2023

# T.C.

# MALTEPE UNIVERSITY

# CLIMATE CHANGE ACTION PLAN

maltepe üniversitesi
istanbul
www.maltepe.edu.tr

# MAU CLIMATE CHANGE ACTION PLAN (2023-2030)

# 1. INTRODUCTION

Global climate, which includes five components defined as the atmosphere, hydrosphere, cryosphere, Lithosphere, and biosphere, is also a complex expression related to the interaction of these components with each other (Türkeş 2011). External forcing factors are changes that interact with and are affected by climate systems. Volcanic eruptions include anthropogenic changes in the composition of the atmosphere through natural phenomena such as changes in the Earth and Solar system and changes involving the astronomical elements of the Earth and Sun (Türkeş 2012; Türkeş 2013). Basically, plate movements in the hard crust of the Lithosphere, solar activity, and changes in the astronomical relationships of the Lithosphere and the Sun encompass potential external causes of climate change. External forcing factors develop with factors such as anthropogenic forcing and natural events outside the climate system. Milankovitch cycles cover periodic changes caused by astronomical events and provide important data to express long-term climate changes (Türkeş 2013). Anthropogenic changes in greenhouse gases (CFC, CH4, CO2, N2O, O3, etc.) and aerosols larger than 2.5 μm can alter the amount or intensity of GUDB radiation by absorbing GUDB ground radiation and releasing less energy at lower air temperatures. The reflectivity of the Earth's surface can be altered by changes and disturbances in the land cover and vegetation, snow or ice cover, and ocean color scale. All these changes, along with natural seasonal and diurnal changes, can be controlled by human influence and activities. The global climate system tends to differ in parameters due to the 4.6 billion years of geological processes of the Lithosphere (Türkeş 2013). The climate has oscillated between climates during glacial periods with many continental glaciers or glacial shields in latitude lands, with prevailing temperatures measured on the outer surface of the planet and spanning millions of years, to warm conditions of more than 10 °C in the polar regions. Some assumptions state that during some cold periods in the past, the entire surface of the Lithosphere was covered with ice. At the Sun-Lithosphere distance, the energy level (radiative energy) emitted in the radius direction from a radiation source reaching the Sun from the Photosphere layer of the Sun has increased by up to 30% during the 4.6 billion years of the Lithosphere. A similar amplitude is observed in changes in solar radiation over short time scales. Low-frequency changes in the orbit of the Lithosphere change the amount of Solar Energy by 0, depending on the seasonal change on the surface of the Lithosphere, while the most significant fluctuations are observed over a period of 10000-100000 years. Volcano eruptions cause a general cooling in the first years of the eruption (Erlat and Türkeş 2015). Atmospheric oscillations such as AO (Arctic Oscillation), ENSO (El Niño – Southern Oscillation) and NAO (North Atlantic Emission) are important examples of internal atmospheric forcings of the global climate system (Şahin 2015; Türkeş 1998; Türkeş 2000; Türkeş and Erlat 2003; Türkeş et al. Erlat 2006; Erlat and Türkeş 2008; Erlat and Yavaşlı 2009).

Orbital strains in the orbit of the Lithosphere affect the distance between the Lithosphere and the Sun. Astronomical calculations control the seasonal and latitudinal distribution of insolation, periodic changes in the outer center of the Lithosphere (Türkeş 2013). Possible past and future changes in sun exposure can be calculated with a high level of confidence over a period of millions of years. The annual average amount of energy of the Lithosphere is low when the orbital feature of the Lithosphere is round and increases with eccentricity, resulting in

minimal differences in the annual average amounts of radiation received by the Lithosphere when changes in eccentricity are relatively small. Seasonal changes in solar radiation caused by motion during small changes in orbit are not as great as during larger eccentricity processes, as they did about 40,000 years ago and may happen in the next 100,000 years. On-time scales of 10000 years, as the axial tilt of the Lithosphere increases, seasonal energy levels change and strengthen temperature contrasts, resulting in colder winters and hotter summers in both hemispheres. When the slope of the Lithosphere decreases, a decrease in the severity of the seasons is observed, which causes the summers to be cooler than expected and the winters to be mild (Türkeş 2013).

