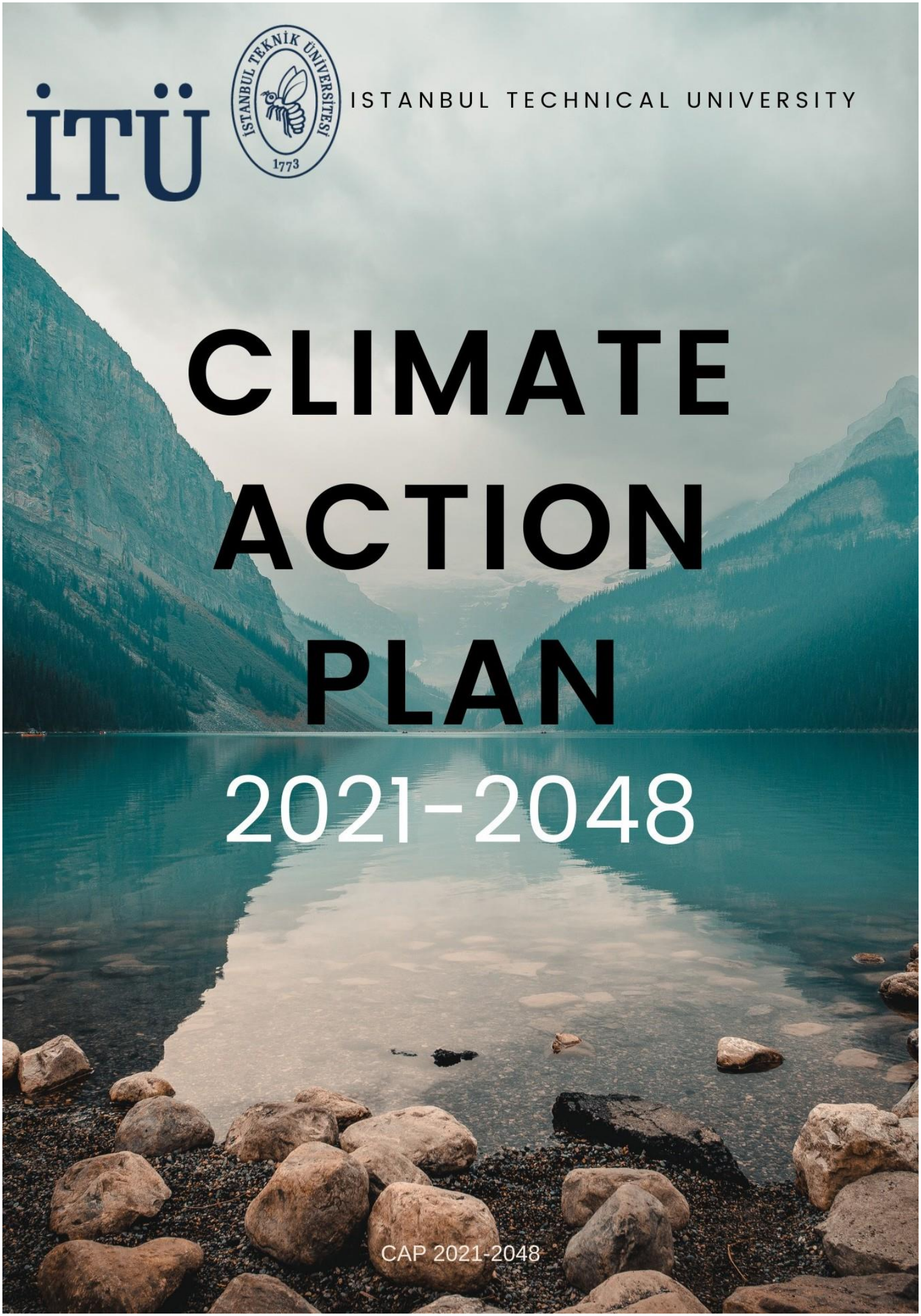
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ISTANBUL TECHNICAL UNIVERSITY
CLIMATE ACTION PLAN
2021-2048
CAP 2021-2048

ISTANBUL TECHNICAL UNIVERSITY

CLIMATE ACTION PLAN

(ITU/CAP)

2021-2048

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LETTER FROM THE RECTOR

Istanbul Technical University, as an established and strong institution heading toward its 250th year, with the experience it takes from its past, its strong academic staff, as a leading research university in the national and international arena, will continue to do good works and to add value to our country's education quality with the dedicated efforts of all of us.

The change that emerged due to the production and consumption habits of human beings adversely affected the habitats of living beings, especially the atmosphere, and changed their characteristics. This change also affected the climate, and the resulting climate change has now begun to manifest itself clearly. Agendas are being formed and policy measures are being taken in order to keep up with the negative effects of climate change in the short and long term and to take mitigation measures. Within the framework of the Climate Action Plan, which is one of the 2030 visions that envisages that the direction of development all over the world and in our country will evolve into a sustainable route; our University has adopted the goals of strengthening resilience and adaptation capacity against climate-related hazards and natural disasters, raising awareness on national and local disaster risk reduction strategies, climate change mitigation and early warning, and developing institutional capacity.

We continue our efforts to become a leading research university, to develop technology for sustainable development, to create qualified employment with a strong alumni network, and to realize projects that go beyond the borders of the country with technology entrepreneurship. In our report titled Climate Action Plan, which includes ITU's goals for the coming years, we present our predictions for the coming years while also revealing the basic strategies of our institution.

This report also has guiding features in terms of being able to better determine our needs in addition to our achievements and our field of action in every new situation that may arise. We will all work in unity for a guiding and leading university by realizing our goals with a fair, equitable and accessible management philosophy. I would like to thank all my colleagues who contributed to the preparation of the report.

With love and respect …

Prof. Dr. İsmail Koyuncu

Rector

EXECUTIVE SUMMARY

Prof. Dr. Ismail Koyuncu, the Rector, signed the ITU/CAP and joined the ranks of top academic institutions committed to formulating an institutional plan to attain net-zero greenhouse gas (GHG) emissions and increase the University's sustainability research and instructional initiatives. The Office of Sustainability sought participants from departments across campus as well as interested students, faculty, staff, and alumni. The Sustainability Advisory Board served as the steering committee, with participants grouped into five main work teams. The main topic areas considered were:

- Transportation
- Energy
- Water
- Waste Diversion
- Education

Conservation, or the attempt to minimize our reliance on nonrenewable resources, is already included in carbon neutrality. Similarly, it entails investigating and adopting new renewable technologies and practices that aren't now part of the University's administrative or operational routine. It's about reversing habits and setting up a vision for behaviors, rules, and activities that will lead to a more sustainable campus. The University's leadership is extended through the Climate Action Plan (ITU/CAP), which incorporates social, economic, and environmental sustainability concepts into campus planning, design, operations, administration, education, and community participation. This plan represents students, staff, teachers, and administration's ambition, capacity, and commitment to drastically reduce our greenhouse gas (GHG) emissions and reach carbon neutrality as soon as possible.

This document is the outcome of the University's first attempt towards carbon neutrality planning. Participants have gained a lot of knowledge from this initiative. To this result, the ITU will help to develop new strategies, systems, practices, and technologies that can be scaled up to the community and state levels. The goals of the ITU/CAP are listed in detail in the chapters given below.

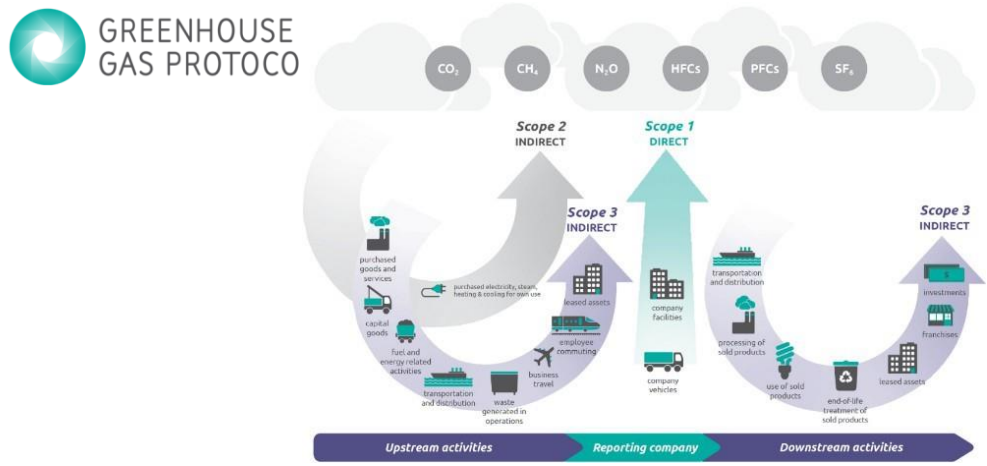
METHODOLOGY

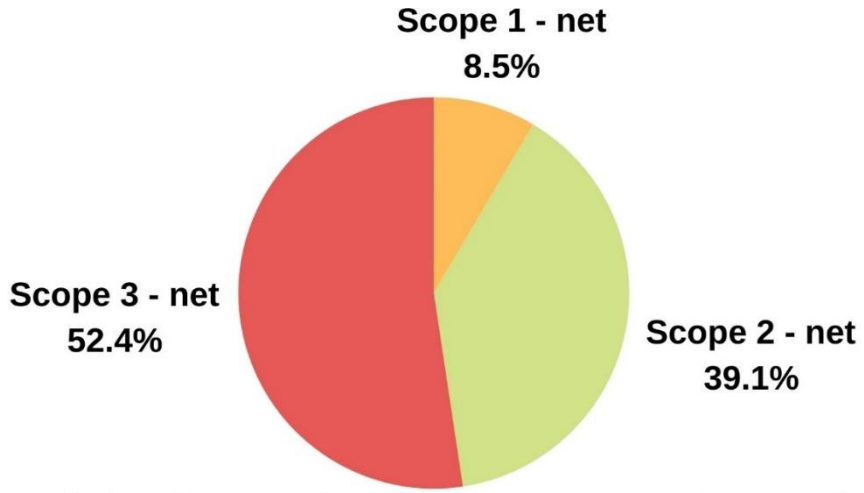
This report aligns with the GHG Protocol Corporate Standard in its carbon emission calculations. The 3 scopes of carbon emissions of the Istanbul Technical University are summarized according to the GHG Protocol.

