



Bolu Abant İzzet Baysal University Sustainability Report

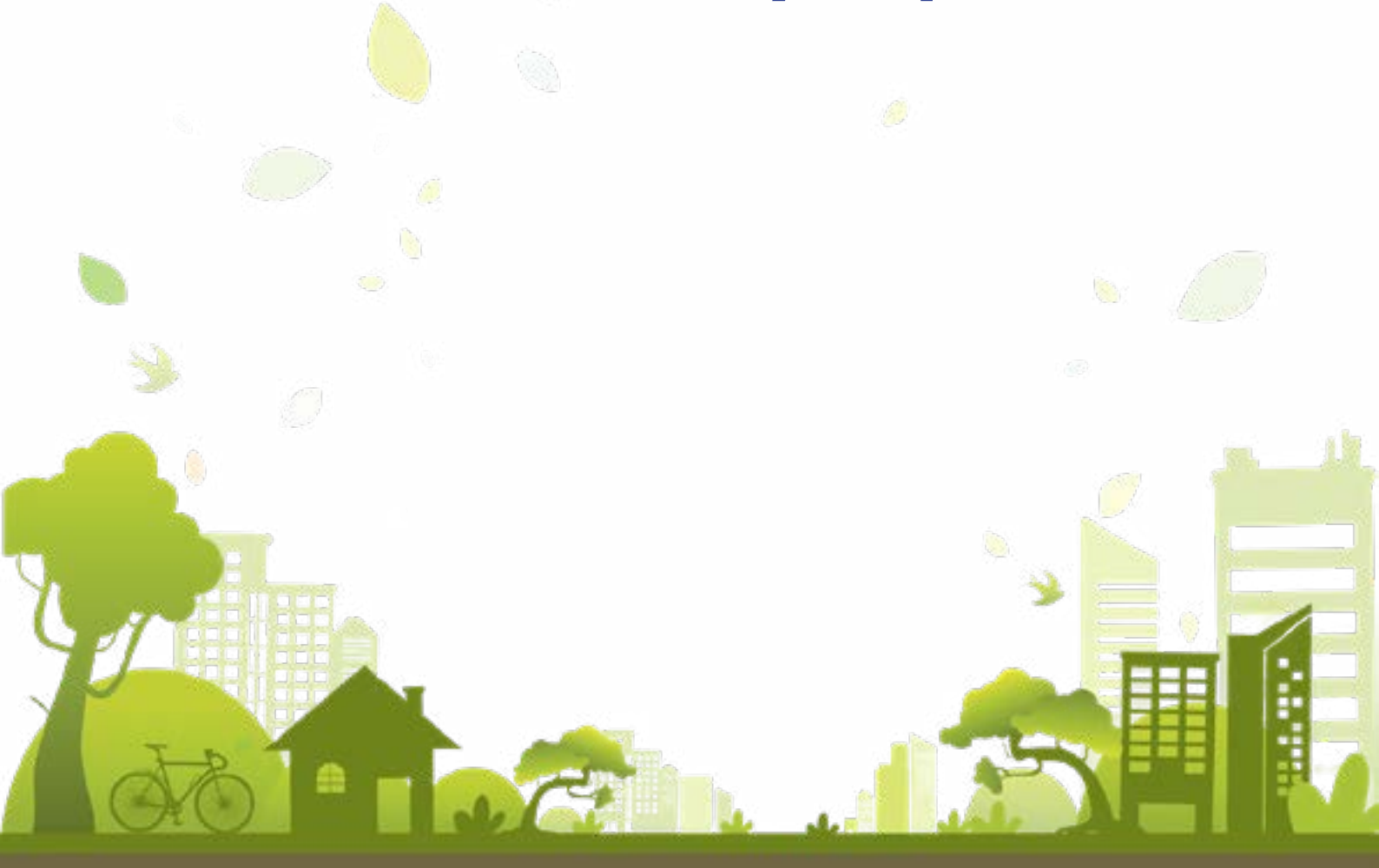


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Preface

Bolu Abant İzzet Baysal University (BAİBU) takes its environmental responsibilities seriously. In this theme, it focus on the efficient use of resources, climate change mitigation, carbon reduction and biodiversity. BAİBU has committed to reduce consumption of goods and services, decrease the generation of waste, enhance the biodiversity on campus. In addition, water has been consumed efficiently in the campus. BAİBU will become a low carbon University, through energy efficiency and reduced carbon emissions.

BAİBU applied to University of Indonesia GreenMetric World University Ranking in 2019 as a first time. This ranking measures campus' sustainability efforts. The driving force behind ranking is that universities' responsibility for sustainable development goals and world's complex challenges. The corresponding ranking has been grading the universities in terms of six categories, which are Setting and Infrastructure (SI), Energy and Climate Change (EC), Waste (WS), Water (WR), Transportation (TR) and Education (ED). Each category has specific indicators and each indicator has awarded with certain point in the ranking. In 2019, 780 universities from 85 countries took apart in the ranking. BAİBU became 609th World's Most Sustainable University in 2019. The overall score of BAİBU was 3500 out of 10000. The contribution of SI, EC, WS, WR, TR and ED to total point was 21%, 15%, 25%, 5%, 16% and 18%, respectively. There were 43 universities applied to this ranking from Turkey. The overall country ranking of BAİBU was 36 in 2019.