Over millions of years to the present, the axial tilt of the Lithosphere has ranged from ~22.5° to 24.5°, with an average semi-periodicity of ~41000 years. The increase/decrease of the axis slope causes an increase of a few W/m2 over the annual average insolation and high latitudes. In contrast, it causes a smaller decrease at the Equator, but has no significant effect on the average insolation on a global scale (Türkeş 2013). When the polar summer is long, the Lithosphere is closer to the Sun. When the polar winter is longer, and farther from the Sun, it is warmer in the Northern Hemisphere in summer and colder in winter. There is an increase in opposite energy and temperature between seasons. When the Lithosphere is close to the Sun during the long polar winter, the climatic motion value will vary between -0.05° and 0.05°, where the winter months will be warmer than expected, and the seasonal contrast in the Northern Hemisphere will be smaller, which is more than 20 W/m2 at all latitudes. will cause much variation. Therefore, climate action is more influential on insolation changes in low and mid latitudes.

Consequently, the motion can be termed equivalent to the quasi-periodic changes or motions of the Lithosphere at the time of its emergence, with a quasi-periodic cyclicity of ~19000-23000 years. The length of the seasons, the differences in orbit determine the latitude and seasonal spread of sunbathing (Türkeş 2013). Climate change, which is one of the most important agenda items in the world today, is caused by human activities. Climate change is defined as human activities, directly or indirectly, that alter the composition of the global atmosphere in addition to natural climate change observed over comparable time periods (UN 1992).

It is emphasized that climate is a phenomenon that has been influencing since the 1850s. After the industrial revolution, it is observed that there is an increase in the accumulation of greenhouse gases in the atmosphere due to human influence. The accumulation of anthropogenic greenhouse gases in the atmosphere continues to increase since the industrial revolution. When the accumulation amount of greenhouse gases, the level of increase, especially the accumulation density of greenhouse gases in the atmosphere, the rate of increase, the life span of 50-200 years, the absorption property of infrared radiation is also calculated, the absorption of most of the infrared ground radiation, the soil-cured suffix of CO2 is very fast. is increasing somehow. When examining the time series of CO2 accumulation, the Industrial Greenhouse effect means that the greenhouse gases (water vapor, CH4, CO2, N2O and O3) on the surface of the Lithosphere are powered by the natural greenhouse effect, which is defined as a global device that has been operating for hundreds of millions of years to the present day.

Since the industrial revolution, global climate change can be defined as the increase in temperature due to the natural greenhouse effect, including urbanization, the increase in greenhouse gases released into the atmosphere by increasing human activities for the consumption of fossil fuels, and the destruction of forests. The main reason for the greenhouse gases released into the atmosphere is the use of fossil fuels for various purposes. Deforestation, change in land use, urbanization are other main causes of climate change (Desonie 2008). There is a relationship between climate change and energy use, environmental necessity, human settlement patterns, transportation and industrial infrastructure (Hardy 2003). There is a reciprocal relationship between climate change and forest fires. Both climate change forest fires and forest fires are a phenomenon that increases climate change. According to the IPCC (2021) report, even in the most favorable scenarios regarding climate change, the increase in global surface temperatures will continue until the middle of this century. This increase indicates that more attention should be paid to the relationship between temperature and wildfires (IPCC 2021). Even the data presented by EFFIS (European Forest Fire Information System) for the year 2022 clearly reveals the relationship between temperature and forest fires EFFIS (https://effis.jrc.ec.europa.eu/apps/effis_current_situation/). According to the current and forecast projections based on the RCP4.5 scenario presented by MGM (General Directorate of Meteorology), the expected conditions in Turkey by the end of the century are MGM (https://mgm.gov.tr/veridegerlenen/sicaklik-analizi.aspx). While the temperature is expected to be around 20ºC in 2016-2040, it is expected to be 2-30ºC in the Marmara Region and Black Sea region in the summer season. It is predicted that precipitation will be observed in the Aegean part, in the Black Sea region and in the Anatolian Region during the winter months, and in the spring months or in the Aegean region excluding the Anatolian Region and Anatolian Region, it will tend to decrease by 20% in a significant part of the country.

Between 2041 and 2070, it is expected to rise to 40ºC in summer, and to be around 2-30ºC in spring and autumn. While a 20% decrease in winter precipitation is expected in the Central and Eastern Regions of the Mediterranean and Southern Anatolia Regions, and a 30% decrease in summer precipitation in Anatolia; In some parts of the Aegean Region and Central Anatolia Region, a decrease in autumn precipitation is expected throughout the country. While a temperature increase of 20ºC in winter and 30ºC in spring and autumn is expected between 2071-2099, decreases of up to 40% will be observed in the summer season of the region, excluding temperatures exceeding 40ºC, excluding the Aegean part and Southern Anatolia. It is calculated that there will be a decrease in almost all dormitories in summer or autumn. M-K (Mann-Kendall) sequence coefficient method is applied in long-term time series to detect trends in MGM's climatology and weather station data (Sneyers 1990; Türkeş et al. 2002). Considering the homogeneity, continuity of the data, and the acceptability of the maximum 5% deficiency in the monthly recorded data (Türkeş 1998; Türkeş 1996; Türkeş 1999), the monthly average of the air temperature and the statistical analysis of the total precipitation trends, and the data obtained from 138 stations were evaluated for the significance test.

