

Çankaya
MUNICIPALITY



ÇANKAYA MUNICIPALITY

SUSTAINABLE ENERGY ACTION PLAN (SEAP)

2015 – 2020



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SUSTAINABLE ENERGY ACTION PLAN (SEAP) 2015-2020

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This document has been prepared by the Directorate of Foreign Affairs of Çankaya Municipality in order to fulfill the requirements of the Covenant of Mayors, in the light of the contributions provided by the relevant Directorates of Çankaya Municipality and the data compiled from the external stakeholders.

This document has been translated into English by İsmail CANBAZ, who has been working as an Expert for the Directorate of Foreign Affairs of Çankaya Municipality, from its original version in Turkish for the convenience of international readers. The original Turkish is the authoritative version. Should there be any contradiction between the Turkish version and the English version, the Turkish version shall prevail.



ÇANKAYA MUNICIPALITY

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(SEAP)

2015 – 2020



Çankaya's
Carbon
Dioxide
Emissions
Under
Control...

In the 21st century, the most important amongst the global-scale problems which scientists have settled on, comes to the fore as the human-induced global climate change. Conducted researches indicate that the phenomenon of climate change lies down on the basis of a majority of other political, social and economic problems such as regional wars, hunger and migration. This situation shows us that we are now faced with a great crisis that surrounds all humanity. Therefore, the “Paris Climate Treaty”, which entered into force on April 4, 2016, has passed into history as an agreement which has been signed with the greatest participation at global level.

There is more than one dimension of combating global climate change. International agreements such as Kyoto and Paris, in which the states are included, constitute a pillar of this combat, and continue to flow in its own channel with its strong and weak sides. Another foot of this combat is the local struggle. Although climate change carries the word global in its name, it is actually a local problem... Because its effects are seen directly in the areas of responsibility of local governments. The balance of nature degraded by global climate change leading natural events causing severe consequences. The problems that arise are those which affect local governments, and which the urbanite expects local governments to solve them. Even the global climate

change is the reason of water that not flowing from the tap or the flood water filling the house, this situation has no sides that could be explained or elucidated to the citizens living in our cities.

That is why, it is clear that, also local governments have to take initiative in combating global climate change, and develop policy strategies on climate change adaptation. As moving from this necessity, as Çankaya Municipality, we have become a party to the “Covenant of Mayors”, which is supported by the European Commission and is a party to more than 6 thousand local governments in the world, and we registered our 2020 commitment which is expected from local governments. Accordingly, as Çankaya Municipality, we will reduce our carbon emissions by 25% by 2020. Here is the Sustainable Energy Action Plan (SEAP) in your hand, describing how we will achieve this goal, is a document which has emerged as a result of the studies conducted by our municipality.

In the presence of the latest scientific reports, as Çankaya Municipality, we know that the 25% target is not a sufficient end; but is a stop, and we aim to contribute to the goal of creating a sustainable life in our World by overcoming this stop with all the studies we conduct.

Alper TAŞDELEN
Mayor of Çankaya



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Abbreviations

ABŞB - Ankara Metropolitan Municipality

AMH - Portugal Association for a Humanitarian World

ASKİ - General Directorate of Ankara Water and Sewage Administration

BOTAŞ - Petroleum Pipeline Corporation

CBCC - Coordination Board on Climate Change

CFC-11 - Dechlorination of trichlorofluoromethane

CH₄ -Methane

CNG - Compressed Natural Gas

CO₂ - Carbon dioxide

CO₂e - Carbon dioxide equivalent

CoM - Covenanat of Mayors

DPT - State Planning Organization

EGO - The Electricity, Gas, Bus General Directorate of Ankara Metropolitan Municipality

EPA - Environmental Protection Agency

EU - The European Union

GHG - Greenhouse Gas

GHGP - Greenhouse Gas Protocol

HFC - Hydrofluorocarbons

ICLD - The Swedish International Center for Local Democracy

ICLEI - The International Council for Local Environmental Initiatives

İDDK - TR Ministry of Finance Internal Audit Coordination Board)

IDEP - The National Climate Change Action Plan

IEAP - International Local Government GHG Emissions Analysis Protocol

İMO - Chamber Of Civil Engineers

IPCC - Intergovernmental Panel on Climate Change

İZODER - Association Of Thermal Insulation, Waterproofing, Sound Insulation And Fireproofing Material Producers, Suppliers And Applicators

N₂O - Nitrous oxide

NBS - Nature Based Solutions



O3 - Ozone

OECD - Organization for Economic Cooperation and Development

PAD - Landscape Research Society

PFC - Perfluorocarbons

Ppm - Parts-per million

RES - Renewable Energy Sources

SALAR - The Swedish Association of Local Authorities and Regions

SEAP - Sustainable Energy Action Plan

SEAP - The Sustainable Energy Action Plan

SF6 - Sulphur hexafluoride

SKB - Turkish Healthy Cities Association

TGNA - Turkish Grand National Assembly

TR - Turkish Republic

TÜİK - Turkish Statistical Institute

UN - The United Nations

UNEP - The United Nations Environment Programme

UNFCCC - The United Nations Framework Convention on Climate Change

WBCSD - The World Business Council for Sustainable Development

WCED - World Commission On Environment and Development

WHO - World Health Organization

WRI - World Resources Institute

1. INTRODUCTION

Institutions, the products of human cultural evolution, have allowed different settlement areas to carry their needs from far away distances for their necessities. Economic relations, the decisive institutions of the capitalist society, which trade and market are also based on, have ended the dependence of people on the carrying capacity of their own living space, and made it possible to establish cities. This was actualized when people could be able to transform the distant nature to meet their needs in everyday urban life. However, together with a certain phase of history of humanity and civilization (agrarian revolution and industrial revolution), regarding the distant nature as a commodity and exploiting it has led to the alienation of human to the transformation of nature. It was barely understood in the 20th century that, the uncontrolled transformation of the environment has led to problems, and brought together the development of social response and the environmental literature with itself. The beginning of the interest in environmental issues in Turkey coincides with the 1950s, the period when the urbanization and industrialization gained speed. The urban population of Turkey, which was 4.687.102 in 1945, has reached 8,859,731 by increasing almost 100% in following fifteen years.

The transformative impact of urbanization and rising industry on environment have led a number of problems in forest and well ecosystem along with agricultural areas, and in aquatic areas, in rivers, lakes and seas. The 1970s was a period when energy needs

were invested in dams. The impact of infrastructure investments on the environment was increased, especially as the scale and volume of investments grow at this period. Investments that were promoted mandatory for the energy needs, such as dams, have changed the nature of selected places, and brought out different climate, vegetation cover and animal species by transforming the environment irrevocably.

These problems attracted the attention of a limited community as the urban population was developing away from the everyday life. The most primary problems in the public eye were air pollution in Ankara, where non-industrial factors also played a role, and air and water pollution in İstanbul and in similar industrial areas. However, these did not create a significant impact on society to go into action.

In the world, the beginning of interest in environmental issues goes back to the early 1960s. However, it was required to wait for the 1970s for the official acceptance of the problem. With the concern that environmental problems would destroy natural resources, and prevent consumption and development, a report was prepared by scientific circles under favor of an initiative of a group of industrialists, businessmen and intellectuals (Donella et al. 1972). A dark picture was drawn for the future of mankind in this work, also known as the Roman Club Report, which was announced in the name of "The Limits to Growth" to the world public.



According to the report, “natural resources would not be sufficed for the rapid growth of the population, and the environment we live in will lose its livability without reaching 150 years. That’s why, if it is aimed to protect and improve the environment, the speed of development should not be slowed down, but should be stopped immediately. Because the current development course is bringing humanity closer to a painful end”. (Donella et al. 1972).

This approach, which surprised the businessmen and industrialists who made the report prepared in the first place, led to wide reactions. While the report, meaning “Zero Growth”, was criticized by developed industrial countries intensely, it was also considered as a “conspiracy” in terms of underdeveloped countries that prepared for preventing the development initiatives of these countries.

The process which witnessed the questioning of the environment in legal, technological and political fields, and began with the United Nations Conference on “Environment and Humanity” held Stockholm in 1972, continued in United Nations Conference on “Environment and Development” held in Rio de Janeiro in 1992, and ended after United Nations Conference on “Sustainable Development” held in Johannesburg, in 2002, took its place in the history of mankind as a unique and tragic experience in terms of indicating paradigm shift and the diversification and deepening of environmental problems along with this change.

At these conferences, international agreements, developments in international environmental law and concerns such as “common future” were expressed

at the level of governments. However, the same governments had not hindered the processes of producing and transporting of hazardous waste, and contrary to this, they continued to exploit the natural resources of underdeveloped countries and to increase the sources of industrial pollution leading to global warming. The result had been environmental degradation and ecological crisis.

The United Nations Conference on Human Environment was convened by the United Nations (UN) in Stockholm, capital of Sweden, on June 5, 1972. At this conference, the effects of industrialization on the environment were pointed out. At the end of the meeting, the “Stockholm Declaration” consisting of 26 principles was published. Thanks to this document the Action Plan for the Human Environment and the Environment Fund were established. Additionally, the United Nations Environment Program (UNEP) was established to ensure the wide spread of environmental experiences globally. Thus, UNEP begun to coordinate the processes for global environmental issues in the international arena. The conference was also important in terms of expressing the concept of “environmental property” in official documents for the first time. However, the conference also revealed a conflict between the developed countries and developing countries that opposing the views of the Roma Club and advocating that the costs of environmental problems should be covered by developed countries that caused them. Besides, it was also emphasized at the Report that the utilization of natural resources by developed countries was not only a threat to the environment, but also a deepening of inequality in income distribution.



The Stockholm Conference that was held in 1972 has also had serious reflections in Turkey. As the environment became a matter of being publicized in the international community as a result of the post-conference process and related developments, the institutional steps regarding the environment have started to be taken in the public administration of Turkey. With this meeting, Turkey became the first party to the Stockholm Declaration. However, although Turkey took the necessary legal steps in the post-meeting period, it cannot be said that it did so willingly (see Arat, 2000). Bureaucracy and politicians were still perceiving the environment as an obstacle, and regarding the environment as an 'obstacle' in front of the welfare economy and economic development. This conclusion can also be drawn from the reflection of the government's 1973 program that only put emphasis on environment concept that, the environment-related regulations should not pose obstacles to industrialization and development. It is important for the first time to include the concepts of environment and environmental problems in the 3rd Five-Year Development Plan, covering the period 1973-1977, prepared in coordination with the State Planning Organization (DPT). The environmental issue was handled in a political document for the first time, and was described as one of the problem areas of politics.

In 1974, with the decision numbered 8329 of the Council of Ministers, the Coordinatorship of Environmental Problems Coordination Board was formed, and in 1978, the Undersecretariat of Environment and the Environment High Committee were established during the period of Prime Minister Bülent Ecevit.

In 1983, when the United Nations General Assembly established the UN World Commission on Environment and Development, Norway's first female Prime Minister Dr. Gro Harlem Brundtland was appointed as the chair of the committee. Four years later, in 1987, Dr. Gro Harlem Brundtland published "Our Common Future" book, also known as the "Brundtland Report", including the concept of sustainable development (WCED 1987). This report had been a milestone in the environmental movement. Contrary to the study of the "Limits of Growth" published in the Rome Club in 1972, the "Our Common Future" report has generally received very high support. Despite of all these developments, and on the other hand, the concept of environment's reflection in main documents such as the Constitution (Such as Article 56 of the 1982 Constitution), environmentalism could not achieve to sit on a legitimate floor in the public sphere, and could not reach a power to get the support of society in the 1980s.

The conflict between bureaucrats who were sensitive to the environmental problems and the world agenda, and pro-economic growth government has delayed the establishment of a stable organization for the environment in the 1980s. The most important development in the environmental field in the 1980s was the T.R. Constitution adopted on October 18, 1982, and the regulations on environment, agricultural lands, forests and pastures contained in the 23rd, 35th, 43th, 44th, 57th, 63rd and 16th Articles, especially in the 56th Article of the Constitution. In particular, the provision contained in Article 56 of the Constitution is extremely important in terms of the reflection of the 1972 Stockholm Conference soul to the text of the Constitution.

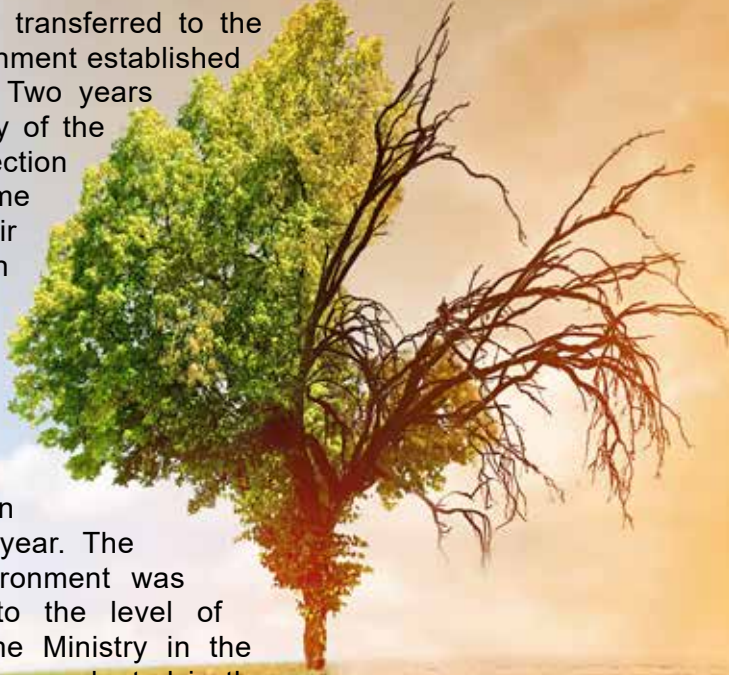


With this arrangement, environmental right was included in an official document for the first time, which is also very valuable in terms of climate and environmental policies.

In 1984, the Undersecretariat of Environment and the Environment High Committee were closed down. Their authorities were transferred to the General Directorate of Environment established under the Ministry of State. Two years later, in 1986, the Presidency of the Special Environmental Protection Regions affiliated to the Prime Ministry was opened. The Air Quality Control Regulation in November 1986, and the Noise Control Regulation in December 1986 were declared. In 1988, TGNA Environmental Research Commission was established. The Water Pollution Regulation was approved in the same year. The General Directorate of Environment was closed and brought back to the level of Undersecretariat of the Prime Ministry in the next year. The Coastal Law was adopted in the following year, in 1990, and in 1991 the Ministry of Environment was established. 1991 was also the year in which the Solid Waste Regulation was adopted.

However, the establishment of the Ministry of the Environment could not be able to control the authority and responsibilities that was previously decentralized to many ministries and agencies

related to environment, and could not intervene to the environmental problems within the existed environmental restructuring. Moreover, a ministry-level organization has also limited new and radical organization and intervention possibilities.



2. CLIMATE CHANGE AND CURRENT SITUATION IN TURKEY

2.1. CLIMATE CHANGE, DROUGHT AND DESERTIFICATION

Global Warming, or with its expression in international documents and contracts, 'Global Climate Change' refers a change forcing nature's own conditions of existence and lifting the possibility of renewing itself. The greenhouse gases leading to global warming are mainly gases released into the air, originating from fossil fuels, from various industries, especially from cement, energy, transport and industrial agriculture.

Some part of these gases is trapped by land and ocean ecosystems. However, both the decline and / or the destruction of these conservative environments and the increase in the amount of greenhouse gases released into the atmosphere have disrupted the global carbon balance. As a result, the increase in surface temperature was 0.8 degrees from the beginning of the 20th century to our modern-day. This increase in temperature is greater than any increase in the past 1000 years. Temperatures in the lowest 8 km of the atmosphere also show a significant upward trend over the past 40 years. The projected increase in this century is between 1.8°C and 4°C. Some scientists believe that a 2°C increase is the threshold

value before reaching large and irreversible destruction. It is thought that at higher temperatures, the severity of epidemics such as diarrhea and malaria will increase, and in the global sense, food production will decrease. On the other hand, in the 20th century, while polar snow cover, polar land and sea ice and snow cover of middle latitudes and mountain glaciers have decreased, the global average sea level has risen around 0.1-0.2 m, and the heat content of the oceans has increased. Rainfall increased from about 0.5% to 1% per decade in the northern hemisphere's medium and high latitude regions, and decreased by about 3% per decade in a significant part of the semi-tropical mainland.

It is accepted by scientists and all circles that the world's climate change is human-induced, and that the most responsible are the developed rich countries. Although rich countries, comprising 15% of the world's population, are responsible for half of total CO2 emissions, it seems that the poor countries will pay the highest price of climate change.

The utilization of fossil fuels per capita continues to increase in developed countries. It is determined that there is an 80% increase in air travel between 1990 and 2003. The amount of cargo in seafaring, which was 4 billion tons in 1990, has reached 7.1 billion tons in 2005. Every branch of industry is demanding on a gigantic scale and ever-increasingly energy. It is projected that in case all the people in the world generate greenhouse gas at the same level as some developed countries, nine world-like more planets will be needed.

In the face of this picture, which causes global climate change to become quite frequent, United Nations, The



Climate Change Framework Convention and its annex the Kyoto Protocol have become important. Nevertheless, it will be a missing perspective that suggesting ecological crisis can only be solved with international conventions and protocols, or linking all hopes to such processes. It will not be a scientific approach to discuss the result without determining the causes of the problem, and producing a “solution” over this result.

As a result, it seems that, it is not possible to discuss the global warming phenomenon and accordingly the ecological crisis independently of the production relations.

