

CLIMATE ACTION PLAN

BURSA ULUDAĞ UNIVERSITY



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**BUU
CAP**



Sustainable Campus Project of , Bursa Uludag University



Message from the Rector



Higher education can play a leadership role in addressing global climate change. Bursa Uludag University is dedicated to promoting a sustainable culture and implementing environmentally-conscious policies through its research, teaching, and operational practices.

As Türkiye has announced that it intends to be carbon-neutral by 2053, Bursa Uludag University followed this target year of 2053 to be carbon-neutral in terms of Scope 1 and Scope 2 emissions.

The university has expanded a considerable research effort on energy research, urban research, and sustainability science in which climate change plays a central role.

Bursa Uludag University launched the Sustainable Campus Project in April 2021, defining its sustainability vision as "Being a university that lives sustainability in all activities such as research, education and campus operations." The university included "being a leader in environmental protection, sustainability, and restoration" into its core values.



I am pleased to share with you this summary of our strategies for climate action, and I invite you to visit the Bursa Uludag University Sustainability Office website. Please join in our efforts to foster a more sustainable university community that raises environmental awareness and believes that change is possible.

Prof. Dr. Ahmet Saim KILAVUZ



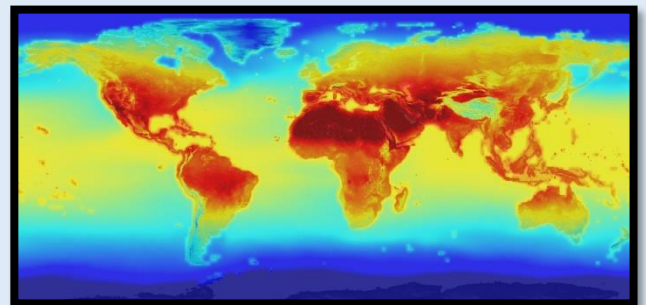
Climate Change and Türkiye

Climate change is the most pressing environmental issue we face today. The long-term transfer of carbon to the atmosphere through the combustion of fossil fuels and the clearing of forested land for agriculture, along with a host of other human activities, resulted in increases in the atmosphere's capacity to trap heat.

Türkiye, like all other countries, is facing the impacts of climate change, experiencing the hottest summers on record. Increasing heat waves led to widespread wildfires in the country's southwest, affecting five times more land than usual during the summer. Though Türkiye usually has large water

surpluses, some areas experienced shortages due to extreme drought. Others suffered heavy flooding, leaving scores dead.

In its 2021 report, the U.N. Intergovernmental Panel on Climate Change (IPCC) concluded that Türkiye would experience three accelerating trends: rising temperatures, dehydration, and rising sea levels. Thus, the country will likely experience more frequent and more severe weather conditions throughout the year. It is estimated that by 2050, temperatures will increase by 2.5° in the east and central Türkiye and by 1.5° on the coasts. Temperatures exceeding 40° are expected in the summer for extended periods.





Climate Change and Türkiye

Türkiye ratified the Paris Agreement in October 2021 and accelerated its steps in the fight against climate change with the ratification of the Paris Agreement in October 2021, when its pledge of net zero by 2053 was confirmed.

At that time, it submitted its 2015 Intended Nationally Determined Contributions (INDC) as its Nationally Determined Contributions (NDC), intending to unconditionally reduce GHG emissions, including Land Use, Land-Use Change, and Forestry (LULUCF) in 2030 by 21% below a Business as Usual (BAU) projection. The NDC submission included a reference BAU projection of emissions in 2030 of 1175 MtCO₂e, including LULUCF,

and a target emissions level is 929 MtCO₂e (incl. LULUCF).

Türkiye is expected to submit its updated nationally determined contributions at the 27th Conference of Parties (COP27) that will take place in Egypt in 2022, where green financing will be among the main agenda topics. A climate law set for completion this year is another milestone for Türkiye's fight against climate change. The law will cover the legal process to reach net zero emissions by 2053.

