Global Goals For
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ACCESSIBLE AND CLEAN ENERGY REPORT

1- Put an End to Poverty 2- Put an End to Hunger 3-Health and Quality Living 4- Qualified Education 5-Community Gender Equality 6-Clean Water and Sanitation 7-Accessible and Clean Energy 8- Decent Work and Economic Growth 9- Industry, Innovation and Infrastructure 10- Reducing Inequalities 11 Sustainable Cities and Communities 12- Responsible Production and Consumption 13- Climate Action 14- Aquatic Life 15- Territorial Life 16- Peace, Justice and Strong Institutions 17-Partnerships for Purposes

IGU for "Ecological, Social and Economic Sustainability"

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Global Goals For
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**GELİŞİM
ÜNİVERSİTESİ**

Energy Management Report

2020

ISTANBUL GELISIM UNIVERSITY
FOREIGN RELATIONS COORDINATORSHIP | NOVEMBER,2020

Preface

Global warming is one of the most important environmental problems that threaten basic living resources such as food, water, environment, etc., which are essential for the survival of all living things in the world. The cycle of population growth, industrialization and increase in energy demand and resource use are triggering devastating consequences of global warming. While countries aiming to have a word in global competition in parallel with their welfare and development goals make their industrialization investments, the release of harmful gases such as carbon dioxide and methane into the atmosphere is triggered. Energy is the most important requirement for sustaining human life. However, the main purpose of energy supply policies should be to eliminate the environmental threat. At this point, the vision of global goals is a guide for the whole world.

Taking measures against the environmental effects of energy use, especially supporting a sustainable economy with a policy that constantly supports and encourages renewable energy sources, plays a key role in reducing the ecological damage of global warming. With the striking ecological and environmental damages of global warming and climate change coming into the world agenda, national and international measures have begun to be taken, but the fight against the pessimistic picture drawn by climate scientists for the coming years can only be realized with the joint responsibility of all stakeholders at the global and local level.

Istanbul Gelisim University is committed to fulfilling its responsibilities by maintaining the scope of its work with international and national stakeholders day by day in order to minimize the damage to the environment with the effective and efficient use of energy in line with the United Nations Sustainable Development Goals, with the vision of producing more permanent solutions on climate and energy. .

Academic Member Dr. Aslıhan Güzin

SELÇUK, FHEA Community Service

Coordinator

Director of Sustainable Environment and Society Application and Research Center

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1. INTRODUCTION

The effect of developing technologies in addition to increasing rate in the world population, increases the amount of energy consumption rapidly. This situation has reached dimensions that threaten the future of the world and humanity. Every energy source that is consumed excessively today will cause future generations to enter into processes that will have difficulties. In this context, turning to environmentally friendly renewable energy sources is important in terms of building a sustainable future, as well as increasing the quality of life lived today. The irresponsible use of energy, and especially of energy sources that cause the emission of greenhouse gases and toxic gases, clearly endanger the future of our world. In order not to consume energy resources of future generations today, it is an important duty and responsibility to turn to environmentally friendly renewable energy sources and to minimize energy consumption.

The purpose of the Istanbul Gelisim University (IGU) Energy Management Report, in line with the goal of a sustainable future, within the scope of the United Nations Sustainability Goals, is to create a continuous way for the effective use of energy, ensuring energy efficiency and minimizing the damage to the environment. In this context, the aim of IGU is to improve the energy performance in all administrative and social campus areas, as well as to create areas that are respectful to nature and the environment, which provide solutions to environmental problems, and to ensure the sustainability of these areas.

1.1. Scope of the Plan

There are 8 building/building blocks within Istanbul Gelisim University and this report covers the improvement works to be done in all our buildings in 2020, based on 2019 data. Our building information is given in Table 1.