This report summarizes the performance of BAİBU on specific indicators under these six categories.

1. Number of Campus Sites

Bolu Abant İzzet Baysal University consists of 7 campuses.



Figure 1.1 Gököy Campus



Figure 1.2 Gököy Campus



Figure 1.3 Yeniçağa Campus



Figure 1.4 Mengen Campus



Figure 1.5 Gerede Campus



Figure 1.6 Gököy Campus

2. Energy and Climate Change (EC)

2.1 Energy Efficient Appliances Usage



Figure 1.7 Seben Campus



Figure 1.8 Mudurnu Campus

Gölköy Campus is the largest campus with a total surface area of 3926500 m². It is one of the six campus of the BAİBU. The main campus of the university, namely İzzet Baysal Campus, is located in Gölköy, which is 8 km from the city center and surrounded by a unique natural beauty. Yeniçağa Campus is a modern purpose-built campus, which now extends to 10050 m². This campus was established in September of 2009. Mengen Campus was established in 1997 and the total surface area of this campus is 41695 m². Gerede Campus, with a total surface area of 64600 km², was established in 1993. Vocational School of BAİBU, is located at the city center of Bolu. Total surface area of this campus is 55753 m². Seben Campus was established in 2015 and the total surface area of this campus is 21732 m². Mudurnu Campus was established in 1997 and the total surface area of this campus is 15100 m².

Gölköy Campus is located in a suburban area with a high rate of forest cover. Gölköy Campus has a total area of 3926500 m² and a total population of 9487 including academic and administrative staff, students staying in dormitories and employee and their families living in public housing.

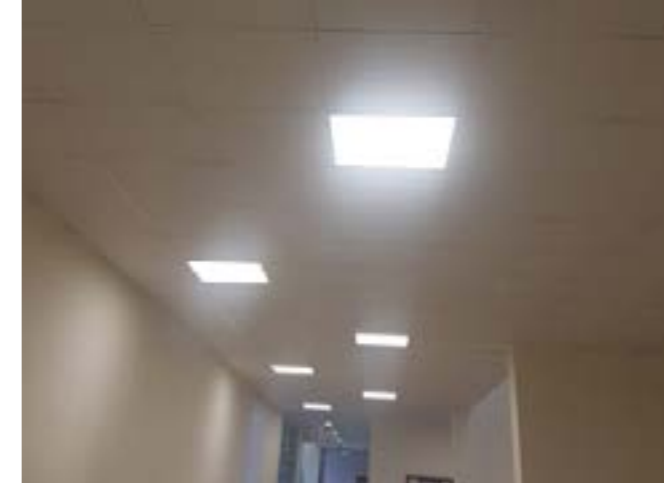


Figure 2.1 Energy Efficient Appliances Usage: Use of LED lighting and lamps with light detection at Faculty of Engineering in Gölköy Campus

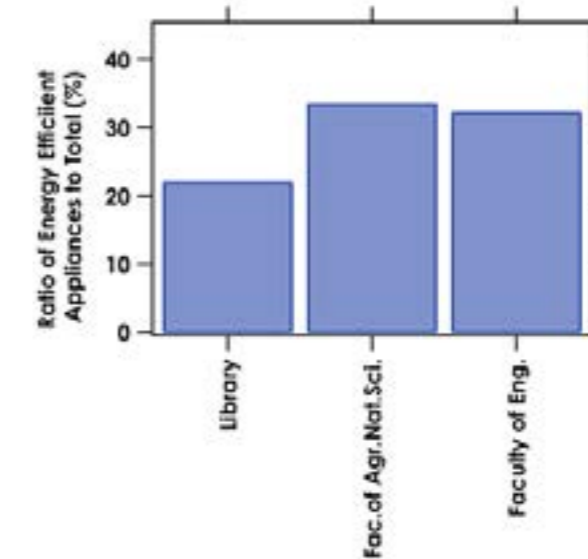


Figure 2.2 Ratio of energy efficient appliances to total at three different buildings at Gölköy Campus

Energy efficient appliances are also used in the Gölköy Campus of BAİBU. These appliances include mainly LED lamps as depicted in Figure 1. The ratio of used of LED lamps to total varies from one building to another, but on average, 29.3 % of total lamps is LED. In addition, the total number of appliances in the Gölköy Campus is 4992 and 232 of these appliances (including freezers and other instruments used in the laboratories) are energy efficient in total, which implies that 4.65 % of total appliances are energy efficient.



