilitation and water management for sustainability of natural resources, reduced vulnerability to climate change with the participation of stakeholders— including local governments, communities, and the private sector.

**National Disaster Management Strategic Plan (2013-2017)**

As a result of global climate change, Turkey has to tackle either natural or human-induced disasters such as drought, desertification, hydro-meteorological disasters and sea-level rise. The extensive industrialization and urbanization increases both the probability of human-induced disasters, and the extent of potential damage to life and property from both natural and human-induced disasters. In this stage action plans for mitigate the risks, climate-change adaptation and sustainable development are really important. AFAD’s National Disaster Management Strategic Plan (NDMSP) for 2013 – 2017 period was prepared according to the Public Financial Management and Control Law No.5018 and provide coherency among national plans defining duties and responsibilities of all stakeholders within disaster management system. Main objectives of the NDMSP are to bring together all institutions involving in disaster management at national level by taking into account works carried out by institutions to define strategic goals. Under goal 5, it is foreseen that development of a mechanism to facilitate public access to risk maps and disaster management plans relating to climate change.

4.3. **National Legislation**

Although Turkey joined the international climate agreements rather recently, there is already significant number of legislative arrangement in enforce concerning climate change, climate mitigation and adaptation as shown in the following tables (11 to 14). The given legislation will be elaborated in detail during the “Gap Analysis”. The legislative documents are directly binding and are applied according to the legislative hierarchy mentioned below. The following figure provides the structural hierarchy in the Turkish Regulatory framework (Figure 31).
4.3.1. Main Legislative Structure on Climate Change in Turkey

Constitution

The legal base takes part in the Republic of Turkey Constitution is Article Number 56 which says “Everyone has the right to live in a healthy, balanced environment. It is the duty of the state and citizens to improve the natural environment, and to prevent environmental pollution. To ensure that everyone leads their lives in conditions of physical and mental health and to secure cooperation in terms of human and material resources through economy and increased productivity, the state shall regulate central planning and functioning of the health services. The state shall fulfil this task by utilizing and supervising the health and social assistance institutions, in both public and private sectors. In order to establish widespread health services, general health insurance may be introduced by law.”

International Treaties/Protocols

This section provides an overview of the international agreements to which Turkey is a party. First the United Nations Framework Convention on Climate Change (UNFCCC) is discussed and then a general information shall be given on Vienna Convention and Montreal Protocol.

United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC represents the international framework treaty related to climate change. It was adopted on 9 May 1992 and opened for signature at the Earth Summit in Rio de Janeiro. The Convention entered into force on 21 March 1994 and Turkey is party to the Convention as being Annex I country since 2004. The objective of the Convention is “stabilization of greenhouse gas concentrations in the atmosphere at a
level that would prevent dangerous anthropogenic interference with the climate system".  

The Convention, for the purposes of reducing greenhouse emissions, envisions "common but differentiated responsibilities" taking into account the countries’ common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances. Parties to the Convention are grouped in three categories: Annex-I countries; Annex-II Countries and Non-Annex Countries. Annex I countries are developed countries that were members of the OECD in 1992 and Economies in Transition (EIT). Annex II parties are OECD countries that are listed in Annex I and under the obligation to provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties. Non-Annex I parties are the developing countries and are not bound by neither mandatory GHG emissions reduction nor financial commitments, differently to Annex I and II countries.

The following sub-sections discuss the Kyoto Protocol and Paris Agreement as Turkey is a party to these agreements. Last but not least, information is provided on Turkey’s Intended Nationally Determined Contribution (INDC), which is the first emission reduction target submitted to the UNFCCC by Turkey in the run-up to the Conference of the Parties in Paris in December 2015.

➤ Kyoto Protocol

The Kyoto Protocol, “is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties to the binding emission reduction individual targets set in its Annex B”. It was adopted in the 3rd Conference of Parties (COP) in Kyoto Japan in 1997 and entered into force in 2005. The aim of the Protocol is to reduce the greenhouse gas emissions and define targets for reductions by mandated countries. The protocol sets binding emission targets for 36 developed countries and the EU. Turkey became a party to Kyoto Protocol on 26

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35 Please see Article 2 of the UNFCCC;  
36 http://unfccc.int/parties_and_observers/items/2704.php  
37 http://unfccc.int/kyoto_protocol/items/2830.php
August 2009 and has no binding emission reduction targets under the Kyoto Protocol, given its special status recognised by the COP.\(^{38}\)

Although countries must meet their targets primarily through national measures, the Protocol introduces three market-based mechanisms to meet the emission targets in a cost-effective way: “International Emission Trading”, the “Clean Development Mechanisms” (CDM) and “Joint Implementation” (JI) that can be used by Annex I parties.

However, given its special status, Turkey may not have access to CDM and JI. On the other hand, Turkey is an active country in the voluntary carbon markets since 2006.

> **Paris Climate Change Agreement**

The Paris Climate Change Agreement (Paris Agreement) was the key outcome of the Paris Climate Conference (COP21) held in December 2015. The central aim of the Paris Agreement’s is to strengthen the global response to the threat of climate change by keeping a global temperature rise well below 2 degrees Celsius above pre-industrial levels and to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change.

The Paris Agreement requires all Parties to put forward their best efforts through “nationally determined contributions” (NDCs) and to strengthen these efforts in the years ahead. Moreover, all Parties shall report regularly on their emissions and on their implementation efforts. It is expected that the developed countries will have certain reduction targets and they will complete their transition to a carbon neutral economy by the end of 2050.

The Paris Agreement was opened for signature on 22 April 2016. Until today (January 2018) 197 countries including Turkey signed it but 174 country ratified it. The Agreement is in force as of 4 November in 2016. Although Paris Agreement was signed by Turkey, it isn’t ratified by Turkish National Assembly. After the ratification of the INDC, which outlines intended efforts to reduce GHGs, as of 2020 it shall turn into NDC that is Nationally Determined Contributions.

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\(^{38}\) Turkey has been a party to UNFCCC since 2004 and the Kyoto Protocol (KP) since 2009. In the Marrakesh Accord (CP7), Turkey was removed from the list of countries in Annex II of the KP, and the special circumstances of Turkey was recognized by the parties.
Turkey’s Intended Nationally Determined Contribution (INDC)

Turkey submitted its INDC on 30 September 2015, with a greenhouse gas reduction target (including land use, land use change and forestry (LULUCF)) of up to 21% below Business as Usual (BAU) in 2030 which is expected to be 1,175 Mt CO₂-eq in 2030. This is almost two and a half times the 2014 emissions level of 467.6 Mt CO₂-eq according to the TurkStat (See Chapter 2 for more details).