Experts agree that developing a coal phase-out strategy would be a practical step toward this aim. The cancellation of new coal power plant licenses needs to be announced before completing the update of nationally determined contributions.





Climate Change and Türkiye

Türkiye's emissions stood at 530 million tons of carbon dioxide in 2020, representing a 1% share of global emissions.

The electricity sector accounted for 24.1% of total emissions, followed by the manufacturing sector at 21.2%. Transportation recorded 15.8%, buildings held a 13.8% share, and waste 11.1%.

The agricultural sector was responsible for 9.3% of emissions, and the remaining 4.7% stemmed from the shipping, oil, and gas sectors in Türkiye.

The general dimensions of global and national policy have been precise for a long time: decarbonize the energy system, halt deforestation, and implement sensible adaptation measures to respond to and anticipate harm from climate change that cannot be avoided. Bursa Uludag University followed global and national policy to prepare its climate action plan.



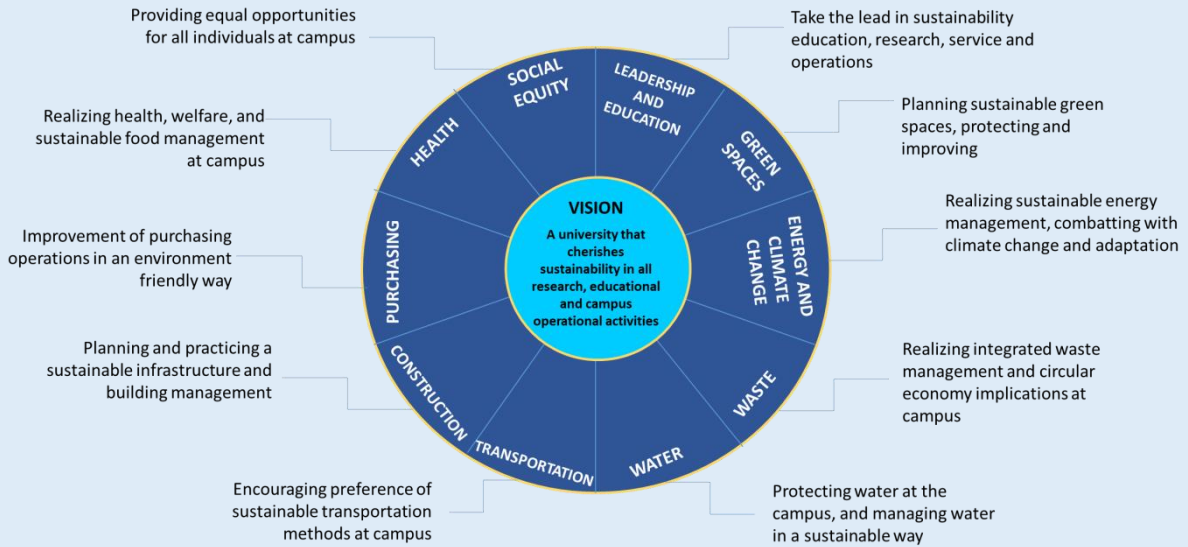
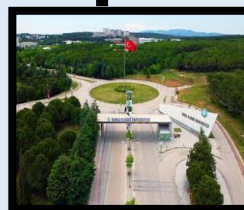


Figure 1. Goals of Bursa Uludag University for Sustainable Development

As Türkiye has announced that it intends to be carbon-neutral by 2053, Bursa Uludag University followed this target year of 2053 to be carbon-neutral in terms of Scope 1 and Scope 2 emissions. The university has expanded a considerable research effort on energy research, urban research, and sustainability science in which climate change plays a central role.

Bursa Uludag University launched the Sustainable Campus Project in April 2021, defining its sustainability

vision as "Being a university that lives sustainability in all activities such as research, education and campus operations,« and set the goals (Figure 1). The university included "being a leader in environmental protection, sustainability, and restoration" into its core values.