2.2 Energy Efficient Appliances Usage



Figure 2.3 Façade Mounted Solar Panels at Gökçöy Campus



Figure 2.4 Traffic Light with solar panel at Gökçöy



Figure 2.5 Roof Mounted Solar Panels at Gökçöy Campus



Figure 2.6 Wind Turbine at Gökçöy Campus

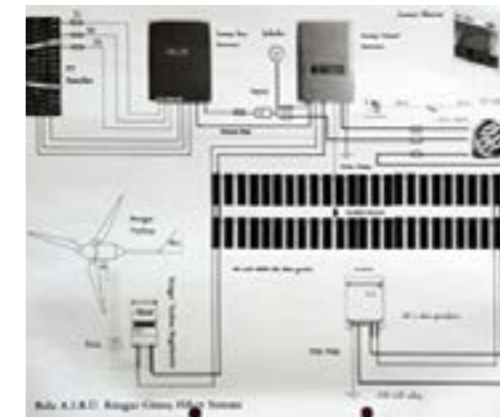


Figure 2.7 Hybrid system of solar panel (Figure 2.7) and wind turbine

Figure 2.5 Solar PV power station of total 2.32 kWh was installed on the façade of one of the building, so called Nuclear Radiation Detectors Application and Research Center (NÜRDAM), of BAİBU.

Figure 2.6 Traffic lights with solar panel also present in the Gökçöy Campus of BAİBU

Figure 2.7 Roof mounted panel in front of the Vocational School of Physical Education Department in the Gökçöy Campus of BAİBU

Figure 2.7 A wind turbine is also available on the Gökçöy Campus of BAİBU.



Figure 2.8 A plan view of hybrid system including Figure (3) and Figure (4)

2.3 Electricity Usage per Year

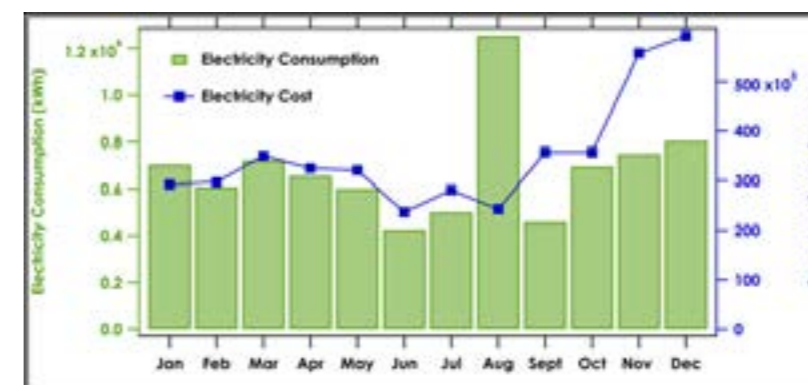
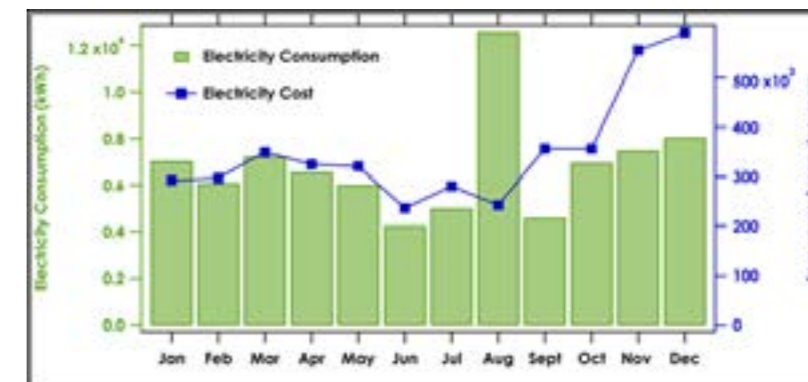


Figure 2.8 Total Electricity Consumption in 2019 at Gökçöy Campus



The total electricity consumption of Gököy Campus in 2018 is 8165880 kWh. In addition, the total energy usage at the Gököy Campus between January 2019 and September 2019 is 5002357 kWh. The electricity usage in the last 12 months (October 2018 and September 2019) is 7249029 kWh. On the main campus area of BAİBU, electricity is used for lighting, cooling, heating and laboratory appliances. The total natural gas consumption in the main campus is 3 million m³ per year. The natural gas is mainly use for heating in the main campus. The total wastewater discharged to the sewage system of Bolu Municipality is 30000 ton per month.