Table 1. Building Information

Campus Name	Building Name	Indoor Area (m2)	Construction Year	Type of Use Before Being an Educational Institution	Opening Date for Use as an Educational Institution
A BLOCK	RECTORATE	39114	1997	Place of Business	2012
B BLOCK	SBYO	11755	1996	Place of Business	2012
C BLOCK	SHMYO	10445	1996	Place of Business	2012
D BLOCK	MMF	12353	1991	Place of Business	2013
E BLOCK	GSF	9836	1991	Place of Business	2013

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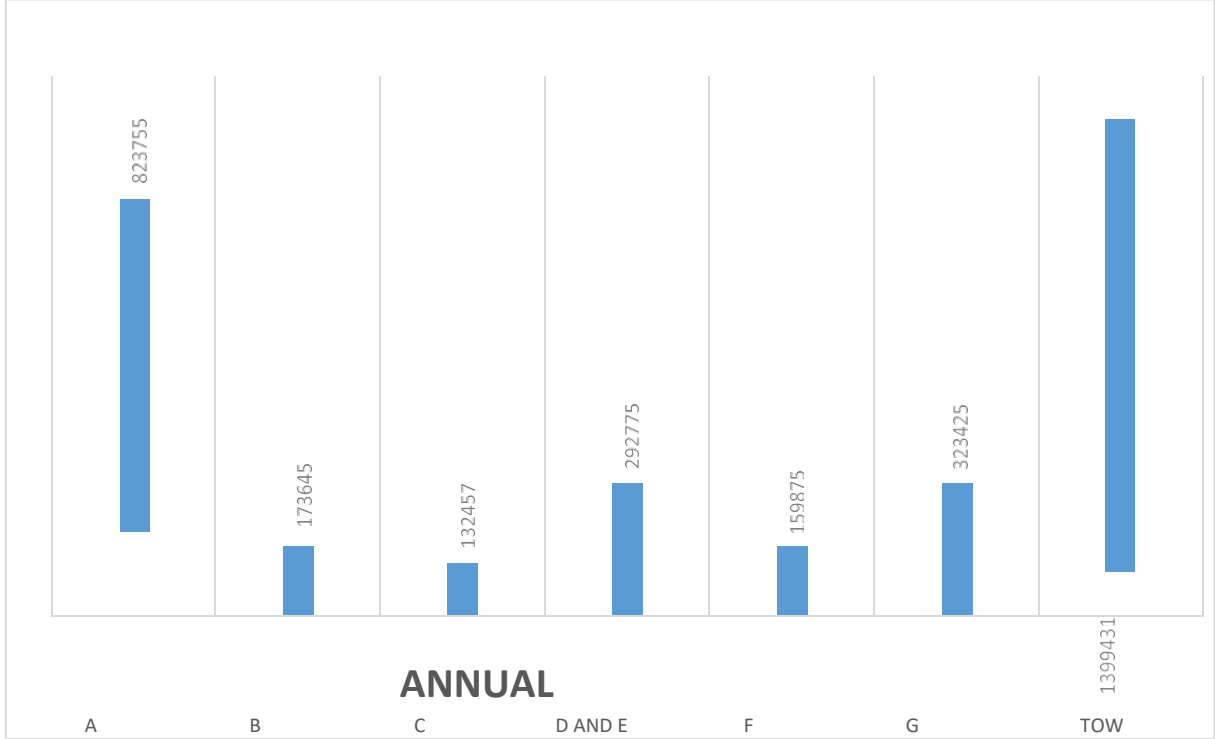| F BLOCK	YD	8285	1995	Place of Business	2011
G BLOCK	Vocational School	29536	1998	Place of Business	2015
TOWER		91054	1999	Place of Business	2018

2. EVALUATION OF ENERGY USE

2.1 Energy Consumption

The data to be used in the plan covers the period of 01.01.2019-31.12.2019. This period will be in the form of a summary of the energy consumption situation in 2019 and will determine the measures to be taken for 2020 and will be a road map. The main goal of Istanbul Gelisim University is to gradually reduce the energy usage rates in a stable manner compared to the situation in previous years for 2020. For this purpose, the details of the savings measures planned to be taken, are given in 4. Section.