Scope 1 – covers direct greenhouse gas (GHG) emissions generated on site, e.g. gas and oil consumption and from onsite company owned vehicles and facilities.
Scope 2 – includes net indirect emissions from energy imports and exports, particularly imported and exported electricity and steam.

Scope 3 – includes other indirect GHG emissions, such as employee business travel, product transport by third parties, outsourcing of core activities and off-site waste disposal/ management activities, water consumption and procurement related emissions.
In calculation of Istanbul Technical University (ITU) carbon emissions, the Scope 1 emissions are due to the natural gas use, Scope 2 emissions are caused by electricity consumption of the university and Scope 3 included the emissions from water, waste and transportation.

In 2023, (this value in this part of the report is renewed yearly), Scope 1 emission of ITU Ayazağa campus was 2,439,635 kgCO2e, Scope 2 emission 11,256,965 kgCO2e and Scope 3 is 15,066,261 kgCO2e an total emission including offset were 22,667,220 kgCO2e.





Scope 1 emission of ITU Ayazağa campus accounts for 8%, Scope 2 emission is around 40% and Scope 3 is teh highest contributor by 52%. Our total emissions are calculated considering our offsets.

CARBON REDUCTION STRATEGY

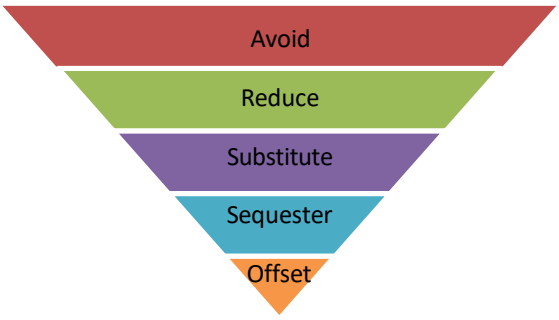
Zero carbon is the term used to describe the fact that there is no carbon emissions in the beginning. **Carbon neutrality** is achieved when measured carbon emissions are balanced or equalised by an equivalent amount of carbon that is sequestered.

Turkey has committed to reduce its emission increase by 21% until 2030. Another important goal of Turkey in the fight against climate change is to achieve "net zero carbon emissions" by 2053. ITU is a pioneer university in complying with national plans from past to present.

ITU has agreed to be Carbon Neutral by **2048**. **Scope 1** emission which are direct emissions from university owned or controlled sources are being estimated as of 2020. **Scope 2** emissions which are mainly due to indirect emissions from the generation of purchased electricity will be estimated by 2021. **Scope 3** emissions which are due to all activities related university goals will estimated by 2023. The plan is to quantify and then zero out **Scope 1** emissions by 2025, **Scope 3** emissions by 2030 and the rest by 2048.

The ITU targeted several areas to achieve GHG emissions reductions and make an impact for decarbonization:

- Avoid future emissions by focusing on energy efficient design of new buildings
- Reduce on-campus energy consumption
- Substitute electricity emissions (scope 2) with renewable energy and gasoline/diesel fueled fleet with electric/hybrid conversion
- Develop teams to focus on scope 3 awareness and goal creation
- Energy optimization
- Business travel
- Campus and community engagement
- Landfill waste diversion
- Funding strategies
- ITU is committed to expanding on-site and off-site renewable energy generation.
- ITU will prioritise sustainable transport options for students and staff, encouraging active transport and public transport options ahead of vehicle transport.
- ITU will offset the emissions from all domestic and international travel by 2025.
- ITU will offset all residual emissions in a way that demonstrates best practice by implementing key principles in offset purchasing decisions by 2025.
- ITU tracks food waste from ITU dining halls and the carbon emissions associated with food waste and catering services. In the future, food waste will be directed to anaerobic digestion on campus.



This plan will be reviewed and revised regularly to monitor progress and update project plans.

INTRODUCTION

The decision has been made to pursue carbon neutrality makes **İstanbul Technical University (ITU)** a leader among the more than 200 universities in Turkey. With a historical background tracing almost 250 years, Istanbul Technical University is an institution that plays a leading role in science, engineering, and technology. ITU aims to be the center of science and technology, which connects the past to the present by producing projects for the future.

ITU have five main campus which are Ayazağa, Gümüşsuyu, Maçka, Taşkışla, and Tuzla. Ayazağa campus has a total area of 1.651.000 m^2, consisting of the Rectorate, Faculty, Institute and Education Units Buildings, Laboratories, Sports Facilities, Technopolis Buildings, Dormitories, and Housing, Culture, Art and Health Units Buildings and other Central buildings with a total living area of 201.681 m^2. It consists of 120 building blocks (Istanbul Technical University Annual Report 2020). The bird's eye view of the Ayazağa campus is shown in Fig. 1.

Figure 1 Ayazağa campus layout plan

Gümüşsuyu Campus consists of 8 building blocks with a building area of approximately 21.730 m^2, consisting of faculty buildings, laboratory, dormitory buildings, and gym buildings on an area of 58.000 m^2. Maçka Campus consists of 10 building blocks with a building area of approximately 16.935 m^2 consisting of faculty, conservatory, and social facility buildings on an area of 63.000 m^2. Taşkışla campus consists of a total of 4 building blocks with a residentialarea of approximately 11.425 m^2, consisting of the Faculty, Headquarters, and Cafeteria buildings on an area of 52.000 m^2. Tuzla Campus consists of a total of 24 building blocks witha building area of approximately 15.490 m^2 consisting of faculty buildings, laboratories, sportsfacilities, social facility buildings, and dormitories on an area of 117.000 m^2.

How our university, which is in its 250th year, has been pursuing this goal is unique to its circumstances and character. This plan describes the path that university constituents

established to achieve this objective. In its dedication to an ethical and compassionate community, ITU strives to take responsible actions affecting and preserving the environment. For several years, ITU has collaborated with Turkey leaders to create programs, policies, and strategies to address climate change. Through her faculties, Energy Institute, Climate Research, and Implementation Center, Disaster Management Institute, etc., ITU works to study energy policy issues, conduct a range of educational activities, and share resources to facilitate climate action planning. For example, the green campus philosophy of our university emerged in 2013. Such as;

- Gaining a sustainable life culture,
- Creating an aesthetic campus with an ecological and unique identity,
- Preparation of an unobstructed, safe, and 24-hour campus environment,

covers basic philosophies.

Since the beginning of 2013, work has been started primarily at Ayazağa Campus.

- To be a pedestrian, bicycle-friendly, and unobstructed campus,
- To provide sports and wellness opportunities,
- Recycling and zero waste movement,
- To be a campus that supports biodiversity and has a high environmental quality.

In this context, studies have been initiated to increase energy efficiency within the boundaries of ITU campuses, based on the **"Energy Efficiency Law"**, in line with the objectives and scopes specified in the **"ITU energy management directive"**. In addition, taking into account the 2023 energy efficiency targets set in **The Energy Efficiency Strategy Document** and the strategic approaches in **The National Energy Efficiency Action Plan**, the necessary activities for the effective **"implementation"** of applications that will increase energy efficiency on campus and also for **"ensuring sustainability"** determined.

In conjunction with the projects **'ITU Smart Campus'** and **'ITU Electric Minibus'**, to provide a campus-wide autonomous and electric shuttle service while restricting private car use through zoning. In this context, by providing an electro-mobility service for mass transport and integrating it with the systems of active travel modes currently in use, i.e., **bikes** and **e-scooters,** the use of motorized vehicles will be restricted in part and the consequent emissions will be reduced. ITU's 2017-2021 Strategic Plan has also been prepared with this respect. The most important feature of this study, which lasts about 2 years; for the first time, a strategic plan based on "measurable and impartially assessable data" has been prepared at our university. To provide this ground, ITU Dashboard has been established. This system, which is as well important for sustainable development.

In response to demand from students, faculty, and staff, sustainability was launched as a new initiative as part of the President's Strategic Directions in Fall 2021. As part of this initiative, the Sustainability Task Force was created to evaluate the status of sustainability at ITU and its peer institutions (Fig. 2). This committee created the "Outline of Sustainability Initiatives," which encompassed academics, outreach and community relations, auxiliaries operations, facilities operations, campus life, and executive council decisions.