2.4 Elements of Green Building Implementation as Reflected in All Construction and Renovation Policies



Figure 2.9 Green Building Implementation at Gököy Campus

2.5 The Total Carbon Footprint

CO₂ (electricity)

$$= (7249029 \text{ (kWh)}) / 1000 \times 0,84$$

$$= 6089.18 \text{ metric tons}$$

CO₂ (bus)

$$= (\text{number of shuttle bus in your university} \times \text{total trips for shuttle bus service each day} \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240) / 100 \times 0,01$$

$$= (2 \times 47 \times 5 \times 240) / 100 \times 0,01$$

$$= 11.28 \text{ metric tons}$$

CO₂ (cars)

$$= (\text{number of cars entering your university} \times 2 \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240) / 100 \times 0,02$$

$$= (3480 \times 2 \times 3 \times 240) / 100 \times 0,02$$

$$= 1002.24 \text{ metric tons}$$



CO₂ (motorcycle)

$$= (\text{number of motorcycle entering your university} \times 2 \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240) / 100 \times 0,01$$

$$= (15 \times 2 \times 3 \times 240) / 100 \times 0,01$$

$$= 2.16 \text{ metric tons}$$

CO₂ (total)

$$= 6089.18 + 11.28 + 1002.24 + 2.16$$

$$= 3561.96 \text{ metric tons}$$

Carbon footprint in 2018 = 7104.864 metric tons

The carbon footprint of the main campus (Gököy Campus, BAİBU) was calculated based on the Option 2 of UI GreenMetric guideline. The CO₂ release from the use of electricity in the campus is summed up with the CO₂ emissions from cars, buses and motorcycles and considered as the carbon footprint of the campus, which is 7104.864 metric tons for the last 12 months (October 2018- September 2019).

3. Waste

3.1 Recycling Program for University Waste

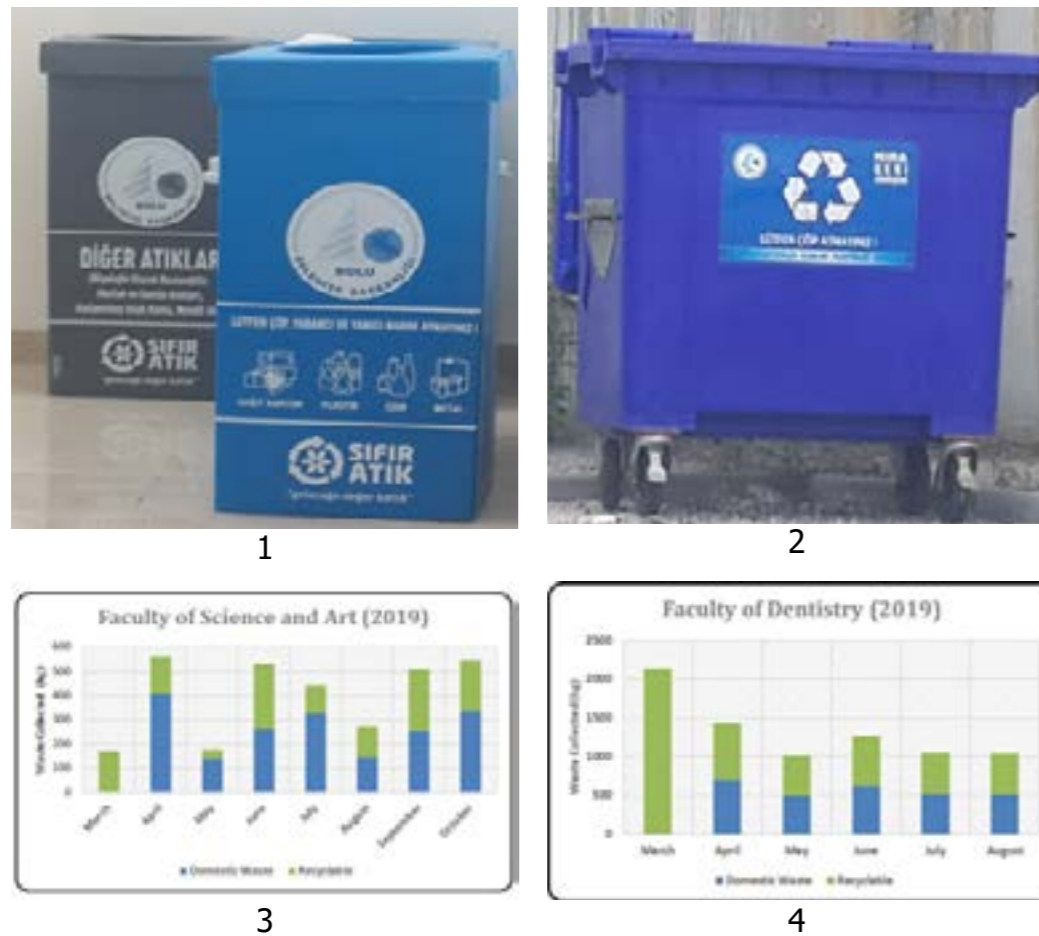


Figure 3.1 Example of Recycling Program for University Waste

1. Zero Waste (so-called "Sıfır Atık" in Turkish) Project was started in Turkey in January 2019. In the framework of this project, it is aimed that the recovery of packaging wastes will be increased up to 12 % in 2023, which was 5.3 % in 2014. Consequently, the plastics and papers have been collecting separately in campuses of BAİBÜ to reduce the waste amount disposed at the landfills. Recycle boxes have been put all around the faculties, dormitories, gym centers, and administrative building in the campus to collect glass, paper, metals and plastic separately from the organic wastes.