With the 1990s, the global agenda is determined by ‘global warming’. Carbon dioxide gas released to the atmosphere as a result of combustion of fossil fuels, leading the world climate to change and warm up. These changes are climate changes that arise due to the global warming caused by the release of greenhouse gases. The main source of global warming is expressed as the increase in density of greenhouse gases released into the atmosphere. Carbon dioxide (CO₂), the most important effector amongst these gases, is released as a result of combustion of fossil fuels to meet the energy requirement of economic growth, so, it is released into the atmosphere by the human hand.

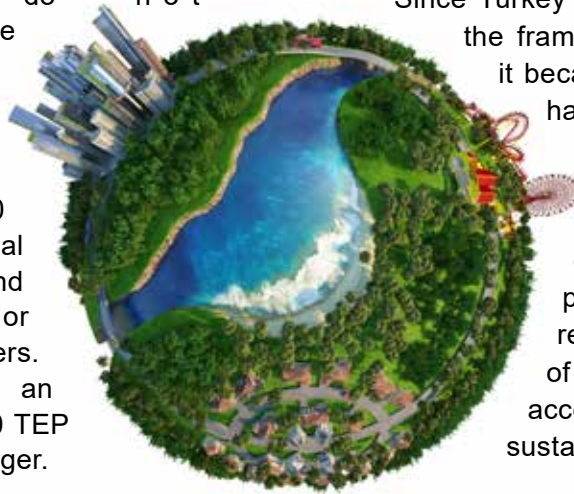
This process, which would result in disaster, was the focal point of the United Nations Conference on Environment and Development in Rio in 1992, and the concept of sustainability has become a universally adopted principle. Leaders in the meeting reached a consensus on global warming, protection of biodiversity and utilization of hazardous wastes, and prepared the Rio Declaration, the Biological Diversity Treaty and the Kyoto Protocol

or in its other name the Climate Change Treaty. The Kyoto Protocol requested governments to reduce carbon dioxide consumption by 5% between 2008 and 2012 at the meeting of parties in Kyoto, Japan, held in December 1997. It was unanimously accepted that the emissions of industrialized countries should be reduced by at least 5% between 2008 and 2012 compared to 1990.

The Rio Declaration and the Convention on Biological Diversity were also signed by the Government of Turkey, and the solution to climate change problem was adopted as the gradual reduction of the concentrations of greenhouse gases in the atmosphere by taking greenhouse gas emissions under control. In this context, Turkey became a party to the United Nations Framework Convention on Climate Change in 2004. However, Turkey did not accept to be a party to the Kyoto Protocol immediately, in which it was unanimously agreed that industrialized countries should reduce their emissions by at least 5% between 2008 and 2012 compared to 1990, Turkey was considered amongst the developed countries, and the protocol had obligations to a developed country. Within The United Nations Framework Convention on Climate Change (UNFCCC), with the Decision No. 26 / CP.7 taken in 2001, the parties were invited to recognize that Turkey was in a different position amongst the other countries attached to the Convention and it was decided to remove Turkey from the list of Annex II of the Convention. Following this decision, Turkey became a party to the Convention in 2004.

Coordination Board on Climate Change (CBCC) was restructured when Turkey became a party to UNFCCC in 2004, and was extended with the participation of new members in 2010.

While the law on the Utilization of Renewable Energy Sources (RES) for the Purpose of Generating Energy was entered into force on May 10, 2005, the Energy Efficiency Law was published in 2007 in order to comply with EU harmonization laws and to reduce energy intensity. According to the law, the managements of commercial and service buildings which have a total construction area at least 20000 square meters or have an annual energy consumption of 500 TEP and above, and in case the managements do not exist, the building owners appoint the energy manager, or take service from the energy managers. The managements of public sector buildings which have the total construction area at least 10000 square meters or have an annual energy consumption of 250 TEP and above, appoint the energy manager, or take service from the energy managers. Industrial enterprises which have an annual energy consumption of 1000 TEP and above appoint the energy manager.



On April 14, 2008, the Regulation on Central Heating and Sanitary Hot Water Systems; on August 9, 2008, the Regulation on Procedures and Principles for Increasing Energy Efficiency in Transportation; on October 14, 2008, the Regulation on the Utilization of Geothermal Resource Areas for Electricity Generation; on October 25, 2008, the Regulation on Increasing Productivity in the Utilization of Energy Sources and Energy, and on December 5, 2008, the Regulation on Energy Performance were made. While taking the Energy

Identity Certificate became compulsory in new buildings along with this arrangement, new buildings that have an area of 2000 m² and above were required to provide heating with the central heating system. In December 2010, permission to produce unlicensed electricity up to 500 kW based on renewable energy sources was granted with the Regulation on Unlicensed Electricity Generation in Electricity Market.

Since Turkey was not included in Annex B list in the framework of the Kyoto Protocol, which it became a party in 2009, Turkey did not have a numerical target for reducing greenhouse gas emissions. The main objective within the scope of Turkey's global combating global climate was to participate in the protocol in common but differentiated responsibilities and in the framework of special conditions of Turkey, in accordance with global efforts and sustainable development policies.

Turkey aims to ensure the widespread of energy efficiency, to increase the utilization of clean and renewable energy sources, and to integrate climate change policies with development policies in order to be a country that can offer welfare to all its citizens with low carbon intensity with high quality of life. The National Climate Change Action Plan (IDEP) was prepared in the light of this basic approach, for the implementation of the National Climate Change Strategy Paper approved by the High Planning Council in 2010.



190 countries and the European Union (EU) became parties to the Carbon Market which was formed in Kyoto Protocol and in the following process. The priority demand of the European Union was that Turkey has to be a party to all international agreements that the EU has been a party to. Turkey has been a country attaching great importance to combating climate change in the framework of country conditions, and recognizing that the global climate system needs to be protected. In addition to Turkey's responsibilities under the United Nations framework on climate change, Turkey also needed to work on the issue in the process of full membership of the European Union. Therefore, in order to prevent greenhouse gas emissions from transport, energy, industry and housing, and to reduce final energy consumption; the Energy Efficiency Law No. 5627 was entered into force on May 2, 2007, and the Regulation on the Establishment of Greenhouse Gas Emissions was made on May 25, 2012.

ICLEI (The International Council for Local Environmental Initiatives) - Local Governments for Sustainability has developed the International Local Government Greenhouse Gas Emissions Analysis Protocol adhering to the IPCC-2006 criteria, in order to ensure this crisis, which has effects on different dimensions in both ecological and economic systems, to be perceived as a global problem, and to create a realistic, permanent and rapid solution development environment. With this protocol, ICLEI aims to help local governments to achieve a significant reduction in greenhouse gas emissions by developing a common convention and standard approaches.

The Law on the Utilization of Renewable Energy Sources for Electricity Generation Production (YEK Law) was

entered into force in order to ensure the utilization of renewable energy resources for electric energy generation and its wide spread, to bring these resources in economy in a reliable, economical and high quality form, to increase resource diversity, to reduce greenhouse gas emissions, to ensure waste assessment, to protect the environment and to develop the manufacturing sector providing services and products in these fields. With the amendment made in 2012, purchasing incentives for energy generated by electricity generating plants welding renewable resources were also defined.

Right along with İDDK (TR Ministry of Finance Internal Audit Coordination Board), the Directorate of Climate Change Department was established within the Ministry of Environment and Forestry in 2010. In addition to this, it will be a considerable development in terms of making necessary regulations in the establishment laws of the public institutions that should undertake duties and responsibilities on climate change, creating the legal background and institutional structuring.

In this inventory and analysis study in your hand; a macro level carbon footprint analysis based on energy consumption elements and a sustainable energy action plan have been put forward, based on the 2015 carbon emissions within the geopolitical borders of Çankaya Municipality, depending on the criteria of the ICLEI - Local Governments for Sustainability (ICLEI-2009), the Intergovernmental Panel on Climate Change (IPCC-2006) and the Covenant of Mayors (CoM Sustainable Energy Action Plan Practice Guidance - 2015).

2.2. POSSIBLE EFFECTS OF CLIMATE CHANGE AND NECESSITY OF THE SUSTAINABLE ENERGY ACTION PLAN

Climate change has been defining as “the natural climate change observed in comparable time periods, in addition to the change originating from human activities that directly or indirectly distorting the composition of the global atmosphere”.

Global climate change refers to the increase in the average surface temperature of the earth’s surface and changes in the climate as a result of rapid increase in the concentration of greenhouse gases (H₂O, CO₂, CH₄, O₃, N₂O, CFC-11, HFC, PFC, SF₆) released to the atmosphere by human activities such as the utilization of fossil fuels, changes in the land use, deforestation and industrial processes, and as a result of strengthening of the natural greenhouse effect by this rapid increase.

Climate change is one of the greatest problems that humanity faces with in the 21st century. Climate change, which is seen as a problem that can lead to very serious socio-economic consequences due to its negative effects threatening human health, ecosystems and even human sustainability, has been taking place on the international agenda, especially in recent years.

The declining freshwater resources, general changes in food production conditions, storms, hot waves and drought-related deaths are shown amongst the effects of climate change. The common feature of climate change

in all aspects of economic and human dimension is that, if the world is exposed to a temperature increase of more than 2°C, it is projected that irreversible changes and deterioration will occur in the global economy, and more importantly in human and vital life; in the whole ecosystem. The studies of climate scientists now indicate that, climate change is occurred by human activities and production processes, and it is stated that, if this process continues in line with today’s trends, it will lead to very serious environmental problems. In this case, many plants and animals will go extinct that cannot be able to keep up with the rapid change of their habitat, and millions of people will face up to death due to malaria and malnutrition.

After it was accepted by the international public opinion together with science circles that the climate change is occurred as a result of human-centered activities, the resolution of the problem and implementing of preventive policies have come to the agenda. In this context, two main elements of climate change issue should be emphasized: combating climate change and adapting to climate change.

Both approaches reveal the policies and projects at the technical level, the holistic approaches to this field, and the development of institutional capacities at central and local level, for example, they reveal the establishment of climate-based approaches in all planning and decision-making processes at urban level. This political opening also reveals the importance and priority of sustainable energy action plans.



2.3. CLIMATE CHANGE IN THE WORLD

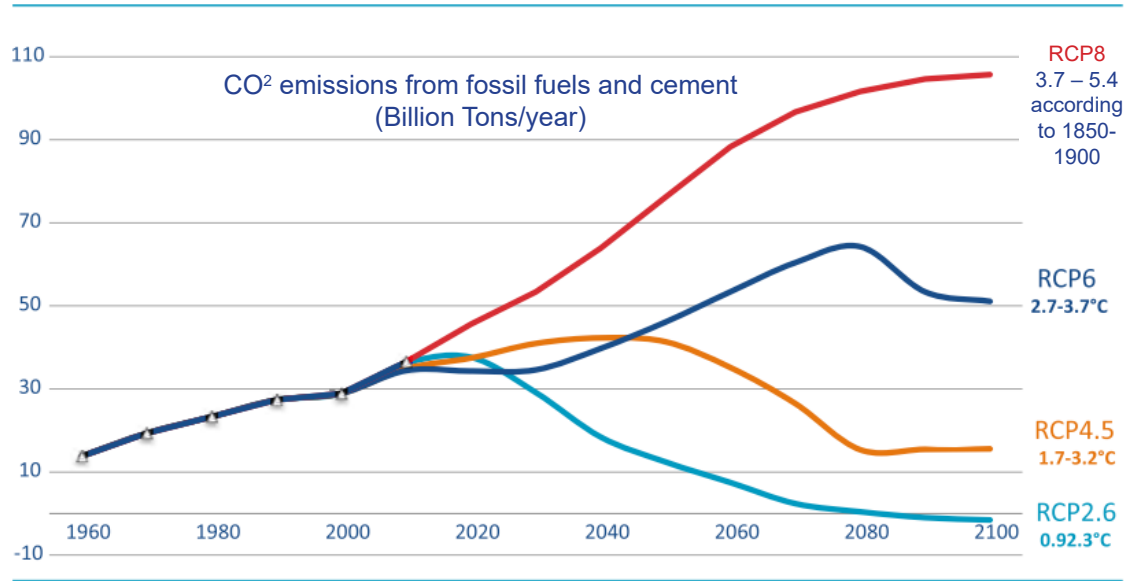
In the world history, the energy consumption, which was limited by biomass before industrialization, has increased rapidly later when the fossil fuels became a part of an activity. The accumulation of greenhouse gases in the atmosphere has multiplied with the excessive utilization of fossil fuels for the industrial, urban and agricultural activities, and also with gradually increasing of deforestation. While carbon dioxide was 278 ppm in the atmosphere in 1750, this rate has increased by 40% to 391 ppm by 2011. This situation indicates an extraordinary increase in the amount of carbon dioxide in the atmosphere over the last 800 thousand years before industrialization. In this process, the increase in methane and dinitrogen monoxide which are amongst the other major greenhouse gases was realized as 150% and 20%.

The science circles have been sharing their findings related with climate change in different ways with the world public opinion. The Intergovernmental Panel on Climate Change (IPCC), which was established in 1988, has been conducting extensive scientific studies since the 90's in the field of climate change. The global climate change assessment reports prepared by the IPCC in specific time periods (1991, 1995, 2001, 2007 and 2014) have revealed significant and detailed data on the current state of climate change.

The IPCC's up-to-date report; the Fifth Assessment Report (AR5, 2014), clearly points out the crucial and critical impacts of climate change at present situation. AR5 indicates that besides the temperature increase in the world, snow-covered surfaces in the northern hemisphere in winter months have begun to decrease, the accumulation of carbon dioxide in the oceanic upper layer has increased and has been in tendency to be acidic, and the heat accumulation has begun to increase.

These finding that are emerged from the 5th Assessment Report of the IPCC, explain the deterioration of global climate balances together with climate change, and also provide important clues about the outcomes as to the consequences of further stages.

In case the temperature increase due to greenhouse gas from climate change comes very close to 2°C compared to the pre-industrial stage, the risks will increase a lot more and extraordinary weather events will become commonplace. This situation means irreversible conditions. Scientific models point out the risk that the warmth cannot be stopped as the amount of carbon dioxide in the atmosphere approaches 450 ppm, and the climate balances will be lost.



Source: Algedik, Ö. et all. (2016)

Figure 1. Carbon Dioxide Emissions Scenarios

The carbon dioxide emissions scenarios and the temperature increases in AR5 are given in the graph above. Accordingly, the left column gives the annual amount of carbon dioxide in billion tons (Gt), and the right column gives the temperature difference that the scenarios will create according to the temperature average of 1850-1900.

2.4. CLIMATE CHANGE IN TURKEY

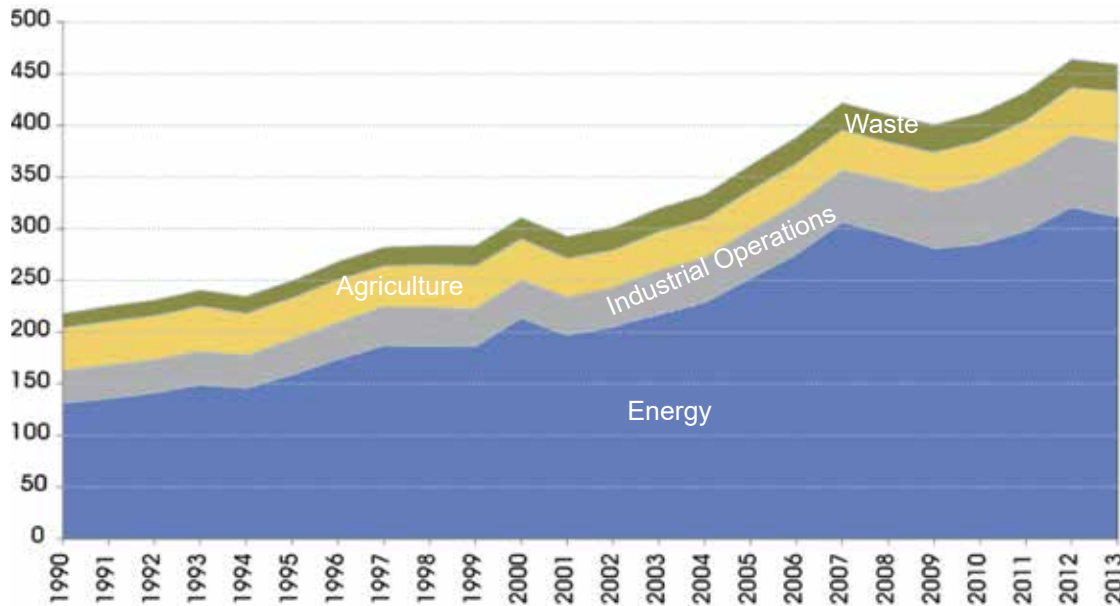
It is seen that when examining the indicators of Turkey's economic, social and greenhouse gas emissions (see Table 1), both the level of economic development and greenhouse gas emissions are not similar to the developed countries included in Annex I of the UNFCCC. Turkey's electricity consumption per capita and greenhouse gas emissions per capita are about one third of OECD countries. On the other hand, energy intensity of the economy in Turkey is about one third higher than in OECD countries.



Table 1. Turkey's Greenhouse Gas Emissions Rates for the Years 1990-2009 (Mton CO₂e)

Sectors	1990	1995	2000	2005	2006	2007	2008	2009
Energy	132,13	160,79	212,55	241,75	258,56	288,69	276,71	278,33
Industrial Processes	15,44	24,21	24,37	28,78	30,70	29,26	29,83	31,69
Agricultural Activities	29,78	29,68	27,37	25,84	26,50	26,31	25,04	25,70
Waste	9,68	23,83	32,72	33,52	33,88	35,71	33,92	33,93
TOTAL	187,03	239,17	297,01	329,56	349,64	379,98	366,49	369,65

Source: Turkish Statistical Institute, 2011, Turkey's Greenhouse Gas Emissions Inventory 2011



Source: Algedik, Ö. et al. (2016).