**Being
carbon-
neutral
by 2053**

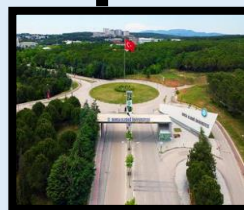
Several commissions are/will be established to plan toward the goals. The institutional structure adopted to coordinate, monitor, and report the sustainability activities at the campus is shown in Figure 2.



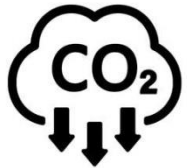
Figure 2. Institutional Structure to Organize Sustainability Studies

Sustainable Development Board will strategically orient the sustainability activities at the campus and monitor the performance and policies of the university departments towards sustainability. The board will be chaired by the university rector, the top decision-maker at the university. The board will be composed of the commissions' representatives working towards the university's specific sustainability goals.

Commissions will be composed of the university's academic and administrative staff. The Office of Sustainability will coordinate the Sustainable Development Board.



**Being
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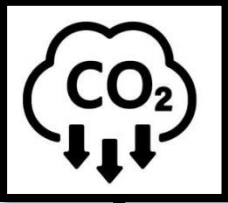
Emissions by the University

For emissions, we have first sought to document the current emissions of the university from all sources and then establish a baseline scenario against which our recommendations, and eventually the university's progress, can be measured. Emissions are represented as CO₂-e (CO₂-equivalents), which accounts for trace amounts of methane and other GHGs. However, the vast majority of BUU's emissions are simply in the form of CO₂.

The Carbon footprint calculation was based on the analysis stage as stated on www.carbonfootprint.com, which is the sum of electricity usage per year, natural gas usage per year, and transportation per year. The

emissions absorbed by the sinks were subtracted from the total.

Our primary focus is on Scope 1 and Scope 2 emissions because they are the emissions the university has direct control over. Scope 1 emissions are those that the university emits directly. Natural gas is burned in boilers for heating purposes. Scope 2 emissions are the result of BUU's electricity purchases, which come from the local grid. Scope 3 emissions are either compelled by the university or are indirect consequences of the university's actions. Examples include emissions from commuting by faculty and staff, emissions associated with student travel to and from campus for the academic year, emissions from waste disposal, emissions related to purchasing supplies, and the emissions associated with providing dining services. Although efforts are being developed to decrease Scope 3 emissions, the carbon footprint calculation does not cover the Scope 3 emissions.



Emissions by the University

Scope 1 emissions consider all buildings and vehicles managed by the university or entering the university. The assessment of Scope 1

emissions also considers the forests at the university campus, which constitute small sinks of GHGs as trees and other woody vegetation continue to grow. Scope 2 emissions incorporate electricity purchases on the campus. The CO₂ equivalent levels of the emissions generated at the BUU campus are shown in Figure 3 by source.