2. Recycle bins have been placed in the garden of each faculties to collect the recyclable plastics, metals, glass, paper and cardboard at all campuses of BAİBÜ. Additionally, this program allows all types recyclables (plastic, paper, glass, aluminum) to be placed in the same container, making it easier for the user. BAİBÜ also promotes the recycling of Electronic Waste and ink-cartridges from printers. E-waste items should not be disposed of in the normal trash due to their high concentrations of toxic chemicals and heavy metals. These wastes have been put in the transparent plastic bags and placed aside the recycle bins, which have then been collected by the municipality of Bolu.



3. Figure 2 shows the total amount of domestic waste and recyclables collected at the Faculty of Science and Art in 2019. The total amount of waste collected in this faculty between March and October (2019) is 3223 kg, which includes 1861 kg of domestic waste and 1362 kg of recyclables.

4. Figure 4 depicts the total amount of domestic waste and recyclables collected at the Faculty of Dentistry in 2019. The total amount of waste collected in this faculty between March and August (2019) is 7911 kg, which includes 2821 kg of domestic waste and 5090 kg of recyclables.

3.2 Program to Reduce the Use of Paper and Plastic on Campus



Figure 3.2 Example of Program to Reduce the Use of Paper and Plastic in Gölköy Campus

1. Use of plastic bags has decreased by 50 % in Turkey after January 1st, 2019, when retailers began charging for environmentally charging plastic bags. The retailers are charging 0.25 Turkish Lira (\$ 0.05) for each plastic bag after 1st of January, 2019 at the shopping mall in the campuses of BAİBU, which encourage people (students, academicians and officials) to use their cotton reusable bags during shopping (Figure 1).

2. Moreover, academic and administrative personnel always try to use 2-side of the paper for printing and check their data before print. Students and academicians try to use e-books and online system instead of hard copy of the books and other relevant material.



3. BAİBÜ IT supports paperless system to reduce paper in daily workplace. Electronic Document Management System (EBYS) has been used for sending and receiving of documents in the university and also within the other state departments in the country.

The objective of all these efforts is to reduce a lot of paper use at BAİBÜ, which in turn can reduce CO2 emissions and save the world.

3.3 Organic Waste Treatment

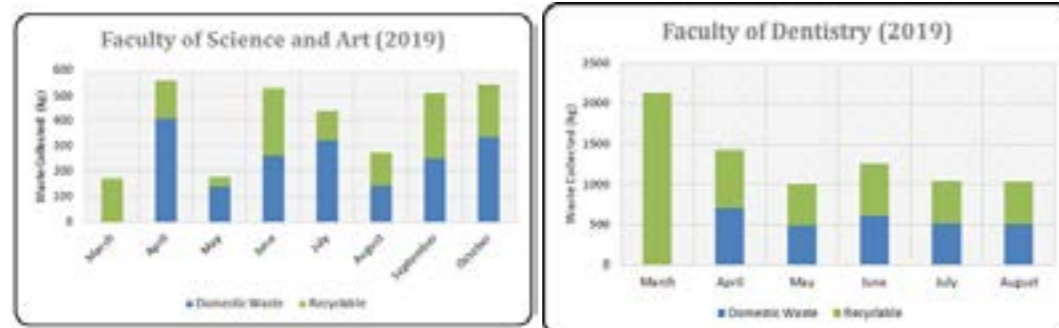


Figure 3.3 Example of Organic Waste Treatment at Gölköy Campus

In Gölköy Campus of BAİBÜ, the only structures that produce organic waste are canteens and cafés, which have been collected in special bins separately from recyclables, hazardous and toxic wastes. Municipality of Bolu (so-called "Bolu Belediyesi" in Turkish) collects the organic waste and it delivers them at an authorized waste treatment plant that processes the material through anaerobic digestion. The outputs of this system are: biogas, from which biomethane, electricity and liquid carbon dioxide for industrial use are produced, and organic fertilizers.



- The total amount of organic waste collected in the Faculty of Dentistry between April 2019 and September 2019 was 2,821 kg.
- The total amount of organic waste collected in the Faculty of Science and Art between March 2019 and October 2019 was 1,861 kg.