Figure 2. Change in Total Greenhouse Gas Emissions of Turkey by Years and Sectors

While GDP in Turkey increased by 170.82% between 1990 and 2008, the total greenhouse gas emissions increased by only 95.96%, this situation points out a positive tendency for the development of the economy to be attributed to the activities that will generate less and less greenhouse gas emissions. On the other hand, while the decline in the energy intensity of the economy was 29.41% between 1990 and 2008, only 27.87% of the carbon intensity of the economy declined during the same years, and the carbon intensity of energy supply increased by 15.06%, and this situation points out that there was still some works to be done to reduce greenhouse gas emissions from the energy supply. Nevertheless, the increase of 79.59% in total sink areas between 1990 and 2008 is also a very important development.

2.4.1. Climate Change and Energy in Turkey

When examining the 2008 energy indicators published by the International Energy Agency (see Table 1), we see that, the world average of primary energy consumption value per capita was 1,83 TOE, and the OECD average was 4.56 TEP. Turkey's primary energy consumption per capita was 1.39 TOE and it was below the world and OECD average. On the other hand, Turkey's energy consumption increased by almost 100% between 1990 and 2009. When considering together with the increase in energy demand, the ever-increasing fossil fuel dependence of the energy supply system is a problem that should be resolved within the country's energy policies.

On the other hand, according to Turkey's National Inventory submitted to UNFCCC in April 2011, the share of the energy sector in total energy consumption in 2009 was 75.3%. As it can be seen in the National Inventory Report, while the total greenhouse gas emissions of our country increased by 97.6% between 1990 and 2009, the increase in CO₂ emissions of energy sector was 114%. On the other hand, electricity sector emissions, which have the largest share amongst energy sector emissions, tend to decline starting by 2007.

2.4.2. Climate Change and Buildings in Turkey

Because the building sector is a significant energy consuming sector, building sector has been evaluated as a priority area for increasing energy efficiency and policies and programs for climate change. Increasing energy efficiency in buildings leading actions related to greenhouse gas emission reduction in EU member countries and all developed countries. According to the statistics of the Turkish Statistical Institute, while the number of buildings in Turkey was 4.3 million in 1984, it increased by 78% in 2000 and reached 7.8 million, and the number of homes reached to 16.2 million with a 129% increase compared to the data of the same year. According to construction permits taken between 2000 and 2008, residential, commercial and public buildings increased by 56% in terms of covered area, and reached 1,524 million m², while their number increased by 7%, and reached 8.35 million. This increase in demand indicates that energy efficiency measures must be taken in the buildings immediately.



The building sector caused 53,4 Mton CO₂ emissions in our country in 2009. It is projected that the energy consumption of the sector, which was 29.5 million TOE in 2009, will reach 47.5 million TOE in 2020, and this indicates that CO₂ emissions will reach about two-fold compared to 2009 values.

The coal utilization for heating in our country in 2009 was around 14 million tons. By the end of 2009, the number of provinces where natural gas supply was provided reached 66. When examining the data of the Ministry of Energy and Natural Resources, it is seen that the rates of coal utilization (27%) and natural gas utilization (24%) were very close to each other in the building sector. By the end of 2009, the number of provinces where natural gas supply was provided reached 66. When considering the plan of launching the natural gas utilization in almost all our factories since 2012, wide spread proliferation of natural gas in heating can be expected if the price is affordable. In our country, 24% of energy consumption is covered by electricity, and 20% by renewable energy sources consisting of solar, geothermal, wood, plant-animal residues in building sector. More than one third of the energy used in Turkey is spent for heating and cooling purposes. The most important measure that can be applied in the buildings is thermal insulation which means strengthening buildings against heat loss in cold regions and heat increase in hot regions. Especially in our cities located in the first degree day zone, outdoor temperatures reach 40~45°C in summer months. Cooling process is three to six times more expensive than heating cost. In recent years, with the rise in temperatures in the

summer months, there has been a significant increase in window-type air conditioner sales, especially in southern regions. Sales of air conditioners increased by a hundred percent between 2007 and 2010.

According to the Turkish Statistical Institute's 1998 household energy consumption survey, 84% of existing buildings were single-glazed and only 16% has had roof insulation. According to the İZODER Perception Survey data, only 9% of the consumers have made building insulation that they reside in.

The fact that consumption of per-capita insulation material is as one-tenth of Europe explains more clearly the cause of energy loss in our buildings. Building stokes constructed before 2000 have been consuming at least twice as much energy as today's regulations, even when compared only in terms of current construction standards. While the General Directorate of Electrical Power Resources Survey and Development Administration announced that the energy efficiency potential of the buildings is about 35%, it estimates that, up to 2023, 2400 GWh of cooling and 2.3 million TEP fuel savings will be achieved with thermal insulation in 10 million homes.

2.4.3. Climate Change and Transport in Turkey

Within the scope of this report, intra-city transport has been taken into consideration. Cycling and pedestrian access have taken part as basic species under intra-city transport, which are defined as public transport, private vehicle transport and non-motorized transport.



Although the data and statistics on emissions in our cities are limited, it is known that İstanbul and Ankara receive the first orders in terms of carbon dioxide emissions from transport. It is calculated that, CO₂ emissions from road transport in İstanbul increased by 37% between 1990 and 2007, from 6.5 Mton / year to 8.9 Mton / year.

One of the main development trends leading to the increase of greenhouse gas emissions in intra-city is the increase in private vehicle ownership, namely automobile ownership, and in parallel the increase in the ratio of automobile journeys in intra-city transport. During the 1990s, motor vehicle journeys in İstanbul and Ankara were 17-20% of total motor vehicle journeys; by the end of the 2000s, this ratio has risen to 35% in İstanbul and to 28% in Ankara. Automobile generates 125 times more air pollution per passenger per kilometer than bus, and when it comes to energy consumption per passenger / km, automobile consumes five times more energy than bus and metro. Another development trends increasing greenhouse gas emissions in intra-city transport are the spatial growth of cities, the scattered location selection of urban utilizations, the development of low-density residential areas in the city walls, and the increase in the average length of journeys made per person as a result of all these trends.

2.4.4. Climate Change and Waste in Turkey

The waste sector plays an important role in climate change and global warming as one of the main sectors leading to emissions of methane (CH₄) and carbon dioxide (CO₂) gases, the major greenhouse gases. In the present situation, the sources of waste sector greenhouse gas emissions are the storage gas (~ 50-



55% CH4 content) that is released from regular and uncontrolled (irregular) storage areas, and as of 2009, the waste sector, which has a share of 33.93 million tons of CO2 equivalent / year (~ 9.18%) in total greenhouse gas emissions, ranks second after the energy sector. According to the statistics of the Turkish Statistical Institute, the amount of municipal solid waste collected in Turkey as of 2008 is 24.360.863 tons / year (1,15 kg / per capita daily, 420 kg / per capita annual) and 82% of the country's population and 99% of the municipal population benefited from the waste collecting service. 46% of waste collected from municipalities is disposed of in accordance with waste management legislation such as regular storage and composting. Approximately 46% of the municipal population benefits from such facilities, and the waste of 54% of municipal population is removed by irregular (uncontrolled) storage and other methods. Packaging wastes constitutes approximately 30% by weight and approximately 50% by volume of municipal solid wastes. Packaging wastes are recyclable wastes, and sending such wastes to the warehouse area means; shortening the life cycle of some materials, energy expenditure for these materials to be re-exported, processed and presented to consumers, and of course, increase in greenhouse gas emissions..

2.5. POSSIBLE EFFECTS OF GLOBAL CLIMATE CHANGE ON TURKEY

It is projected that Turkey will be adversely affected from the climate change phenomena by experiencing the consequences of diminishing water resources, forest fires, drought and desertification, and ecological

deterioration due to these. Climate projections predict that with the prominent increases in temperature the precipitation pattern, that is, the water cycle will change in such a way as to affect virtually all economic sectors, settlements and poverty-related natural disaster risks.

Changes in average temperatures and precipitation directly affect ecosystem services that regulate the quantity and quality of factors that provide raw materials for water resources, agricultural production, public health, natural disaster risks and economic sectors, which are closely related to these parameters.

According to scientists, the environmental and socioeconomic problems that a climate change could cause in our country can be summarized as follows:

Bilim insanlarına göre olası bir iklim değişikliğinin ülkemizde neden olabileceği çevresel ve sosyoekonomik sorunlar aşağıdaki şekilde özetlenebilir:

- The increase in the duration and severity of hot and dry circuits will accelerate events such as drought and desertification, salinization and erosion.
- As a consequence of the shift of the climate zones to the north, Turkey will be affected by warmer and drier climatic conditions.
- New problems will be added to Turkey's existing water resources problem, and great difficulties will be experienced in drinking and water utilization.
- Agricultural production potential may change. (This change may be in the form of an increase or decrease relative to species, together with regional



- and seasonal differences).
- Terrestrial ecosystems and agricultural production systems will get harmed owing to the increase of pests and diseases.
 - The increase in temperature will have adverse effects on human and animal health and will increase the illness and mortality rates caused by extreme warmth.
 - Depending on the sea level rise, low areas of Turkey, in where Turkey's settlement, tourism and agricultural areas are located intensively will go under water.
 - There will be an increase in snow avalanches, floods and overflowing events depending on the erosion in areas covered by seasonal snow and permanent snow-ice cover.
 - Changes in marine currents will have negative effects on marine ecosystems, and seafood will decrease.

Undoubtedly, a change that may occur in the global climate will affect different regions of Turkey differently. More negative results will be experienced in terms of agriculture, forestry and water resources in Turkey's Central Anatolia, Southeastern Anatolia, Aegean and Mediterranean regions, the regions that have semi-arid and semi-humid features, and which are especially under the threat of desertification. In recent years, it is known that mass tree dryings, pest outbreaks and fires are increasing in Turkish forests. Increase in drought rate depending on the climate change will accelerate these events even more.





3. CLIMATE CHANGE AND SITUATION IN ÇANKAYA

3.1. THE VERIFIED SITUATIONS AND CONDITIONS IN ÇANKAYA MUNICIPALITY

With the amendment made in 2014, the district borders of Çankaya Municipality expanded and reached 124 neighborhoods, and its surface area reached 46.220 hectares. Çankaya, which is located in the center position of Ankara, is bordered by Elmadağ, Mamak, Altındağ, Yenimahalle, Etimesgut, and Gölbaşı district municipalities.

Due to its high population, many primary education schools and universities as well as many of the most important universities of Turkey including foundation universities are located in Çankaya district. Over one hundred students in eleven universities are studying higher education in Çankaya. As well as many universities, university sub-establishments such as university hospitals and vocational schools are also located in Çankaya district.

The institutional structure of Çankaya Municipality consists of Municipal Council, Municipal Committee, Deputy Mayors and Service Units, and our municipality operates according to the Municipal Law No. 5393.

Çankaya Municipal Council consists of 45 members. 9 of the council members are women, and 36 are men, 5 of these have primary school graduate, 6 of these have secondary school graduate, 6 of these have high school degree, 2 of these have associate degree, 20 of these

have bachelor's degree, 4 of these have postgraduate degree, and 2 of these have doctoral degree. There are 7 members fulfilling a duty in Çankaya Municipality Committee.

Our municipal services are carried out by 4 Deputy Mayors, 26 Directorates, and Internal Audit Unit. There are 5 companies affiliated to our municipality.

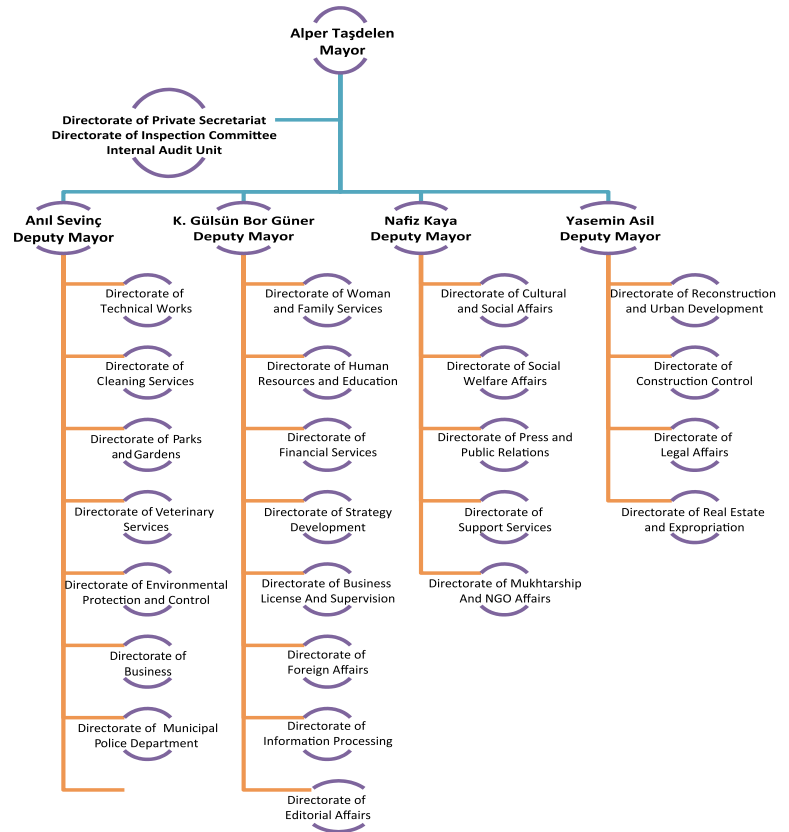


Figure 3. Çankaya Municipality Organization Chart





3.1.1. Geographical Position and Natural Structure

Çankaya is located in the Upper Sakarya basin in the north-western part of Central Anatolia Region. Mamak and Altındağ districts that are also bounded to Ankara are located to the east and north-east of Çankaya, Gölbaşı district is located to the south, and Etimesgut district is located to the west of Çankaya. Ankara was established in the middle of the plains of Central Anatolia. Today, this rocky area, where Ankara Castle is located, now carries a small island feature in the center of the city. The ridges that the Çankaya hills are also amongst them, encircle this island, and leave a bowl in the middle. This bowl, which was once a marsh, was dried and opened to settlement in the Republican period. However, also with the influence of increasing population, this area where natural air currents are limited, has significant air pollution problems today. It is hoped that this problem will be reduced when the construction of the natural gas network is completed nowadays.

When we look at the closed surroundings, we see that the mountainous and wooded area in the north forms the threshold of the transition to the Black Sea Region. Kızılcahamam on İstanbul Road, and Ilgaz Mountains in its east are very close to Ankara. Ankara's airport, two Çubuk Dams and Karagöl are in the south of these ridges and north of Ankara. Like Ankara's closest point to the sea, the water resources that enable Ankara Province not to Thirst even in the driest seasons are in the north. The areas of the Zonguldak, Kastamonu and Sinop Provinces that are part of the Black Sea coast can

be reached from Ankara by a 4-6-hour car journey.

A Flat and steppe area lies in the south of Ankara. Nerarby, Eymir and Mogan lakes are now remain within Ankara. Beynam Forests, a forest island in the middle of the steppe, are also in the south. Gölbaşı District at the edge of Mogan Lake, and an hour or so away, Hirfanlı Dam, and Kesikköprü Dam are all take place in this direction. Konya and Adana can be reached from this direction from Ankara. Konya is 4, and Adana is in the 6-hour road distance to Ankara. Cappadocia and the touristic areas around the surrounding are also in the south, and only a few hours away.

In the west of Ankara, there a re several settlements parallel to a few arteries opening to Aegean Region. The roads outgoing to Eskişehir direction provide transport to the Aegean and Mediterranean regions. The closest point on this line is Polatlı District. Polatlı, which is an hour away from Ankara, is one of the wheat silos of Central Anatolia. Sakarya River is born within this district's borders.

Another line goes to Ayaş, Beypazarı, Nallıhan direction. Saryar Dam is also in this direction, near Nallıhan. Ayaş is a famous settlement with hot springs and spa. As from Ayaş, this area is a region where garden farming is very common.

Ankara leans on the Elmadağ ridge in the east. On this mountain, which can be reached in a few minutes from Ankara, there are skiing facilities with ski lifts. Touristic hotels and other small organizations in these facilities offer a variety of opportunities.



Elmadag District is on the other slope of the mountain where the district took its name. After this district, you will see Kırıkkale Province. Kızılırmak is the most important natural event shaping this region.

Although Ankara has all the characteristics of the land climate, it can compete with the Mediterranean Regions in terms of the number of sunny days. There are sunny days in the third of the year. The summers are hot and without precipitation. There is a long autumn. A hard but short winter, and a rainy and short spring are amongst the characteristics of this climate.

3.1.2. Demographic Structure

According to 2011 data, Çankaya was ranked seventh after İstanbul, Ankara, İzmir, Kocaeli, Antalya and Bursa

in the socio-economic development ranking in which a total of 61 variables including population, education, health, employment, competitive and innovative capacity indicators, financial capacity, accessibility, and life quality indicators were assessed. The urbanization rate in the rapidly developing district is 90%, well above the 75% of Turkey average. The structural densities and spatial organizations of cities and urban areas are the main causes of energy consumption trends and greenhouse gas emission concentrations.

- Çankaya became a district in 1936.
- Çankaya Municipality was established in 1983 with the Municipality Law No. 1580.
- There are 124 neighborhoods in Çankaya.





- According to the 2015 data, the population of our district is 922 thousand 536.
- The daytime population exceeds 2 million.
- There are 4 state and 8 foundation universities and the Turkish Military Academy located in Çankaya.
- There are over 100 thousand university students in Çankaya.
- 103 Primary Schools, 46 high schools, and 59 private schools are located within the boundaries of our municipality.
- The number of homes is 333 thousand 537.
- The number of workplaces is 107 thousand.
- There are 114 Embassies in Çankaya.