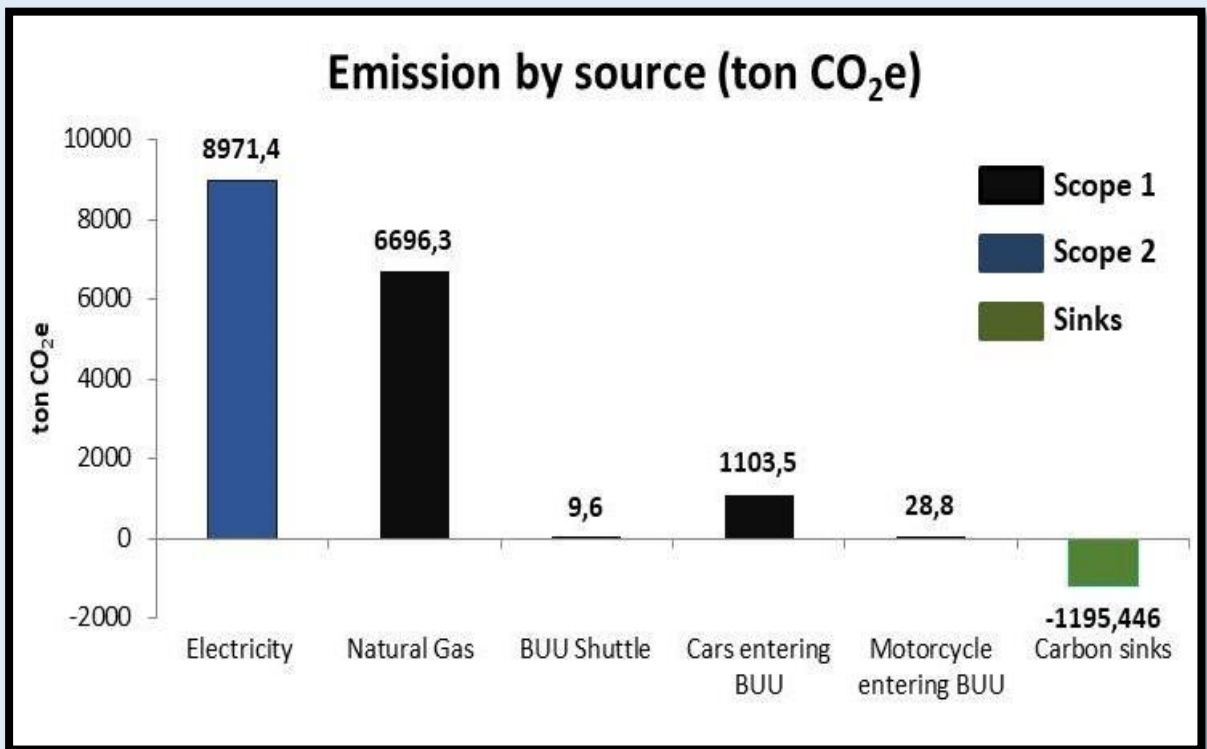
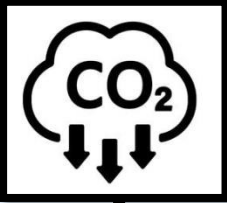


Figure 3. Emissions generated at the Bursa Uludag University Campus by source



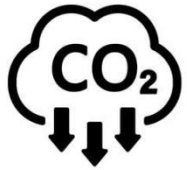
Emissions by the University

Bursa Uludag University has large green areas, some of which function as carbon sinks.

The total area of the main campus is 14.41 km² (14411513.8 m²). More than 55% of these fields are covered with forests. The distribution of the sites at the Main Campus of Bursa Uludag University is shown in Table 1.

Table 1. Distribution of the Areas at the Main Campus of Bursa Uludag University

Category	Square kilometer (km ²)	% in the total
Forests	7.98	55.4
Garden & Arable Field	3.74	26.0
Roads	0.28	2.0
Settlement & Buildings	0.18	1.3
Parking Area	0.13	0.9
Irrigation Pond	0.09	0.6
Sports Space	0.06	0.4
Other	1.95	13.5
TOTAL	14.41	100.0



Emissions by the University

The distribution of green spaces at the campus is shown in Figure 4 and Figure 5.



Figure 4. Distribution of the Areas at the Main Campus of Bursa Uludag University

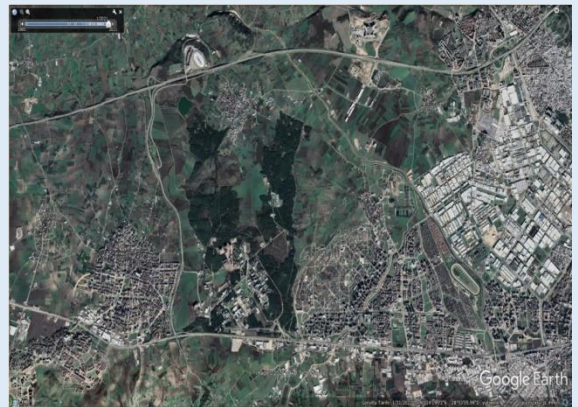
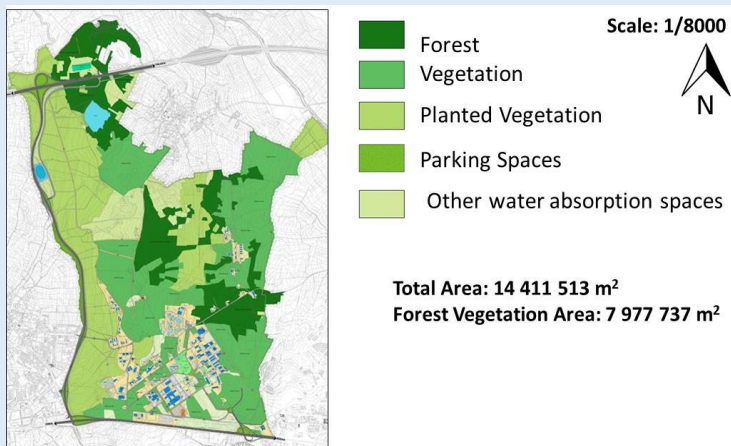
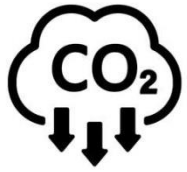