Vienna Convention

Vienna Convention for the protection of the ozone layer was signed on 22/03/1985 and entered into force on 22/09/1988. The main purpose of the Convention is to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer. To this end, the Convention promotes international cooperation in the legal, scientific and technical fields, and encourage the exchange of information among countries. It also established a mechanism for international cooperation in research, monitoring, and exchange of data on the state of the stratospheric ozone layer and on emissions and concentrations of CFCs and other relevant chemicals.

The Vienna Convention is a framework agreement and does not contain legally binding targets. Turkey takes part as accession country as of 20 September 1991. It was updated by the Montreal Protocol on Substances that Deplete the Ozone Layer signed in Montreal by 29 countries on 16/09/1987. The Vienna Convention together with the Montreal Protocol make up the “Ozone Treaties”. Participation in the Protocol implies participation in the Convention (Article 16(1)).

Montreal Protocol

The Montreal Protocol on Substances that Deplete the Ozone Layer was adopted in September 1987 and aims to regulate the production and consumption of ozone-depleting substances (ODS). Controlled substances are listed in four annexes, and their respective phase-out schedules are designed to allow for progressive tightening over time as scientific evidence for ozone depletion trend is strengthened and as substitutes for the ODS in question are developed. The parties committed to reduce production and consumption of CFCs by half by 1998 and to freeze production and consumption of halons by 1992. It has been adjusted six times in 1990 (London), 1992 (Copenhagen), 1995 (Vienna), 1997 (Montreal), 1999 (Beijing) and again in 2007 (Montreal). It has also been amended to introduce other kinds of control measures and to add new controlled substances to the treaty.

Turkey became a party to the Protocol on 19 December 1991 and adopted all amendments thereof. Monitoring of all national and international works regarding the
Protocol are being executed under the coordination of Ministry of Environment and Forestry performing National Focal Point position.

► European Union (EU) Accession

As Turkey is currently a candidate for EU its performances within the and accession process are evaluated by the EU Commission with yearly progress reports. “Environment and climate change” is discussed under Chapter 27 of EU Commission Turkey progress report dated 2016 as follows:

In the past year, there was some progress, mainly in increasing capacity in waste management and waste water treatment, whereas enforcement and implementation still remains weak, especially on waste management and industrial pollution. Efforts are being done in river basin management plans. More ambitious and better coordinated environment and climate policies still need to be established and implemented. Strategic planning, substantial investment and stronger administrative capacity are required as well. In the coming year, Turkey should in particular:

- complete alignment with the directives on waste management, industrial pollution and water and ensure correct implementation of the environmental impact assessment legislation;
- ensure alignment with the acquis on public participation and the public’s right to environmental information, as well as on transparency on climate action;
- ratify the Paris Agreement on climate change, and start implementing its contribution to it.

► Laws & Regulations

- Laws
  - Environmental Law Date: 9/8/1983 Numbered: 2872

- Regulations
  - Regulation on Monitoring of Greenhouse Gas Emissions Date: 17/5/2014 Numbered: 29003
  - Regulation on Ozone Depleting Substance (RG: 12.11.2008-27052)
  - Regulation on the Control of Industrial Air Pollution

- Communiqués
  - Communiqué on Monitoring and Reporting of Greenhouse Gas Emissions Date: 22/7/2014 Numbered: 29068
  - Communiqué on Verification of the Greenhouse Gas Emissions Reports and Authorization of Verifying Institutions Date: 2/4/2015 Numbered: 29314
  - Communiqué on Voluntary Carbon Market Project Registry
### Circular
- Circular for usage and import of substances refining the ozone layer (2016/1)
- Circular for Climate change and air management coordination committee (2013/11)
- Halon Circular (2007/4)

Below in tables 11 to 14 current direct and indirect legislation related to climate change is presented in systematic form.

#### Table 11. Current climate change related legislation in effect.\(^{39}\)

<table>
<thead>
<tr>
<th>Climate Change related legislation in Force</th>
<th>Law</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Law on favourable decision to participation to the UNFCCC (4990)</td>
</tr>
<tr>
<td></td>
<td>Law on favourable decision to participate to the Kyoto Climate Change Framework Agreement (5836)</td>
</tr>
<tr>
<td></td>
<td>Law on Utilisation of Renewable Energy Resources for the Purpose of Generating Electrical Energy (5346)</td>
</tr>
<tr>
<td></td>
<td>Electricity Market Law (6446)</td>
</tr>
<tr>
<td></td>
<td>Law on Geothermal Resources and Mineral Waters (5686)</td>
</tr>
<tr>
<td></td>
<td>Energy Efficiency Law</td>
</tr>
<tr>
<td>Regulations (By-Laws)</td>
<td>By-law on Unlicensed Electricity Production in Electricity Market</td>
</tr>
<tr>
<td></td>
<td>By-law on Domestic Manufacturing of the Parts Used in Facilities that Produce Electricity Energy from Renewable Energy Resources</td>
</tr>
<tr>
<td></td>
<td>By-law on Electricity Market License</td>
</tr>
<tr>
<td></td>
<td>By-Law on Documentation and Support of Renewable Energy Resources</td>
</tr>
<tr>
<td></td>
<td>By-Law on Renewable Energy Resources Area</td>
</tr>
<tr>
<td></td>
<td>By-Law on Technical Assessment of Electricity Generation Applications Based on Wind Energy</td>
</tr>
<tr>
<td></td>
<td>By-Law on Technical Assessment of Electricity Generation Applications Based on Solar Energy</td>
</tr>
<tr>
<td></td>
<td>By-law on Implementation of Law on Geothermal Re- sources and Mineral Waters and its Annexes</td>
</tr>
<tr>
<td></td>
<td>By-law on Inspection of SHW Water Structures</td>
</tr>
</tbody>
</table>

By-law on principles and procedures related to signing of water rights agreements in order to carry out production activities in electricity market

Communique

Communique on Implementation of Regulation on Unlicensed Electricity Generation in Electricity Market