The Çankaya settlement hosted respectively; the Hatti, the Hittites, the Phrygians, the Lydians, the Persian Empire, the Kingdom of Macedonia, the Galatians, the Roman Empire, the Eastern Roman Empire, the Great Seljuk Empire and finally the Ottoman Empire periods. The settlement which lost its importance in the 19th century regained its importance with the construction of the Baghdad Railway in the beginning of the 20th century, and later as being the place where Mustafa Kemal Atatürk ruled the Turkish War of Independence. Çankaya obtained District status on June 9, 1936, as the result of the rapid urbanization movements after Ankara was proclaimed as the capital of the newly founded Republic of Turkey on October 13, 1923.

Çankaya District obtained its Metropolitan District status by the sectionalize of the provincial center of Ankara into five districts, namely Çankaya, Altındağ, Yenimahalle,





Mamak and Keçiören. With the local elections held on March 25, 1984, Çankaya elected its first Municipal Council and Mayor, and ensured Çankaya Municipality to take its place within the metropolitan area of Ankara Metropolitan Municipality.

Çankaya is one of the most crowded districts of Turkey with a population of 922,536 inhabitants, and the district is even more crowded than 58 provinces of Turkey which consists of 81 provinces. Çankaya is in the position of a district of the capital Ankara that containing the most important political, public and socio-economic and cultural institutions within itself. The top management of the Republic of Turkey, official public institutions and organizations and all foreign embassies are located within the boundaries of our district. Also, when considering that the majority of trade and business life in Ankara is located in Çankaya district, it is seen that, Çankaya is more crowded than many provinces depending on its daily population movements, and with this feature, it carries a separate urban center feature within the city.

3.1.3. Economic Structure

Ankara is a city that was reborn again and again in history. The birth of the city was due to its political importance; but previous births are based on economic reasons.; but its previous births were based on economic reasons. For instance, Ankara was a city famous for weaving in the 17th century and its population was exceeding one hundred inhabitants, but it fell out of sight due to the decline of this handicraft-based industry and had been lost again in the silence of the steppe.







A famous author in love with Ankara, Bilal N. Şimşir says that: “In the 1920s, Ankara was a dusty, malignant Central Anatolian town with nothing but with its cats, goats and pearls, on the other hand, İstanbul was the splendid, glorious capital of the emperorship, which had also been the capital for Byzantine for over a thousand years, and for the Ottoman Empire for five centuries. It is a surprising fact that a dull town like Ankara dethroned glorious city of İstanbul from being the capital, as if Ankara, this is an astonishing incident just like witnessing a veteran chief wrestler is beaten by a skinny youngster.” (Şimşir, 2000)

The separation of Kırşehir-Kayseri-Yozgat sanjacks on various dates, two major fires, two major famines, the migrations to other cities due to the attacks of locusts, and the destruction brought by wars resulted as the decrease in population, the decline in trade, the deterioration of the economy and the impoverishment of people in Ankara. In addition to the clerical profession that has been dominant from the beginning, people were also engaged in iron, copper and jewelry, as well as tailoring. But Ankara had the most important income from the mohair trade. Until 1838, this trade was monopolized by Turkey. After the slim, curly, lily white and 25-30 cm long shiny feathered mohair goats were taken to South Africa by the British, the monopoly got out of hand. The name of the mohair was still Ankara Goat. The name of sweaters made from mohair was still angora sweater. The loss of mohair goat monopoly was the biggest economic blow for Ankara at that time. Neither the roads that crossing Ankara and reaching to the four sides, nor hundreds of bridges built on these roads to facilitate transitions, nor the railroad that came in 1893 could revive Ankara. The resurrection

was realized in 1923 when Ankara became the capital city. The administrators of the new state that got ready for the declaration of the Republic had created a capital city from Ankara which was as a Middle Anatolian town that initiating the contemporary lifestyle in the country after being declared as the new capital.

The declaration of Ankara as the capital changed the fate of Ankara rapidly. First of all, the population has increased thanks to those coming from all over Turkey, especially from the nearby provinces. The annual increase of around 5.6-6% until mid-70s started to fall after this date and tended to approach stability.

Today, Ankara is a metropolitan city on the E-5 highway that linking the Middle East to Europe, where the population has risen to five million, where a wide variety of service areas are concentrated, where the industrial sector has developed to such an extent that it cannot be underestimated, and where decisions leading to the country's government are taken.

When the development of economic life in the Republican period is examined, it is seen that, in the first years the Grand National Assembly of Turkey has not had enough power even to change the tiles of the roof. The economic life that revived over time has presented itself at first with the dynamism it created at Anafartalar Avenue in Ulus region. This avenue and some of the streets in the vicinity are also attracting attention today.

The vast majority of the public sector organizations have their headquarters in Çankaya in Ankara. The Machinery and Chemical Industry Institute, which is amongst them, and which plays an important role in the formation of Çankaya's city plan, is located in Tandoğan Square. This

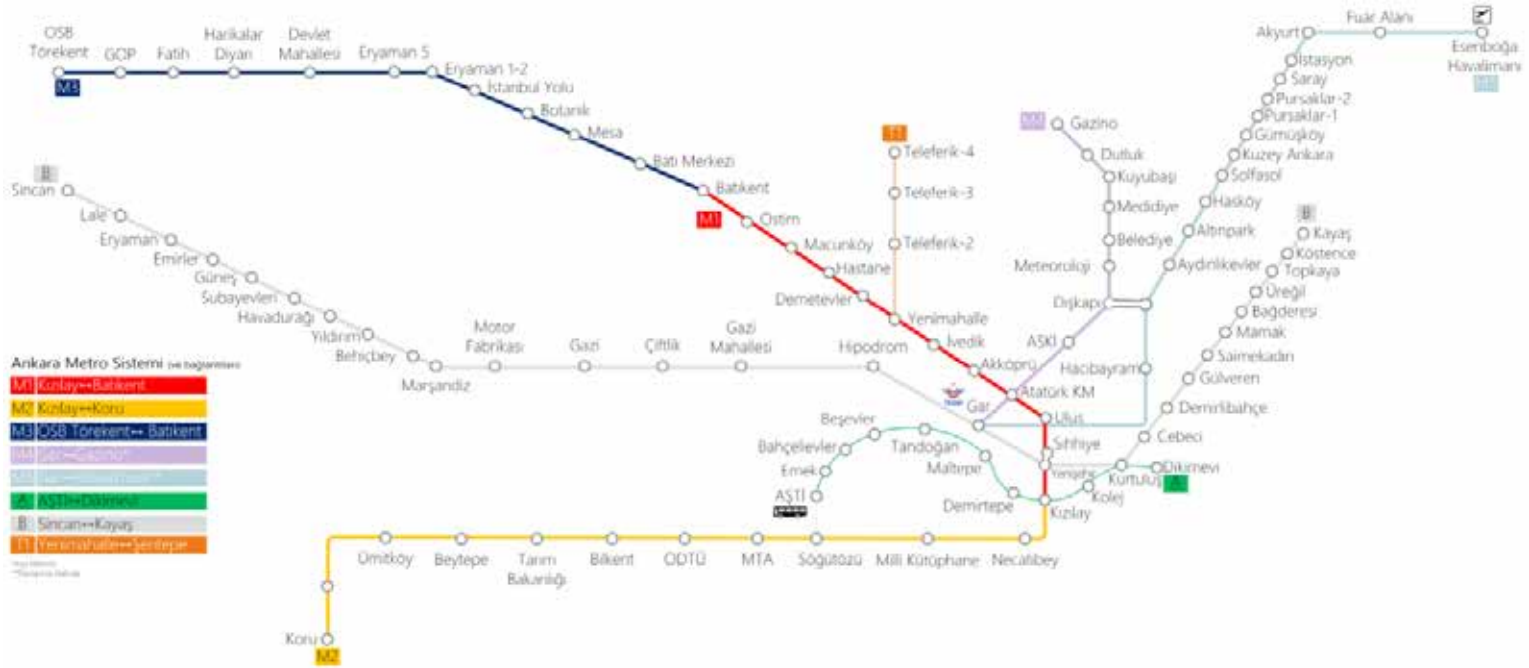


Figure 4. Ankara Province Light and Heavy Rail Public Transport Scheme

institution was founded under the name of Manufacturing Military Equipment by patriotic engineers, technicians and workers, who fled from İstanbul to Ankara in order to meet the need for arms and ammunition of the Turkish War of Independence. Ankaragücü Sports Club which was founded by Machine and Chemical Industry is Ankara's first sports club.

3.1.4. Transport

Çankaya district is located in the center of Ankara. There are 4 active and 2 under construction metros facilitating the intra-district transport. The metro routes are located

on Dikimevi - Söğütözü, M1 Kızılay - Batıkent, M2 Kızılay - Koru, M3 Batıkent - Törekeent, M4 Gar - Gazino and M5 Gar - Esenboğa Airport lines. These metros link Çankaya to Yenimahalle, Altındağ, Etimesgut, Sincan, Keçiören, Pursaklar, and Çubuk districts. There is a direct transition to the Ankara Intercity Bus Terminal from the Ankaray metro. The Sincan-Kayaş Suburban Railway Line has stations passing through the district. It is possible to reach Çankaya district by air north-way through the Eesenboğa International Airport which is 28 km away from the city center and located in the north-east of Çankaya.



Table 2. Climatic Values by Month for Ankara Province

ANKARA	January	February	March	April	May	June	July	August	September	October	November	December	Annually
Average Values Realized Over Many Years (1950-2015)													
Average Temperature (°C)	0.4	1.9	6.0	11.3	16.1	20.1	23.6	23.4	18.8	13.0	7.0	2.6	12.0
Average Maximum Temperature (°C)	4.4	6.6	11.6	17.3	22.2	26.6	30.2	30.3	26.0	19.8	12.9	6.6	17.9
Average Minimum Temperature (°C)	-3.0	-2.2	0.9	5.6	9.7	13.0	15.9	16.0	11.8	7.2	2.4	-0.7	6.4
Average Sunrise Time (hours)	2.5	3.5	5.2	6.4	8.4	10.2	11.3	11.6	9.2	6.5	4.4	2.4	81.6
Average Number of Rainy Days	12.3	11.0	11.1	11.7	12.6	8.9	3.7	2.8	3.9	6.9	8.4	11.5	104.8
Monthly Total Rainfall Average (kg/m2)	42.1	36.6	40.3	46.5	52.0	36.7	14.2	10.9	18.7	29.1	32.0	43.1	402.2
The Highest and Lowest Values Realized Over Many Years (1950-2015)													
Maximum Temperature (°C)	16.6	20.4	27.8	31.1	33.0	37.0	41.0	40.4	36.0	33.3	24.4	20.4	41.0
Minimum Temperature (°C)	-24.4	-22.2	-19.2	-6.7	-1.6	3.8	4.5	6.3	2.5	-5.3	-13.4	-18.0	-24.4

Çankaya District is the center of intra-city transport due to its central location in Ankara. Kızılay Square, the intersection point of two existing metro lines, where all buses and other transport vehicles (dolmuş etc.) come and disperse, is the key point of transport area of Çankaya and Ankara. This situation brings the positive aspects together with the negative aspects such as traffic, and emission and pollution originating from transport.

3.1.5. Climate

Continental climate prevails in the district. The winters are cold and snowy, and the summers are hot and dry. A dry black frost is seen in winters. There is a convectional rainfall type called Kırkikindi falling in the spring season.

The region is the least rainfall area of Turkey in the Central Anatolia Region, that's why, one third of the year is sunny in the district. The annual rainfall average of Ankara city center is 404.5 millimeters. The max. rainfall is observed in May with 51.8 mm, while the minimum rainfall is observed in August with 14.4 mm.

3.2. ÇANKAYA MUNICIPALITY AND ITS ACTIVITIES FOR CLIMATE CHANGE

According to Çankaya Municipality's strategic plans and programs, the environmental works are shaped on three main axes;

'BİYOLOJİK GÖLETE' ÖZEL ÖDÜL

13 üye belediyenin 43 projeye başvurduğu "Sağlıklı Kentler Birliği 2015 Sağlıklı Şehirler En İyi Uygulama Ödülleri" yarışması sonuçlandı. Sosyal Sorumluluk kategorisinden 19, Sağlıklı Şehir Planlaması kategorisinden 6, Sağlıklı Yaşam kategorisinden 6 ve Sağlıklı Çevre kategorisinden 12 proje jüri tarafından değerlendirildi. Başkanlığını Ankara Üniversitesi Siyasal Bilgiler Fakültesi Emekli Öğretim Üyesi Prof. Dr. Ruşen Keleş tarafından yapılan büyük jürinin, 43

kaya Belediyesi'nin "Doğal-Biyolojik Gölet/Çamsarapark" adlı projesi jüri özel ödülüne layık görüldü.

Ankara'ya, Çankaya Belediyesi'nin kazandırdığı Biyolojik Gölet ilk olarak Ahi Evran Spor ve Sosyal Tesisleri'nde yaşama geçirilmişti. İkincisi Çamsara'da yapılan Biyolojik Gölet, görsel güzelliğinin yanı sıra doğallığıyla da dikkat çekiyor. Hiçbir kimyasal madde kullanılmadan su bitkileri ve yararlı mikroorganizmalar sayesinde suyunu arıtarak temiz kalma özelliğine sahip

olan sistem, şehrin içine doğadan bir parça sunarak ekosisteme katkı sağlıyor.

Jüri tarafından "Sağlıklı Şehir Planlama" kategorisinde "Doğal-Biyolojik Gölet/Çamsarapark" adlı projesi ile özel ödüle layık görülen Çankaya Belediyesi, Ekim ayında Osmaniye'de Kadırlı Belediyesi'nin ev sahipliğinde yapılacak "Sağlıklı Şehirler Konferansı"nda düzenlenecek törende ödülünü alacak.





- Environmental protection and control works within the framework of legal responsibilities on the whole of Çankaya District.
- Çankaya Healthy City Project and Environment in line with Çankaya City Health Development Plan
- Climate, Energy and Environment Projects, Climate Change and Adaptation Practices



3.2.1. Çankaya Municipality and Healthy City Project

The studies on Healthy Cities Project in Çankaya Municipality first started in 1994 with the bilateral relations established by that period's Çankaya Mayor Doğan Taşdelen with the United Nations World Health Organization Ankara Office. Çankaya Municipality is one of the leading municipalities in Turkey that joined the "Healthy Cities Project" in 2004, coordinated by the World Health Organization (WHO) European Regional Office.

Çankaya Municipality has initiated a series of structuring and arrangements with the purpose of implementing the philosophy of "Health for All" to the local level within the scope of Healthy Cities Project.

Çankaya Healthy City Indicators and City Health Profile, and then, in the light of this data, the City Health Development Plan covering the years 2002-2007 was prepared by the Healthy Cities Project Office which was formed within the framework of the decision taken by the Çankaya Municipal Council. Currently, Çankaya Municipality, one of the members of WHO European Healthy Cities Network and Turkish Healthy Cities Association, is updating its Healthy Development Plan and concentrates on its studies on this scope.

Çankaya Municipal Council took an important step towards effective and functional participation in Healthy Cities Association Meetings and Union related processes with decision no. 330, dated 07.04.2006. In this context, Çankaya Municipality has also been a founding member of the Turkish Healthy Cities Association.





In different periods, Çankaya Municipality is represented in the bodies of the Turkish Healthy Cities Association (SKB), and ensured participation to the related conferences with scientific declarations reflecting the studies of our municipality. Çankaya Municipality received prizes in different periods in the “Best Project” competitions of Healthy Cities Association measuring the performance of the municipalities in one sense. Our “Çengel Cafe Implementation” Project, “Natural-Biological Pond / Çansera Park Project” and “Integration of Street Collectors into the System Project” were deemed worthy to receive awards as a reflection of the holistic view of the environment and social problems.

3.2.2. Climate and Environmental Works

Çankaya Municipality acts with an understanding with a sense of unity combining the authority, duty and responsibility given by the laws in the field of environmental protection and climate change with the requirements of the age we pass through. Çankaya Municipality, which provides waste management, noise control and pollution control services which are amongst the authorities, duties and responsibilities of the municipalities also takes modest steps in combating climate change and follows the requirements of the era.

Çankaya Municipality works intensively in recycling services to protect the environmental health and the environment while working in the control of air pollution caused by heating and carrying out training and informing studies concurrently. In addition, our Municipality also conducting international projects such as European Cycling Challenge, Rain Harvesting, Nature4cities

(nature-based solutions project), developing a participatory method for energy efficiency at the local level and manufacturing wind turbines while building biological ponds in parks.

Çankaya Municipality, which has become one of the leading municipalities of Turkey with the figures obtained in the fields of recycling, works in the fields of packaging waste, waste batteries, waste oil, electronic waste, and aims to increase the amount of collected waste, to raise awareness of the public in this respect, and widespread the environmental protection by organizing periodical campaigns. The collected wastes are recycled and disposed after being separated. Recycling should be seen as combating environmental pollution on one hand, and on the other hand, it also presents itself as an economic saving and nature protection move through the reuse of raw materials.

The steps taken by Çankaya Municipality on recycling and waste also reveal itself as a social project. Some part of the waste collectors which are working without job security on streets under uninsured and dangerous conditions and are very common in Turkey, are taken into the municipal waste collection system, and thus both waste collection work is being carried out more systematic, and a social wound is being tried to be healed.

Çankaya Municipality, which works to keep the life within the habitable limits in the district, and to prevent efforts in the opposite direction, continues its supervision and monitoring activities on these issues.