Due to detailed homogeneity and randomness analyzes (Türkeş et al. 2002), time series from 70 meteorological stations belonging to the longest temperature observations in Turkey were used to determine the trends in the average of maximum and minimum air temperatures. Although analyzes were performed for seasonal and annual sequences for all data, seasonal and annual Mann-Kendall results were given for the sums of air temperature and precipitation

averages, and only annual M-K results were given for the average of the lowest and highest air temperatures. According to the data of the M-K trial in Turkey, statistically significant warming trends are observed in the Mediterranean Region. As for the cooling trends, it is seen to be statistically significant in the inner and western parts of the Black Sea Region. Average air temperatures in the spring, except for a few stations, the air temperature tends to increase in a very large part of Turkey. The warming trends are mostly at 1% importance in the Istanbul region, where urbanization is rapid and widespread and urban heat island effects are concentrated, in the coastal areas of the Mediterranean and Aegean Regions and in the Southeastern Anatolia Region, and they are climatically interesting. According to the time series analysis data, the observed warming trend gained momentum after 1980, regardless of urbanization levels, and turned into a remarkable warm period with a significant jump in the last 20 years. When averaged over a long period of time, it tends to shift to a period of warmer conditions (climate change signal), observed at some stations in the mid-1980s and some stations in the early 1990s. Average temperatures tend to warm mostly during the autumn period. While the cooling trend observed in some stations is statistically significant in only one station, the observed warming trends provide statistically significant data at a significant level such as 1% in the Mediterranean, Aegean and Central Anatolian Regions.

According to the data of the studies conducted for the temperature trends observed previously in Turkey, it is seen that the annual average temperature warming is getting stronger day by day, the warming trend is observed in a large part of the stations except for a few stations showing a decreasing trend, and most of the stations are statistically significant. Statistically significant warming signals show very clear field consistency. All these results, among others, show that global climate change/warming, one of the most obvious and relatively easily identifiable consequences of global climate change, including anthropogenic factors, is effective in Turkey. It has been determined that the drought process, which increased its impact on a wider area as of 2012 and intensified in the summer of 2013 in a part of the Central Anatolia Region and Eastern Anatolia Region, was effective in a significant part of Turkey in the first 6 months of 2014 (Türkeş 2014; Türkeş). and Star 2014). Short-term changes and long-term fluctuations in regional precipitation are a defined feature of semi-arid and arid land. Precipitation levels in the Sahel and Sahara (Africa) have declined greatly since the 1960s. Although similar dry periods have been observed in the Quaternary geological period (the most recent geological period) and in the historical past, it has been noted that the last dry period in the Sahara is more prone to a dry period on the mainland scale. Long-term decreasing trends in precipitation and significant drought have been effective in the subtropical belt and Mediterranean Basin, including Turkey, since 1970 (Türkeş 2013; Türkeş 2008, Türkeş 2014; Türkeş 2014).

It is seen that the seasonal and annual precipitation trends observed in Turkey are not as severe as the trends observed in air temperatures. As in many parts of the world, changes in precipitation can be characterized as significant changes in the frequency and magnitude of dry and rainy periods rather than long-term trends (Türkeş 1998; Türkeş and Erlat 2003; Türkeş 2013; Türkeş 1996; Türkeş 1999; Trenberth 2007; Trigo 2006; Türkeş 2011, Türkeş and Erlat 2005; Türkeş and Tatlı 2009; Türkeş et al. 2009; Türkeş et al. 2009). The spatial variability of precipitation changes is also on a strong scale. Mediterranean, Aegean, Marmara, Southeastern Anatolia and Central Anatolia regions were most affected by this drought trend mentioned in Turkey. In today's world, where the relations between countries are increasing and complex, it

has become mandatory for governments to regulate these issues, to set certain standards, and to monitor issues with global effects such as environmental pollution and climate change. Turkey is a party to the "United Nations Framework Convention on Climate Change" and the "Kyoto Protocol", which directly regulate the issue of global climate change. Turkey has signed but not yet ratified the Paris Agreement, and although it does not directly cover the issue of climate change, it has also been included in some environmentally focused international agreements on combating climate change. Within the framework of the obligations arising from the agreements, Turkey's elements of combating climate change and the policies deemed appropriate, the contribution of the climate change policy to the international global emission reduction efforts due to common but differentiated responsibilities within its relative capacity and not hindering the sustainable development and socio-economic development of all countries are discussed and this approach is a must.