Table 12. Legislation directly related to climate change adaptation

<table>
<thead>
<tr>
<th>Category</th>
<th>Legislation related to Climate Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disaster Risk Management</td>
<td>• Law on Duties and Organisation of the Disaster and Emergency Management Presidency (5902):</td>
</tr>
<tr>
<td></td>
<td>• Law on Precautions to be taken and Aids regarding Disasters Effecting Public (7269)</td>
</tr>
<tr>
<td></td>
<td>• Coastal Law (3621):</td>
</tr>
<tr>
<td>Conservation of Biodiversity</td>
<td>• Environmental Law (2872):</td>
</tr>
<tr>
<td></td>
<td>• Forestry Law (6831),</td>
</tr>
<tr>
<td></td>
<td>• By-law on the Implementation of the Forest Cadastre in accordance with the Forestry Law no 6831 (15.07.2004), and Tourism Incentive Law (2634):</td>
</tr>
<tr>
<td></td>
<td>• Land Hunting Law (4915):</td>
</tr>
<tr>
<td></td>
<td>• Forest Management Regulation (05.02.2008)</td>
</tr>
<tr>
<td></td>
<td>• National Parks Law (2873):</td>
</tr>
<tr>
<td></td>
<td>• Law on Precautions to be taken and Aids regarding Disasters Effecting on Public (7269):</td>
</tr>
<tr>
<td></td>
<td>• Agriculture Law (5488):</td>
</tr>
<tr>
<td></td>
<td>• Pasture Law (4342)</td>
</tr>
<tr>
<td></td>
<td>• Seed Law (5553)</td>
</tr>
<tr>
<td></td>
<td>• Decree Law on Organisation and Duties of Ministry of Environment and Urbanisation</td>
</tr>
<tr>
<td></td>
<td>• Law No. 5403 on Soil Conservation and Land Use</td>
</tr>
<tr>
<td>Water Safety and Security</td>
<td>• Environmental Law (2872)</td>
</tr>
<tr>
<td></td>
<td>• Environmental Impact Assessment (EIA) Regulation:</td>
</tr>
<tr>
<td></td>
<td>• Regulation on the Protection of Wetlands (17.05.2005):</td>
</tr>
<tr>
<td></td>
<td>• Regulation on Water Pollution Control (31.12.2004)</td>
</tr>
<tr>
<td></td>
<td>• Zoning Law (3194)</td>
</tr>
<tr>
<td></td>
<td>• Renewable Energy Law (5346)</td>
</tr>
<tr>
<td>Food Safety and Security</td>
<td>• Law on Adoption with Amendments of the Decree Law regarding Food Generation, Consumption and</td>
</tr>
<tr>
<td></td>
<td>• Inspection (5179):</td>
</tr>
<tr>
<td></td>
<td>• Biosafety Law (5977):</td>
</tr>
<tr>
<td></td>
<td>• Agriculture Law (5488) and Agricultural Basins Regulation (07.09.2010)</td>
</tr>
</tbody>
</table>
Table 13. Legislation indirectly and secondarily related to climate change adaptation

<table>
<thead>
<tr>
<th>Category</th>
<th>Legal Regulations</th>
</tr>
</thead>
</table>
| Disaster Risk Management         | • By-law on Emergency Aid Organisation and Planning Principles regarding Disasters (Council of Ministers: 88/12777 - 1.4.1988)  
• By-Law on to the Norms, Organisation, Standards and Principles of Provincial Disaster and Emergency  
• Directorates and Civil Defence Search and Rescue Unions |
| Conservation of Biodiversity     | • The Constitution  
• Law on the Duties and Organisation of the Ministry of Forestry and Water Works  
• Law on the Duties and Organisation of the Ministry of Environment and Urbanisation  
• Law on the Adoption with Amendments of the Decree Law regarding to the Duties and Organisation of the General Directorate of Forestry  
• Law on the Mobilisation for National Reforestation and Soil Erosion Prevention  
• Bay-law on Implementation of the Forest Cadastre in accordance with the Forestry Law no 6831  
• Circular no 2007/ 28 on the Mobilisation of Reforestation Draft Law on the Protection of Nature and Biodiversity  
• Cadastre Law  
• Regulation regarding the Marking of Wood Package Materials in relation with Phytosanitary  
• By-Law on Rooting, Generation and Export of Natural Bulbs  
• Beekeeping Regulation  
• Fisheries Law  
• Fisheries by-law  
• Aquaculture by-law  
• Fishing Ports by-law  
• State’s Forest Management and Fluid Capital Regulation |
| Water Safety and Security        | • The Constitution  
• Communiqué on the Identification of Closed Bay and Gulfs which are of Sensitive Nature Where Fish Farms Shall not be Built  
• Wetlands Communiqués |

Table 14. Relevant Legislations for Institutional Structure on Climate Change

<table>
<thead>
<tr>
<th>Type of Legislation</th>
<th>Name of Legislation</th>
<th>Objective of Legislation</th>
</tr>
</thead>
</table>
Furthermore, short and medium term strategy papers of relevant ministries and institutes also shed important light on the agenda that Turkey will follow through for mitigating the impact of climate change and future low carbon development pathway. Accordingly, the MoEU’s Strategy Paper 2015-2017 recognised “prevention of pollution, increasing environmental standards, mitigating the impact of climate change and protection of natural resources” as its key purposes. Specific objectives under this purpose include:

- At least 85% of municipalities will provide waste water treatment, and the population that receives solid waste disposal services will reach up to 83% (the rate of the population that received such services in 2014 was 70%);
- Stocktaking of emissions in Turkey will be completed, sectoral studies will be completed for enhancing the regulations concerning large combustion plants;
- National Climate Change Action Plan will be implemented; regulations concerning the ozone-depleting substances will be improved and use of another 11 substances will be regulated / restrained as per the EU REACH regulations;
- Sea and land polluters will be fought more effectively and the number of blue flagged shores will be increased;
- Environmental Impact Assessment Reports will continue to be carried out online and environmental impact assessment processes will be spread throughout the country;
- Through the use of e-supervision system, more effective environmental assessment will be carried out and its results will be improved;
- Real-time tracking systems of waste water and stack gas emission will be improved;
- Better protection of natural habitats and cultural values will be provided; and
- Improved ability to effectuate relevant IPA funds and provide additional funds for meeting municipalities’ infrastructural needs.
The Ministry of Forestry and Water Affairs (MoFWA) is also a key public body concerning the protection of environment, water and natural resources, and the fight against climate change. The MoFWA’s Strategic Plan covers the years between 2013 and 2017 and consists of 5 strategic purposes. The relevant purposes are as follows:

- Development and effective implementation of national and international polices in Forestry, Biodiversity, Water and Meteorology line
- Fight against desertification and erosion;
- Protection of water resources, their improvement and sustainable management; and
- Protection of biological diversity and ensuring its sustainable management.