One of the most important issues that Çankaya Municipality attaches importance in combating environmental pollution is the awareness-raising studies. Çankaya Municipality, which works in in this area in the schools located within the district boundaries, is making campaigns aimed at instilling environmental awareness foremost to the youngest Çankaya people.

Çankaya Municipality also takes action on environmental protection and waste management and control as well as combating climate change. Çankaya Municipality,

which has signed the Covenant of Mayors, the largest geographical comprehensive agreement for local governments, has also prepared the Sustainable Energy Action Plan which is the necessity of this agreement. In accordance with this agreement, Çankaya Mayor Alper Taşdelen has pledged to commit not to increase carbon footprint and to reduce it by a quarter, and to organize all the works that the municipality will carry out henceforward.

Çankaya Municipality, which seeking alternative routes





within the framework of this commitment, has been participating in the European Cycling Challenge aiming to ensure the wide spread utilization of bicycles for clean transport, and carrying out afforestation activities by organizing the Climate Diplomacy Day. Apart from these, a symbolic wind turbine has been brought into service in the largest park of the district, and The Seed Exchange Festival has been realized to protect local seeds.



Çankaya Municipality, which seeking alternative routes and collaborations in combating climate change, also participated in the SymbioCity training program which was jointly organized by the Swedish International Center for Local Democracy (ICLD) and the Swedish Association of Local Authorities and Regions (SALAR), and developed a participatory urban planning project based on energy efficiency throughout the training.



3.2.3. Recycling Services

Çankaya Municipality carries out its activities for the purpose of implementing the methods developed with the aim of preventing the harmful effects of solid wastes on environment and human health by approaching the concepts of waste and recycling in a holistic manner.

Within solid waste management; organic wastes, packaging wastes, waste batteries and accumulators, vegetable oil wastes, and waste electrical and electronic goods are collected separately at the source, decomposed, recycled or definitively disposed by the municipality.

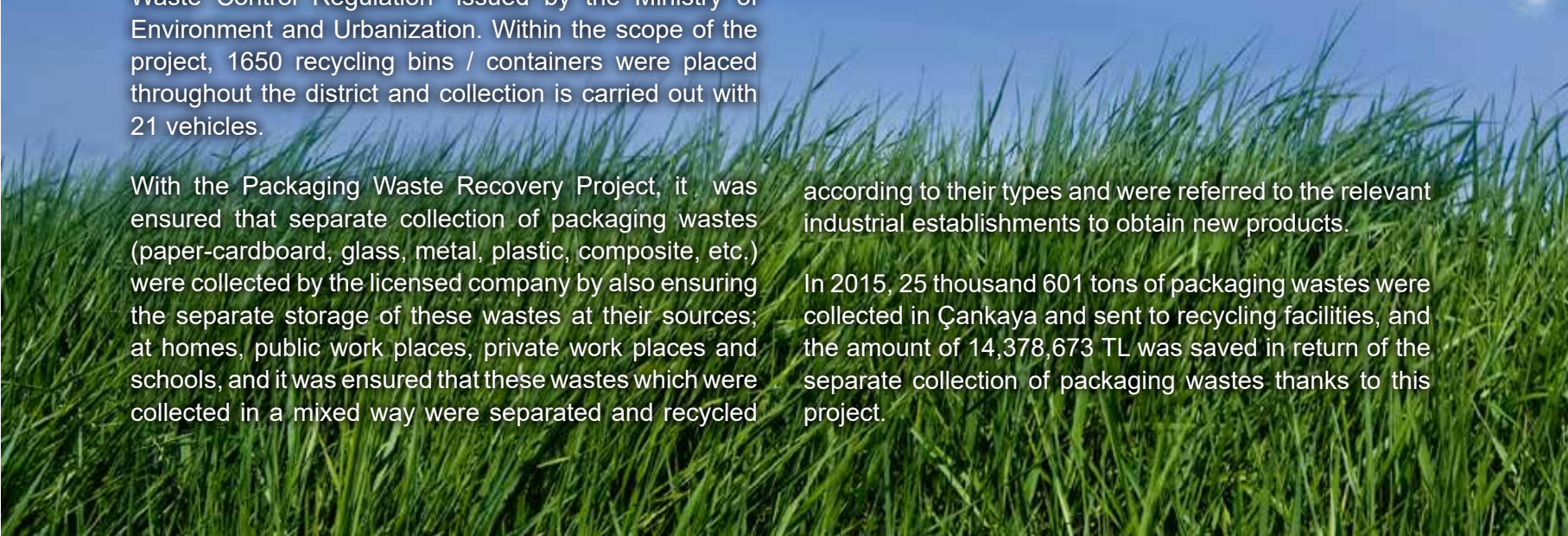
Packaging Wastes

Çankaya Recovery Project including 124 neighborhoods was carried out in accordance with the “Packaging Waste Control Regulation” issued by the Ministry of Environment and Urbanization. Within the scope of the project, 1650 recycling bins / containers were placed throughout the district and collection is carried out with 21 vehicles.

With the Packaging Waste Recovery Project, it was ensured that separate collection of packaging wastes (paper-cardboard, glass, metal, plastic, composite, etc.) were collected by the licensed company by also ensuring the separate storage of these wastes at their sources; at homes, public work places, private work places and schools, and it was ensured that these wastes which were collected in a mixed way were separated and recycled

according to their types and were referred to the relevant industrial establishments to obtain new products.

In 2015, 25 thousand 601 tons of packaging wastes were collected in Çankaya and sent to recycling facilities, and the amount of 14,378,673 TL was saved in return of the separate collection of packaging wastes thanks to this project.





With the recycling of paper and paper composites in 2015; 284.16 million liters of water and 182,325 trees were saved, 402 tons of CO2 emissions was prevented with the recycling of glass waste, the consumption of 4.6 million liters of gasoline was prevented with the recycling of plastic waste, and a total saving of 121,862 MWh was achieved thanks to the recycling of paper, paper composite, glass and plastic waste.

Waste Batteries and Accumulators

According to the Waste Batteries and Accumulators Regulation, waste battery collection points are established in order for battery manufacturers to collect waste batteries and accumulators. Waste batteries collection boxes are placed in Çankaya Houses (municipality's indigenous social service buildings), municipal police points, management units of large sites, lodgings and

schools located within the boundaries of the district. Collection points where citizens can bring waste batteries are also announced on Çankaya Municipality's official website.

Vegetable Waste Oils

Çankaya Municipality motivates workplaces and homes, which are included within its authority and responsibility, to deliver the waste oils from their kitchens to the companies that are granted collecting licenses by the Ministry of Environment and Urbanization, and continues the necessary works and operations to make contracts with these companies.

In 2015, 439.487 kg of vegetable waste oil was collected in Çankaya and this waste was prevented from being poured into the garbage and sinks. In addition to this, the reduction in the utilization of fossil fuels was also achieved with the recycling of waste oils to nature friendly biodiesel. Thus, added value was also created.

Electrical and Electronic Wastes

The damaged, broken, ruined, and irreparable electrical and electronic devices that can neither be repaired nor have usage value are taken by our Municipality from related addresses within a certain program. In addition, there are 4 containers in different regions of Çankaya where citizens can leave their small e-wastes. In 2015, 10.808 kg of e-waste was collected within the borders of Çankaya Municipality.



The Integration of Street Collectors into the System Project

The conversion of waste materials for reuse has emerged a new economic sector: 'Street Collection'. Street collection which has arisen as a result of migration, unemployment and education problems, etc. in Turkey, has become more socially complicated with the inclusion of Afghan and Syrian immigrants for the last two years.

It is known that more than 2 thousand street collectors making street collection in Çankaya District in a way lacking job security and occupational health.

Street collectors living in Ankara Province, existing within the scope of a group requiring private social policy, are integrated into the Municipality's collection system in order to reduce the amount of unregistered packaging waste and to establish a healthier, cleaner and sustainable waste collection system.

In this direction, Çankaya Municipality has undertaken a bridge role between the street collectors and the licensed waste collector company. With this project, street collectors have become insured employees of the company which is contracted with Çankaya Municipality.

As a result of the negotiations within the scope of this project, Bahçelievler was selected as the first pilot region due to its socioeconomic level, settlement area and the density of street collectors working in this region. The identified collectors were trained on job security and





human relationships prior to their inclusion in the Pilot Zone study.

The tools of street collectors who completed this training are adapted to the regulations, and the collectors started to work on street collection with municipal logotype clothes.

With this project, it is aimed to prevent the health risks caused by the scattered garbage during the collection of unpacked packaging wastes by street collectors that had not separated at their sources. Rough, noisy and irregular-unhealthy collection threatens both public health and the health of street animals. Storing the waste by unidentified street collectors also threatens the health of the environment. The elimination or partial reduction of these adversities will improve the benefit of the people who collects wastes, their family, and also other living things. The integration of the street collectors

employed in the pilot region into the system as labor force, and their adaptation to the regular working life are ensured thanks to this project, which also received the Best Project Award in the “Environment Category” in the Healthy Cities Best Practice Competition of the Healthy Cities Association in 2016.

3.2.4. Control of Air Pollution Caused by Heating

The authority of pollution control caused by heating has been given to Çankaya Municipality in the direction of the circular which The Ministry of Environment and Urbanism conveyed to the Governorship of Ankara and the Provincial Directorate of Environment and Urban Planning. In this context, the sale of low quality products is prevented from being offered by controlling the coal sales depots located in the district boundaries.



3.2.5. Training and Information Works

Various trainings have been organizing for the purposes to encourage the protection of environment and recycling, to make people aware of environment and sustainability issues, and to establish of a collection system that can create a model for the city. A detailed promotion and publicity work is being carried out in the regions to provide residents' participation where the Promotion and Training Studies of Separate Collection at Source Practice and the new collection systems will be implemented, and housing estate and group meetings are being held with residents, parcel and block managers on a predetermined day and time in the regions where the practice is intended to be disseminated and the information to be renewed. Educational films and slides about recycling and recovery are shown to students / teachers with cooperation of Çankaya Municipality, Çankaya District National Education Directorate and authorized institutions.

Trainings are given on important issues to various groups such as the students and teachers of kindergartens, primary schools, junior high schools, high schools, and universities; apartment managers and janitors; cleaning staff of institutions and hotels; and building estate managers by experts on the issues such as; the necessity to accumulate packaging wastes (glass, metal, plastic, paper-cardboard, composite etc.), vegetable waste oil, waste batteries, and electrical and electronic goods separately from other wastes; where these accumulated materials can be left; the recycling processes of the collected wastes, and the importance of



recycling, and information works are also being carried out. These works are supported by visual materials such as brochures, posters, series of environmental books, booklets, and seed cards. Apart from training seminars, campaigns, theater plays, fairs, competitions, technical tours, the world environmental day events are being organized by our municipality in order to develop environmental awareness.

Communication media such as printed media and social media are actively used for the healthy processing of

separate collection at source practices. In addition to these tools, the detailed background information is also available on the Çankaya Municipality's official website, which is open to everyone.

3.2.6. European Cycling Challenge

The European Bicycle Challenge which was organized by Bologna Municipality of Italia was held with the participation of 39 cities from 215 countries in 2015, in order to encourage the utilization of cycling in everyday



life and to reduce the rate of carbon dioxide released into the atmosphere. Çankaya Municipality participated to this event in its fourth year for the first time from Turkey in 2015, which was first started in 2012.

In May 2015, 26,020 participants rallied 2,487,258 km at the European Bicycle Challenge, where the rides were collected and thus the ranking of the cities was determined. Çankaya Municipality also saved about 6,800 kilos of carbon from atmospheric emissions with 33,823 km of cycling.

In 2016, the total number was 3,969,581 km. A total of 52 cities participated in the European Cycling Challenge where Çankaya Municipality also participated for the second time in 2016.





3.2.7. Rain Harvesting Project

This is a study, which was emerged in the framework of a project in which Çankaya Municipality was included as a co-applicant to the Civil Society Dialogue between EU and Turkey - IV Environment Grant Scheme, and realized in cooperation with Landscape Research Society (PAD) and Portugal Association for a Humanitarian World (AMH) - the EU member partner located in Tamera, Portugal. In addition, the Union of Municipalities of Turkey was also involved in the project as an associate. The full name of the project was: "Climate Resilience through Rain Harvesting". The project which was started at the beginning of 2016, and ended one year later, at the beginning of 2017, aimed to create an environment for sharing knowledge and experience that promotes dialogue between civil society and the EU while developing cooperation between Turkey and the EU in the context of adaptation to climate change.

The outputs obtained as the result of the project were briefly as follows: to establish Çankaya municipality's sustainable partnership and networking, to arrange training programs of trainers intended for rain harvesting practices with our municipality and PAD experts, to prepare guidance on adaptation to climate change, and to organize "Rain Day" activities within the scope of awareness-raising events.



This project is co-financed by the European Union and the Republic of Turkey





3.2.8. Nature4cities Project (Nature Based Solutions Project)

The project application including our municipality entitled H2020-SCC-NBS-1stage-2016 NATURE4CITIES under the heading of the European Commission's Horizon 2020 (Horizons 2020) Research and Innovation Framework Program has been accepted. Thus, our municipality has taken its place in the consortium composed of 9 countries,

as the only municipality participating from Turkey. The project aiming to create New Governance, Business and Finance Models, and Economic Impact Tools for Nature Based Solutions (NBS) and Sustainable Cities, covers a whole including universities, local governments, companies and non-governmental organizations.

The project, which was started as of November 2016, will be completed within a total of 48 months. During this time, it is aimed to create a comprehensive and multi-subjected data base for NBS; to create the necessary tools for shifting public and private sector investments from conventional to NBS; to diagnose the relationship between citizen and nature correctly by gathering urban information; and to create an internet based platform in which innovative application models are offered.

3.2.9. Climate Diplomacy Day

Çankaya Municipality organized an event titled "Tree, My Friend" in Kuğulupark, one of the landmarks of the city, together with the German Embassy, in order to draw attention to the environmental problems associated with



global warming and climate change.

Within the scope of the event held on International Climate Diplomacy Day, mini questionnaires and short training studies about the subject were made with the citizens, and 300 blue spruce seedlings, informative brochures and certificates were presented to Çankaya people. Also a blue spruce seedling was planted in Kuğulupark symbolically within this event.

3.2.10. Wind Turbine Manufacturing

Çankaya Municipality, seeking alternative routes in renewable energy, placed the wind turbine that the Municipality produced with its own resources in Ahlatlıbel Atatürk Sports and Social Facilities, the largest park of the district. The search for renewable, clean energy has become symbolic in this turbine.



3.2.11. Biological Ponds

Çankaya Municipality built biological ponds in its three important parks in a direction that emphasizes the importance of water in combating climate change and also in consideration of urban aesthetics. These ponds which do their own cleanings with the materials located within themselves, serve both to the urban aesthetics and also to water-saving through the utilization of the same water. Çankaya Municipality also received an award from the Turkish Healthy Cities Association with its biological ponds.

3.2.12. ICLD Symbiocity Project (Enabling Local Democracy and Inclusive Urban Development through the SymbioCity Approach Training Program)

International Education Programs are prepared by the Swedish International Center for Local Democracy (ICLD) and the Swedish Association of Local Authorities and Regions (SALAR) in the name of establishing broad international communication networks, increasing strategically important knowledge and competence, and





providing an increased understanding and foresight. There are education programs in 6 main topics including an important issue such as Gender Equality.

Çankaya Municipality was invited to the international program entitled “Enabling Local Democracy and Inclusive Urban Development through the SymbioCity Approach Training Program”, in which only two municipalities from Turkey; Çankaya Municipality - with the Project entitled “Creating a New Model for Municipalities - Developing a Participatory Method for Energy Efficiency at the Local Level” which was prepared in coordination with the Directorate of Foreign Affairs and the Directorate of Reconstruction and Urban Development of Çankaya Municipality, and Bursa / Nilüfer Municipality were entitled to participate.

The first training of the SymbioCity approach, in which the concept of sustainable urban development became the forefront was realized in Macedonia / Skopje with the participation of selected municipalities from Turkey, Serbia, Macedonia and Georgia between June 1-6, 2015. This project aiming to raise awareness of energy efficiency based on citizen participation was completed after 18 months of training.





4. METHODOLOGY AND THE PREPARATION PROCESS OF SUSTAINABLE ENERGY ACTION PLAN

The Sustainable Energy Action Plan (SEAP) is a long-term planning process endeavoring to achieve reductions in urban greenhouse gas emissions by ensuring consistency between decision-making processes of urban actors.

The plan is not limited to a single sector or an area of activity. The reduction measures of greenhouse gas emissions point to sectoral activities with economic consequences.

All the reduction measures such as an efficient public transport and transportation system, and the investments in energy-efficient building stock or renewable energy are projects with economic consequences that require investment on a large or small scale.

In this analysis study; a macro-level carbon footprint analysis and a sustainable energy action plan based on energy consumption elements within the municipality's borders has been put forward based on the 2015 data, within the scope of the protocol between the Covenant of Mayors and Çankaya Municipality aiming to reduce carbon emissions by 25% by 2020.







The Sustainable Energy Action Plan firstly required Çankaya Municipality's emissions to be determined at the institutional and urban level.

In this study, firstly the climate change, the threats it creates and the interactions of the cities with this dynamic have been handled with in many dimensions, then the interventions initiated by local governments on processes related to climate change-related problems and activities that cause climate change have been disclosed. In this study, the methods and standards adopted by the parties of Covenant of Mayors have been used.