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Table 2. Consumption Data for 2019

Total electricity consumption value of our university, which consists of 8 building/building blocks and 11 blocks with 212.378 m2 closed area, is 3,305,363 kWh in 2019. Compared to the consumption in 2018, there is an increase in electricity **(Table 2)** and natural gas **(Table 7)** consumption. One of the reasons for this increase; is that while the first 9 months of 2018, we did consumption in 121.324 m2 of our indoor space, it was 212.378 m2 when the tower is activated in the last 3-months of 2018, our indoor space where we did consumption was 212.378 n2 in the whole 2020. If we look at it from this perspective, our electricity consumption has decreased compared to the previous year. The reason for the increase in natural gas consumption is that 3 of our boilers were commissioned in our Tower campus in 2020, the area we are trying to heat has grown and due to the size of the area, it has not worked very efficiently, increased our consumption. By increasing the efficiency of the boilers, our consumption values will be reduced.

2.2. Importance of Energy Consumption Analysis

In order for the plan to give healthy results, consumption values should be examined together with the multipliers of the reasons causing consumption. E.g; As shown in Table 2, the consumption of our Tower campus is more than Block A. However, when we examine it consumption value as per m2, we see that the consumption is higher in the A block as indicated in Table 3. The reason for these consumption values is that it is the rectorate building and therefore most of our offices that carry out administrative works are here.
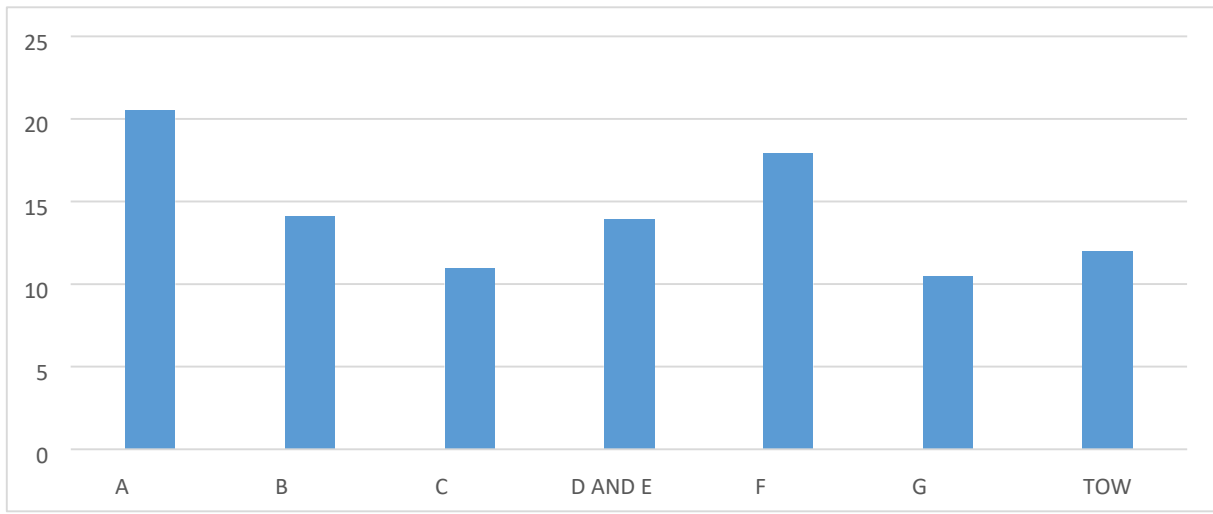

Table 3. Annual kW Consumption Values for 1 m2

3. CARBON FOOTPRINT

Carbon footprint is a term used to describe the amount of carbon that each person causes to be emitted into the atmosphere as a result of transportation, heating, energy consumption or any product purchased. The biggest factor affecting carbon footprint is energy. For this reason, increasing energy efficiency and thus reducing energy consumption is considered as a factor that will directly reduce the carbon footprint.