At the global and national level, as at the local level, at the beginning of the fight against climate change, mitigation policies and practices for these policies have been at the forefront. Considering that the greenhouse gas that causes climate change in cities has a significant share in the amount of emissions, this is normal, but it is normal to say that other complementary components are neglected in the fight against climate change. Adapting to the effects of climate change in cities brings along a strategic planning situation that integrates all planning elements, especially spatial planning, and this issue has an inevitable place in regional climate action planning. While the results of mitigation actions are not immediate, they are global benefits. Adaptation activities can be seen both in the short term and in the long term and can have direct benefits at the local level. Local policy choices have gained importance in integrating the struggles related to climate change. Activities to reduce greenhouse gas emissions in cities are important opportunities to adapt to the effects of climate change. The fact that a city is a 'green city' in the process of combating climate change provides direct benefits in achieving sustainable urbanization goals.

In terms of the integration of all social, economic and environmental factors, it is known that local climate action plans have been prepared and continue to be prepared for hundreds of cities around the world whose urban development has been completed. Being in the early stages of the preparation process can provide opportunities to multiply activities related to reducing urban emissions and adapting to impacts more quickly. Within the scope of the first-generation urban climate action plans, it contributed to the initiation of emission measurements in cities, the institutionalization of local governments in this area, and the awareness of the public about the individual fight against climate change. Many of these plans only cover GHG emission reduction targets and actions and do not cover a program to adapt to the effects of climate change. In the coming period, second generation climate action plans will be put into effect, which will address adaptation policies at the city level and allow the integration of mitigation and adaptation interventions. It has been reported that even if the programs to reduce greenhouse gas emissions are continued and the increase in emissions is completely prevented, the negative effects caused by climate change will continue to increase.

# 2. CLIMATE CHANGE ACTION PLAN OF MALTEPE UNIVERSITY

With multi-stakeholder partnerships and collaborations, which are an important element of sustainable development, it is aimed to contribute to regional development and finally to global development along with institutional development. It is among the most important actions of development, together with the sharing and reproduction of the experience of institutions in using the knowledge, expertise, technology and financial resources gained while reaching their development goals, new business and project development activities, and announcing the experiences and outputs of partnerships. Encouraging and supporting public-private and non-governmental partnerships in Turkey and in the world comes to the fore in this regard, and universities, which are the centers of R&D, innovation and education, are usually given the task of pioneering these structures.

With the Paris Agreement, which is a worldwide joint action against climate change, which is the biggest problem facing global development, and global warming, it has been emphasized that the future is common, and it has come to the fore that all countries of the world should act jointly on this issue. In this context, Turkey, which signed the Agreement in 2021, declared that it would contribute to reducing emissions and keeping the temperature rise below 1.5 degrees with other countries in the world, and started working to determine its actions with the target of net zero emissions by 2053.

Maltepe University (MAU), which has been carrying out educational and research and development activities for 25 years, has a vision to reach international education, training and research excellence with the education and training it provides in order to raise individuals who contribute to the needs of society and national competitiveness.

To be a leading university in education and research, to adopt diversity and diversity, open to change and innovation, to maintain a culture of research and to dominate critical technologies with the cooperation of Public-University-Industry, and to provide innovative solutions for administrative activities, R&D studies, academic activities, national and international projects are carried out within the scope of sustainability. In addition, MAU supports the economic, social and environmental development on a global scale by taking an active role in the growth of the society in which it is located in line with the objectives of sustainable development. In this context, all activities are carried out within the framework of environmental sustainability principles; Circular solutions that protect the environment and human health are used in activities. While aiming to provide an environment with low carbon intensity and high quality of life to all employees, students, and stakeholders, and to integrate their own policies into national and international climate change policies, active participation in resistance, mitigation, and adaptation activities against the negative effects of climate change is ensured. Energy efficiency is expanded, and clean and renewable use of energy resources is increased.