With the aim to reduce desertification and erosion, the MoFWA will:

(i) prepare a national desertification map; (ii) update national erosion map; (iii) update national soil map; (iv) implementation of national erosion action plan; (v) prepare 10 integrated river basin erosion and desertification combat plans; (vi) implement 50 erosion control projects; (vii) implement 46 flood control projects; (viii) implement 13 avalanche projects;

With the aim to protect water resources, their improvement and sustainable management, the MoFWA targets the following:

(i) prepare and update 29 regulations for approaching international requirements in water regulations; (ii) prepare basin protection action plans (iii) prepare river basin management plans for 11 basins over a period of 5 years; (iv) prepare 17 flood management plans; (v) determine quality category of 102 drinking water resources; (vi) establish online tracking systems in 18 river basins; (vii) establish mobile water analysis labs; (viii) establish tracking systems for the purposes of determining water quality standards and reference points in 18 basins; (ix) complete water potential studies by municipalities by 2016; (x) complete national water information system by the end of 2015; and develop 22 modules and decision making support tools by 2017.

Moreover, the Energy Strategy55 (2015-2019) of the Ministry of Energy and Natural Recourses (MoENR) contains important policy directions under the objective G2 Objective 3 until 2019, which are provided in the table below. The strategy foresees an ambitious 53% total renewable increase in five renewable sectors by 2019.
Table 15. MoENR Strategic Plan Renewable Energy Objectives (2015-2019)41

<table>
<thead>
<tr>
<th>Planned installed power values based on renewable energy sources (MW):</th>
<th>Base Year 2013</th>
<th>2015</th>
<th>2017</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic</td>
<td>22,289</td>
<td>25,000</td>
<td>27,700</td>
<td>32,000</td>
</tr>
<tr>
<td>Wind</td>
<td>2,759</td>
<td>5,600</td>
<td>9,500</td>
<td>10,000</td>
</tr>
<tr>
<td>Geothermal</td>
<td>311</td>
<td>360</td>
<td>420</td>
<td>700</td>
</tr>
<tr>
<td>Solar</td>
<td>-</td>
<td>300</td>
<td>1,800</td>
<td>3,000</td>
</tr>
<tr>
<td>Biomass</td>
<td>237</td>
<td>380</td>
<td>540</td>
<td>700</td>
</tr>
</tbody>
</table>

Under G2 Objective MoENR targets to: (i) finalise studies regarding geothermal fields suitable for electricity generation, heating and for other purposes; (ii) maintain the Renewable Energy Support Mechanism (YEKDEM); (iii) design an incentive mechanism for geothermal exploration; (iv) strengthen the necessary infrastructure for integration of renewable energy (wind and solar) into national network; (v) promotion of Hybrid system whereby feeding water is subjected to pre-heating process with solar energy in thermal power plants; (vi) establish monitoring and follow up system for renewable energy projects; (vii) carry out feasibility on wave energy production; (viii) support studies to identify possible renewable investment treasury owned sites; (ix) support pilot hybrid project on renewable energy; (x) develop renewable energy finance mechanisms; (xi) pumped storage to be promoted in hydro-electric Power Plants; (xii) increase the use of renewable energy for heating and cooling purposes.

Further, the Ministry of Industry and Trade Turkish Industrial Strategy Document (2011-2014, chapter 5.7 Environment) clearly underlines the importance of moving towards a low carbon future and clean production, in line with the EU pre-accession objectives:

“Transition to a low carbon economy and clean production processes in industry will be promoted and informative activities regarding this subject will be focused on. For this purpose, moving industry to production zones enabling them to produce with organised infrastructure facilities will be encouraged and the greenhouse gas emissions will be controlled, monitored and reported. [267-b, pg. 115]”

Similarly, the Turkish Government 2011 Annual Plan reaffirms her commitment to fight against climate change and improve environmental conditions in sections “F.
Environment Protection and development of urban infrastructure” and “E. Improvement of Energy and Transport Infrastructure”.

4.4. National Studies on Low Carbon Development

Besides this project, many other related studies, projects, and programmes had been implemented recently and some of them are still under implementation by national and international organizations and institutions in order to support low carbon development in Turkey. Brief summary of the most important studies and projects you may find below:

Table 16. National Studies on Low Carbon Development

<table>
<thead>
<tr>
<th>Key National Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Turkey Green Growth Policy Paper (GGPP), World Bank, 2013</strong></td>
</tr>
<tr>
<td>Although Turkey is in the early stages in the preparation of low carbon or green growth policies, some important steps have already been made with the support of the World Bank on finalisation of the first semi-official document namely the Green Growth Policy Paper (GGPP) which reviews the scope for green growth in Turkey. The Paper was prepared by the World Bank, at the request of the Ministry of Development (MoD), as a contribution to the analytical activities and stakeholder consultations aimed at informing Turkey’s vision for greening its economy, by identifying opportunities to better integrate environmental sustainability considerations and related social and economic issues into the mainstream economic growth and competitiveness agenda. It should be noted at the outset that Turkey’s development vision puts human development at centre stage. <strong>This GGPP does not attempt to evaluate the distributional implications of policies to green Turkey’s development path - such analysis will however be critical to building political support for inclusive, green growth.</strong></td>
</tr>
<tr>
<td><strong>Low Carbon Development pathways and priorities for Turkey, World Wildlife Fund (WWF) and Istanbul Policy Center (IPC), 2015</strong></td>
</tr>
<tr>
<td>This study sought to:</td>
</tr>
<tr>
<td>• Identify Turkey’s emission reduction target within the scope of the 2°C target;</td>
</tr>
<tr>
<td>• Identify the type of policy package required to meet this target; and</td>
</tr>
<tr>
<td>• Identify the costs, benefits and possible impacts of these policies.</td>
</tr>
<tr>
<td>This study identified Turkey’s share in the remaining carbon budget based on &quot;minimum historical responsibility&quot; and &quot;maximum development needs&quot;. According to the results of this study, Turkey needs to reduce its cumulative carbon emissions by 2,980 MtCO₂ until 2030 relative to the reference scenario. The study suggests that Turkey’s 363 MtCO₂ in 2013 CO₂ emissions, will reach up to 851 MtCO₂ by 2030 under high growth scenarios and 659 MtCO₂ by 2030 under realistic growth scenarios. High growth scenarios were simulated under two assumptions, first the Official Plans Scenario, and secondly the more realistic Business-As-Usual (BaU) Scenario. According to model simulation under the 2°C target annual CO₂ emissions reaches a peak level of 390 MtCO₂ by 2020 and gradually decreasing to 340 MtCO₂ reaching 2010 level by 2030. Under 2°C target scenario, namely “Climate Policy Package”, the following three main policy instruments proposed: carbon tax; renewable energy investment fund developed by the carbon tax revenues; and autonomous efficiency gains (i.e., technological advances, competitive market conditions, consumer behaviour changes without any special energy efficiency policies).</td>
</tr>
</tbody>
</table>
### Energy [R]evolution, Greenpeace, 2015