Carbon footprint consists of two parts, primary and secondary carbon footprints;

▶ **Primary carbon footprint;** It is defined as a direct measure of CO_2 emissions resulting from the combustion of fossil fuels used for energy consumption and transportation activities.

▶ **Secondary carbon footprint;** It is stated as a measure of CO_2 emissions that occur during the entire life cycle of the products we use, from production to deterioration.

3.1. Calculating Carbon Footprint

3.1.1. Calculation Purposes and Constraints

The purpose of the calculation is to determine the current emission status by calculating the carbon footprint of Istanbul Gelisim University, to form the basis for the Carbon Management Plan and to produce a solution for reducing emissions. Calculation constraints; The data of all units of Istanbul Gelisim University for the year 2020 and the calculation of only the primary carbon footprint of the University.

3.1.2. Calculation Method

The primary carbon footprint was calculated using IPCC calculation method. Therefore, the carbon footprint of the University resulting from electricity, transportation and heating, which causes carbon emissions, has been calculated. It is easy to calculate since carbon dioxide emissions are related to the combustion of fuel. Many criteria are required to calculate other greenhouse gases. IPCC calculation method consists of 3 different categories under the name of Tier. Tier 1 approach was used in this study. For this approach;

1. Gasoline, diesel, LPG, natural gas and electricity consumption amounts were obtained from university official records. 0.584 ton/mWh specified in postgraduate study prepared by Toröz (2015:79) in the calculation of the emission caused by electricity consumption, that is the IPCC carbon dioxide emission factor, was used.

2. The energy content is calculated by multiplying the consumption values of the fuels with the conversion values given in IPCC manual. Conversion values are the values included in the Communiqué on Monitoring and Reporting of Greenhouse Gas Emissions, published in the Official Gazette dated 22.07.2014 and numbered 29068, and specified in IPCC 2006 Guidelines. These values are given in Table 3.

Fuel Type	Net Calorific Value (Tj/Gg)
Gas	44,3
Diesel Fuel	43
Natural gas	48

Table 4. Net Calorific Value of Fuels (Source: ÇŞB, 2014:40) Energy

Consumption (TJ) = Fuel Consumption (t)× Net Calorific Value (TJ/Gg)

3. For each fuel group, carbon emission factors (average value) determined in IPCC manual are selected and using this value, the total carbon content in the fuel is calculated.

Carbon Content (t C) = Carbon Emission Factor (t C/TJ) × Energy Consumption (TJ)

Fuel Type	Emission Factor (tC/tJ)
Gas	18,9
Diesel Fuel	20,2
Natural gas	15,3

Table 5. Emission Factor of Fuels (Source: TÜİK, 2013:16)

4. The amount of carbon that is not oxidized during combustion is found and the carbon value that is fully included in the combustion is calculated.

Carbon Emission (Gg C) = Carbon Content (Gg C) × Carbon Oxidation Rate

Fuel Type	Oxidation Rate
Gas	0,99
Diesel Fuel	0,99
Natural gas	0,995

Table 6. Oxidation Rates of Fuels (Source: ÇŞB, 2014:40)

5. At this stage, the ratio of 44/12, which is the ratio of the molecular weight of CO2 to the molecular weight of carbon, is multiplied by the value found in the previous step, and CO2 emission value resulting from combustion of fuel is found.

CO2 Emission (Gg CO2) = Carbon Emission (Gg C) × (44/12)

3.2. Carbon Footprint Calculation Result

The electricity, gasoline, diesel, natural gas consumption data for 2020 obtained from the university and calculations with the IPCC methodology Tier 1 approach are shown in Table 7.