Maltepe University's overall climate change and resistance to global climate change, adaptation, and mitigation policies are as follows:

• Designing processes based on disaster resilience and coping with them,

• Organizing effective activities within the scope of combating and adapting to climate change; To contribute to the R&D and innovation capacity needed in this regard in scientific studies,

• To take part in national and international projects in order to reduce the negative effects of global climate change and adapt to these effects,

• To prefer applications and technologies that will reduce greenhouse gas emissions and increase carbon capture in activities,

• Protecting natural life, soil, water, air, vegetation and biodiversity and raising awareness of students, employees and all stakeholders on this issue,

• To raise awareness and sensitivity to all stakeholders such as the public, private sector, non-governmental organizations, starting from their own employees and students, on issues such as combating climate change, resilience to disasters, reducing greenhouse gas emissions, adapting to climate change, and thus increasing public awareness on this issue.

Within the framework of these policies, it is committed to reaching "100% Clean Energy" by 2030 and "Zero Carbon" by 2050 by determining actions to achieve targets for sustainable environmental management.

With the increasing population, developing technology and production in the world, the need for energy is increasing and the energy need is mostly met from fossil fuels. The increase in environmental impacts caused by the use of fossil fuels and the depletion of natural resources day by day make it necessary to turn to renewable and clean energy sources. In this context, a series of actions and plans are being made in international platforms such as the UN Sustainable Development Goals, the EU Green Consensus and the EU Circular Economy Action Plan.

In Turkey, within the scope of the National Energy Efficiency Action Plan, 55 actions were defined in 6 categories, including buildings and services, energy, transportation, industry and technology, agriculture and horizontal issues to be implemented between the years 2017-2023, and the percentage of primary energy consumption of Turkey in 2023 was defined. 14 reductions are targeted. This reduction is expected to save 23.9 million tons of oil equivalent (MTEP) cumulatively with an investment of $10.9 billion.

Maltepe University has determined its energy efficiency policy in order to contribute to the decrease in national energy intensity indices and increase of energy efficiency indices, and to meet the energy need from more renewable energy.
According to this;

• To design applications and technologies that will minimize energy consumption and to plan processes in a way that minimizes energy needs,

• Contributing to the reduction of energy-related emissions;

• Making more use of renewable energy sources and establishing a sustainable energy management system,

• Developing cooperation with different stakeholders and carrying out projects on clean production, zero emission alternative fuels, energy storage, energy efficiency, renewable energy

• To prefer clean production technologies in processes, to use energy efficient and renewable energy materials,

• To encourage the efficient and smart use of energy, to contribute to the increase of awareness and sensitivity on this issue,

• To design buildings and buildings based on minimum energy use and to bring them to national and international energy efficiency standards with efficiency-enhancing practices,

• To carry out R&D studies on issues such as clean production, zero emission alternative fuels, and energy storage, and to contribute to the development of the industry in this regard.

These are the basic policies determined by Maltepe University to reach "100% clean energy" by 2030.

## 2.1. EDUCATION

Maltepe University carries out its scientific activities in cooperation with institutions from all over the world. Technical and vocational education is provided to students by offering courses such as climate change, solar energy technologies, energy storage systems, and energy efficiency at the Faculty of Engineering and Natural Sciences and Graduate Education Institute of Maltepe University. Since 2019, research and development studies on climate have been carried out at MAU. Articles are published in international journals and books with high impact factors. Projects on climate change are being prepared.

By 2023, it is planned to provide administrative and academic staff with various trainings on climate change, waste management, zero waste, water saving, energy efficiency. It is planned to carry out practices aimed at raising awareness and informing students and other stakeholders on the campus on environmental management issues. Organizations are planned for more information sharing and transfer of experience on climate change with the participation of

different institutions from not only the direct stakeholders but also from the regions where the campus campuses are located, from Istanbul, Turkey and the world.

## 2.2 ENERGY AND ENERGY EFFICIENCY

The main energy needs of Maltepe University, both in its buildings and in its gardens and parks, which have a significant size, arise from heating-cooling and lighting. Some of the energy needs are met from natural gas and some from electricity. Monitoring energy consumption is one of the first steps required to implement energy management policies and to create the necessary actions in line with the determined targets. Total electricity consumption at the University is controlled and monitored by transformer-based software. In addition, electrical energy consumption is monitored with the building management system used in some of the buildings. Efforts to reduce the need for energy by using the required energy in the buildings, parks and gardens of the University in a more efficient way continue, increasing every year. Building designs in Maltepe University buildings are designed to minimize energy consumption; Natural lighting windows have been widely used in order for the buildings to benefit from daylight at the maximum level. Energy-efficient products are preferred in electrical and electronic devices, it is planned to use automatic systems to save on lighting, to realize LED conversion in all garden lighting, and to provide LED conversion in 40% of the lighting in buildings. It is planned to conduct an energy survey covering all buildings and to carry out electrical, mechanical and thermal measurements of the buildings. According to the survey study, it is planned to certify MAU buildings according to their energy performance. It is planned to carry out Energy Identity Certificate (ECB) studies for the current energy performance of the buildings. After the electrical, mechanical and thermal measurements of the buildings, possible energy efficiency measures will be determined and the savings and emission reductions that each measure will provide will be calculated.