The preparation of SEEP was carried out in three main stages:

- Stakeholder Analysis;
- Assessing Current Situation and Determining Needs;
- Determining the Objectives, Targets and Actions of SEAP

4.1. STAKEHOLDER ANALYSIS

At the first stage of the project, the active participation of stakeholders in the whole project process was ensured after the stakeholders were determined by stakeholder analysis made on sectoral basis, that may influence the policies to be developed for combating climate change, and the measures to be taken, and that also may be affected from these. During the project, the project team received full support from Çankaya Municipality's relevant units in the data collection process.



4.2. ASSESSMENT OF CURRENT SITUATION AND DETERMINATION OF NEEDS

The current policies, implementation tools and practices related to Turkey's greenhouse gas emissions control and other ongoing activities have been examined with a sectoral approach, and the umbrella policies and practices related to Turkey's combating climate change has also been discussed. For the adaptation to climate change, the current situation has been assessed by presenting existing policies, practices and needs, and by making adaptation analyzes to climate change in national legislation.

In this direction, the Carbon Footprint Inventory will be established by documenting and determining the

institutional and urban scale emissions in accordance with international standards. This inventory will also provide a useful basis for recording emissions and monitoring the reductions in the direction of determined targets.

Following the establishment of inventory, the reductions that the municipality can make with the activities under its control will be determined. In order to set an example for the projects to be implemented for the realization of reductions, examples of approved, initiated and / or successfully implemented practices of energy action plans of cities that are parties to the Covenant of Mayors have also been compiled in the guidance prepared under the same project. It is necessary to be inspired by these successful examples during the development of applicable projects to reach Çankaya's emissions reduction targets.



4.3. DETERMINATION OF OBJECTIVES, TARGETS AND ACTIONS OF SEAP

In the third stage of the project, again in a participatory manner, the actions to be taken in line with the objectives and targets set for the sectors have been determined. The Climate Change Action Plan has been prepared based on the literature reviews of industry experts, face-to-face meetings with relevant stakeholders, studies conducted with focus groups, and opinions received through correspondences.





5. CONDUCTING A GREENHOUSE GAS EMISSIONS INVENTORY

5.1. METHODOLOGY

In this inventory and analysis study in your hand; a macro level carbon footprint analysis based on energy consumption elements and a sustainable energy action plan have been put forward, based on the 2015 carbon emissions within the geopolitical borders of Çankaya Municipality, depending on the criteria of the ICLEI - Local Governments for Sustainability (ICLEI-2009), the Intergovernmental Panel on Climate Change (IPCC-2006) and the Covenant of Mayors (CoM Sustainable Energy Action Plan Practice Guidance -2015).

The GHG Protocol standards published by the Greenhouse Gas Protocol (GHGP), World Resources Institute (WRI), and the World Business Council for Sustainable Development (WBCSD) are used for the institutional greenhouse gas inventory.

In terms of local governance structure, the Ankara city center which is located within the metropolitan region, consists of many municipalities apart from Çankaya. For this reason, it is actually very difficult to dissociate the urban life from each other in every sense. However, some of the data obtained from the official authorities is presented based on a provincial basis, and some

of them based on the provincial center. There are no data covering only Çankaya Municipality. However, the determination of the boundaries of the urban district municipalities has been separated administratively, and the level of living from the socio-economic view and the utilization of the urban areas show great homogeneity. Therefore, the obtained data has been realized on the projection to population scenario.

5.2. BASELINE YEAR

An emissions inventory should include all emissions generated during the selected calendar year. Local governments should examine the existing data sources before starting the data collection process, and in order to create a complete and consistent inventory, they have to select the year in which the correct records of all sources of emissions can be found in as detailed as possible. It is important to prepare the inventory belongs to the oldest year in which all the accurate and error-free data can be found.

The baseline year of Çankaya Municipality in conducting the greenhouse gas inventory within the Sustainable Energy Action Plan is 2015. Çankaya Municipality which was serving on divided service buildings before 2014, has been providing services on one single service building after this year. Healthy data collection was only become possible by the year 2015. For this reason, the baseline year is determined as 2015.

5.3. GREEN GAS EMISSIONS INVENTORY RESOURCES

In the process of conducting this data inventory, an effective division of labor has been ensured between the administrative units of the local administration on

the institutional scale, and with both institutional and other organizations (other public institutions, organized industrial zones, various associations and chambers, energy suppliers, etc.) which can influence and inform urban activities at the urban scale.

Analysis of greenhouse gas emissions includes all urban greenhouse gas emissions analysis within the administrative boundaries of the local government, and at the same time, the inventory also describes the results of urban activities and decisions taken in throughout the district without paying attention to where the emissions geographically originated.

Distinctive greenhouse gas management programs have been prepared for each of the many activity areas which come under the authority of Çankaya Municipality. Çankaya Municipality's greenhouse gas emissions inventories consist of two parts:

1. Emissions related to local government's own activities,
2. Emissions related to urban activities of the population within the liable administrative borders.

The emissions from local government activities are similar to those of a somewhat complex private sector organization. For this reason, calculations are not very different from the emission inventory requirements of the Institutional Calculating and Reporting Standard under the Greenhouse Gas Protocol developed by the World Resources Institute and World Sustainable Development Business Council.

For the calculation of **urban-scale emissions**, it is necessary to take a different approach and follow a

different methodology than when calculating national greenhouse gas emissions inventories. One of the key reasons for this is the challenges in determining the activities causing greenhouse gas emissions at the local level.

- **Scope 1 - direct greenhouse gas emissions:**

They are emissions from all stationary and mobile sources of emissions that the institution has or directly controls. Owned, rented or assets gained through financial leasing are included in these sources. Scope limit is all sources of emissions that can be controlled. The cooling gases of the air-conditioning systems that used for the activities should be included in this scope.

- **Scope 2 - indirect energy greenhouse gas emissions:**

They are emissions from the purchased energy for the activities of the Institution. In this chapter, mains electricity used or other types of energy used for heating / cooling should be included.

- **Scope 3 - other indirect greenhouse gas emissions:**

They are emissions under the Institution's own control, apart from the indirect emissions and emissions caused by the Institution's activities. These emissions may be originating from the ahead of or behind activities of the institution's core activities, employee travels or sub-contracting activities. In this scope, the decision parameter should be the level and quality of the data available.



Table 3. Emissions at Municipal and Urban Scale According to the Scopes

	Municipal Scale	Urban Scale
Scope 1	Direct Emissions	Direct Emissions
	(eg. municipal vehicle fleet, fossil fuel consumption in municipal buildings for heating purposes)	(eg. emissions from vehicles in the city, emissions from fuels consumed in buildings)
Scope 2	Indirect Emissions	Indirect Emissions
	(eg. emissions from mains electricity consumed in municipal buildings)	(eg. emissions from the electricity consumed in the city but purchased from the national network)
Scope 3	Consumption Based Emissions	Consumption Based Emissions
	(eg. emissions from production and transportation of goods / services purchased by the municipality)	(eg. emissions emerging in different countries or regions due to production and transportation of consumed products and services in the city)

The carbon footprint inventory of the Çankaya Municipality was 12,160 tons CO₂e, and 864,071 tons CO₂e for the urban scale, for the year 2010. The distinction according to the scopes specific to the City and Çankaya Municipality is seen in Figure 5.

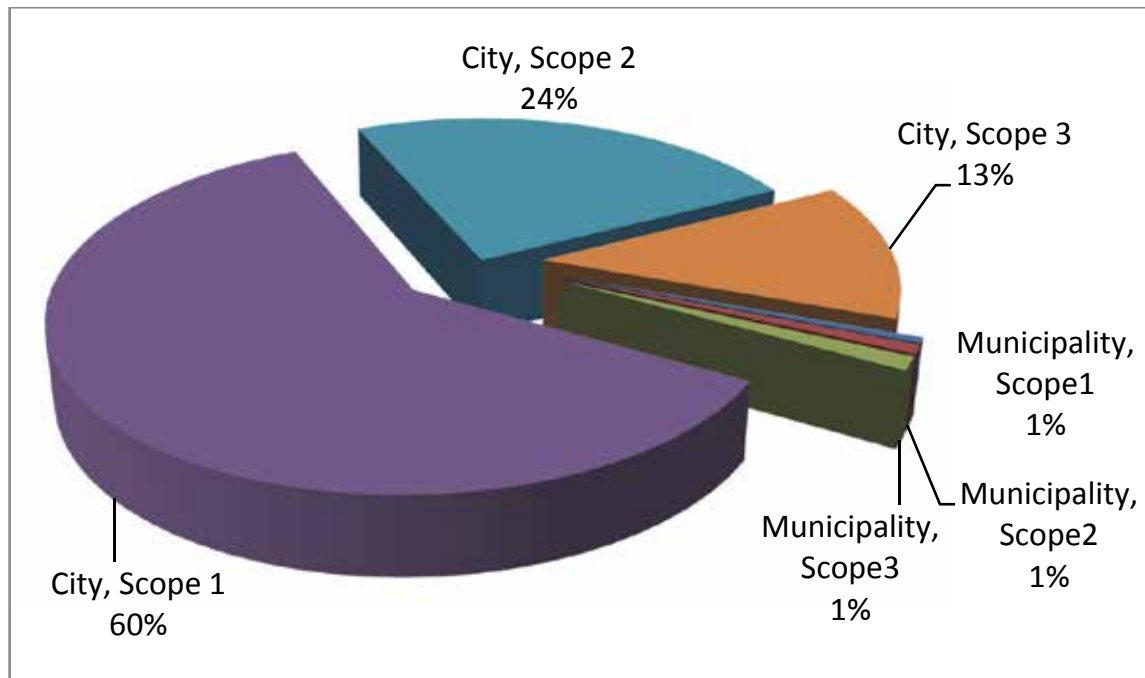


Figure 5. The Distribution of 2010 Greenhouse Gas Emissions According to the Scopes in the Borders of Çankaya Municipality, %,



Table 4: Scope Classification by Sectors for the Urban Scale Emissions Inventory

Sectors	Activity Sectors	Scope 1	Scope 2	Scope 3
• Stationary Energy	<ul style="list-style-type: none">• Residential• Commercial• Industrial	<ul style="list-style-type: none">• Residential fuel consumption• Commercial fuel consumption• Industrial fuel consumption• Decentralized consumption	<ul style="list-style-type: none">• Residential electricity consumption• Commercial electricity consumption• Industrial electricity consumption	
• Transport	<ul style="list-style-type: none">• Transportation	<ul style="list-style-type: none">• Exhaust emissions of vehicles	<ul style="list-style-type: none">• Electric vehicle consumption in the city	<ul style="list-style-type: none">• Bus Terminal vehicles• Airport-originated
• Waste	<ul style="list-style-type: none">• Solid waste disposal• Biological treatment of wastes• Waste incineration and litter incineration on open area	<ul style="list-style-type: none">• Regular storage and incineration of wastes during the current year• that accumulated in the settlement till today, and compost releases• Future emissions of wastes from past		
	<ul style="list-style-type: none">• Wastewater treatment and evacuation	<ul style="list-style-type: none">• Emissions from wastewater that have accumulated till today within the settlement• Future emissions of those		

The analysis of urban scale emissions should include all GHG emissions analysis within the geographical and administrative boundaries of the local government. The urban scale inventory should also explain the results of the activities and decisions taken within the region without paying attention to where the emissions are geographically originated. In most cases, as in Table 4, it greatly facilitates decision-making processes for sectors to be divided into sub-sectors similar to the methods used by local governments to determine their policies.



5.4. ÇANKAYA'S GREENHOUSE GAS EMISSIONS INVENTORY

The public transport activities carried out within the Metropolitan Municipality has the largest share in Çankaya Municipality's greenhouse gas emissions inventory by 49%. This is followed by public lighting and signalization electricity consumption (26%) in Çankaya. Since the service that the municipality should provide for public transport is under the control of the Metropolitan Municipality, not Çankaya Municipality, it is evaluated in **Scope 1 instead Scope 3**.

Table 5. Çankaya Municipality's 2015 Institutional Greenhouse Gas Inventory

Category		ton CO ₂ e
Buildings and Facilities		9.758,57
Scope 1	Stationary Combustion Emissions	5.105,29
Scope 2	Electricity Consumption	4.653,28
Public Lighting and Traffic Lights		25.911,62
Scope 2	Electricity Consumption	25.911,62
Scope 3	Electricity Consumption	
Vehicle Fleet		14.682,80
Scope 1	Mobile Combustion Emissions	14.682,65
Scope 2	Electricity Consumptions of Electric Vehicles	0,15
Public transport		47.809,62
Scope 3	Public Transport Municipal Buses	31.644,35
Scope 3	Public Transport Metro Electricity Consumption	16.165,26
TOTAL		98.162,62

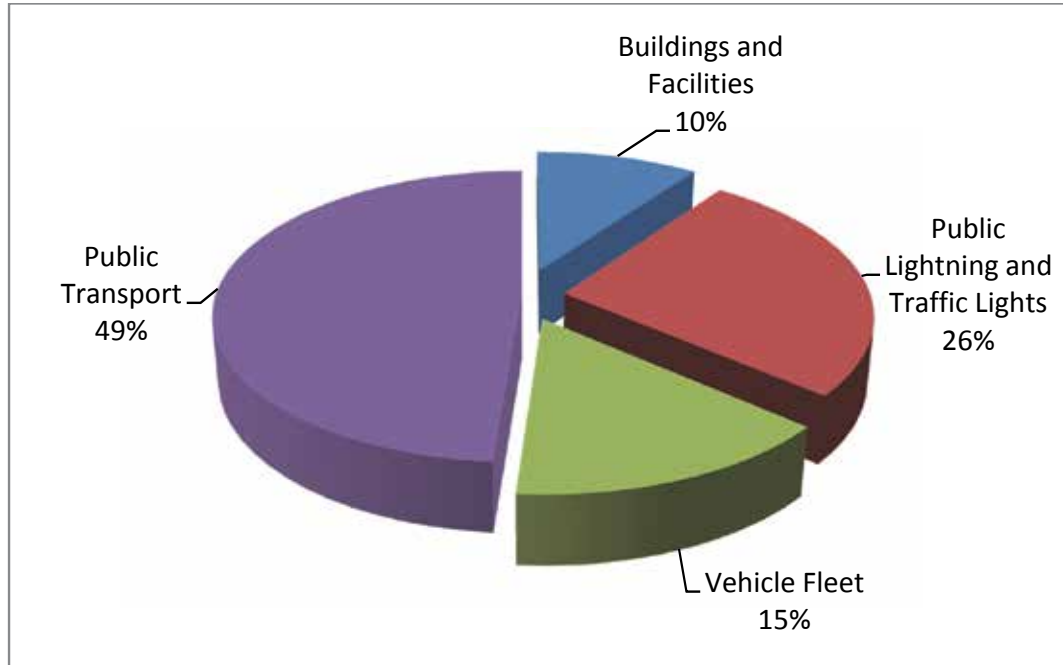


Figure 6. Çankaya Municipality's 2015 Institutional Greenhouse Gas Emissions Inventory


Tablo 6. Çankaya Municipality's 2015 Greenhouse Gas Emissions Inventory at Urban Scale

Category		
Residential		871.872,00
Scope 1	Stationary Combustion Emissions	619.768,00
Scope 2	Electricity consumption	252.104,00
Commercial, Public		797.741,00
Scope 1	Stationary Combustion Emissions	379.704,00
Scope 2	Electricity consumption	418.037,00
Industrial		417.169,00
Scope 1	Stationary Combustion Emissions	173.332,00
Scope 2	Electricity consumption	243.837,00
Vehicles		1.209.852,00
Scope 1	Mobile Combustion Emissions	1.126.338,00
Scope 3	Mobile Combustion Emissions – Bus Terminal	83.514,00
Solid waste		275.622,00
Scope 3	Methane Emissions	275.622,00
Wastewater		141.105,00
Scope 3	CO ₂ , CH ₄ and N ₂ O Emissions	141.105,00
TOTAL		3.713.361,00

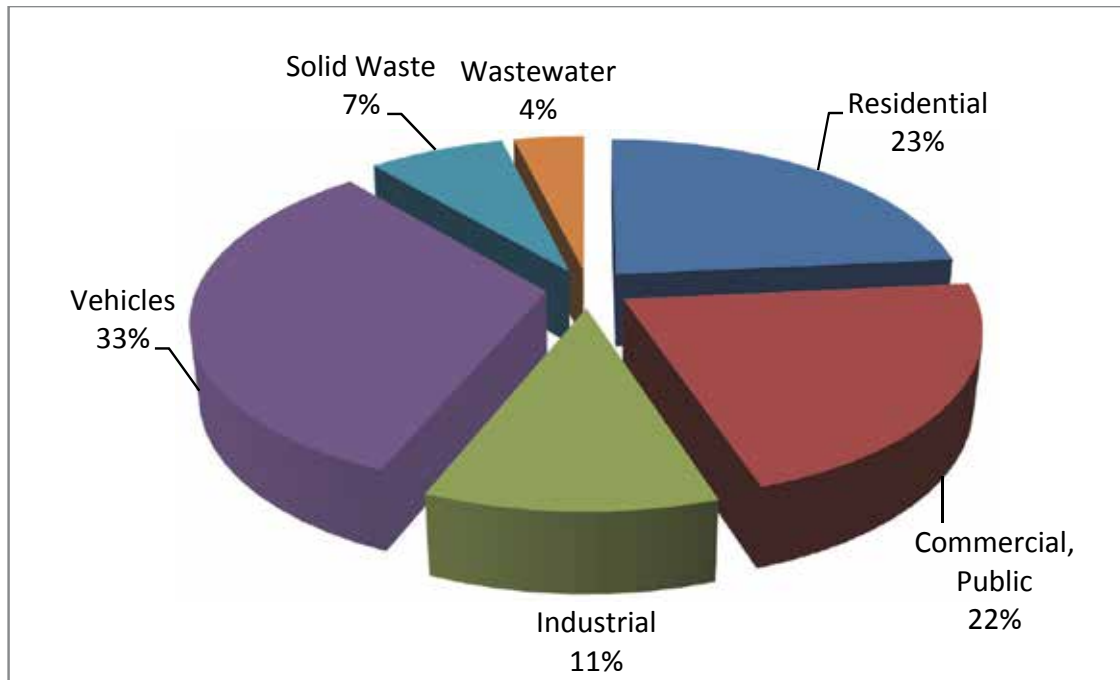


Figure 7. Çankaya Municipality's 2015 Greenhouse Gas Emissions Inventory at Urban Scale

The greatest share of greenhouse gas emissions at the urban scale of Çankaya District is from the intra-city vehicles utilization by 33% as seen in Figure 7. Then, fuel and electricity consumption in homes (23%), fuel and electricity consumption in public and commercial buildings (21%), and emissions from solid waste and wastewater (7% and 4%) comes respectively. These ratios include clues about the areas to be improved most.