Figure 5. Green spaces at Bursa Uludag University Campus



Emissions by the University

We calculated the total carbon wealth of the forest biomass at the campus according to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol 4 Agriculture, Forestry and Other Land Uses (AFOLU).

Accordingly, the following results were obtained (Figure 4):

- Total C wealth of the biomass at the campus: 9857,74 tons C
- Annual Carbon absorption by the biomass at the campus: 326,03 C/year
- CO₂ yearly equivalent of the absorption: 1195,44 metric tons

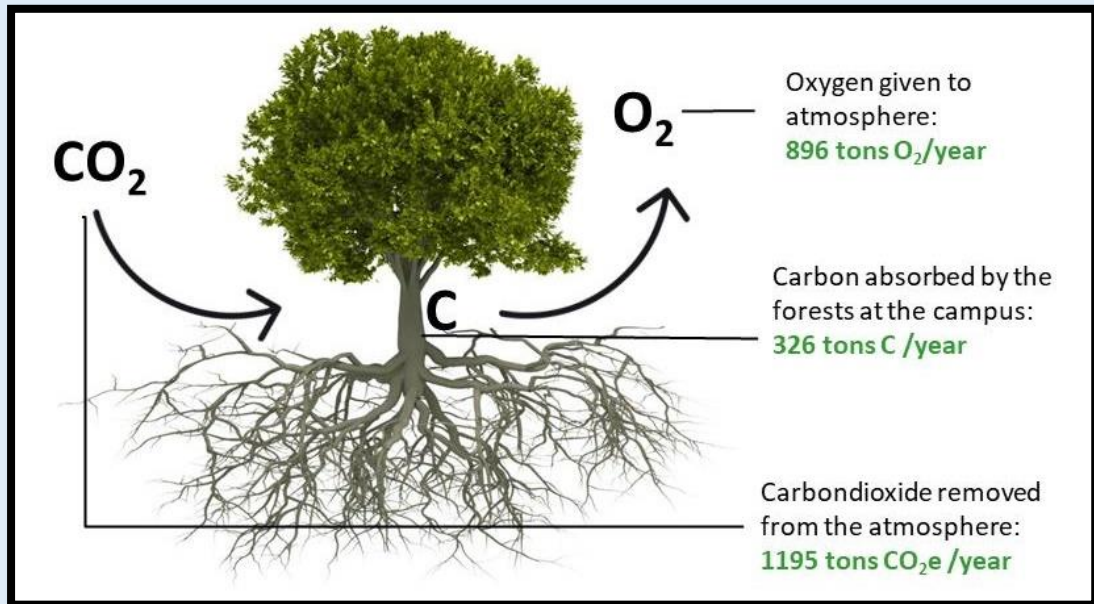
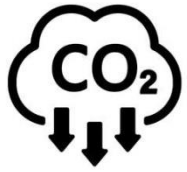


Figure 6. Carbon absorption by the sinks at the BUU campus

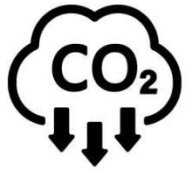


Emissions by the University

The year 2021 was chosen as the base year since it is the year for which the most up-to-date and complete data are available. Scope 1 and Scope 2 emissions will be monitored over the years. In the meantime, efforts on campus will focus on improving energy efficiency and increasing the ratio of renewable energy in the total. The sinks from BUU's natural areas are unlikely to change much, assuming that no unique events (e.g., fire, severe storms) occur. Tree planting activities will continue, of course.