The Energy [R]evolution study for Turkey was carried out by Greenpeace in 2015. This scenario is based on the global energy scenario produced by Greenpeace International, which demonstrates how energy related global CO₂ emissions could be at least halved by 2050. The Turkish scenario provides an exciting, ambitious and necessary blueprint for how emission reductions can be made in the energy and transport sectors and how Turkey’s energy can be sustainably managed up to the middle of this century. The five key principles behind this Energy [R]evolution will be to:

- Implement renewable solutions, especially through decentralised energy systems and grid expansions
- Respect the natural limits of the environment
- Phase out dirty, unsustainable energy sources
- Create greater equity in the use of resources
- Decouple economic growth from the consumption of fossil fuels

### Co-benefits of Climate Action, Assessing Turkey’s Climate Pledge, İklim Agı, New Climate Institute, and Climate Action Network, 2016

This report, prepared by New Climate Institute and with Climate Action Network (CAN) Europe’s contribution, aims at identifying for Turkey the co-benefits of policies compatible with the fight against climate change throughout the sections on job creation, public health and dependency on energy imports. The analysis shows that if Turkey adopts a pathway that prioritises renewable energy and energy efficiency in line with the 1.5°C and 2°C targets, it can considerably reduce energy import dependency, can create tens of thousands of qualified jobs in the renewable energy sector and can prevent thousands of premature deaths from air pollution.

While this report only demonstrates the co-benefits of the transition to 100% renewables in the energy sector using available and up-to-date data, we should also bear in mind that a report that covers all sectors, written when current data from energy-intensive sectors such as transportation and construction become accessible, could exhibit an important increase in co-benefits.

### Summary of Analysis of Key National Studies

It is noteworthy that the first two green growth/low carbon studies - carried out by two different organisations, the World Bank & WWF - used the same computable general equilibrium (CGE) model with different scenario objectives but still reached similar conclusions that de-carbonisation of Turkish economy is possible while maintaining GDP growth objectives. The other two studies used different methodologies, the study by Greenpeace was developed utilising their global models and the New Climate Institute/ CAN was developed on Installed capacities for specific renewable electricity technologies and employment factors per unit of installed capacity.

The all given studies used tool of the top-down approach of the computable general equilibrium (CGE) modelling which incorporated general energy production and consumption and macro-economic data. This model enables the representation of the macroeconomic structure of the country under analysis, thus allowing the observation of the impact of any policy change on the scale of the entire economy. However, these models lack statistical background in the standard calibration process. These models can also generally omit explicit capital representation of the energy sector as they use economic variables in an aggregated manner; hence, they are considered weak in representing the technological restrictions in detail. Moreover, top-down approaches are based on past data and assume rational agents so that they are also weak in representing inter-fuel substitution possibilities. As a result, top-down approaches tend to overestimate the cost of mitigation options.

### Other National Studies
<table>
<thead>
<tr>
<th>Project Description</th>
<th>Fund Source</th>
<th>Duration</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Communication to UNFCCC Reports on Climate Change and National Contribution Preparation Project, <strong>TUBITAK, 2013-2015, 2.3 million TL State Fund</strong></td>
<td></td>
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</tr>
<tr>
<td>As a result of the project conducted together with TUBITAK, necessary projection studies were completed as part of Turkey’s obligation under UNFCCC. As a result of this study the 6th National Communication Report prepared by TUBITAK in early 2016.</td>
<td></td>
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<tr>
<td>**Preparation of Joint First and Second Biennial Report, <strong>UNDP, 2014-2016, 412.000$US</strong></td>
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</tr>
<tr>
<td>The following outputs delivered: Output 1. National circumstances reviewed and updated, institutional arrangements relevant to the preparation of the national communications and BR and level of support received to enable the preparation of the BR described; Output 2. National GHG Inventory for 2012 is reviewed and elaborated in line with BR requirements; Output 3. Mitigation actions and their effects, including associated methodologies and assumptions, and progress of implementation are described as per the guidelines; Output 4. Financial, technology and capacity building needs and support received described; Output 5. MRV arrangements in the waste sector are supported; Output 6. Compilation, consolidation of information in tabular format and Publication of the FBR; Output 7. Monitoring, reporting, and preparing of financial audits.</td>
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<tr>
<td><strong>Creating Awareness on Climate Change Project, Ministry of Development, 2015-2016, 4 million TL</strong></td>
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</tr>
<tr>
<td>The project aims to increase Climate Change awareness focusing students and teachers. It is implemented by Yildirim Beyazit University. Under this project, 12 climate camps are planned for 240 students from 48 secondary schools in 16 provinces where training programmes are organised.</td>
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<tr>
<td><strong>Project Funded by EU: Developed analytical basis for Land Use, Land-Use Change and Forestry (LULUCF) sector, 2017-2019, EUR 2 million</strong></td>
<td></td>
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</tr>
<tr>
<td>To support Turkey to improve the capacity to estimate and report greenhouse gas emissions resulting from the LULUCF sector in according to IPCC guideline.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Project Funded by EU: Increased capacity for transposition and capacity building on F-gases, 2017-2019, EUR 2 million</strong></td>
<td></td>
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<tr>
<td>The project aims to transpose and enhance the capacities on F-Gases, aiming to prepare a fully-fledged national legislation, establishing a database, conducting e-reporting and registry activities from a life-cycle perspective with a specific focus on end-of-life equipment containing F-gases.</td>
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</tr>
<tr>
<td><strong>Project Funded by EU: Increased public understanding and enhanced stakeholder capacity on the required joint efforts, 2017-2019, EUR 2 million TA and EUR 5.5 million grant component</strong></td>
<td></td>
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</tr>
<tr>
<td>The main objective of this component is to increase public understanding and enhanced stakeholder capacity on the required joint efforts on climate change. This project is primarily focused on the municipalities, local governments, NGOs and other stakeholders. The call for proposals has been launched already and selection of</td>
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</table>
projects are expected to be announced in January 2017. The TA component will help the smooth implementation of the grant scheme and also provide wide range of capacity building activities for selected target groups.