3.4 Inorganic Waste Treatment



Figure 3.4 Inorganic Waste Treatment

Used batteries in the campus are collected in special red collection bins at Gölköy Campus of BAİBÜ

3.5 Toxic Waste Treatment



Figure 3.5 Example of Toxic Waste Treatment



Management of (solid/liquid/gaseous) hazardous waste is directed by Waste Technical Team in the university, which was formed in accordance with the requirements of "Zero Waste Project" after 1st of January, 2019. Currently, the toxic wastes are collected in special bins in the Faculty of Dentistry (Figure 1, orange bin) only. In addition, the batteries are also collected in special bins (Figure 2, red bin) at this and other faculties at the Gököy Campus. Moreover, Faculty of Dentistry is provided with a Temporary Waste Storage (Figure 3) to safely store the



Hazardous Waste received from the labs where they are originated until they are picked up from the authorized Company. One trained Environmental Officer-Technician (Jale Bağcı) is responsible for the waste packaging and labeling and fill documents to comply with national and international regulations. The Table 1 shows the type and amount of toxic wastes collected and sent to authorized companies for disposal.

3.6 Sewage Disposal



Figure 3.6 Sewage Disposal

Wastewater generated within the campus is discharged to the sewage system of the Bolu Municipality, where it is treated with the conventional treatment. Every month 30000 tonnes of wastewater is treated by this way.



4. Transportation

4.1 Number of Transportation Initiatives to Decrease Private Vehicles on Campus



Figure 4.1 Campus Shuttle

Bus service for the administrative and academic personnel in the morning from home to campus and in the evening from campus to home in each working day

4.2 Shuttle Services



Figure 4.2 Shuttle Route

Shuttle services are started at 08:15 am in the morning and the duration between each shuttle service is 15 minutes. The route of the shuttle service at the Gököy Campus (BAİBU) is depicted in Figure 4.2. The shuttle services are continued till 10:00 pm in the evening and the total number of shuttle service between 08:15 am and 10:00 pm is 47 per day.



4.3 Pedestrian Path Policy on Campus



Figure 4.3 Example of pedestrian path at Gököy Campus



Figure 4.4 Example of pedestrian path street lamp at Gököy Campus

1. Separator between road for vehicle and pedestrian path.
2. Ramps and guiding blocks which have suitable design for pedestrian having physical disabilities.
3. Street lamp for pedestrian in night. Gököy Campus of BAİBU has 200 solar street lamps, which control the solar street lights automatically through the intensity of light.

4.4 Ratio of Parking Area to Total Campus Area



1



2



3

Figure 4.5 Parking areas

There are several parking lots in the Gököy Campus (BAİBU). Figure 1 depicts the parking lots (highlighted in red). Figure 2 and 3 show the parking lots on the west and east side of the campus, respectively. Parking area information at BAİBU's campuses are provided in Table 1 below:

Table 4.1 Parking area information of the campuses at BAİBU

Campus	Total Area (m ²)	Parking Area (m ²)	Ratio
Gököy Campus	3,926,500	47,824	0.012
Yeniçağa	10,050	351	0.035
Mengen	41,694.72	663	0.016
Gerede	64,598.99	3,342	0.052
Mudurnu	15,096.25	6,085	0.403
Seben	21,732.08	1,101	0.051



5. Education and Research

5.1 Number of Courses/Subjects Related to Sustainability Offered

Table 5.1 Courses offered in Environmental Engineering Department of Faculty of Engineering in BAİBU

Faculty of Engineering
Introduction to Environmental Engineering
Ecosystems Ecology
Environmental Chemistry I
Environmental Chemistry II
Environmental Microbiology
Environmental Hydrogeology
Unit Operations I
Unit Operations II
Fundamentals of Treatment
Disposal of Solid Wastes
Water Resources Engineering I
Water Resources Engineering II
Environmental Law
Air pollution and control
Environmental Impact Assessment
Land Use and Watershed Management
Environmental and Energy Policy
Treatment Plant Design and Operation
Modelling Ecosystem Dynamics
Global Environmental Changes
Statistics and Environmental System Analysis
Dewatering of sewage sludges
Mapping with Geographical Information Systems
Advanced Water and Wastewater Treatment
Contaminated Site Remediation
Environmental Biotechnology
Anaerobic Treatment of Wastes
Fate and Transport of Pollutants in the Environment
Pollution in Atmospheric and Aqueous Environment
Advanced Environmental Chemistry
Solid Wastes
Wetland Hydrology
Environmental Monitoring
Phosphorus recovery methods from municipal wastewaters
Atmospheric Pollution and Modeling
Water Pollution: Sources and Protection Areas
Lake and Wetland Management

Table 5.2 Courses offered in other faculties/institutes

Faculty of Agriculture and Natural Sciences/Plant protection
Agriculture and environmental pollution
Faculty of Economic and Administrative Sciences
Sustainable Environmental Policies and Practices
Environmental Management
Environmental Policy
Vocational School of BAİBU
Environmental Protection
Agriculture and Environment
Institute of Medical Sciences
Environmental Protection
Vocational School of Süreyya Astarçı at Mudurnu Campus of BAİBU
Urban and Environmental Protection
Vocational School at Gerede Campus of BAİBU
Leather Industry and Environment
Faculty of Science and Art
Environmental Science
Ecosystem Ecology

Above is a list of the courses that have had changes approved through BAİBU's Curriculum undergraduate and graduate programmes, which aims to embed sustainability into all course and module content offered by the University.