BUU's emissions from travel, purchasing, and the waste stream the university

generates are large and complicated. Faculty at large research universities are often expected to travel as part of their research and service activities. The large number of students (nearly 60,000) and staff (more than 6000) makes it challenging to calculate Scope 3 emissions. These must be estimated by surveying faculty and staff. Commuting by faculty and staff can be estimated reasonably through knowing the number of parking passes issued and home addresses, how many people take advantage of public transport, and through annual surveys of commuting practices. But no one has previously estimated either graduate student or undergraduate travel: there is a total of 59,339 students—52,808 are undergrads, 6,517 are grad students. It is challenging to estimate travel emissions from these sources.



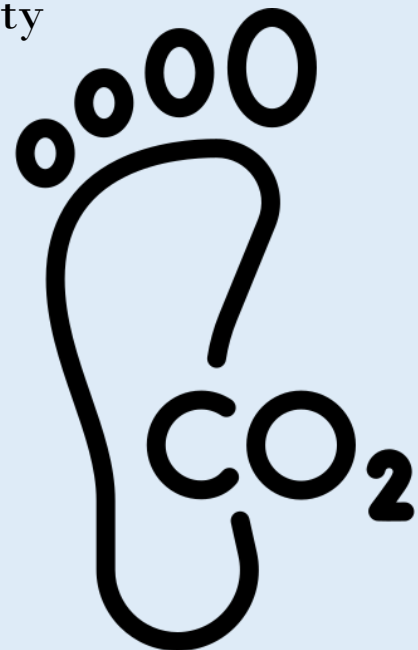
Emissions by the University

The last component of Scope 3 emissions is purchasing and waste disposal. To make a quantitative estimate of current emissions, life-cycle analyses for each significant purchasing and waste category are necessary. In most cases, the university has not collected the data required for such studies. Therefore we are unable to assess their impacts on those emissions quantitatively.

There are emissions associated with each product that the University purchases, whether paper or food, that result from everything done to produce that product and how it is transported. There are

emissions associated with the disposal of waste material, whether construction waste, standard trash, recycling, or food waste. Some of this material is recycled; some is landfilled; other materials are taken to waste-to-energy facilities to be converted to methane/natural gas that is then burned for energy. Each supply chain for each product has its characteristic GHG signature. But there has been no systematic effort at characterizing all the relevant supply chains for the university, let alone calculating their GHG signatures.

The university currently lacks the Information to make quantitative estimates of GHG emissions from these sources.





Action Plan

Bursa Uludag University's new target is to reach carbon-neutral campus greenhouse gas emissions — reducing both direct emissions from on-site energy production and fleet fuel use and indirect emissions from purchased electricity — by 2053. Additional indirect emissions from commuting, procurement, and other activities will be tracked and reduced where feasible.

The university's emissions due to its fossil fuel use (Scope 1) and purchasing of electricity (Scope 2) were approximately 7838 and 8971 tons of CO₂-equivalents (CO₂ eq) in 2021, respectively. These emissions include campus' facilities, shuttle, and the vehicles entering the campus daily. The small carbon sinks absorb approximately 1196 tons of

CO₂ eq. Indirect emissions from transportation (including faculty, staff, and student travel), purchasing, and waste disposal (collectively known as Scope 3 emissions) are more challenging to estimate and are not under the university's direct control.

We have analyzed the existing curriculum relevant to climate change and sustainability. The share of sustainability courses in all courses is more than 25%. A research center on climate change and sustainability, supported by using the university as a living laboratory, could enhance the approach to understanding the specific threats of climate change and demonstrating our commitment to reducing these threats through our actions. Such a research center could play a catalytic role for research and education that cuts across the entire university by developing collaborative relationships with colleges, schools, departments, and existing University-wide centers.