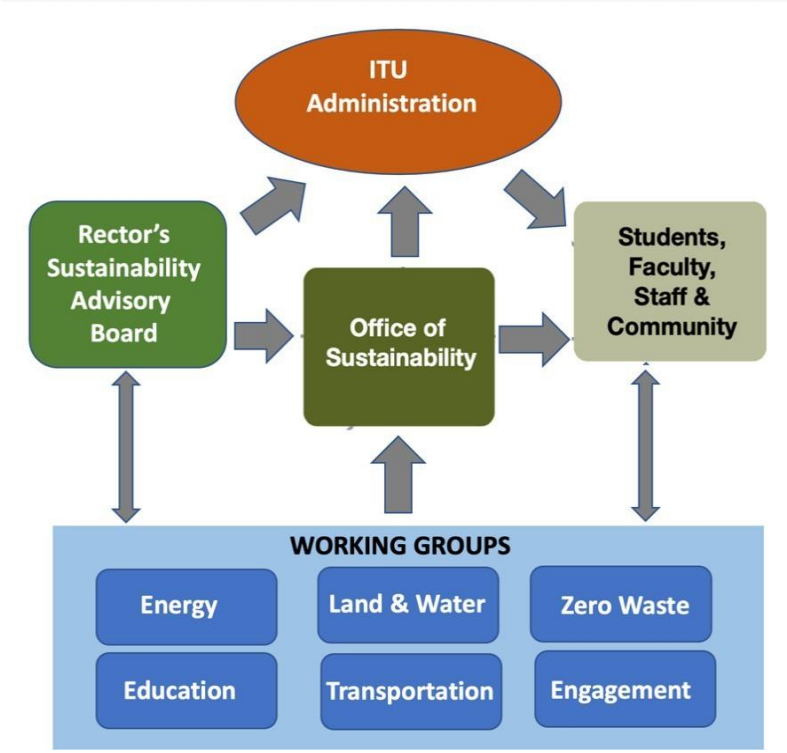


Figure 2 ITU organization chart for the climate action plan and its implementation

Noting that the implementation of an extensive action plan would require the guidance of a full-time director with the authority and resources to carry out the proposed objectives, the Director of Sustainability position was created and the **Office of Sustainability** was formed in September 2020. Since this time, the Office of Sustainability has designed and implemented several initiatives to build a culture of sustainability on campus and across the greater Istanbul community. For a complete list of Task Force members please see in the Acknowledgements. The newly established ITU Office of Sustainability sought participants from departments across campus as well as interested students, faculty, staff, and alumni. Participants were divided into five main task teams, with the President's Sustainability Advisory Board serving as the steering committee. (Fig. 2). The main topic areas in **ITU Climate Action Plan (ITU/CAP**) considered were:

- Energy
- Transportation
- Land & water
- Zero waste
- Education

This led to the formation of a standing, presidentially-appointed **Campus Sustainability Committee (CSC)** comprised of faculty, staff, and students, which is currently co-chaired by Lütfiye Durak Ata, Executive Vice-Rector. The CSC and numerous other stakeholders worked diligently for two years to develop ITU's comprehensive **Climate Action Plan (CAP)** outlining the strategies and opportunities for the campus to meet the aggressive 2024 target for climate neutrality. The plan was endorsed by the Board of Trustees in October 2009.

This document is therefore the outcome of the University's first planning effort to achieve carbon neutrality. Participants have learned a great deal from this effort and recognize that it is

an iterative process that will be repeated in the future as progress is made and new information becomes available. The initial charge of this committee is two-fold. First, the committee has been responsible for gathering data and analyzing and defining ITU's overall greenhouse gas emissions. Secondly, the CSC has focused on developing a clear Climate Action Plan (CAP) to reduce the three main sources of ITU's greenhouse gas emissions: electricity, natural gas, and water usage, and transportation, as well as communicating ITU's efforts to address climate change and how individual behavior impacts success.

The CAP includes the target date and interim milestones for achieving climate neutrality, strategies and mitigation projects that will allow ITU to reach its target, and mechanisms for tracking progress on goals and actions. While the University intends to take aggressive action toward on-campus carbon reduction, it accepts the reality that GHG offsets, emissions reductions or sequestration purchased or produced outside ITU's own carbon and water footprint, will be a part of the overall climate neutrality plan. The CAP will also focus on how to ensure all students graduate from ITU with an understanding of sustainability and that the entire campus community is engaged in this ambitious institutional effort to address climate change. Taking action on this issue is expected to hold further advantages in the quest to recruit top students, faculty, and staff; attract new sources of funding and maximize the support of alumni and local communities.

To this end, this initiative is a part of ITU's deep-rooted culture of public engagement and the belief that the University has to share the knowledge of faculty and students to address pressing global issues. Tackling the complex problem of climate change here at ITU, not only benefits this institution but society as a whole. To solve the pressing environmental and social issues facing the world, it will take the participation and inspiration of the entire society, and the world is looking to institutions of higher education for leadership and innovation. ITU is confident in its ability to address the campus climate footprint.

OBJECTIVES

The CAP includes the objectives, target date and interim milestones for achieving climate neutrality, strategies and mitigation projects. The objectives are presented in five topics below.

1) TRANSPORTATION

1. OBJECTIVES TOWARDS INCREASING ENVIRONMENTALLY SUSTAINABLE TRANSPORT

Ultimately aiming to reduce the consequent contribution to the greenhouse gas emissions of both the campus-wide area traffic and the traffic due to its students' and personnel's need to access to/from the campuses, ITU adopts several policies of sustainable transport. In this context, while active travel and electromobility-based solutions are mostly designed to cope with the campus-wide exhaust emission problem, restrictive and incentive approaches are employed respectively for private car traffic and public transport in order to tolerate/manage the city-wide/metropolitan scale effects of motorized vehicular traffic that is attracted/produced at the campuses, most of which take place in the central business districts of Istanbul metropolitan area.

Goals of sustainable transport to improve the existing solutions designed for reducing emissions from motorized vehicular traffic in either the campus area or off-campus are stated in the following.

1.1. IMPROVING TRANSIT OPERATIONS

1.1.1. IMPROVING SHUTTLE OPERATIONS THROUGH OPTIMIZATION

To optimize the operation characteristics of student shuttle bus service in use, i.e., the number of vehicles in the fleet, capacity/type of vehicle, routing, and scheduling, while reducing/minimizing objectives of environmental sustainability, such as pollutant emissions. In this context, the current solution involving fixed scheduling and fixed routes will be improved by dynamic routing to account for temporal and spatial variations of demand at bus stops.

1.1.2. REPLACING SHUTTLE FLEETS

In conjunction with the ITU Electric Minibus Project, to improve through minimization of environmentally sustainable objectives, such as pollutant emissions, the service quality for students and personnel shuttle bus operations by replacing the fossil fuel burning vehicles in the fleet with electric vehicles. In this context, by considering additionally the locations and the number of electric vehicle recharging stations existing in the campus area, the scheduling and routing plans in use will be alternated/updated to minimize emissions from shuttle operations. Similar to the previous goal stated dynamic routing solutions to account for the spatial and temporal changes in demand will be sought as well.

1.1.3. IMPROVING OFF-CAMPUS BUS FLEET OPERATION THROUGH OPTIMIZATION

To optimize the operation characteristics of personnel off-campus bus service in use, i.e., the number of vehicles in the fleet, capacity/type of vehicle, routing, and scheduling, while reducing/minimizing objectives of environmental sustainability, such as pollutant emissions. In this context, the current routing solution will be improved considering the traffic characteristics of the city-wide road network and the sprawl of trip originating points/locations that personnel reside.

1.2. RESTRICTING GRADUALLY PRIVATE CAR TRAFFIC

1.2.1. PROMOTING INTEGRATION OF MODES OF ACTIVE TRAVEL AND ELECTRO-MOBILITY

In conjunction with the projects 'ITU Smart Campus' and 'ITU Electric Minibus', to provide a campus-wide autonomous and electric shuttle service while restricting private car use through zoning. In this context, by providing an electro-mobility service for mass transport and integrating it with the systems of active travel modes currently in use, i.e., bikes and e-scooters, the use of motorized vehicles will be restricted in part and the consequent emissions will be reduced.

1.2.2. DISABLING BY-PASS TRAFFIC

To forbid the by-pass and transpass of vehicles with no parking membership due to the arterials that surround most campuses. With the decreases in motorized vehicular traffic by forbidding the transpass of vehicles with no parking membership, the flows demanding to enter the campus, and hence the stop and go traffic at entrance gates, especially in peak hours, and the consequent emissions will be reduced.

1.2.3. REVISING MANAGEMENT OF PARKING LOTS IN CONJUNCTION WITH PRICING AND MEMBERSHIP

To revise the pricing and management strategies for parking membership and daily parking with no membership. In this context, the following actions are ready to be taken (have already been taken) in order to reduce emissions from vehicles burning fossil fuels: offering relatively advantageous fees for parking memberships prioritizing electric and hybrid-electric vehicles; increasing the parking space allocation for memberships of electric and hybrid-electric vehicles while restraining the entire parking capacity; and, adopting a dynamic pricing scheme for vehicles with no membership dependent on the within-day dynamics of traffic congestion.

1.2.4. IMPROVING COOPERATION WITH LOCAL AUTHORITIES THROUGH SPECIFIC PROJECTS

ITU cooperates with local authorities in the design and implementation of specific projects to reduce especially the vehicular emissions from off-campus city-wide traffic. For instance, a new funicular line to serve as well to transfer trips from sea transport to the Ayazaga Campus with parking and riding facilities to be provided around the port area has already been projected.

Several other features that the cooperation involves (may involve) are towards helping to increase the accessibility by micro-mobility, i.e., improving the bikeway network with extensions to campuses, allocating additional hubs closer to campuses at the bike-sharing system operated by the local authority, improving the bike carrying capacity of especially rail-based public transport vehicles by allocating additional bike racks, etc. The cooperation with the local authority will help to shift off-campus trips by car to public transport reinforced by modes of micro-mobility, and hence to reduce emissions from car use.
To construct sustainable pavements utilizing the re-use of road material especially in the campus area, the university cooperates with the local authority as well.