Within the scope of the "Communiqué on Granting Authorization Certificates to Institutions and Organizations to Carry out Energy Efficiency Services", which was published in the Official Gazette dated July 25, 2012 and numbered 28365, for the authorization certificate required for MAU to conduct applied training and to authorize companies, T.R. Application to the Ministry of Energy and Natural Resources; In this context, it is planned that faculty members will receive study-project certification trainings. Taking into account the course contents and subject headings defined by the Ministry, it is planned to define a faculty member as an educator for each subject and to prepare training documents for the relevant subject titles. Thus, thanks to these efforts to promote energy efficiency, the savings in buildings and the smart use of energy at the University provide an important impetus to reach the "100% clean energy" target by 2030, and contribute to the prevention of energy-related emissions. In addition, the renewable energy systems implemented at the University play an important role in zeroing these emissions.

## 2.3. TRANSPORTATION

In order to minimize carbon emissions on the Maltepe University campus and to reach the "Zero Carbon" target by 2050, it is aimed to reduce and zero emissions in the field of transportation, as well as the investments made in the fields of infrastructure and energy.

The development focused on easy transportation is adopted with regular services on the campus-metrobus line of the University. Individual vehicle use is reduced with personnel service between residential campuses. Students, staff and other stakeholders are encouraged to use public transport as the university campus is easily accessible by public transport. Emission-reducing practices are planned with regulations such as charging fees for fossil fuel vehicles at the entrance to the campus. Ensuring effective, safe and shorter movement within the campus; For the safety of pedestrians and vehicles, it is planned to create a "Traffic Booklet" on the Maltepe University campus and present it to the users at the campus entrance.

Accessible transportation is provided by rearranging building entrances, pedestrian paths and parking lots within the scope of the barrier-free campus. Within the scope of MAU, it is planned to take measures to reduce on-campus emissions with improved pedestrian and bicycle path infrastructure, bicycle rental and regular bicycle parking areas. In addition to reducing traffic, noise and pollution, the focus is on micromobility with the goal of creating more sustainable, improved and environmentally friendly mobility within the campus. In this context, electric scooters suitable for on-campus use of personnel and electric scooter rental points for the use of students and other stakeholders are among these studies. With the further development of micromobility initiatives, it is foreseen that a reduction in emissions will be achieved, it will be supported to reduce the carbon footprint and it will make a significant contribution to carbon neutrality.

## 2.4. WASTE MANAGEMENT

With the increasing population and consumption, the amount of waste generated is increasing, and the environmental effects of waste are becoming more evident. On the other hand, the protection of natural resources, which are depleted every day, is possible by turning to alternative resources and returning more waste to the economy with different material designs. In this context, international actions such as the EU Circular Economy Action Plan and the EU Green Consensus, as well as national regulations such as Zero Waste, National Waste Action Plan, are important steps taken to help reduce the generation of waste, recycle more waste and bring it into the economy.

Maltepe University, which handles all its scientific, technological and social activities within the framework of environmental sustainability, turns to circular solutions that protect the environment and human health. It is planned to create an effective, accurate, comprehensive, efficient and highly participatory waste management model on the university campus, to implement a waste management system supported by appropriate infrastructure and

technologies, and to create waste policies with a "zero waste" vision. The prominent points in the waste policies determined by the University are as follows:

• To give priority to the prevention of waste generation, reduction and reuse of waste in order to use resources efficiently in all processes, and to raise awareness and sensitivity to employees, students and relevant stakeholders by taking into account the principles regarding this.

• To take the necessary measures for the wastes that do not harm the environment and human health, and to create the necessary infrastructure and zero waste system to cover all types of waste.

• By ensuring that the wastes are separated at the source, to bring them into the circular economy with both material recovery and energy recovery.

• To use the most environmentally friendly solutions while collecting waste separately at the source, temporarily storing, accumulating and transporting; To prefer methods that will not pose a risk to water, air, soil, plants, animals and people, that will not cause discomfort through noise, vibration and odor, that will prevent the natural environment from being adversely affected and that will not harm the environment and human health.

• To create awareness and awareness for the development, dissemination, effective implementation and maintenance of the zero waste management system,

• To take part in national and international projects on more effective and efficient waste management and the development of innovative approaches to waste, and to develop projects with a high multiplier effect.