Total number of courses on sustainability and environment is 48.

5.2 Total Number of Courses/Subjects Offered

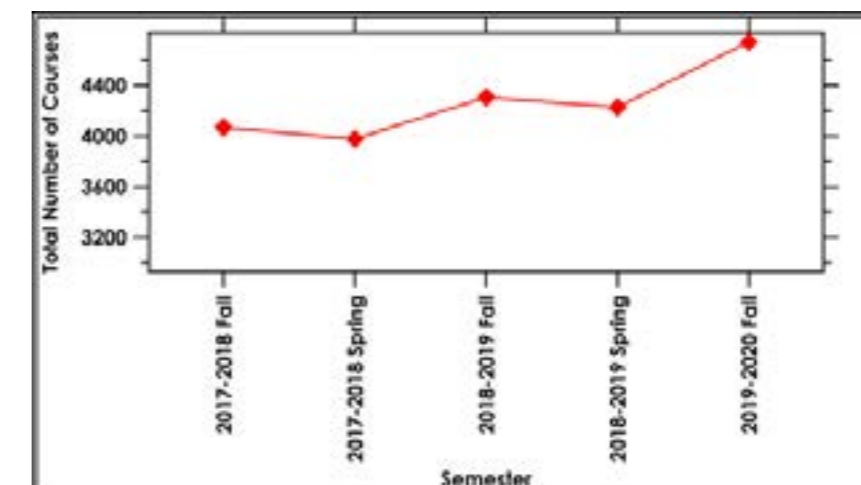


Figure 5.1 Total number of courses

Total number of courses offered in 2018-2019 Spring and 2019/2020 Fall = 8,965 courses (not modules)



5.3 Total Research Funds Dedicated to Sustainability Research (in US Dollars)

Table 5.3 Projects supported by the University Scientific Research Fund

No	Project No	Project Type	Faculty/Center	Principal Investigator (PI)	Start Date	End Date	Duration (Months)	Total Budget (Turkish Lira)
1.	2018.31.01.1336	Univeristy Scientific Research Fund	Scientific, Industrial and Technological Application and Research Center	Dr. Sanaz LAKESTANI	5/16/2018	9/16/2019	16	27442.27
2.	2017.31.01.1142	Univeristy Scientific Research Fund	Scientific, Industrial and Technological Application and Research Center	Dr. Sanaz LAKESTANI	2/13/2017	8/13/2018	18	29251.24
3.	2019.03.03.1406	Univeristy Scientific Research Fund	Faculty of Science and Art	Dr. Azra Bozcaarmutlu	2/14/2019	2/14/2020	12	20000
4.	2018.03.01.1396	Univeristy Scientific Research Fund	Faculty of Science and Art	Dr. Mehmet ÖZTÜRK	12/25/2018	12/25/2019	12	4996.71
5.	2018.03.03.1328	Univeristy Scientific Research Fund	Faculty of Science and Art	Dr. Serpil YENİSOY KARAKAŞ	5/16/2018	11/16/2019	18	29990.88
6.	2018.03.01.1325	Univeristy Scientific Research Fund	Faculty of Science and Art	Dr. Yasin Bakış	5/16/2018	5/16/2019	12	17251.8
7.	2018.03.02.1321	Univeristy Scientific Research Fund	Faculty of Science and Art	Dr. Filiz KORKMAZ GÖRÜR	4/11/2018	4/11/2019	12	5204.13
8.	2018.03.03.1320	Univeristy Scientific Research Fund	Faculty of Science and Art	Dr. Sevim DEMİRÖZÜ ŞENOL	4/11/2018	12/11/2019	20	13000
9.	2019.09.02.1424	Univeristy Scientific Research Fund	Faculty of Engineering	Dr. Fatma Öztürk	3/20/2019	3/20/2021	24	15000
10.	2019.09.02.1416	Univeristy Scientific Research Fund	Faculty of Engineering	Dr.YAKUP ERMURAT	2/14/2019	8/14/2020	18	24537.1
11.	2018.09.04.1399	Univeristy Scientific Research Fund	Faculty of Engineering	Dr. Hande Selen ERGE	12/25/2018	6/25/2020	18	22062
12.	2018.09.04.1397	Univeristy Scientific Research Fund	Faculty of Engineering	Dr. Erkan YALÇIN	12/25/2018	12/25/2020	24	25000
13.	2018.09.02.1347	Univeristy Scientific Research Fund	Faculty of Engineering	Dr. Duran KARAKAŞ	6/18/2018	12/18/2019	18	27608.12
14.	2018.09.02.1346	Univeristy Scientific Research Fund	Faculty of Engineering	Dr. Gamze DOĞDU OKÇU	6/18/2018	12/18/2019	18	29547.79
15.	2018.09.02.1327	Univeristy Scientific Research Fund	Faculty of Engineering	Dr. Akif Arı	5/16/2018	11/16/2019	18	23000
16.	2018.09.02.1271	Univeristy Scientific Research Fund	Faculty of Engineering	Dr. YAKUP ERMURAT	1/3/2018	1/3/2019	12	4866.48
17.	2017.9.04.1162	Univeristy Scientific Research Fund	Faculty of Engineering	Dr. Fatma Öztürk	3/15/2017	3/15/2018	12	20951.27
18.	2017.33.01.1231	Univeristy Scientific Research Fund	Center of Innovative Food Technologies Development, Application and Research	Dr. Melike Büşra BAYRAMOĞLU KARŞI	8/9/2017	2/9/2019	18	14788
19.	2017.10.01.1120	Univeristy Scientific Research Fund	Faculty of Agriculture and Natural Sciences	Dr. Şenol YILDIZ	1/3/2017	1/3/2019	24	29984.39
							Total	384482.18