1.3. (IMPROVING) DYNAMIC INFORMATION DISSEMINATION THROUGH TOOLS OF SMART CAMPUS

To develop tools for dynamic management of campus network traffic within the frame of the ITU Smart Campus Project. The project aims in part to improve the feature of the existing sensing/detecting network using Bluetooth, GPS, IoT, etc. technologies for a better spatial and temporal resolution in detecting traffic flows on the campus network and to improve the layout of data transmission to feed a data management software to be designed and integrated with traffic simulator component. Using the system designed, analysis of data in real-time, and hence the current state of several measures on campus-wide traffic, i.e., travel times, congested sections, etc., will be available so that short/medium term predictions will be performed interactively to aid decisions on managing traffic towards emission mitigation. Campus-wide information on both the prevailing and the predicted traffic will be disseminated through digital interactive maps at the ITU Web site and ITUMobile App.

1.4. ON-HOLD PROMOTIONS ON SHARING & FLEXIBLE WORKING HOURS DUE TO LEGAL REGULATIONS/RESTRICTIONS

Due to the current legal regulations and restrictions, services for the modes of shared mobility can not be provided to campus commuters by either the university or the ride-sharing/car-sharing companies. However, with the revisions on membership and pricing for parking lots, shared mobility will be promoted while penalizing the use of single-occupancy vehicles. In order to support car-sharing, the university will provide a platform, possibly through an app, to ease the communication of commuters with the car users who will voluntarily share their rides.
Arranging flexible working hours to manage the travel demand especially through peak hours of congested traffic is an action that the university board can not take due to the legal restrictions as well.

2) ENERGY

2.1. BASIS OF ITU ENERGY ACTION PLAN

ITU energy action plan includes the works planned to be carried out in line with the strategic goals of the university to reduce the energy use and carbon emission within the boundaries of the ITU campus, protect the environment by utilizing renewable energy sources to avoid the use of carbon-intensive industries (i.e. coal and oil), providing energy safely (uninterruptedly and at affordable prices by means of divesting investments) and thus relieving the financial burden of energy costs on the university. Ensuring the sustainability of these studies and their results also covers an important part of energy efficiency.

Our university aims to make efficient use of energy and natural resources with an environmentally friendly campus mission. It aims to increase the efficiency in processes that include not only the consumption of energy but also its production using renewable resources rather than carbon-incentive energy industries like natural gas, coal and oil. In this context, studies have been initiated to increase energy efficiency within the boundaries of ITU campuses, based on the "Energy Efficiency Law", in line with the objectives and scopes specified in the "ITU energy management directive". In addition, taking into account the 2023 energy efficiency targets set in The Energy Efficiency Strategy Document and the strategic approaches in The National Energy Efficiency Action Plan, the necessary activities for the effective "implementation" of applications that will increase energy efficiency on campus and also for "ensuring sustainability" determined.

In the first stage, the energy efficiency study was started by considering the renovation of existing buildings and the construction of new buildings on the campuses of our university. The current conditions of the buildings, their construction years, their building classes, and their monthly energy consumption are taken into consideration. In this context, the “ITU Energy Efficiency Action Plan” has been prepared and the strategies that can be applied to increase the energy efficiency of ITU campuses have been prepared by taking into account the good practices in Turkey and the world.

Energy efficiency studies include multi-faceted studies that require public institutions, different sectors, and different disciplines to work together. However, energy efficiency studies in buildings require different expertise according to the functions and motivations of the buildings. The buildings in the ITU Campuses include functions such as management, education, research, and accommodation and they are planned with different motivations. Buildings have different architecture, carrier systems, mechanical systems, and smart systems. Therefore, close cooperation between the institutions, sectors, and disciplines responsible for the implementation of the actions determined in this study and for the evaluation of the results should be established, and different strategies should be determined for each building.

The processes of ensuring the said coordination and cooperation, monitoring, reporting, and validating the Action Plan will be carried out by the Rectorate as specified in the “ITU Energy Management Directive”.

2.1. SCOPE OF ITU ENERGY EFFICIENCY ACTION PLAN

ITU Energy Efficiency Action Plan; It covers the policy actions taken related to energy, existing

and new buildings, and their sectors to increase the efficiency of energy consumption in the campuses of Istanbul Technical University.

In the "ITU Energy Management Directive"

- effective use of energy by increasing energy efficiency in the existing and planned buildings,
- conducting energy audits to identify areas where energy waste is high,
- divesting investments in carbon-intensive energy industries, especially coal and oil, in order to protect the environment and increase efficiency in the use of energy resources,

are determined.

Based on the objectives for the above statements, the scope and execution principles specified in the directive were applied. At the same time, it reveals the implementation steps of these actions, key performance indicators, how they will be implemented, their outputs, and their possible effects. These actions include multi-faceted studies to be carried out with the participation of experts from different faculties and other stakeholders, taking into account the economic, social, and environmental dimensions, with innovative approaches to applicable technologies, based on resource efficiency.

The sustainability of the Action Plan is also one of the criteria we take into consideration. For this reason, the applied method is planned as flexible and measurable, which can be updated according to the changing conditions in the following processes. In this context, in the ITU Energy Action Plan, within the scope of;

- creating and activating support models in energy efficiency,
- development of sustainable financing mechanisms,
- encouraging on-site production and consumption with the integration of renewable technologies, increasing the use of renewable resources within the framework of energy efficiency,
- positioning smart buildings, smart campuses, and smart grids in terms of energy efficiency,
- disseminating sustainable environment-friendly structures and making existing structures more efficient, studies to increase the efficiency of energy efficiency in all sectors were included.

2.3. CURRENT SITUATION

Especially the main campus of ITU which is Ayazağa, and other campuses Gümüşsuyu, Maçka, Taşkışla, and Tuzla campuses have been evaluated. Ayazağa campus has a total area of 1,651,000 m^2, consisting of the Rectorate, Faculty, Institute and Education Units Buildings, Laboratories, Sports Facilities, Technopolis Buildings, Dormitories, and Housing, Culture, Art and Health Units Buildings and other Central buildings with a total living area of 201,681 m^2. It consists of 120 building blocks. The bird's eye view of the Ayazağa campus is shown in Figure 1.

Gümüşsuyu Campus consists of 8 building blocks with a building area of approximately 21,730 m^2, consisting of faculty buildings, laboratory, dormitory buildings, and gym buildings on an area of 58,000 m^2. Maçka Campus consists of 10 building blocks with a building area of approximately 16,935 m^2 consisting of faculty, conservatory, and social facility buildings on an area of 63,000 m^2. Taşkışla campus consists of a total of 4 building blocks with a residential area of approximately 11,425 m^2, consisting of the Faculty, Headquarters, and

Cafeteriabuildings on an area of 52,000 m^2. Tuzla Campus consists of a total of 24 building blocks with a building area of approximately 15,490 m^2 consisting of faculty buildings, laboratories, sports facilities, social facility buildings, and dormitories on an area of 117,000 m^2.

2.3.1. DETERMINATION OF ENERGY CONSUMPTION IN CAMPUSES

In the first stage, certain assumptions were made to determine the energy efficiency potential of the buildings on the campuses. Existing buildings have been classified according to their construction years. Accordingly, it has been accepted that energy efficiency will be the least efficient in buildings built before 2000, moderate in buildings built between 2000 and 2010, and good in buildings built after 2010. The total invoiced energy consumption of the buildings in the campuses for 2021 was provided like electricity and natural gas under the ITU personnel department. Figure 3 shows natural gas and Figure 4 shows electricity consumption.

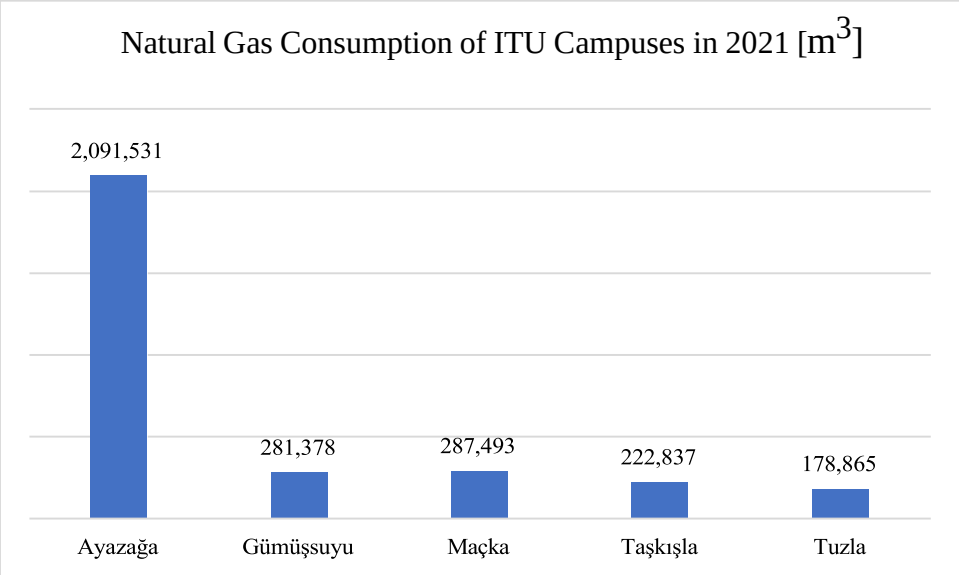


Figure 3 Natural gas consumption of ITU campuses in 2021 (m^3)

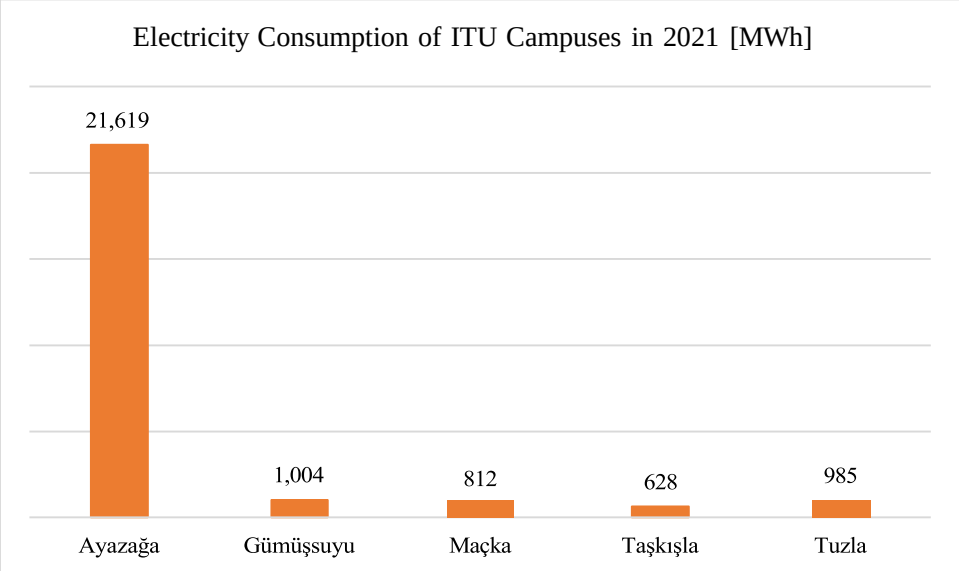


Figure 4 Electricity consumption of ITU campuses in 2019 (MWh)

The number of building blocks, construction years and construction areas were determined and shown in Table 1. In addition, the roof areas were described to determine the integration potential of renewable energy sources such as photovoltaic.