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Energy Type	Amount of Consumption (Year 2020)	Consumption Amount (Ton)	Net Calorie Value (TJ/Gg)	Carbon Emission Factor (T.R/TJ)	Carbon Oxidation Rate	Ton CO2	Percentage (%)
Gas	1.585 Liters	1,22	44,3	18,9	0,99	3,65	0,147
Diesel Fuel	12.498 Liters	11,38	43	20,2	0,99	33,74	1,365
Natural gas	242,128 m3	193,32	48	15,3	0,995	503,03	20,354
Electricity	3.305.363 kWh					1,928,895	78,131
Total						2,471,315	

Table 7. Carbon Footprint Calculation of Istanbul Gelisim University (Year 2020)

4. PLANS TO IMPROVE ENERGY EFFICIENCY AND REDUCE CARBON EMISSIONS

ENERGY MANAGEMENT ACTION PLAN

Istanbul Gelisim University has established its energy management studies on 5 foundations by following ISO 50001 standards. These standards will provide qualified progress in energy efficiency, efficient energy use and energy saving. This practice will reduce greenhouse gases, energy costs and other environmental problems and will lead to systematic energy management.

These five pillars can be listed as

follows; Participation

Reporting

Planning-Organization

Implementation

Control and Quality Tracking

Participation:

In order for 'Energy Management Policy' to be applicable, it must receive support from the senior management. Reporting on related issues should be made to the university administration and budget works should be made.

Initial work on these issues should ensure a clear understanding of the benefits that may accrue to senior management. The benefits to be obtained from the efforts and low-cost investments that will save in the short term should be transferred to the management.

Reporting:

In order for this planning to be functional, past, current and future energy uses should be reported. In this study, it should be stated where the energy consumption is made and the use in certain periods should be reported. In this way, it will be easier to get an idea about which areas can be saved.

Planning and Organization

An Energy Management Team should be established within the university. It is essential to support this team for the activities carried out by the senior management. This team should report the existing structures and living spaces in the campus area. Energy consumption in buildings should be examined together with their reasons, energy saving projects should be developed for these buildings and the project should be detailed down to sub-headings. Incandescent lighting, fluorescent lighting, led lighting numbers in buildings should be reported, and a budget should be created for lighting fixtures with high energy consumption and revision should be made.

In addition to this, standards should be established for new buildings to be built, and it should be ensured that buildings with high energy efficiency are built that respect the nature.

Practice

Participation by stakeholders is essential for the efficient implementation of energy management. This participation; academic and administrative staff, students, alumni, public and private sector employees, private and legal persons. In order to increase the sensitivity on this issue, the subject should be supported with simple visual and written posters, added to the curriculum as an elective course, program outputs should be shared with stakeholders and the results should be shared periodically in order to increase incentives.

In this context, IGU exhibits various posters and visuals in the campus area in order to raise awareness. It reinforced the sensitivity of the administrative and academic management on this issue with elective courses under the main heading of 'Sustainability' and contributed to raising awareness.

Control and Quality Tracking:

Implementation of a measurement strategy in energy management is one of the basic principles. This control, which will support the reduction of energy consumption, will prove the progress. The controls that complement the success and rationality of the planning will also reveal whether the process is managed correctly. These data, which will be supported by a follow-up chart, will support the work on the sustainability of Energy Management Quality Control.

ENERGY AND CARBON MANAGEMENT PLAN

IGU regularly reports the outputs related to energy efficiency and carbon reduction, and puts the program outputs and performance progress at the disposal of the stakeholders.

IGU follows ISO 50001 standards and has revealed the energy management plan that can establish the systems and processes necessary for the improvement of the energy performance of the institution, including its energy efficiency, use and consumption. ISO 50001 Management System aims to reduce greenhouse gas emissions and other environmental impacts and energy costs. IGU has followed the following principles while putting forward the Energy and Carbon Management Plan:

The management plan should be global and inclusive, and its effects on our near future should be considered.

Sustainability should always be considered when evaluating solutions and options.

It should be economical and feasible.