### Project Funded by EU: Improving Emissions Control Project, 2011-2013, EUR 2.02 million

The Improving Emissions Control project was a two-fold initiative, twinning and technical assistance. The twinning part aimed to establish the necessary capacity within the Ministry of Environment and Urbanisation to transpose and implement National Emission Ceilings (NEC) Directive (2001/81/EC) in Turkey. The following components have been implemented:

- Supporting the determination of national emission ceilings of the pollutants $\text{SO}_2$, $\text{NO}_x$, $\text{NMVOC}$ and $\text{NH}_3$ referred to in the NEC Directive;
- Preparing of a Regulatory Impact Analysis of NEC Directive implementation;
- Developing guidelines for updating the NEC Directive emissions inventory and emissions projections;
- Drafting of cost benefit analysis for the implementation of the NEC Directive.

A national inventory for the emissions in Turkey of the NECD pollutants was prepared for the period 1990-2010.


The purpose of this contract is to improving energy efficiency in buildings through better design of new buildings and analyses of the necessities and typologies of the existing buildings to establish refurbishment principles.

- Result 1: Systems, Tools for Building Energy Performance (BEP) and institutional capacity will be developed by carrying institutional analysis and evaluation of the current situation
- Result 2: Improved policy and legislation for implementing BEP
- Result 3: Analyses of building typologies in the building stock of four climate zones are completed.
- Result 4: Awareness and knowledge raised on EE in new and existing buildings at central and local level

### Project Funded by EU: IPPC - Integrated Pollution Prevention and Control Project, 2014-2016, EUR 1 million

The project will establish the necessary capacity to implement the Large Combustion Plant Directive (2001/80/EC), currently in the process of full incorporation in the Industrial Emissions Directive (2010/75/EU). The following results achieved:

- A detailed inventory of all large combustion plants in Turkey and a web site including information about large combustion plants available to use;
- A Regulatory Impact Assessment for the implementation of the Large Combustion Plant Directive available to use;
- Required institutional structure, technical capacity and procedural arrangements defined and developed to implement the LCP Directive.


The EU funded Project Technical Assistance for Support to Mechanisms for Monitoring Turkey’s Greenhouse Gas Emissions aims to strengthen existing capacities in Turkey and assist the Country to:
- Fully implement a monitoring mechanism of Greenhouse Gas (GHG) emissions in Turkey, in line with the EU Monitoring Mechanism Regulation 525/2013 repealing Decision 280/2004/EC, and
- Better fulfil its reporting requirements to the UNFCCC, including national GHG inventories, National Communications and Biennial Reports.


The project foresees analytic studies on decisions for the usage of carbon market mechanisms and preparations, capacity building, awareness raising and training activities.

Turkey was the first country to sign a grant agreement with the World Bank. PMR Turkey has been pioneering activities on implementation of legislation on monitoring, reporting and verification, and conducting studies on applicability of carbon pricing instruments in our country since 2013. PMR Turkey was set to analytically analyse the suitability and applicability of market-based emission reduction policy instruments, such as emissions trading scheme, carbon tax in detail, in addition to white and green energy certificates, scaled-up crediting mechanism, result-based finance in Turkey. The final output of the PMR Turkey will be a report which will suggest a carbon pricing policy package, in consideration of its economic and sectoral implications. This report will be presented to the Climate Change and Air Management Coordination Board and to the decision-makers. Capacity building, awareness raising and training activities in respect to the carbon pricing mechanisms will be carried out in coordination with all relevant stakeholders throughout the project.

PMR aim at:
- Encouraging market-based approaches in reducing greenhouse gas emissions
- Encouraging innovative carbon pricing instruments
- Serving as a platform for technical discussions
- Providing innovative and collective approach for market instruments
- Sharing its experiences with international community including the parties of United Nations Framework Convention on Climate Change.


Objective of the assistance is to assist Turkey in enhancing capacity for transmission planning as well as grid management in anticipation of increased share of renewable energy in the generation mix.

**TUSİAD’s Political Stance Document in the field of Climate Change Fighting, a Project by TUSIAD TASK FORCE**

This document was prepared by the Task Force formed by the TUSIAD Executive Board Resolution of 9 February 2017 in order to share the understanding of TUSİAD with the public in the main issues on the agenda during the fight against climate change and this document was approved by the TUSİAD Board Decision dated 7 September 2017.

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42 TÜSİAD is a voluntary business organization of leading entrepreneurs and executives of the business community of Turkey.
43 The task force is formed by the following: Akçansa, Arçelik, Çimsa, Enerjisa, Garanti Bankası, Koç Holding, OMV, OYAK, Polat Enerji, Sabancı Holding, TSKB, Turchas Petrol, TÜPRAŞ, TÜSİAD, Yaşar Holding, Zorlu Enerji
The document confronts the climate change challenge from two aspects: A. Strengthening the negotiation power of Turkey and helping Turkey’s positioning in the international platforms, and B, by Preparation to a Low Carbon Future. The Second is detailed as follows:

- Monitoring Reporting Verification (MRV)
- Financial sources and support mechanisms
- Management of Carbon economy
- Low Carbon Energy Supply portfolio
- Energy efficiency.

In this policy stance document TUSIAD emphasises the following: “In the aftermath of the Paris Agreement, Turkey will have to join in the global trend towards gradually reducing the economy’s carbon intensity. All major emission generating sectors will have to be transformed in the coming period; renewable energy sources will have to come to the forefront in the primary energy mix; high emission industries will have to adapt to this new era, and low-emission modes of transportation, such as railroad and combined transportation, will have to be developed”

TUSIAD also points out that “Transition to a low-carbon economy does not only entail greenhouse gas emissions reduction, but also involves other benefits that should also be taken into account. These additional benefits include, in the first place, the reduction of import dependency in energy, enhancement of energy safety, elimination of air pollution, and creation of new employment opportunities.”