Table 1 Number of buildings in campuses

Construction Year	Total Building Area	Total Seating Area (m^2)	Total Roof Area (m^2)
Ayazağa Campus			
Before 2000	49	123 951	130 371
2000-2010	39	41 540	41 540
After 2010	32	36 190	36 190
Gümüşsuyu Campus			
1850	1 (main building)	13 515	13 515
1960	8	8 215	8 215
Maçka Campus			
1873 and 1876	2	7 315	7 315
Before 1990	6	6 775	6 775
After 2000	3	2 845	2 845
Taşkışla Campus			
1846	1 (main building)	8 760	8 760
After 2010	3	2 665	2 665
Tuzla Campus			
1900	2	1 430	1 430
Before 2000	12	9 270	9 270
After 2000	9	4 790	4 790

2.3.2. DETERMINATION OF METHODS TO BE APPLIED TO DETERMINE THE ENERGY EFFICIENCY POTENTIAL IN BUILDINGS

Primary energy intensity in buildings is an important indicator in terms of demonstrating energy savings in primary and final energy consumption and improving energy efficiency. Therefore, the results in this study are presented with these two indicators. Three basic documents related to energy performance in buildings, which are also used in this document, constitute the technical background.

1) EN ISO 52000-1:2017: Energy Performance of Buildings, Energy performance assessment in Inclusive Buildings. - Part 1: General framework and procedures. (ISO 52000-1: 2017)

2) CEN/TS 16628:2014: Basic principles for the energy performance standard set in buildings.

3) CEN/TS 16629:2014: Detailed technical rules on the energy performance standard set of buildings.

2.3.3. CARBON FOOTPRINT OF ITU CAMPUSES IN 2021

The amounts of greenhouse gases (CO_2, CH_4 and N_2O) released into the atmosphere as a resultof the electricity and natural gas consumptions used in the buildings in all campuses have been calculated. Calculations were made according to GHG Protocol Corporate Standard and CO_2 emissions coefficients from the IPCC 2006 report. Tier 1 method was used for calculations. Figure 5 and Figure 6 present the emission amounts from electricity and natural gas consumption at ITU campuses. Considering the results; It has been observed that the amount of emissions caused by electricity consumption is higher in Ayazağa, Gümüşsuyu and Tuzla campuses. In Maçka and Taşkışla campuses, the amount of emissions caused by natural gas consumption is higher than that of electricity consumption. In terms of campuses, it has been observed that the amountof emissions is higher due to the excess of buildings and lighting in the Ayazağa Campus, andthe population being more crowded compared to other campuses.

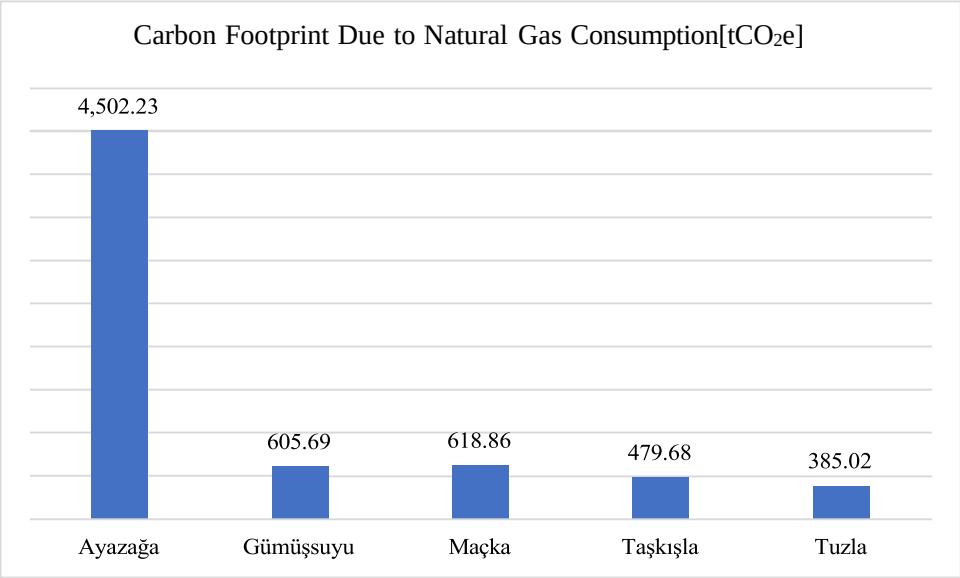


Figure 5 Carbon footprint due to natural gas consumption (tCO_2e)

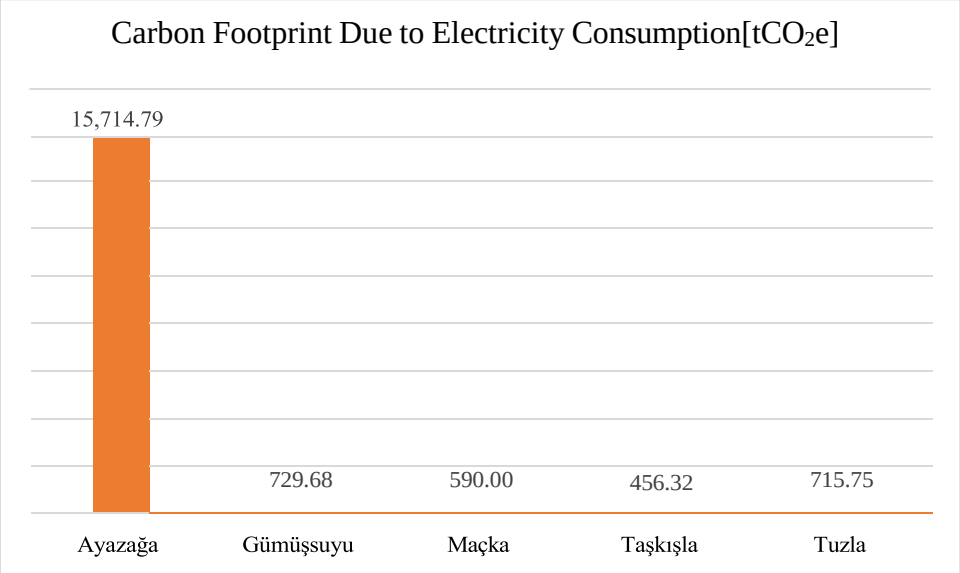


Figure 6 Carbon footprint due to electricity consumption (tCO_2e)

2.4. PLANNED ACTIONS

The main objective of the Action Plan, which was prepared to cover ITU Campuses, is to make the highest contribution to the welfare of the country by using energy and natural resources in an efficient and environmentally friendly manner. Planned actions are listed under 8 headings:

1. Establishment of energy management systems and increasing their effectiveness
2. Development of ITU energy efficiency financing mechanism divesting the investments to renewable energy rather than the coal and oil
3. Development of database, reporting, and monitoring systems and creation of energy platform for smart management
4. Energy efficiency audits for the renovation needs of the existing buildings
5. Establishing a database including energy consumption data on campuses
6. Defining energy-saving targets for both the existing and new buildings
7. Rehabilitation of existing buildings and improvement of energy efficiency
8. Expanding the use of renewable energy and cogeneration systems in buildings

2.4.1. ESTABLISHMENT OF ENERGY MANAGEMENT SYSTEMS AND INCREASING THEIR EFFECTIVENESS

Goal	Increasing the effectiveness of the "energy management unit" installation activities of certain sizes of buildings in ITU Campuses. Establishment of the current energy management system; It is mandatory in public buildings with a total construction area of over 10,000 m^2 or annual energy consumption of more than 250 TOE. As stated in the ITU Energy Management Specification, Energy management practices will be established within the framework of the current legislation, necessary activities will be carried out, and energy manager appointments will be provided for all buildings and enterprises located on the campus that meet the conditions defined in the legislation. Energy management systems will be established following ISO 50001 Energy Management System-User Manual and Conditions Standard. These activities will be strengthened by periodic inspections. The scope will be expanded depending on the application's performance. According to the legislation, buildings of certain sizes must have an energy manager and carry out energy management activities. In addition, it is necessary to carry out and monitor energy management activities in buildings and facilities. With energy management systems, energy efficiency activities have achieved an effective and continuous application ground. It is aimed to reach 80% implementation efficiency by the end of 2022.