Innovation and rational solutions should be produced.

In this context, IGU makes short and long-term plans and implements its plans:

Short Term Plans (1 year)

Making field surveys for planning and organizations Making

improvements to the existing infrastructure

Revealing the energy saving plan

Setting standards for the correct processing of data

Ensuring energy savings by performing periodic maintenance of energy-consuming

devices, Using devices with low carbon emission

Long Term Plans (5 year)

More suitable energy suppliers should be selected.

Performing technical analysis of the fuel in order to reduce fuel consumption and carrying

out studies to ensure maximum combustion.

Ensuring that the use of renewable energy sources within the university is widespread.

Increasing the use of energy efficient devices

Centralize long-term used units and reducing the use of lighting and heating.

Increasing energy efficiency will directly reduce carbon emissions. Therefore, the targets that will increase energy efficiency are also valid for carbon emissions.

There are two areas with great potential to ensure efficient use of energy.

▶ Lighting
▶ Heating/Cooling Systems

4.1. Plans to improve energy efficiency

1. As part of our plan to replace our fluorescent lighting with LED lighting, all of our G Block lighting has been replaced **(Picture 1)** . Longer life of LED lighting, consuming less energy and getting better illumination levels at less cost continue to provide serious benefits for efficiency. For this reason, it is planned to change our lighting in other blocks as well.

Picture 1. Some areas where A, B and C Block lighting works are carried out

2. The plan to use sensors in all common areas such as corridors, toilets, etc. in the campuses, was decided in 2018 and was realized in the majority **(Picture 2)** . Areas not yet completed will be completed in 2020.

Picture 2. Some areas where we use sensors

3. It was planned in 2018 to convert environmental lighting to LED projectors and to control them with timers or light sensors, and the plan was realized in all our campuses. In order to maintain energy efficiency, it is planned to adjust and maintain the timers used according to seasonal conditions.


Picture 3. Some areas where we use LED projectors in environmental lighting

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4. Our plan to control the heating/cooling systems with DDC boards has become operational with our Tower campus **(Picture 4)** . The same planning continues in other possible campuses.

Picture 4. Our MCC and DDC panels in our tower campus
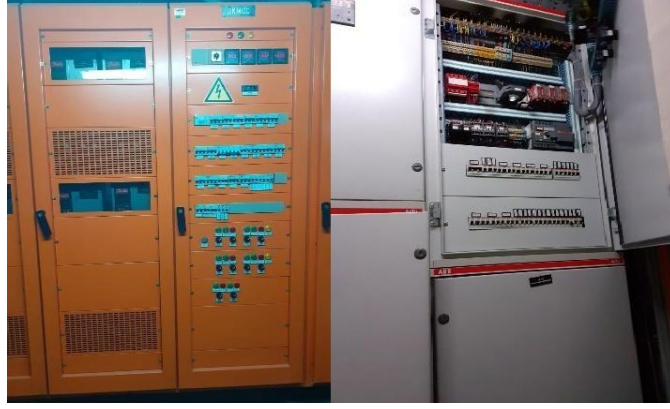
5. Our primary plan for the reduction of electric heaters, which we planned in 2018, was to ensure that the existing heating systems operate smoothly, and our heater usage was reduced by maintaining all of them. Our new plan to reduce the use of heaters due to the efficiency of the heating system is to prevent heat losses in the campuses. In this context, it is planned to place air curtains at the building entrances, etc.

6. It is planned to bring it into a position to provide its own energy in these matters such as increasing the studies on the use of renewable energy (wind and solar energy) and environmental lighting of the university. In this context; An environmental lighting powered by wind and solar energy was installed in the garden of **Block D as an example (Picture 5),** and there is a study prepared by our academicians and presented to the management to operate the environmental lighting of Block A with solar panels.


Picture 5. D block solar and wind powered environmental lighting pole

7. In the procurement processes of new devices to be used in the campuses, the sales specifications have been studied at the point where energy saving is the leading selection criteria, and it is planned to take these selection criteria as a basis in the new year.