The Sustainability Working Group of TUSIAD constantly joins and contributes to the work of the Climate Change and Air Management Coordination Board, which TUSIAD is a member, and to the annual Conference of the Parties to the United Nations Convention on Climate Change. The group, also supports the awareness raising activities in the business world in the field of climate change in Turkey, within the frame work of the Climate Platform established with the partnership by REC Turkey and TUSIAD.

### 4.5. E-Inventory of Climate Change Policy Documents

One of the tasks of the Activity 1.1 is to create an e-inventory section in the project website to provide accession to these documents directly. For the sake of this task, we have developed “climate policies” page under the project website (www.lowcarbonturkey.org) to share reviewed 22 documents electronically. We have used seven different classification tools, as given below, to categorize them through a simple keyword search feature:

- Name of policy, strategy, and action plan
- Year of adoption
- Period of time covered
- Responsible governmental agency
- Economic sector(s)
- Status of completion
- Access to full document
By using the simple search tab on the upper right corner of the table, documents can be easily reached. E-inventory enables to reach all related policy documents. After discussions during two Working Group workshops, project stakeholders suggested that the list can be extended, adding other related documents, and some of the documents should be updated with the new versions. E-inventory is the open-ended system that allows quick and simple updates and further development in line with the comments and suggestions.

With National Climate Change Knowledge Portal (CCKP), which is currently under development (Activity 1.4), even more comprehensive e-inventory system will be provided. With CCKP, we are aiming to bring all dispersed climate-related documents such as legislative and regulatory acts, policies, strategies, action plans, development plans, communication reports, and similar resources together within one platform. Our e-inventory section will be the initial data source for the CCKP.

Below, you can see the screenshot taken from the project website, where policy document inventory is located. For full access, please visit our project website through the following link, http://www.lowcarbonturkey.org/climatepolicies/
### Inventory of Main Environment and Climate Change Related Policies, Strategies and Action Plans in Turkey

<table>
<thead>
<tr>
<th>No.</th>
<th>Policies, Strategies and Action Plans</th>
<th>Year of Adoption</th>
<th>Period of Time Covered</th>
<th>Responsible Governmental Agency</th>
<th>Sector(s)</th>
<th>Status of Completion</th>
<th>Access to full document</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10th National Development Plan</td>
<td>2013</td>
<td>2014-2018</td>
<td>Republic of Turkey Ministry of Development</td>
<td>Crosscutting</td>
<td>Active</td>
<td>Turkish - English</td>
</tr>
<tr>
<td>2</td>
<td>National Climate Change Strategy</td>
<td>2010</td>
<td>2010-2022</td>
<td>Republic of Turkey Ministry Environmental and Urbanization</td>
<td>Energy, industry, Transportation, Building, Waste, Agriculture, and LULUCF</td>
<td>Active</td>
<td>Turkish - English</td>
</tr>
<tr>
<td>3</td>
<td>National Climate Change Action Plan</td>
<td>2011</td>
<td>2011-2023</td>
<td>Republic of Turkey Ministry Environmental and Urbanization</td>
<td>Energy, industry, Transportation, Building, Waste, Agriculture, and LULUCF</td>
<td>Active</td>
<td>Turkish - English</td>
</tr>
<tr>
<td>4</td>
<td>National Climate Change Adaptation</td>
<td>2018</td>
<td>2011-2023</td>
<td>Republic of Turkey Ministry Environmental and Urbanization</td>
<td>Energy, industry, Transportation, Building, Waste, Agriculture, and LULUCF</td>
<td>Active</td>
<td>Turkish - English</td>
</tr>
<tr>
<td>5</td>
<td>The Strategic Plan of the Ministry of Energy and Natural Resources</td>
<td>2015</td>
<td>2015-2019</td>
<td>Republic of Turkey Ministry of Energy and Natural Resources</td>
<td>Energy</td>
<td>Active</td>
<td>Turkish - English</td>
</tr>
<tr>
<td>6</td>
<td>Strategy on Energy Efficiency</td>
<td>2010</td>
<td>2010-2023</td>
<td>Republic of Turkey Ministry of Energy and Natural Resources</td>
<td>Energy, industry</td>
<td>Active</td>
<td>Turkish - English</td>
</tr>
</tbody>
</table>

**Figure 32. A screenshot from the e-Inventory of Climate Change Policy Documents page at the project website**
5. Conclusions, Recommendations and Inputs for Further Analysis

The worldwide analytical and modelling studies suggest that low carbon development can be achieved by taking step by step approach and using the advantages of the state-of-the-art technology, research and innovation, as well as providing necessary investments and changing the social behaviour.

This requires also changes and adaptation in many economic sectors and significant policy transformation. Major sectors, especially, power generation, industry, transport, buildings, construction, waste and agriculture need to contribute to the low-carbon transition utilising their technological and economic potential.

In this report, as it is required by project’s Terms of References, current status of affairs is analysed with regards to three important and interconnected areas – Turkey’s GHG emissions trends, country’s macroeconomic outlook till 2053 and Turkish legal and political framework on climate action and low carbon development.

Based on conducted analysis, it can be concluded that:

- Turkey faces an increasing energy demand, as a result of growing economy and population growth, especially, urban population growth. In parallel to increasing energy consumption, GHG emissions have also an increasing trend. Energy sector is main contributor to GHG emissions of the country and it is responsible for 71.6% of total GHG emissions. The share of fossil fuel in total primary energy supply is 88%, while the share of renewables is 12%. Fuel mix in total energy consumption has a critical role for GHG emission reduction. Increasing share of renewables and shifting from coal to such lower CO₂ emitting fuel as natural gas should be in focus of low carbon development policies.

- The country is still at the early stages of low carbon development policy formation. The 10th National Development Plan is clearly defining policy objective as green economic growth, and, thus, as low carbon development option for Turkey. This option is also laid out in “Turkey Green Growth Policy Paper”, prepared by the World Bank jointly with the Ministry of Development.

- Following the twin crisis of the early 2000s, Turkish economy performed an eye-catching adjustment on the back of the structural reforms. Open commitment to fiscal discipline and price stability mandate of the Central Bank, based on newly granted independence, brought back confidence of the investors.