Table 7. Çankaya Municipality's 2015 Greenhouse Gas Emissions within the scope of SEAP

Category	MWh	tCO ₂ e
Energy Consumption in Buildings, Equipment / Facilities	4.583.465,77	1.705.283,20
Municipal Building & Facilities	18.356,05	9.758,57
Homes	2.120.305,64	871.872,00
Tertiary Buildings & Facilities	2.396.064,10	797.741,00
Municipal Public Lighting	48.739,98	25.911,62
Energy Consumption in Transport	8.101.424,73	1.272.344,42
Municipal Vehicle Fleet	62.444,39	14.682,80
Public Transport Municipal Buses	133.273,11	31.644,35
Public Transport Metro	30.409,15	16.165,26
Intra City Vehicles	7.212.121,88	1.126.338,00
Transit – Bus Terminal	663.176,20	83.514,00
Other Emissions	-	416.727,00
Solid Waste Disposal		275.622,00
Wastewater Treatment		141.105,00
TOTAL	12.684.890,50	3.394.354,62



6. OBJECTIVES, TARGETS AND ACTIONS

Within the framework of the EU climate and energy package adopted in 2008, our Municipality has pledged to reducing CO2 emissions by 25% by 2020 as a party to the Covenant of Mayors in 2015, which is enacted by the European Commission and supports sustainable energy policies.

While realizing this; sharing gained experiences and knowledge with other municipalities, organizing Local Energy Days to raise the awareness of district residents on energy efficiency, renewable energy and environment, participating in panels, exhibitions, thematic workshops and discussion group meetings every year on energy week and contributing to Covenant of Mayors, spreading Covenant's message on appropriate platforms; especially inviting other mayors to take place in the covenant, and raising awareness by explaining the climate change and its effects to the public are amongst the targeted outputs of the Sustainable Energy Action Plan.

**Table 8.** Çankaya Municipality's 2015-2020 CO2 Reduction Rates

Category	2015	2020 Target	Reduction %
Energy Consumption in Buildings, Equipment / Facilities	1.705.283,20	1.210.244,31	0,29
Municipal Building & Facilities	9.758,57	7.904,45	0,19
Homes	871.872,00	601.591,68	0,31
Tertiary Buildings & Facilities	797.741,00	582.350,93	0,27
Municipal Public Lighting	25.911,62	18.397,25	0,29
Energy Consumption in Transport	1.272.344,42	1.056.704,32	0,17
Municipal Vehicle Fleet	14.682,80	12.039,90	0,18
Public Transport Municipal Buses	31.644,35	28.796,36	0,09
Public Transport Subway	16.165,26	17.943,44	0,11
Intra City Vehicles	1.126.338,00	923.597,16	0,18
Transit - Bus Terminal	83.514,00	74.327,46	0,11
Other Emissions	416.727,00	279.338,85	0,33
Solid Waste Disposal	275.622,00	179.154,30	0,35
Wastewater Treatment	141.105,00	100.184,55	0,29
TOTAL	3.394.354,62	2.546.287,48	0,2498

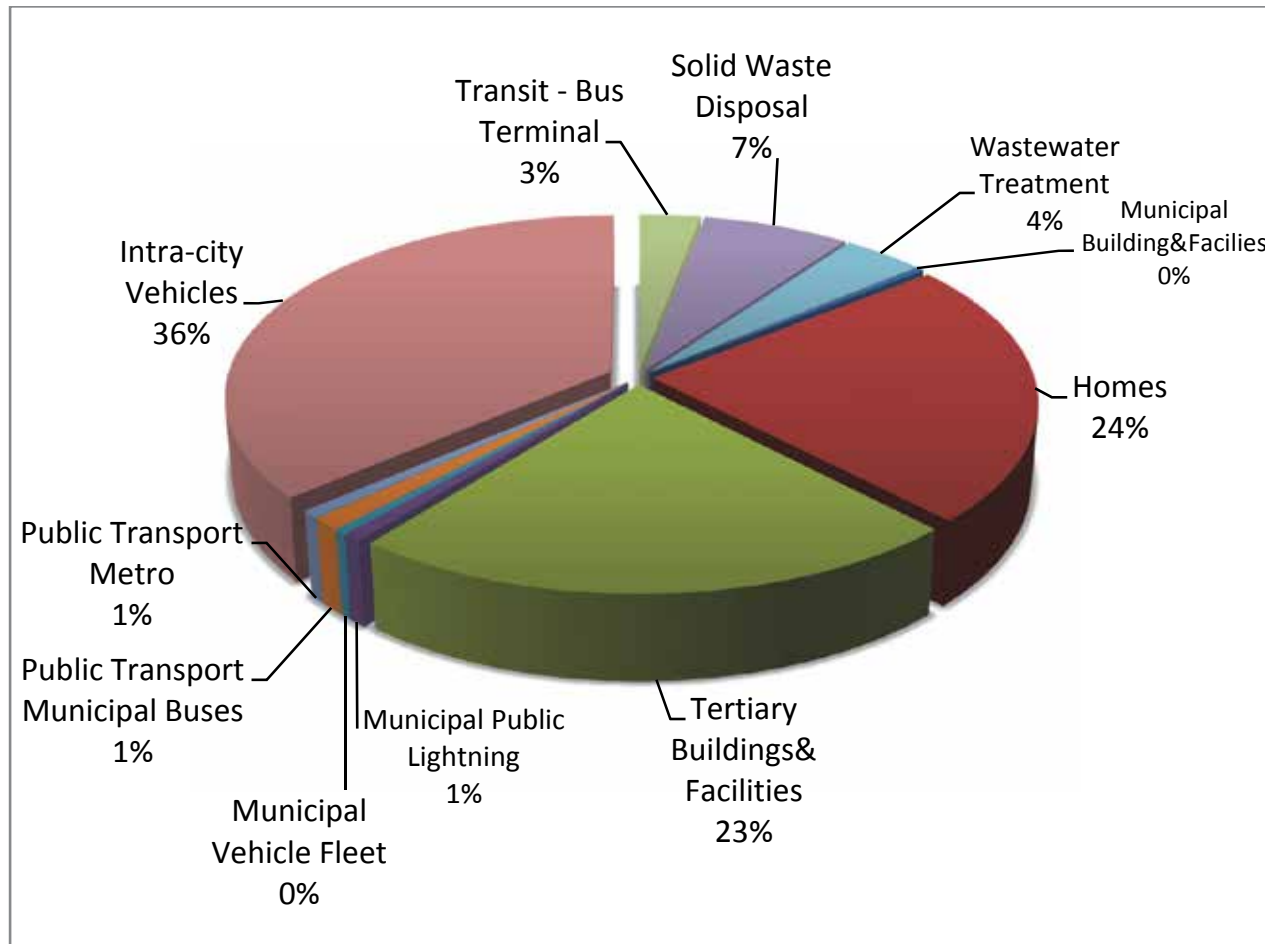


Figure 8. Çankaya Municipality's 2020 Sectoral CO2 Emissions Changes

The electricity consumption was calculated as 12.684.890,50 MWh, and the CO₂ emissions was calculated as 3,394,354,62 tons in 2015, the reference year for Çankaya Municipality. A sustainable energy action plan has been conducted within the municipal borders according to the year 2015 to be applied until 2020, and energy consumption and reduction targets for CO₂ emissions are calculated until 2020 in each category. The electricity to be generated from renewable energy sources, targeted until 2020, and the reduction in CO₂ emissions from this generated electricity are calculated as follows.

Çankaya Municipality Sustainable Energy Action Plan has been conducted under four main headings; urban development (measures and strategies for buildings), transport, awareness-raising campaigns, solid waste and wastewater management actions. No direct actions are foreseen for emissions from industry and agriculture that are included in Çankaya Carbon Footprint Inventory in line with ICLEI standards and which will not be effective in reducing the emissions of Çankaya local government

In Figure 9, it is shown by considering the population increase projections of Çankaya Municipality that if no measures will be taken how Çankaya's GHG emissions will follow a path until 2020, and an increase by more than 10% compared to the year 2015 is added to the number of homes by making emissions projection based on calculating that the urban population will be 993.221 by 2020. According to this projection, emissions will increase by 8% in 2020 to 3.654.432,50 ktCO₂e.

2,546,287,48 tons of CO₂e GHG emission is targeted by ensuring a 23% emission reduction compared to 2010 by achieving a reduction of 404,373 tons of CO₂ with the measures described in the SEAP. The reductions in greenhouse gas emissions compared to 2015 are shown in Figure 9 provided that the Sustainable Energy Action Plan (SEAP) is implemented and the proposed measures are taken.

In addition to the measures taken in the municipality's own service building, the measures taken in residential buildings (homes), and tertiary buildings apart from residential buildings (commercial and public buildings) will provide significant gains in reducing greenhouse gas emissions.

The Buildings are obliged to obtain an Energy Identity Certificate until 2017 within the context of the Energy Efficiency Law and the Energy Performance of Buildings Directive entered into force in 2008. According to the researches carried out by the Ministry of Public Works and İZODER, the number of heat-insulated buildings in Turkey, including the buildings built in accordance with TS-825 Standard, which have been built after 2000, do not exceed 5-10% in the whole country. A similar value can be assumed for the insulated residential and public buildings for Çankaya common. It is projected that 35% of the buildings located in the city will complete their facade, roof and glass insulation until 2020. The Directorate of Reconstruction and Urban Development of our Municipality encourages such practices in project approval, building control and licensing processes and controls the process.



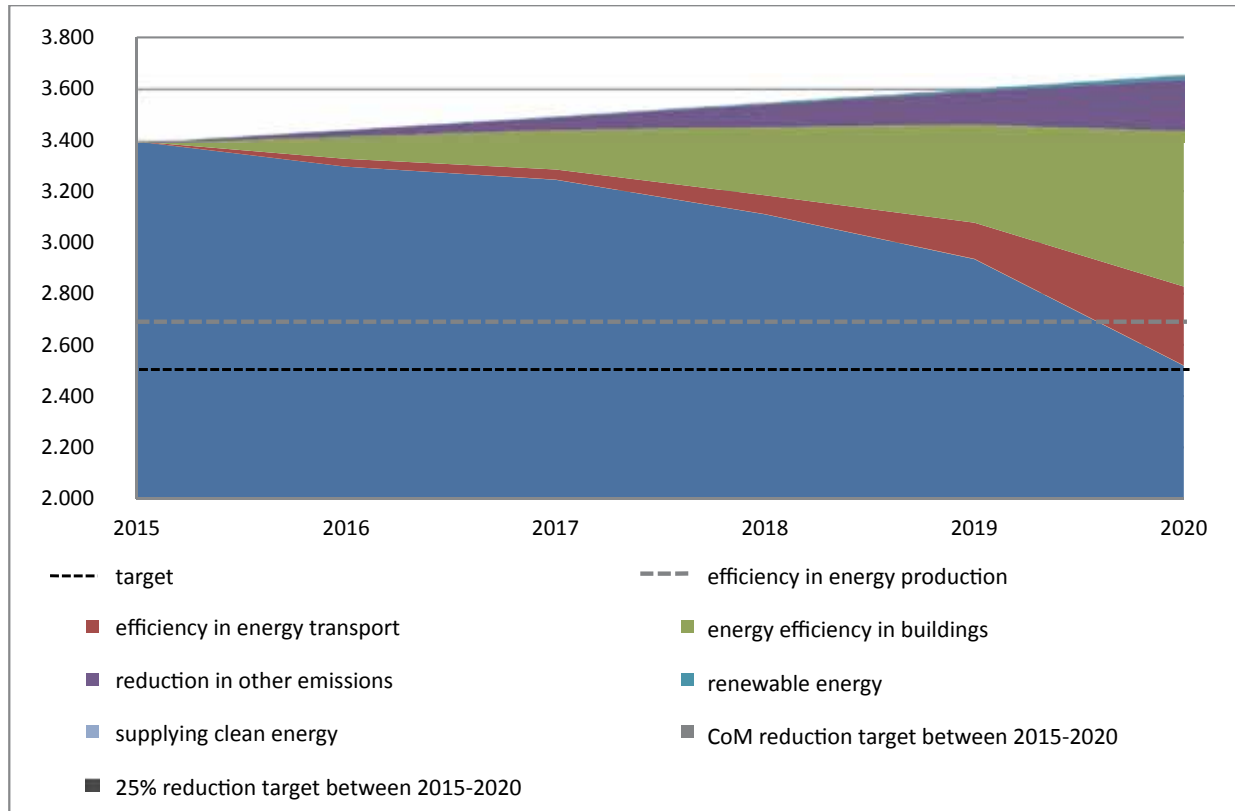


Figure 9. Çankaya Municipality's 2020 Urban Greenhouse Gas Emissions Inventory Target Scenario

6.1. PROJECTS RELATED TO THE SUSTAINABLE ENERGY ACTION PLAN

When intra-city emissions inventories were examined, it was found that the vehicle emissions that are not directly under the control area of the municipality are effective more than one-third.

On the other hand, household energy consumption, which

cannot be directly controlled, also produces emissions close to this value. Regarding these, information programs should be planned related to traffic route arrangement, behavior change, financing, education and awareness-raising programs. In addition, measures that exceed the authority limit will need to be pursued with an effective cooperation and persuasion strategy with other management units.



6.1.1. Measures and Strategies for Buildings

Energy consumption is projected to be 35% less with insulation, efficient lighting and passive measures with the construction of residential buildings, where energy-efficient, renewable energy systems will be integrated as from the design stage of the project and plan studies of the urban transformation area, and in order to achieve this reduction, about 10% of the housing costs should be spent for related implementations. A cost of approximately 7,000 TL per home is foreseen.

Various studies conducted in Turkey presented that 10-20% of all electricity consumptions are consumed for lighting purposes in homes. It is projected that buildings that begin to use energy efficient lighting systems can reduce their energy consumption for lighting purposes by 30-50%.

One of the main objectives is to reduce energy consumption in buildings located within the borders of Çankaya Municipality by reducing fuel utilization which has highly GHG effect. The followings can be taken as precautionary measures regarding buildings also including municipal buildings, residential buildings, public institutions and organizations located within the municipal boundaries.

Increasing Energy Efficiency in Municipal Buildings; reducing the amount of energy consumed in municipal buildings, contributing to the reduction of greenhouse gas emissions, reducing municipal expenses; achieving 40% energy savings.

Measures: Providing thermal insulation, energy efficient

lighting luminaires use and replacing electronic office equipment with energy efficient equipment in these buildings in order to reduce the energy consumption of the Municipality.

Stakeholders: Municipality, contractor companies.

Implementation Period: 2015-2020, the projects to be carried out will be based on the Municipality's own resources.

Encouraging Eco-Friendly Energy Resources in Residential Buildings; reducing coal consumption by 50% compared to 2020 projections, which is still prevalent in homes.

Measures: Encouraging and ensuring a changeover to natural gas or alternative fuels in order for homes using coal for heating.

Stakeholders: ABŞB, house owners, BOTAŞ, contractor companies.

Implementation Period: 2015-2020.

Energy Efficiency in Residential Buildings; achieving savings from 25% heating, 5% cooling consumption by providing thermal insulation at 35% of existing homes.

Measures: There are 79 thousand residential buildings (in 2010) located on the municipal boundaries. At least 25% of these buildings can be insulated in accordance with the standards.

Stakeholders: Residential owners, financial institutions, companies that produce and sell insulation materials.

Implementation Period: 2015-2020



Energy Efficiency in Public Buildings; achieving savings from 25% heating, 5% cooling consumption by providing thermal insulation at 25% of existing public buildings.

Measures: Encouraging insulation complying with the standards at 40% of public institutions and commercial buildings located within municipal boundaries.

Stakeholders: Public institutions, Ministry of Environment and Urbanization, Ministry of Energy and Natural Resources, financial institutions, companies that produce and sell insulation materials.

Implementation Period: 2015-2020

Energy Efficiency in Commercial and Industrial Buildings; achieving savings from 25% heating, 5% cooling consumption by providing thermal insulation at 25% of existing commercial and industrial buildings.

Since consumption of commercial and industrial buildings is higher when compared to residential buildings and because of the profit benefit, it will be easier for these buildings to be encouraged to do energy efficiency studies. In accordance with the Energy Performance of Buildings Directive, all buildings are obliged to obtain an Energy Identity Certificate and to meet the minimum requirements set by the regulations until 2017. Thermal insulation is one of the first measures to be taken in increasing the energy performance of buildings.

Measures: Encouraging insulation complying with the standards at 25% of public institutions and commercial buildings located within municipal boundaries.





Stakeholders: Households, Ministry of Environment and Urbanization, financial institutions, companies that produce and sell insulation materials.