8. Revisions are made in order to increase the efficiency of the compensation panels used to prevent losses affecting the total energy consumption, and regular follow-up of these is planned in the new year **(Picture 6)** . Our aim with this study is to consume energy more efficiently by minimizing our losses in our consumption values. The follow-up of this subject is important as it will directly affect the conductor cross-sections, efficiency, voltage drop and energy consumption.
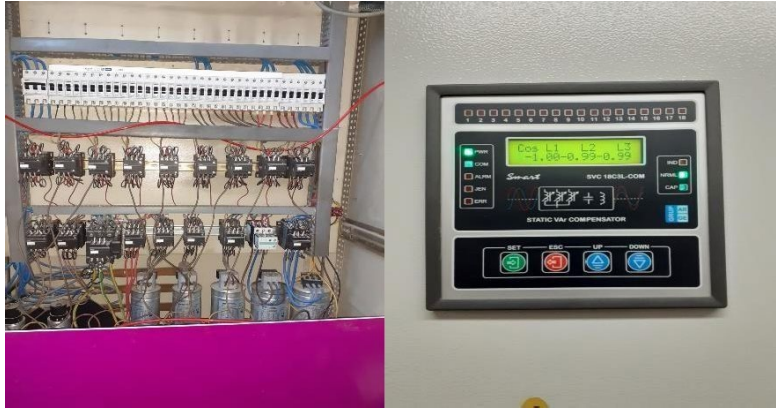
Picture 6. Image of a compensation panel and cos values

9. Central systems were maintained and repaired in order to reduce the use of room type air conditioners used in closed areas of the campuses. It is planned to continue to reduce the use of air conditioners by continuing the maintenance and working towards increasing the efficiency of the central systems.

10. Negotiations should be continued in the new year to sign a contract with the electricity distribution company for consultancy and unit price reduction within the scope of savings.

11. The use of electrical appliances has an increasing effect on energy use such as various tea, coffee machines, etc. in the staff offices. In order to reduce energy use, it is planned to create common kitchen areas in the campuses. In this context, an area has been made for the use of personnel in F Block **(Picture 7)** . Our search for areas for other campuses continues.

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Picture 7. F Block staff resting area

12. As in 2018, training activities are planned for all personnel on energy efficiency within the framework of a certain periodic calendar throughout the year. In this context, our technical team was trained last year on the maintenance of the compensation panel and the efficient use of heating/cooling systems. Training will also be given in different fields.

4.2. Plans to reduce carbon emissions

1. The senior management supported the academic and administrative staff in making projects in order to reduce the carbon footprint of the university and to ensure sustainable resource use. They must continue with the same determination.

2. In addition to the measures to be taken only within IGU within the scope of community service, training and information activities should be conducted for external stakeholders in order to raise awareness of environmental problems and the fight against global climate change in order to raise awareness in the society.

3. It should be planned to create an elective course curriculum that includes environmental problems, nature protection, global climate change and sustainable use of natural resources in all academic departments of the university.

4. Efforts have been made to establish waste management plans and a recycling system that will ensure the lowest level of waste generation (reduction at source) and separation of waste at source. As part of the zero waste project, glass, paper, metal and plastic collection boxes were left on the campuses **(Picture 8)** . Contracts have been signed with authorized institutions for the collection of medical wastes and waste oils. The work should continue with the same determination.

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Picture 8. A waste collection area created within the scope of zero waste

5. In order to reduce the carbon footprint, efforts are planned to provide savings in water, electricity, heating and transportation, and the efforts to ensure that the products supplied in the purchasing processes are environmentally friendly, energy-saving and low carbon emissions should continue with the same determination. In this context, some products preferred last year are; Inventor air conditioners (which can reduce consumption up to 10%), LED lighting (50-90% savings compared to other lighting).