Activities to Undertake	• Updating the energy manager lists in ITU Campuses buildings. • Providing energy manager assignments to buildings that do not have energy managers. • Organizing training to improve the competence of energy managers. • Annual updating and auditing of energy manager appointments and energy management unit installation status.
Outputs	Increasing the ratio of buildings responsible for having an energy manager and/or establishing an energy management unit to 80%, encouraging and increasing the installation of the Energy Management System.
Responsible Institutions	ITU Rectorate, all Faculties, Institutes, facilities are located on campuses.
Timeline	In 2021, the obligatory building list will be updated and implementation efficiency will be reached by the end of 2022.

2.4.2. DEVELOPMENT OF ITU ENERGY EFFICIENCY FINANCING MECHANISM

Goal	It is aimed to establish the "ITU Energy Efficiency Financing Mechanism" to provide additional financial support for the realization of energy efficiency investments together with the investments directed to the renewables energy rather than coal and oil as an efficiency action.. To ensure that the created method is an example for similar studies.
Activities to Undertake	• Making the necessary legislative arrangements for the establishment of the mechanism after detailed needs, implementation, and management definitions. • Ensuring the inclusion of national and international (national, international financial institutions' funds, etc.) resources into the mechanism. • The spending of the resources collected annually in the financing mechanism for the supports included in the plan. • Monitoring energy efficiency practices and ensuring sectoral traceability by the control unit to be established within the scope of the mechanism.
Outputs	Establishment of the National Energy Efficiency Financing Mechanism and functionalization of the mechanism.
Responsible Institutions	ITU Rectorate
Timeline	The legislation will be developed in 2022 and the action will be implemented in 2023.

2.4.3. DEVELOPMENT OF DATABASE, REPORTING, AND RECORDING SYSTEMS AND CREATION OF ENERGY PLATFORM FOR SMART MANAGEMENT

Goal	Establishing a system where energy efficiency activities and energy consumption are tracked and advanced reporting can be made.
Activities to Undertake	• Creating an energy platform and providing technical infrastructure for the development and smart management of energy monitoring, recording, database, and reporting systems in buildings. • Extending of smart meters. • Energy efficiency indicators will be determined on campus, and savings will be monitored and reported. • Determining energy efficiency indicators on campus and monitoring and reporting the savings achieved. • Establishing a network of experts on energy efficiency among the faculty members on campus, benefiting from the knowledge and experience of the people in this network in energy efficiency studies. • Recording and reporting of the completed studies and establishing a quality assurance structure in this direction.
Outputs	Establishment and development of a monitoring and evaluation system.
Responsible Institutions	ITU Rectorate
Timeline	Needs analysis and development activities will be completed in 2022 and it will be actively used in all its scope in 2023.

2.4.4. ENERGY EFFICIENCY AUDITS

Goal	Completing energy efficiency studies to determine the measures that can be applied in energy efficiency together with saving potentials, creating an inventory for buildings, and making projections for the future in energy efficiency. To review the building stock in ITU campuses and to renew the building stock in a way that will also be effective on energy efficiency, and also to support the creation of a long-term strategy for investments in this subject. (EU Energy Efficiency Directive 2012/27/EU on energy efficiency http://data.europa.eu/eli/dir/2018/2002/oj)
Activities to Undertake	• Conducting energy audits. • Updating the inventory of buildings. • Carrying out audits, where is sufficient, or only preliminary audits, taking into account cost analyzes for audits and preliminary audits. • Updating audit formats, developing a common methodology and format.

	• Defining annual targets to accelerate energy efficiency audits in buildings and strengthening the monitoring system. • Creating an energy efficiency inventory as a result of the audits and publishing it electronically.
Outputs	Audit formats, energy efficiency inventory reports, the completion rate of energy audits.
Responsible Institutions	ITU Rectorate, all Faculties, Institutes, facilities are located on campuses.
Timeline	In 2022, an inventory of the buildings will be made and the action will be implemented in 2023.

2.4.5. ESTABLISHING A DATABASE INCLUDING ENERGY CONSUMPTION DATA ON CAMPUSES

Goal	Developing an inventory containing the main features of buildings in ITU Campuses, collecting real energy consumption and emission data of buildings of certain sizes, establishing a database that can compare and evaluate buildings in terms of energy efficiency.
Activities to Undertake	• Compilation of statistical data on buildings currently available. • Creating templates to be used in data collection studies on buildings.
Outputs	Establishment of database, development performance with statistical data
Responsible Institutions	ITU Rectorate, all Faculties, Institutes, facilities are located on campuses.
Timeline	In 2022, the scope of the database will be determined and infrastructure work will be carried out. Starting from 2023, the building inventory will be started.

2.4.6. DEFINING ENERGY-SAVING TARGETS FOR BUILDINGS

Goal	Defining annual targets for increasing energy efficiency in buildings. Ensuring that the energy-saving potential in the ITU building stock is defined following Article 7 of the EU Energy Efficiency Directive.
Activities to Undertake	• Determination of savings targets with energy analysis studies in buildings. • Development of guidelines with energy-saving measures. • Carrying out studies to raise awareness of energy-saving among public employees. • Ensuring the appointment of energy managers to buildings. • Making energy efficiency renovations and applications in buildings within the program. • Monitoring of energy-saving results

Outputs	Savings target and realized the amount of savings.
Responsible Institutions	ITU Rectorate, all Faculties, Institutes, facilities are located on campuses.
Timeline	Savings targets will be determined in 2022 and savings will be provided and followed up as of 2023.

2.4.7. REHABILITATION OF EXISTING BUILDINGS AND IMPROVEMENT OF ENERGY EFFICIENCY

Goal	Carrying out studies to increase energy efficiency in areas such as thermal insulation and the use of high-efficiency windows, lighting, white goods, heat pumps, boilers, and elevator motors in buildings.
Activities to Undertake	• Making macroeconomic analyzes for the rehabilitation of existing buildings. • Developing mechanisms for implementation, taking into account incentive, support, and taxation methods in line with the analyzes to be made. • Making necessary legislative arrangements and defining implementation plans. • Conducting awareness-raising activities, preparing guidelines, and guiding documents for the mechanism. • Developing a method for the control and monitoring of applications.
Outputs	Legislative regulation, mechanism development, number of buildings rehabilitated.
Responsible Institutions	ITU Rectorate
Timeline	In 2022, the appropriate method will be determined, and necessary legislative studies will be carried out. As of 2023, the determining method will be implemented and the results will be followed.

2.4.8. EXPANDING THE USE OF RENEWABLE ENERGY AND COGENERATION SYSTEMS IN BUILDINGS

Goal	To increase the use of renewable energy sources and cogeneration systems in buildings, to increase the number of low carbon emission, sustainable, and environmentally friendly buildings on campus. To give information about the effect of renewable technology integrations on the energy efficiency of both the existing and new buildings.
Activities to Undertake	• Investigation of the use and suitability of renewable energy sources in buildings. • Conducting feasibility studies for the application of renewable energy sources in buildings. • Making settlement studies with the grid operators of buildings using photovoltaic (solar panels).

	• Investigation of indirect or direct support models to apply cogeneration, heat pump, and renewable energy sources in existing buildings.
Outputs	Legislative regulation, total renewable energy, and cogeneration installed power to be established for self-consumption in buildings.
Responsible Institutions	ITU Rectorate
Timeline	In 2022, technical and administrative studies will be carried out and implementation will begin.

3) WATER

3.1. CURRENT WATER USE ON ITU CAMPUSES

Currently, in ITU campuses, the distribution of total water use is not known since there is no water meter at each building entrance. The total amount of water used in the campuses is determined over the price invoiced by ISKI. As of 2019, the total amount of water used in ITU campuses is given in Figure 7. Data on water use in Tuzla Campus could not be obtained.