• Reducing emissions from waste and the effects of waste on climate change; prevent possible waste-related disasters

• To design all activities by using more durable, reusable and recyclable clean technologies where natural resources are used as little as possible.

With the zero waste management system to be created in the light of these policies, it is foreseen that all wastes will be managed at Maltepe University. Within the framework of these policies and plans, it is aimed to obtain ISO 14001 Environmental Management System Certificate and Zero Waste Certificate. It is planned to create zero waste units in the building corridors and classrooms so that the domestic wastes generated on the MAU campus can be collected. It is planned to separate the recyclable wastes collected separately into their fractions at the municipal recycling facilities and thus to be sent to the processing facilities in the relevant sector to be brought into the economy. It is aimed to obtain a "Zero Waste Certificate". In addition, it is planned that the twig wastes from the campus gardens and parks will be collected in the grass waste collection area and directed to the IBB Compost and Recycling Facility. On the other hand, some of the biodegradable wastes from the cafeteria and the grass and green

wastes collected from the garden are planned to be used in the compost unit in order to convert them into compost product as a soil conditioner. It is planned to use the parts of the cafeteria waste suitable for animal food as fodder for the animals in the campus garden. It is planned to deliver the vegetable waste oil from the cafeterias, cafeterias and restaurants on the campus to the licensed vegetable oil company contracted by the local government.

In addition to the MAU household waste, it is planned to collect and manage the hazardous wastes, especially the result of laboratory and R&D activities, separately from other wastes. It is planned to prepare a hazardous waste management plan. It is planned to inform the units at the University about the collection method of hazardous wastes and to send the hazardous wastes to the disposal facility without adversely affecting human and environmental health. Similar to hazardous waste, waste electrical and electronic equipment (WEEE) and waste batteries are planned to be collected separately at the source. It is planned to place separate collection boxes for waste batteries at busy points such as cafeterias, cafeterias, main entrances, collect them by the local government and deliver them to the TAP Association, the authorized organization for waste batteries. It is planned to deliver WEEEs to the Mechanical Chemistry Institute, which is a licensed recycling company for the public.

## 2.5. WATER MANAGEMENT

According to the United Nations data, 55% of the world's population lives in urban areas and this rate is expected to increase to 68% by 2050. Due to the increase in population, urbanization and greenhouse gas emissions, the world temperature has increased by 1.5 degrees, causing a change in the water balance and cycle in cities and increasing water-related disasters. Since Turkey is located in the Mediterranean Basin, which is determined as the hot spot of climate change by the International Climate Change Panel, the impact of climate change is expected to be in the form of heat and drought.

While Maltepe University carries out its activities within the framework of environmental sustainability principles by contributing to the effective use of water against global warming and drought on a global and national scale, it primarily considers the continuation of the natural cycle of water in order to protect natural water areas and maintain the existence of its unique green areas. In particular, it is aimed to "design and implement effective, efficient and inclusive water management" in order to prevent all kinds of marine pollution caused by terrestrial activities and to reduce its negative effects, to support the resilience of marine and coastal ecosystems, and to manage and protect existing ecosystems sustainably.

The basic water management policies created in this context are as follows:

• Designing activities in a way that protects existing water resources, maintains biodiversity and does not cause pollution in the surrounding seas.

• To plan effective, efficient, inclusive and sustainable water management and to increase awareness and participation in water management, protection and sustainable use of oceans, seas, lakes, rivers and marine resources

• To disseminate good practices in the prevention of water pollution by developing cooperation and projects in national and international fields.

• Preferring water and energy-efficient technologies as much as possible in water management

• Prioritizing the most environmentally friendly technologies and the use of surface water resources

• To use methods that will prevent the natural environment and water areas from being adversely affected and that will not harm the environment and human health.

• To reduce the generation of wastewater, to minimize the processes that may cause water pollution.