Table 5.4 Projects supported by the Turkish Scientific and Technological Research Council (TÜBİTAK)

No	Project No	Project Type	Faculty/Center	Principal Investigator (PI)	Start Date	End Date	Duration (Months)	Total Budget (Turkish Lira)
1	117Y193	Turkish Scifientic and Technological Research Counsel Fund	Faculty of Engineering	Dr. NUSRET KARAKAYA	6/1/2017	6/1/2020	36	497493
2	117Y204	Turkish Scifientic and Technological Research Counsel Fund	Faculty of Engineering	Dr. FATMA ÖZTÜRK	10/1/2017	10/1/2018	12	30000
3	115Y613	Turkish Scifientic and Technological Research Counsel Fund	Faculty of Engineering	Dr. DURAN KARAKAŞ	10/15/2017	9/15/2020	36	306014
4	116Y447	Turkish Scifientic and Technological Research Counsel Fund	Faculty of Engineering	Dr. NUSRET KARAKAYA	8/15/2018	8/15/2021	36	1539049
5	118Y090	Turkish Scifientic and Technological Research Counsel Fund	Faculty of Engineering	Dr. EMREHAN KUTLUĞ ŞAHİN	2/1/2019	2/1/2021	24	164292
6	117Y511	Turkish Scifientic and Technological Research Counsel Fund	Faculty of Engineering	Dr. NUSRET KARAKAYA	3/1/2019	3/1/2022	36	442620

Total research fund dedicated to sustainability research in 2017 = 162038.56 US Dollars
 Total research fund dedicated to sustainability research in 2018 = 304879.09 US Dollars
 Total research fund dedicated to sustainability research in 2019 = 123824.97 US Dollars

The averaged annum last 3 years of research fund dedicated to sustainability research = 196914.20 US Dollars

5.4 Total Research Funds (in US Dollars)

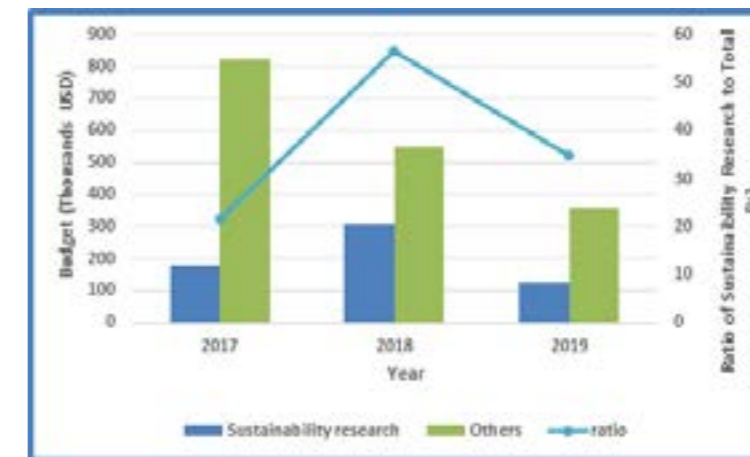


Figure 5.2 Total research funds

Total research fund in 2016 = 999102.61 US Dollars
 Total research fund in 2017 = 854698.08 US Dollars
 Total research fund in 2018 = 479209.59 US Dollars

The averaged annum last 3 years of research fund = 2333010 US Dollars

5.5 Number of Events Related to Sustainability



Figure 5.3 Events

Date	Time	Speaker	Topic
27/03/2019	11:00-12:00	Dr. Kızıltan Yüceil	Smart Cities, Smart Transport and Environment (Figure 5.3)
02/05/2019	13:30-14:30	Mustafa Çetin	Management of Electrical and Electronic Appliance Wastes (Figure 5.3)
27/02/2019	11:00-12:00	İsmail Ertan	Integrated Environmental Management: Food Sector Case (Figure 5.3)