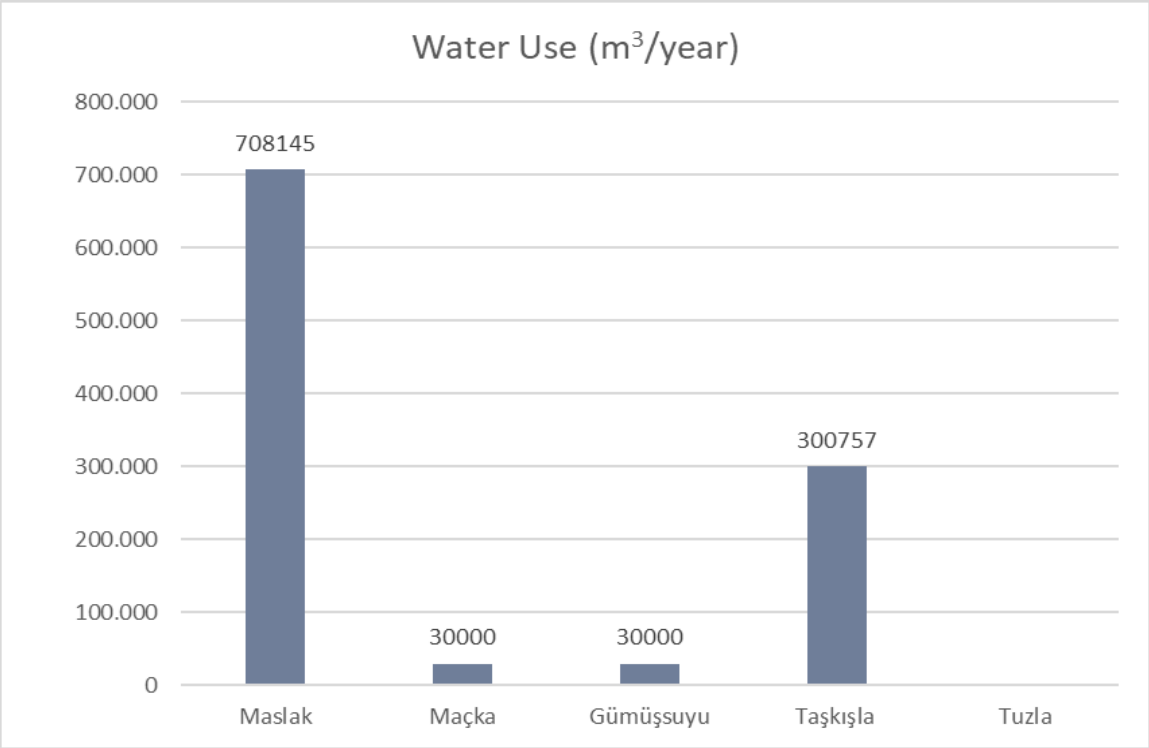


Figure 7 Current waste use

3.2. RAINWATER HARVESTING AND IRRIGATION

At ITU, 77,000 m^3/year of rainwater reaching the ITU Pond through surface runoff is withdrawn and used in green fields as irrigation water (This amount is approximately 10% of the water used in Maslak Campus). One of the methods that can be used to increase stormwater harvesting is rainwater harvesting from building roofs. For example, currently, the water obtained by rainwater harvesting from the roof of ITU Abdulhakim Sancak Mosque is used for irrigation. In line with the "Regulation on Amending the Planned Areas Zoning Regulation", for which the Ministry of Environment and Urbanization (MEU) is in charge and is published in the Official Gazette dated 23 January 2021 and numbered 31373, rainwater harvesting from the roofs is mandatory if the roof area or parcel area is over 2000 m^2. According to the Istanbul Zoning Regulation Draft approved by the Istanbul Metropolitan Municipality (IMM) Assembly, it has been stated that cisterns will be required for rainwater in buildings over 1000 m^2 parcel area.
As the first step of the studies on rainwater harvesting from the roofs of buildings, buildings with a roof surface area of 2000 and 1000 m^2, were determined in ITU campuses, according to

the MEU and IMM regulations, respectively. The analysis of the roof areas of the buildings is provided in Table 2.

Table 2 Roof Area Analysis of Buildings on ITU Campuses

ITU Campus	Total number of Buildings	Number of Buildings with a Roof Area ≥ 1000 m^2	Number of Buildings with a Roof Area ≥ 2000 m^2	Total Roof Area for Cases where Roof Area ≥ 1000 m^2	Total Roof Area for Cases where Roof Area ≥ 2000 m^2
Ayazağa	120	57	30	180796	145316
Gümüşsuyu	9	5	2	20270	16330
Maçka	11	8	1	16040	5530
Taşkışla	4	2	2	11040	11040
Tuzla	24	5	1	7960	2300

As can be seen from Table 2, in the other four campuses except for Tuzla Campus, the roof area of approximately half of the buildings is larger than 1000 m^2. These calculations suggest that rainwater harvesting could be an alternative water resource. Using the long-term monthly average total precipitation data for Istanbul between 1929 and 2020, the amount of water that can be obtained by rainwater harvesting from buildings with a roof area of 1000 m^2 and 2000 m^2 in ITU campuses was calculated and the results are provided in Table 3. In order to stay on the safe side during the calculation, the results obtained were multiplied by a safety factor of 0.75.

Table 3 Amount of Water that Can Be Obtained from the Roofs of the Buildings in ITU Campuses by Rainwater Harvesting

ITU Campus	Amount of water that can be obtained by rainwater harvesting for buildings with roof area ≥ 1000 m^2 (m^3/month)												Annual total (m^3/year)
	January	February	March	April	May	June	July	August	September	October	November	December	
Ayazağa	13560	10712	8393	5682	5139	5220	2671	2997	6156	10929	8109	14061	93630
Gümüşsuyu	1520	1201	941	637	576	585	299	336	690	1225	909	1576	10497
Maçka	1203	950	745	504	456	463	237	266	546	970	719	1248	8307
Taşkışla	828	654	513	347	314	319	163	183	376	667	495	859	5717
Tuzla	597	472	370	250	226	230	118	132	271	481	357	619	4122
ITU Total	17708	13989	10961	7420	6711	6818	3488	3913	8039	14273	10589	18363	122273

ITU Campus	Amount of water that can be obtained by rainwater harvesting for buildings with roof area ≥ 2000 m^2 (m^3/month)												Annual total (m^3/year)
	January	February	March	April	May	June	July	August	September	October	November	December	
Ayazağa	10899	8610	6746	4567	4131	4196	2147	2409	4948	8784	6517	11302	75256
Gümüşsuyu	1225	968	758	513	464	472	241	271	556	987	732	1270	8457
Maçka	415	328	257	174	157	160	82	92	188	334	248	430	2864
Taşkışla	828	654	513	347	314	319	163	183	376	667	495	859	5717
Tuzla	173	136	107	72	65	66	34	38	78	139	103	179	1191
ITU Total	13539	10696	8380	5673	5131	5212	2667	2992	6147	10912	8096	14040	93485

In addition, “Regulation on Rainwater Collection, Storage and Discharge Systems” published in the Official Gazette dated June 23, 2017, and numbered 30105 is in force and can be used for the design of rainwater harvesting systems.

3.3. GREY WATER TREATMENT AND ITS USE IN TOILETS

Grey water defines wastewater other than toilet wastewater (wastewater from kitchen and bathroom sinks, showers and bathtubs). It is possible to use grey water as toilet flush water after it has been treated in a way that will minimize the possible negative effects on human health and the environment. In our country, there are no standards for grey water quality. However, Germany and other EU countries, use the Swimming Water Quality Regulation for the use of grey water as toilet flush water. Until there is a Turkish regulation in effect, Swimming Water Quality Regulation can be used in the evaluation of grey water quality on ITU Campuses.

In our country, no regulation determines the technical conditions of grey water reuse systems (storage tank, treatment, installation, etc.), and it may not be possible to change the infrastructure in existing buildings to accommodate grey water reuse. Nevertheless, it will be possible to reuse grey water in the buildings, which will be constructed in the future, by considering the requirements for grey water reuse during the design phase.

Grey water treatment (membrane treatment) and its use as toilet flush water have started in the Information Technology Building that has been recently built on ITU Maslak Campus. In addition, in the recently constructed Environmental Engineering Building, grey water is collected on the -2nd floor is transferred to the -3rd floor where it is treated and then is sent back to the -2nd floor to be used as toilet flush water. However, this application is only done between two floors and not the entire building.

3.4. TARGETS RELATED TO WATER USE

- Publishing the ITU Water Directive and establishing the Water Management Coordination Board
- Monitoring and recording temporal water use on a building basis
- Prioritization of buildings for meter installation by the Technical/Administrative Commission that will be established by Water Management Coordination Board
- Building an inventory on armatures (in toilet flushes and taps) in buildings and replacing them with armatures using less water
- Detection and prevention of water leaks
- Installation of necessary infrastructure upon selection of appropriate buildings for rainwater harvesting from the roofs
- Designing and constructing the new buildings by considering grey water reuse
- Installation of gauging systems for rainwater harvesting and grey water reuse in order to measure and record the amount of water and calculate the how much water is saved.

4) WASTE DIVERSION

4.1. OBJECTIVES FOR SUSTAINABLE WASTE MANAGEMENT

Sustainable waste management is important in terms of Climate Change. Because the uncontrolled management of waste causes more raw material consumption and the formation of greenhouse gases. The goal of sustainable waste management at ITU is a zero-waste hierarchy based on a circular economy (Figure 8). In order to put this hierarchy into practice, priorities will be given to waste prevention and reduction. Afterward, studies will be carried out to increase the recycling and recovery of wastes. In order to evaluate the efficiency of these studies, indicators such as total waste generation and the amount of recycled packaging waste will be monitored in certain periods.

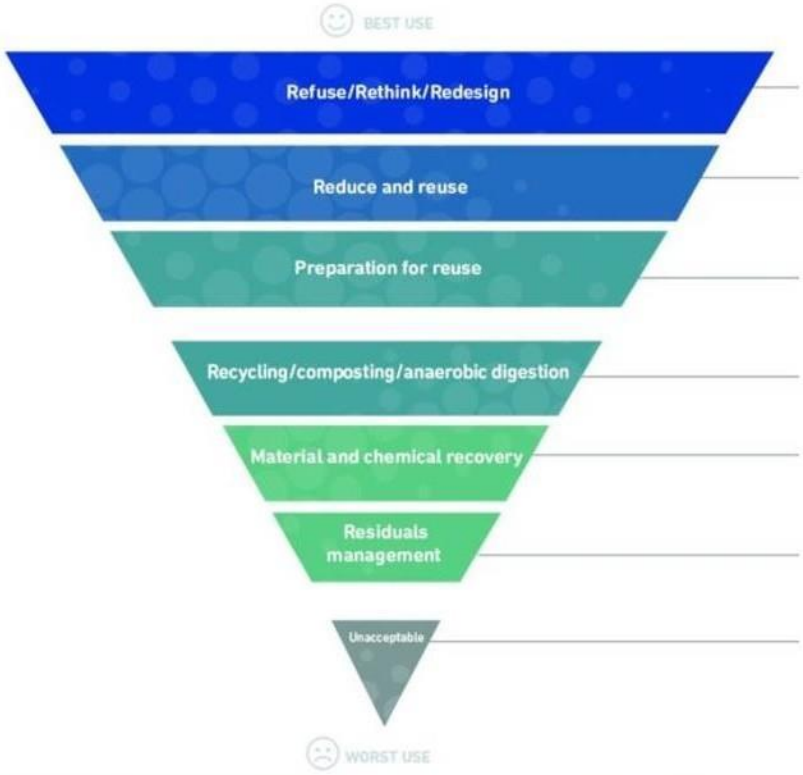


Figure 8 Zero waste hierarchy based on circular economy

4.2 PREVENTION AND REDUCTION

4.2.1. PREVENTING/REDUCING PAPER USE

One of ITU's primary strategic goals is digitalization. With the spread of digitalization, transactions made using paper in many departments are carried out electronically. The Papirus and Ninova systems used at the university are good examples of this. With the Papirus system, correspondence between departments started to be made electronically. Ninova, on the other hand, is a platform where lecture presentations can be shared with students and assignments are sent electronically to faculty members. Thanks to these digital systems, significant reductions in paper usage have been achieved. However, many departments still have paper reduction potential. As an example, the Leave Form has recently been transferred to the digital

environment and the waste of paper used by the personnel in each permit process has been prevented. In order to reduce the paper usage, the processes in all departments will be reviewed and the processes will be transferred to the digital environment at the maximum rate.