6. Studies should be planned to promote the use of environmentally friendly products (cleaning materials, fuel, etc.) and the use of recycled materials.

7. In order to reduce the carbon footprint, it should be planned to carry out regular sapling planting/afforestation studies every year. Within the scope of the 2018 plan, approximately 100 saplings were planted in the campuses.

8. In the use of ornamental plants on campus, the use of plant species native to the region and resistant to drought should be planned.

9. Projects for the reuse of rain water and gray water should be produced and studies for the purpose of saving and awareness should be planned.

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10. Studies should be carried out to make the new buildings to be environmentally friendly green buildings.

5. STANDARDS TO BE APPLIED IN OUR BUILDINGS

In the relevant section of the report, information is shared on the building standards planned to increase energy efficiency and reduce carbon emissions in new campus and building areas, which will be made available to IGU, and to create environmentally friendly buildings.

5.1. Standards to be Applied in Our New Buildings

- Sustainable energy solutions will be used to meet heating, cooling, ventilation and electricity needs.
- The designs will be designed to make maximum use of natural light.
- Plants to be used for landscaping will be selected from species that consume less water.
- After the treatment of waste water in garden irrigation, the systems will be planned to use the cleaned water.
- It will definitely be taken into account that it is economical in material preferences.
- During construction, methods that minimize excavation will be used to ensure that less fuel is consumed.
- Environmental pollution will be minimized by re-evaluating construction residues with
  - various methods. Environmentalist approaches will be applied in the selection of environmentally friendly materials and construction techniques.
- Materials supplied from sources that are not in danger of extinction and as close as possible, will be preferred.
  .

5.2. Standards to be Applied in Our Transformed Buildings

- Saving LED lighting will be used.
- The sensor will definitely be taken into account in the planning of common areas.
- Perimeter lighting will be controlled by photocell, so unnecessary consumption caused by carelessness of personnel will be prevented.
- Heating/cooling systems will be used over central control systems.
- Sheathing will be done to prevent heat loss. Therefore, the use of air conditioners and heaters in offices will decrease.
- All devices to be used will be energy efficient.

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- Kitchens will be created for the use of the personnel and the use of tea and coffee machines in the offices will be prevented.

6.RESULT

Continuing its activities in line with its vision of sustainable and clean energy, Istanbul Gelisim University organizes and monitors its activities in order to minimize the damage to the environment by reducing the carbon footprint with the efficient use of energy resources in all its campuses and to adopt a nature-friendly structure with an ecological identity.

The goals set in this context are:

- An efficient energy manager should be determined to monitor and manage all processes within the university,
- .
  Organizing trainings on energy efficiency for all staff and students, including academic/administrative/support services within the university in line with the direction of the energy manager,
- Establishment of the Energy Efficiency and Environmental Awareness Coordination Board with representatives from all units under the chairmanship of the energy manager,
- 15% reduction should be ensured for energy consumption per m2 within 5 years,
- Energy consumption per person within 5 years, should be reduced
- Organizing training and information activities on environmental awareness and energy for all external stakeholders of the university,
- Ensuring that the zero waste management process is activated within the university
- Creating a resource saving plan in line with sustainability goals,
- Creating a detailed carbon management plan,
- Ensuring that the items that will provide energy-saving and environmentally friendly devices in the purchasing processes are added to the purchasing specifications.

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9 SANAYİ, YENİLİKÇİLİK VE ALTYAPI	10 EŞİTSİZLİKLERİN AZALTILMASI	11 SÜRDÜRÜLEBİLİR ŞEHİRLER VE TOPLULUKLAR	12 SORUMLU ÜRETİM VE TÜKETİM	13 İKLİM EYLEMİ	14 SUDAKİ YAŞAM	15 KARASAL YAŞAM	16 BARIŞ, ADALET VE GÜÇLÜ KURUMLAR	17 AMAÇLAR İÇİN ORTAKLIKLAR

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