Implementation Period: 2015-2020

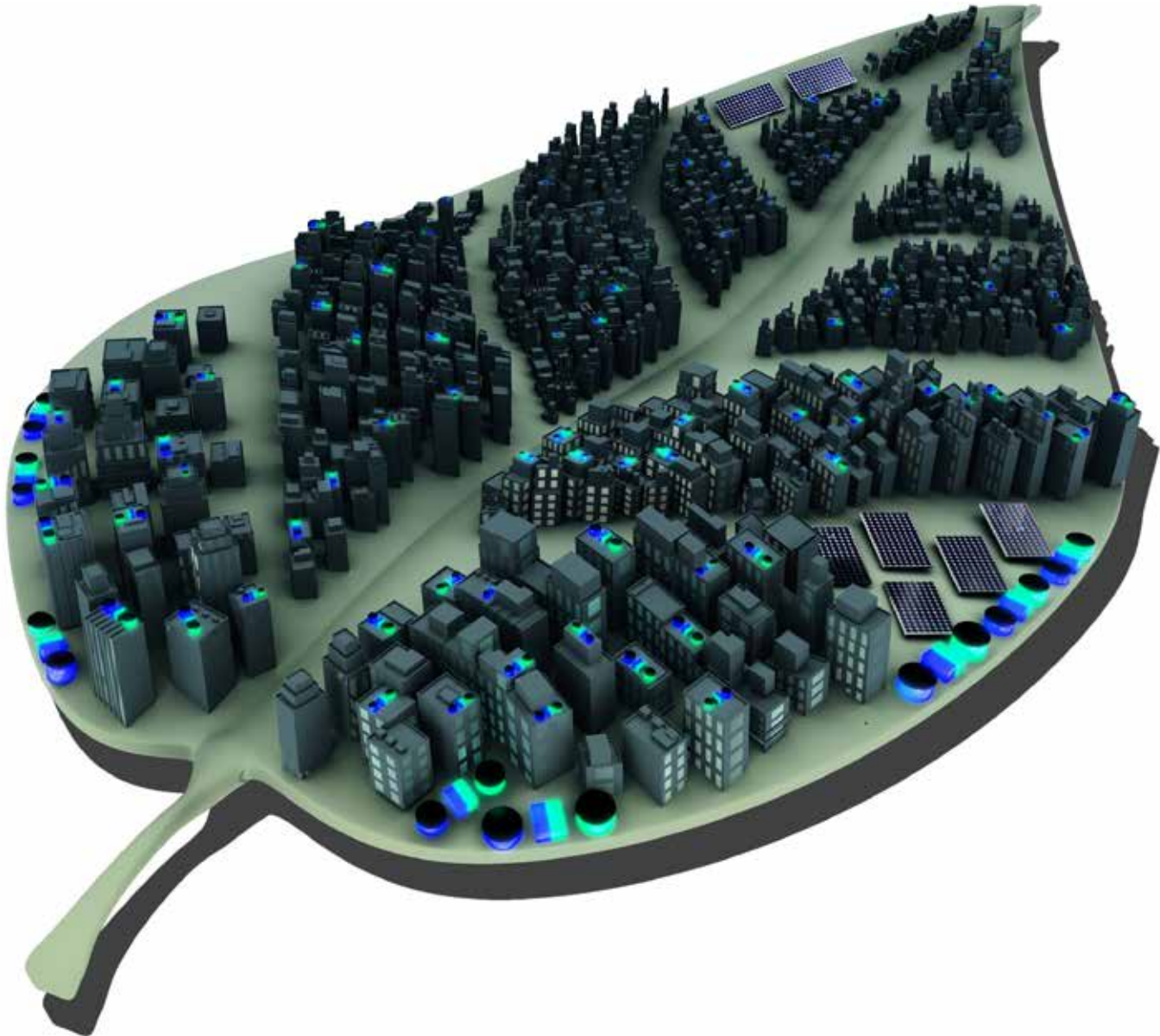
Transforming Lighting and Electrical Equipment to Energy-efficient equipment in Residential, Public and Commercial Industrial Buildings; achieving 15% energy savings until 2020 with the measures to be applied to 30% of residential and to 60% of public buildings by promoting the preference of energy efficient products by introducing the energy efficiency of white and electronic goods such as refrigerator and energy-efficient lighting supported by the lack of existing incandescent bulbs on the market and passing on energy-saving light bulbs.

Measures: Raising public awareness for the purpose of informing the public institutions and citizens about savings that can be provided with energy-efficient lighting utilization and other electrical equipment.

Stakeholders: Citizens, public institutions, private companies, Ministry of Energy and Natural Resources, companies that produce and sell energy efficient lighting and electronic devices.

Implementation Period: 2015-2020

Energy Efficient Urban Transformation in Residential Buildings; ensuring the construction of buildings in new settlements that conserve energy efficiency and renewable energy resources, and considering these while reconstructing existing buildings which are under risk and unsuitable for earthquake regulations as well.



Measures: Constructing new buildings by demolishing those which are unsuitable for earthquake regulations, encouraging and canalizing efficient energy use and energy consumption through the use of insulation and energy efficient systems utilization starting from the design phase of the buildings to be reconstructed and built as multi-storey buildings in this process.

Stakeholders: Çankaya Municipality, ABŞB, Ministry of Environment and Urbanization, Çankaya Municipality, contractors, financial institutions, citizens who will benefit from urban renewal.

Implementation Period: 2015-2020

Reducing Energy Consumption from Street, Park and Garden Lighting; ensuring the widespread utilization of motion sensor lighting equipment that will enable to achieve 10% energy savings by replacing some parts of park, garden and street lighting equipment with energy efficient lighting equipment (LED, etc.).

Measures: Replacing existing lighting equipment with LED or other new technology energy-efficient lamps.

Stakeholders: ABŞB, Çankaya Municipality

Implementation Period: 2015-2020

6.1.2. Transport

The primary reason for the increase in greenhouse gas emissions in urban transport is the increase in private vehicle ownership, namely automobile ownership, and in parallel to this, the increase in the ratio of automobile

journeys in intra-city transport. Urban people increasingly prefer motor vehicle transport instead of pedestrian journeys, and gravitate towards automobile use amongst them, hereby this situation leads to an increase in the amount of energy and generated emissions per passenger transported in intra-city transport. Automobile generates 125 times more air pollution per passenger per kilometer than bus, and when it comes to energy consumption per passenger / km, automobile consumes five times more energy than bus and metro.

Another development trends increasing greenhouse gas emissions in intra-city transport are the spatial growth of cities, the location selection of urban use in a scattered way, the development of low-density residential areas in urban periphery areas, and the increase in the average length of journeys made per person as a result of all these trends. The main factor triggering this spatial growth and scattered development in the cities is the increase in the ratio of automobile use. On the other hand, as the distances cities get around is lengthened, and when investment and planning for public transport are not carried out to the extent required, public transport becomes unable to serve effectively, hereby; long-distance pedestrian and bicycle journeys also become far from being a viable option which in turn supports and increases automobile use.

Examining public transport routes and lines, controlling the traffic flow and making speed and signalization optimizations are the measures providing energy savings



by preventing traffic congestion, which the municipalities already apply and revise according to the intensity and changes in traffic. Conducted researches indicate that carbon emissions can be avoided by up to 20%, if such measures are taken into consideration.

Çankaya Municipality, which has been organizing bicycle tours where the environment friends from all ages come together since 2015, aims to draw attention that the widespread bicycle use will be an important intra-city transport alternative leading increase in urban air quality, and decrease in noise pollution, transport costs and investments, and also in health costs in urban life.

The followings can be taken as precautionary measures to reduce fuel consumption and GHG emissions in intra-city transport.

Reducing Fuel Consumption and GHG Emissions from Municipal Fleet Vehicles; transforming the municipal fleet vehicles used for cleaning etc. to appropriate electric vehicles; replacing the appropriate buses within the municipal fleet with the buses using CNG (Compressed Natural Gas).

Stakeholders: Çankaya Municipality, vehicle companies, financial institutions, funding sources.

Implementation Period: 2015-2020

Reducing Fuel Consumption and Greenhouse Gas Emissions from Public Transport; transforming

municipal buses into vehicles using CNG.

Stakeholders: ABŞB, financial institutions, various funds (development agencies, EU funds)

Implementation Period: 2015-2020

Reducing Individual Automobile Driving Ratio of People Living and / or Working within the borders of Çankaya Municipality; making various promotions for the development of public transport habit, spreading of public transport utilization and improving the comfort of the vehicles used in public transport.

Stakeholders: ABŞB, EGO, Çankaya Municipality

Implementation Period: 2015-2020

Increasing Pedestrian Circulation with Pedestrian Axles to be Newly Constructed; designing pedestrian roads, providing integration to urban transport areas with convenient parking spaces.

Stakeholders: ABŞB, Çankaya Municipality, various funds, contractors

Implementation Period: 2015-2020

Reducing Greenhouse Gas Emissions by Decreasing Waiting Time in Traffic; examining public transportation routes and lines according to the intensity and changes





in traffic, applying traffic flow control, speed and signalization optimizations in an integrated manner with new technologies.

Stakeholders: ABSB, UKOME

Implementation Period: 2015-2020

6.1.3. Awareness-Raising and Molding Public Opinion Campaigns

Consumption habits have a great influence on energy saving. The reflection of minor changes in consumers' daily habits can be above the expectation in proportion to the size of the consumer mass. For example, consumers that keep their electrical devices in stand-by mode lead an increase between 10%-20% in electric energy consumption. So, a device remaining in stand-by for 10

hours consumes as much energy as its 1 hour working state with the most optimistic estimate.

Within the borders of the Çankaya Municipality, there are a large number of workplaces, schools and public institutions other than homes, and the behavior change in electricity consumption in all of these places can lead a significant reduction in daytime consumption. Çankaya Municipality carrying out various studies in order to expand awareness which can respond to all kinds of information needs (financing, finding an authorized company etc.), with the aim of encouraging all the measures to be taken including followings.

Promoting the Wide Spread Utilization of Renewable Energy; providing information to the citizens about the advantages of renewable energy, implementation conditions, and required permissions, and promoting the widespread utilization of renewable energy.



As a result of all these studies, it is estimated that by 2020, greenhouse gas emissions will be prevented enormously by taking measures such as replacing electrical household appliances with energy-efficient appliances, shortening stand-by retention times of those devices and with the use of thermostat valves.

Stakeholders: Çankaya Municipality, citizens, producers, contracted firms

Implementation Period: 2015-2020

Reducing Greenhouse Gas Emissions by Ensuring Energy Saving; organizing various energy-saving events and campaigns in order to influence energy efficiency behavior as a basic value among the citizens and civil.

Stakeholders: Çankaya Municipality, public institutions and organizations, schools.

Implementation Period: 2015-2020

6.1.4. Reducing Greenhouse Gas Emissions from Solid Waste and Wastewater Sources

Çankaya Municipality is responsible for collection of solid wastes, and the institution responsible for storage and disposal of solid wastes, while Ankara Metropolitan Municipality is responsible for storage and disposal of

solid wastes and disposal of waste water.

The reduction projections for greenhouse gas emissions from aforesaid wastes correspond to the values envisaged to be achieved by the work of the Metropolitan Municipality and to be obtained in coordination with the Metropolitan Municipality as well.

Recovery of Solid Waste; ensuring collection of waste pills, decomposition and separate collection of solid wastes for recycling, and recovery of vegetable waste oils. Decreasing the amount of garbage produced in Çankaya, reducing GHG emissions from the process and production-related emissions by increasing the efficiency of our municipal garbage collection.

Stakeholders: Çankaya Municipality, public institutions and organizations, and citizens.

Implementation Period: 2015-2020

Reducing Greenhouse Gas Emissions from Solid Waste Landfill; ensuring disposal of solid wastes without generating GHG in decomposition, recycling, gasification and energy production units, and supporting related works done by ABŞB.

Stakeholders: ABŞB, other district municipalities, financial institutions, technology provider companies

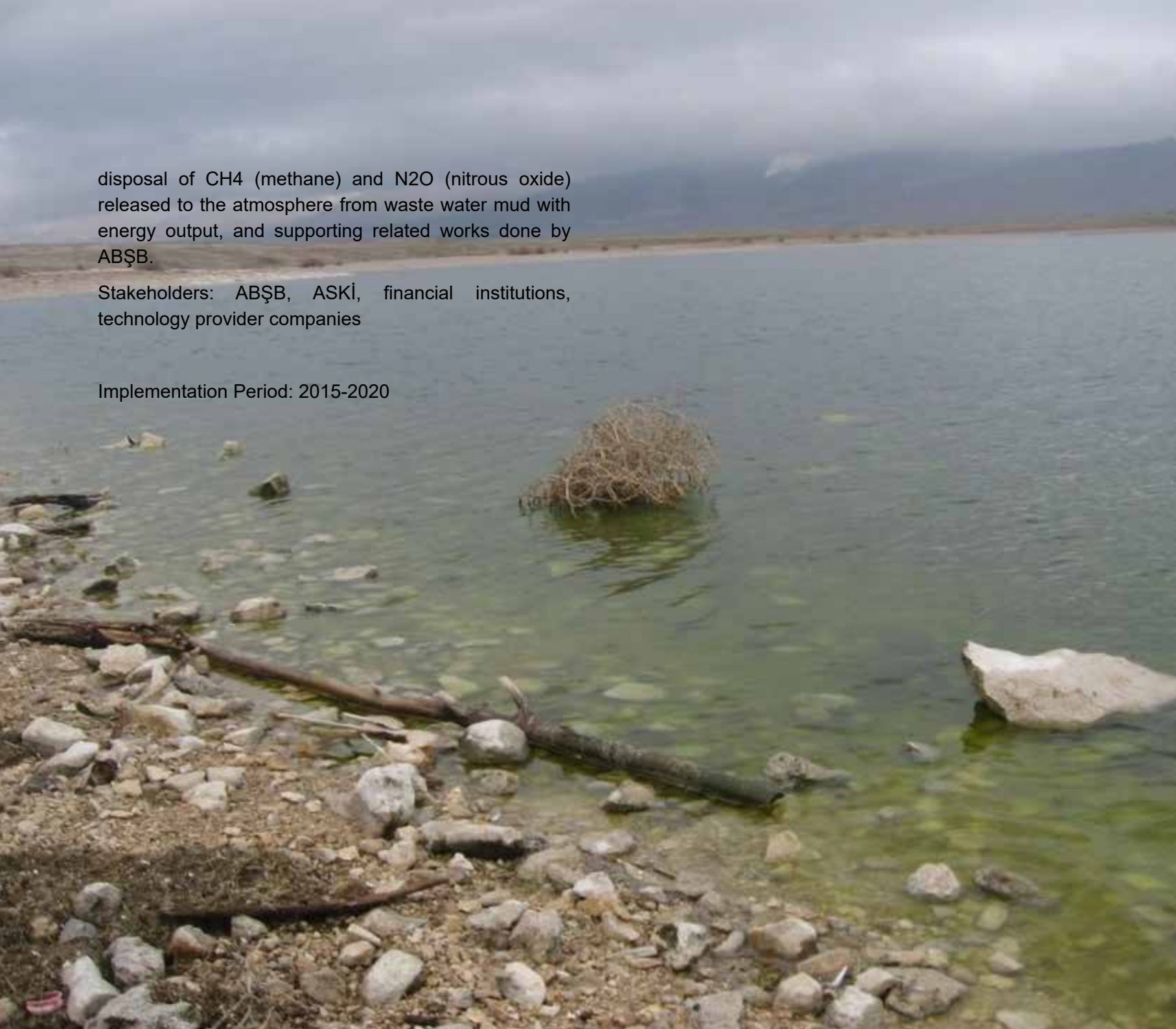
Implementation Period: 2015-2020

Reducing Greenhouse Gas Emissions from Waste Water: ensuring improvement of operating conditions,

disposal of CH₄ (methane) and N₂O (nitrous oxide) released to the atmosphere from waste water mud with energy output, and supporting related works done by ABŞB.

Stakeholders: ABŞB, ASKİ, financial institutions, technology provider companies

Implementation Period: 2015-2020





7. CONCLUSION AND EVALUATION

Çankaya Municipality has determined a political attitude in the solution of healthy urban and environmental problems by signing the Covenant of Mayors. The signing of the Covenant of Mayors involves the preparation of the “Sustainable Energy Action Plan” (SEAP) during urban and environmental planning. Thus, the plan preparation work has begun with the participation of our other relevant Directorates and specialized institutions, in coordination with the Directorate of Foreign Affairs of our Municipality. This plan expands Çankaya Municipality’s combating climate change and energy efficiency studies carried out at the institutional scale to the municipal boundaries and carries them to the district level.

The outputs of the SEAP have the feature of a step taken towards in the direction of the physical orientation of urban development within the municipality as well as integrating the field of energy planning with this development and change. One of the key features of SEAP is the social and

economic activities that define every aspect of the city and it covers many sectors. The Sustainable Energy Action Plan is a long-term planning process that aims to ensure consistency among the decision-making processes of economic actors (households, companies, public institutions, financial institutions, etc.) with the sectoral policies and trends that will lead to declines in the city’s greenhouse gas emissions.

It is natural that the expansion of the works carried out on a narrow institutional scale to a large scale like the district would bring some difficulties with it.

The data used in a metropolitan like Ankara has been obtained from both internal and external stakeholders. The role of external stakeholders is great in SEAP’s effectiveness and development. That’s why, the preparation and implementation of the plan is only possible with the participation of all stakeholders. As a conclusion, since the municipalities have limited jurisdictions, it is crucial for reaching the targets to set the internal and external stakeholders into action by notifying them during the process of completion of the plan.


Çankaya
BELEDİYESİ




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