• Based on the recycling and reuse of water

• Choosing options that minimize energy use and costs arising from water management

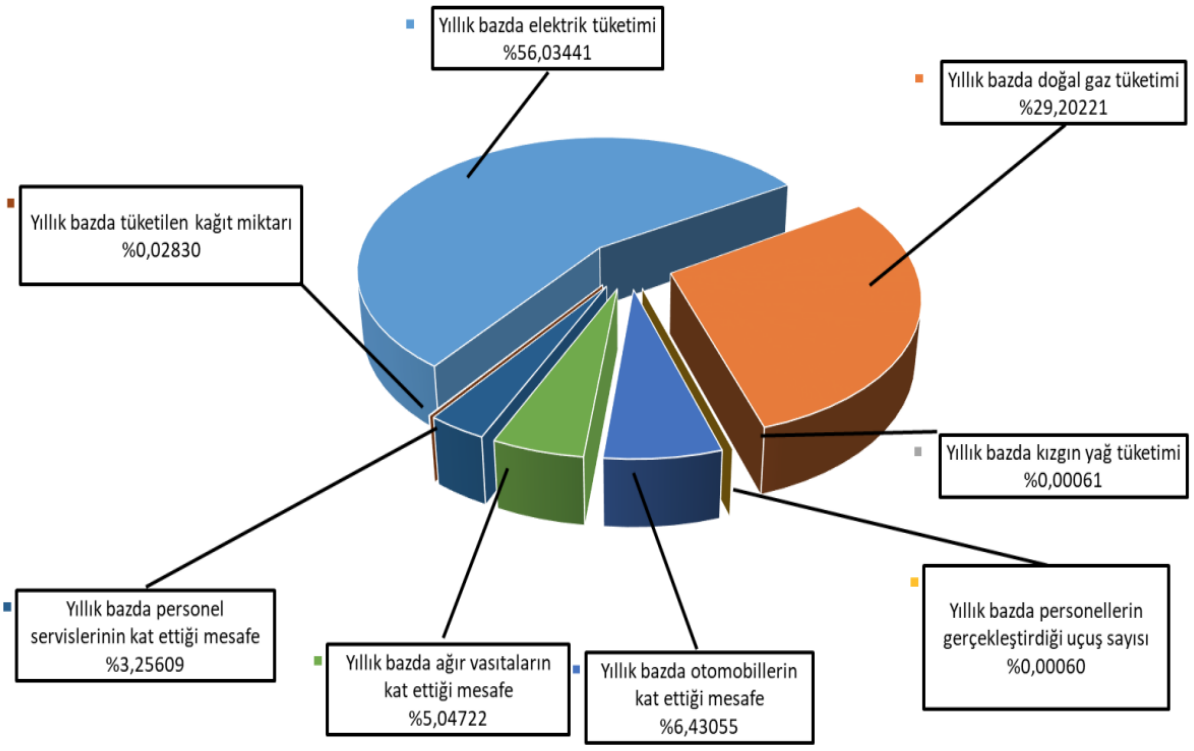
• Measuring and monitoring the aquatic and environmental impacts of waste, water and energy management activities such as eutrophication and resource consumption

Maltepe University, located in a metropolis like Istanbul, Turkey's largest city with the highest population density, contributes to the efficient use of water, the protection of water resources and the least impact on water cycles in Turkey, which is located in the semi-arid climate region, with these policies, with sustainable water management contributes.

Water supply at Maltepe University campus is provided through city mains water. City mains water is used in wet areas in buildings and campuses. It is also used for the irrigation of green areas. It is planned to create rainwater collection tanks within the campus. In order to increase efficiency in irrigation, it is planned to use smart systems with economic and weather forecasts, rain and wind sensors. On the other hand, it is planned to apply water-friendly preferences such as sensor faucets in order to use water efficiently in buildings and to attach warning labels to water usage points. It is predicted that this energy saving, which is achieved by making water supply from alternative sources, will also cause less carbon dioxide emissions.

# 3. MALTEPE UNIVERSITY CARBON FOOTPRINT

"The carbon footprint of Maltepe University" was researched by Maltepe University Environment and Energy Technologies Application and Research Center (ÇEVENTAM). In the research, greenhouse gas emissions caused by energy consumption (electricity consumption and natural gas consumption on a yearly basis) in the university campus, greenhouse gas emissions caused by transportation (the number of flights by the personnel and the distance traveled by the university vehicles on a yearly basis), and waste (A4 size paper consumption and consumption of hot oil resulting from the preparation of food products). The carbon footprint of Maltepe University for 2021 was found to be 9,890 tonsCO2e. 85% of this carbon footprint is the energy consumption of the University, 14% is transportation within the campus, and 1% is paper consumption and hot oil consumption.




In order to reduce the carbon footprint caused by energy consumption, considering the geographical features of the location of the campus, it is recommended to start using the solar energy system, which is one of the renewable energy systems, in buildings with high energy consumption. In order to reduce the carbon footprint caused by transportation, it is recommended that the number of vehicles on campus be sufficient and the minimum necessary. In order to reduce the carbon footprint caused by waste, it is recommended that waste papers and oils at the University be evaluated within the framework of "zero waste with recycling".