Action Plan

The university's pathway to carbon neutrality relies on known and unknown strategies, spanning new on-site energy infrastructure, the potential purchase of new renewable electricity generation off-site, and changes in everyday behavior across the campus community. Bursa Uludag University aims to maintain a campus that fosters an energy conservation culture that utilizes innovative technologies, promotes occupant engagement to improve building performance continually, and provides comfortable learning and work environment.

To increase the university's commitment to and focus on climate change across

teaching, research, and operations, the university identified the steps to be taken in the short and long term as follows:

- Increasing the amount of energy sourced from green alternative power producers (e.g., solar and wind either via the university's power purchasing arrangements or on-campus installations),
- Increasing energy use efficiency to reduce power demand,
- Increasing educational opportunities for students to understand climate change and to explore mitigation and adaptation strategies;
- Increasing the university's cross-disciplinary coordination and support of research related to climate change, mitigation, and adaptation,



Action Plan



This university has recently started to measure greenhouse gas emissions and energy emissions data. An energy conversion efficiency center has been established in the last year to reduce overall greenhouse gas emissions, campus electricity, and natural gas use.

The reductions will be achieved primarily through programs that improve the energy efficiency of some most significant buildings. Initiatives including lighting and equipment upgrades, are also in progress.

Targets to this aim are as follows:

Target 1: Achieve a total institutional greenhouse gas emissions reduction of 30% by 2030, relative to 2021 as the baseline year.

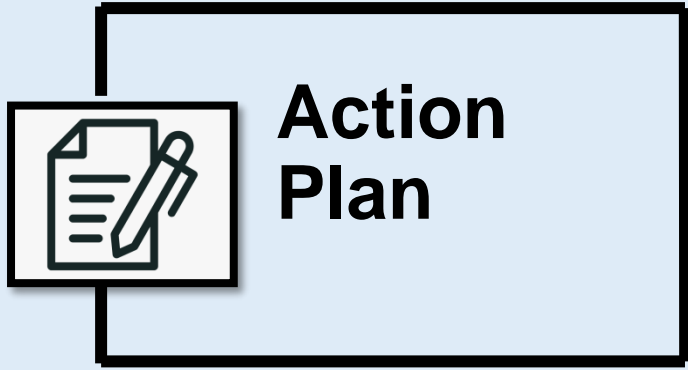
Target 2: Reduce campus electricity consumption by 20% by 2030, relative to 2021 as the baseline year.

Target 3: Reduce campus natural gas consumption by 20% by 2030, relative to 2021 as the baseline year.

Target 4: Implement renewable energy demonstration projects on campus that help reduce greenhouse gas emissions and energy use.

Target 5: Increase the use of sustainable vehicles inside the campus.





Actions:

- Re-evaluate our greenhouse gas emissions inventory (Scope 1 and 2) to ensure all significant sources of campus-based emissions are included.
- Align effective practices to reduce indirect and direct greenhouse gas emissions across campus through coordinated departmental action plans.
- Replace the aging natural gas-powered hot water boiler district energy system with a new high-efficiency system.
- Install a demonstration solar thermal array system.
- Establish the necessary infrastructure to monitor the energy consumption of each building,
- Expand work with building users in offices and student residences on energy efficiency behavior change programs via the Sustainable Campus student club,
- Upgrade the aging outdoor light fixtures around campus with new, high-efficiency systems and provide for the installation of motion-controlled lights in selected common areas of campus buildings and residences.
- Increase bicycle stations and the necessary infrastructure within the campus.
- Advance evidence-based greenhouse gas emissions reduction solutions by continuing to engage students and faculty actively and by supporting campus-as-lab research endeavors.
- Apply behavioral science approaches to promote widespread adoption of mindful energy-use behaviors through programs, building design, and other methods.

BURSA ULUDAĞ UNIVERSITY



Join Us!

We are incomplete without you in sustainability efforts.

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