4.2.2 PREVENTING/REDUCING PLASTIC USE

One of the most important pollutants of seas and beaches is single-use plastics. ITU adopts the policy of reducing single-use plastics on all campuses. For this purpose, studies will be carried out to reduce plastic straws, plates, forks, knives, spoons, stirrers and foam food containers and PET (polyethylene terephthalate) water bottles. In this context, statements regarding the reduction of single-use plastics will be included in the contracts for rentals (especially eating and drinking places) to be made on campuses. In addition, the number of drinking fountains in some buildings will be increased in order to reduce PET water bottles. Students and staff will also be encouraged to bring their water bottles.

4.2.3 PREVENTING/REDUCING ORGANIC WASTE

It is seen that some of the meals taken in the cafeterias and dining halls on the campuses are thrown away without being touched. In order to raise awareness on this issue, photo and poster competitions will be organized and trainings will be given. In this way, less organic waste will be generated.

4.3. CIRCULAR ITU

ITU adopts the circular economy as a policy and encourages the use of waste as a resource.

4.3.1 PREFERENCE OF MATERIALS SUITABLE FOR CIRCULAR ECONOMY IN PROCUREMENTS

Procurements are carried out in many different departments. Trainings will be given to procurement officers in order to choose materials suitable for the circular economy. It will be ensured that the procurements specifications include statements that are environmentally friendly, reusable and recyclable, and that products with a high content of recycled materials will be preferred.

4.3.2 INCREASING SHARING AND REPAIRING

At the top of the Zero waste hierarchy based on the circular economy is the prevention of the purchase of new products. Commonly used methods for this purpose are sharing and repairing. As part of the ongoing Asset Management Project at ITU, an inventory of all assets is prepared, and it is aimed to use this inventory more efficiently and to prevent unnecessary purchases. In addition, sharing of the same materials in many departments will be ensured. While a separate printer was used in each room in the administrative departments at ITU until recently, a single printer was used in the departments with the joint printer project. Similar studies will be carried out to increase sharing. There are many laboratories at ITU. In these laboratories, when the expiry date of chemical consumables has passed, they are classified as hazardous waste and properly disposed of at the municipality's facilities. In order to prevent this situation, a web page will be prepared where the lists of chemical consumables whose expiry date is approaching

can be viewed. Other consumables such as glass materials, are not needed. can be added to the list.

Relevant administrative and academic personnel can register here and monthly lists will be shared with these people via e-mail. In this way, the purchase of new consumables will be prevented and the amount of hazardous waste will be reduced. In ITU, the broken computers of the personnel are repaired free of charge in the IT (Information Technology) Center, and there are repair shops in many departments. In addition, free bicycles were distributed to many departments on campus, and the share of these bicycles was encouraged. Instead of buying a new one, special discounts will be provided for ITU staff and students by making institutional agreements with repair companies in order to encourage repair and increase their usage time. Weekly organizations will be held for the repair of tools. In addition, workshops will be organized so that staff and students can do simple repairs themselves.

4.3.3 DISSEMINATION OF APPROPRIATE SYSTEM FOR SEPARATION OF WASTES AT SOURCE

The collection of packaging waste in Istanbul is under the responsibility of District Municipalities, and there are differences in the practices of district municipalities. Since ITU campuses are located within the borders of different district municipalities, waste separation containers of different colors and numbers are used on campuses. This confuses and wastes being thrown into the wrong container. A pilot study was conducted in representative buildings to use a uniform system at ITU. According to the results of the study, the triple system (glass; paper/plastic/metal; other) was selected, and triple separation containers were placed in many buildings. The use of the new separation system in all campuses and buildings will be provided as soon as possible.

4.3.4 INCREASING RECYCLING

With the widespread use of the above-mentioned triple separation systems, an increase in the recycling rates of packaging waste is expected. However, placing separation containers alone is not enough. It is also important to ensure that waste is disposed of in the correct containers. Wastes thrown into the wrong containers cannot be used as a source, and inappropriate materials thrown into the recyclable waste container cause the low quality of packaging waste.For this reason, the efficiency of triple separation systems will be checked periodically, and theresults will be shared with students and staff. In this context, trainings will be organized for staff and students for correct use, and this issue will be especially emphasized in orientations tonew students and staff.

4.3.5 INCREASING RECOVERY

In ITU, a significant amount of organic waste is generated from eating and drinking places, especially cafeterias and dining halls. In order to ensure the recovery of these organic wastes, a Biomethanization Facility has been established on the Ayazağa Campus. In addition, composting units will be placed at different points in order to increase the recovery of organic wastes. Composting workshops will be organized for staff and students. The compost to be obtained from these areas will be used in the green areas of the campuses.

4.3.6 RAISING AWARENESS ON UPCYCLING

Although the recycling of packaging waste has been known for many years, upcycling, in which materials with higher added value are obtained, has come to the fore in recent years. Since this is a relatively new approach, awareness activities such as exhibitions and workshops will be carried out regarding upcycling. In addition, R&D (Research & Development) projects for upcycling will be encouraged.

5) EDUCATION

As the world is changing in accordance with globalization, so are education institutions including higher education. With the specification of Sustainable Development Goals (SDGs) by the United Nations for a changing world, so as to respond to the demands of the current era, many higher education institutions around the world started to incorporate different aspects of SDGs into their curricula. Being one of the SDGs, Quality Education (SDG4) requires ensuring relevant learning for citizenship in a global world, which forms the main pillar for mainstreaming Global Citizenship Education at all levels to engage students in global issues and instill them with necessary competencies for appropriate and adequate comprehension of issues concerning the SDGs. In addition, to raise graduates equipped with skills and competencies required in the 21st-century workplace, higher education institutions are continuously innovating their curricula to integrate 21st Century 4Cs skills - Critical Thinking, Communication, Collaboration, Creativity- as part of the global sustainable developmentprofile of engineers.

Recognizing that the profile of engineers is a global one with English as one of the core skills, ITU School of Foreign Languages (SFL) has taken the necessary steps to implement English as a primary sustainable development skill for its prospective graduates. Accordingly, ITU SFL started to offer a new and innovative course titled "ING 100-English through Global Goals". ING 100 is an interdisciplinary course of English for Academic Purposes (EAP) that will help students develop their English language skills through 21st century core skills- the 4 Cs (critical thinking, communication, collaboration, creativity) and United Nation's Sustainable Development Goals that have become core to the engineering professional profile. The course was designed to respond to the needs of engineering students in a variety of disciplines in terms of English communication and it started to be implemented as a compulsory course in ITU in the 2021-2022 academic year fall term. In addition to developing students' English communication, academic and soft skills, the focus on the SDGs encourages students to consider their role as responsible 21st century global citizens. The objectives of this course can be summarized as below:

- Enabling students to express themselves using appropriate discourse strategies in written and spoken communication
- Developing the 4 Cs (Critical thinking, communication, collaboration, creativity) of 21st Century Learning, which are core skills that the students will need in their academic and social lives
- Enhancing students' awareness regarding Sustainable Development Goals
- Improving students' collaboration skills in multidisciplinary groups
- Developing integrated academic practices and soft skills, such as goal-setting, self-reflection and time management

While the content focuses mainly on SDGs and is supplemented by activities requiring active participation of and collaboration among students, assessment is conducted through group poster presentations, integrated communication tasks and group projects in line with the objectives of the course and requirements of 21st century learning and assessment as a whole.

CONCLUSION

Istanbul Technical University made a formal commitment to becoming carbon neutral as soon as possible in 2021. As the chapters of ITU/CAP demonstrate, there is no limit to creative solutions for accomplishing this worthy goal. We reaffirm our engagement to this principle with the approval of ITU/CAP 2021-2048, and we look forward to stepping up our environmental stewardship efforts in the years ahead.

To summarize, we would like to embrace significant change in the pursuit of a long-term sustainable future; however, the possibilities for enacting meaningful change are infinite. We devote ourselves, through this statement, to the potential of disruptive decision-making, robust behavior change, and long-term climate action, whether it begins on campus, in a community, or at the state, national, and global levels.

APPENDIX A: ACKNOWLEDGEMENTS

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APPENDIX B: ACRONYMS

CAP : Climate Action Plan

CEN/TS : European Committee for Standardization/Technical Specifications

CSC : Campus Sustainability Committee

EN ISO : European Norm International Organization for Standardization

EU : European Union

GHG : Greenhouse Gas

GPS : Global Positioning System

IMM : Istanbul Metropolitan Municipality

ISO : International Organization for Standardization

IoT : Internet of Things

ITU SFL : Istanbul Technical University School of Foreign Languages

ISKI : Istanbul Water and Sewerage Administration

MEU : Ministry of Environment and Urbanization

MWh : Megawatt hour

SDGs : Sustainable Development Goals

PET : Polyethylene Terephthalate

TOE : Tonne of Oil Equivalent