- High double-digit inflation was successfully brought down to single digit during the implicit inflation targeting period of 2002-2006. Yet, there is still a long way to keep up with the price stability mandate, evidenced by the current high and
volatile inflation. Annual consumer inflation standing at 11.9% at the end of 2017, comparing to the official target of 5%, shows that a cautious monetary policy is needed alongside structural reforms to cut the rigidity of prices in certain sectors.

- Meanwhile, headline growth performance has been surprising to the upside, with an expected growth rate of 7% in 2017. On the other side, per capita GDP, measured in USD, has been declining, and job creation performance requires to be improved in terms of better inclusion of women and youths. A closer look at the high growth performance shows that it favours the construction sector, while the share of the manufacturing sector has been declining, putting a cap over the medium-long term growth performance.

- In terms of the growth composition and the fiscal preferences, Turkey has not yet decoupled its economic growth from rising energy use, a process that has been underway in advanced economies for more than two decades. There is an increasing trend in emissions in the period from 1990 to 2015 for all sectors. Emissions from energy sector have increased by 153%, as compared to 1990. The increase in emissions from IPPU sector was 156.2%, and there were 28.1% and 52.2% increase in agriculture and waste sectors emissions respectively.

- Taxation of energy inputs had been the main policy norm across the OECD. Environmental taxes averaged around 2.5% of the aggregate GDP across the OECD countries, yet with significant divergences, ranging from 0.5% in Mexico, and 0.9% in USA to 3.7% in Turkey. This suggests, that in spite of the tax burden, without the accompanying technological innovations, the gains in emission abatements will be rather small and reliance on taxation and market prices alone is not sufficient for achieving viable reductions in emissions.

- Projections by the OECD over the long duration of the global economy indicate that the current 90 trillion world gross output will reach over 210 trillion US dollars (in 2010 purchasing parity prices) by 2040. The US Energy Information Administration’s (US IEA) 2017 Energy Outlook indicates that under the reference case average GDP in the non-OECD will grow by 3.8% per annum from 2015 to 2040, as compared to 1.7% of the OECD.

- The Ministry of Development in its short-term forecasts with its Medium-Term Program typically sets the growth rate at 5% per annum in real terms and expects that Turkish economy will become one of the biggest 10 economies globally by 2023 – the centennial of the Turkish Republic. This is clearly a very ambitious target, and current report maintains this as an official projection rate.
A key component of the GDP projections is the behaviour of investment expenditures. Under the official path, investment expenditures will increase at a rate of 5% per annum and reach to 2,800 billion TL in 2050, in 2010 prices. The alternative/moderate path based on Acar et al’(2018) and OECD (2014) give an estimate of 1,061 billion TL in 2050. Both pathways assume that the ratio of investment expenditures in GDP will be in a range of 26%-28%. This requires a steady inflow of domestic and foreign savings into macroeconomic equilibrium.

While medium-term downward pressures over the growth carries the risk of hurting the fiscal balance, there is no immediate risk over the public sector borrowing ability. Both, the official and the alternative growth pathways assume that the government’s fiscal policies will remain intact over the long run. Current stance of the Turkish government (as shared by almost all emerging developing economy governments as well) adheres to a strategy of strict fiscal discipline of reducing the public budget and lowering the debt burden of the public sector. Concurrently, the public sector borrowing requirement (PSBR), as a ratio to the GDP, is maintained at near-zero levels to indicate that the public sector has no extra burden on debt formation along the projected path.

The current account deficit is expected to reach 2.2% by 2050. This shows that Turkey will continue to depend on significant inflows of foreign capital through 2050. The financing of the persistent current account deficit (even though at a declining speed) along with servicing requirements of the existing level of foreign debt will likely create extra pressures on foreign debt.

The assumed patterns of growth will create a declining unemployment. On average, the rate of open unemployment is observed to decline secularly to 6.1% by 2050. This performance clearly is the outcome of many supporting data and accompanying assumptions, in particular, that of population growth. According to TurkStat projections, Turkey’s population (except from international migrations that may be significant) will reach up to 94 million in 2045-2050, and start to taper off towards 89 million by 2075.

Some of the sector strategies are still more supportive to carbon intensive technologies. However, energy efficiency and renewable energy are getting stronger in key sector strategies. Climate change related strategies are more focusing directly on climate change mitigation and adaptation objectives, what, in turn, clearly supports overall low carbon development objectives.

Significant number of the national strategy documents, related to climate change, such as National Climate Change Strategy (NCCS 2010-2023), National Climate Change Adaptation Strategy and Action Plan (NCCASAP
2011–2023), National Climate Change Action Plan NCCAP (2011–2023), reveal some difficulties of reaching desired national consensus regarding goals and strategies to address climate change.

- The documents related to low carbon development in different sectors are not well aligned with each other yet.

- The climate change national legislative framework is rather young, yet it is progressing rapidly with the EU accession objectives but needs more holistic approach to take into account all other sector circumstances and economic growth. EU accession objective is positively contributing to Turkey’s low carbon motivation and ambitions.

- It appears that implementing existing climate policies may not be a sufficient response to climate change targets of Turkey; significant additional efforts and investments are required in key sectors, especially, in energy and transportation, which will play a crucial role in decarbonisation of Turkish economy.

- There seems to be a need to develop more targeted and measurable climate change strategies and to set clear responsibilities with a road map, supported by science based analytical tools. The existing sectoral strategies should be revised to accommodate the needs of low carbon ambition of Turkey.

- The actors (public and private stakeholders, NGOs) may not have the same sectoral visions and motivations for moving to low carbon economy. It is necessary to establish common goals and measurable targets, with clear tasks and responsibilities for the different categories of stakeholders, supported by effective coordination and result oriented monitoring.

- Additionally, creation of online platform, that will make all documents, related to low carbon development, available and easily accessible by all stakeholders, is urgently needed.

- Organisation of public awareness campaigns would significantly facilitate a broad understanding, acceptance and support of low carbon development ideas and practical implementation measures.

Overall, a further policy improvement and better alignment is needed to support the low carbon development pathways at the country level. The low carbon development pathway certainly is an important opportunity for Turkey, if based on a “win-win” approach. It can help not only to fight against GHG emissions rise, but also will serve the objectives of increased social welfare, employment and sustained growth.
This publication is prepared with financial contribution of the European Union and the Republic of Turkey. Only the consortium led by the Hulla & Co Human Dynamics KG is solely responsible for the contents of this publication, and such contents do not reflect the opinions and the attitude of the European Union nor the Republic of Turkey.