



— ISTANBUL —

# GELISIM

— UNIVERSITY —

## ENERGY MANAGEMENT REPORT 2018

**ANNUAL REPORT**  
RESEARCH SUPPORT UNIT



[www.gelisim.edu.tr](http://www.gelisim.edu.tr)

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## 1. INTRODUCTION

The rising dimension of damage, inflicted on the environment from day to day, as a result of rapid increase of the amount of energy, consumed in this respect, paves the way for the occurrence of some environmental approaches. The applications that come forth within the process at issue such as green buildings, green energy, sustainability of sources, energy efficiency and so on, bear significant importance for the reduction of energy consumption that may have substantial share on the climate change especially as a result of greenhouse gas emission.

The objective of the Istanbul Gelişim University is to draw a road map in order to bring the damage, inflicted on the environment, to the minimum level through the effective and efficient use of the energy within the direction of Sustainable Development Targets of the United Nations through a sustainable future vision. The target of the Istanbul Gelişim University is the increase of the energy efficiency with the provision of energy saving at the campus sites and reduction of the damage, inflicted on the environment.

### 1.1.Scope of the Report

There are 8 blocks within the scope of the Istanbul Gelişim University and this report covers the improvement works, planned in all of our structures in 2019, based on the date of 2018. Our construction knowledge is given at the Table no. 1.

**Table: 1-** Construction Knowledge

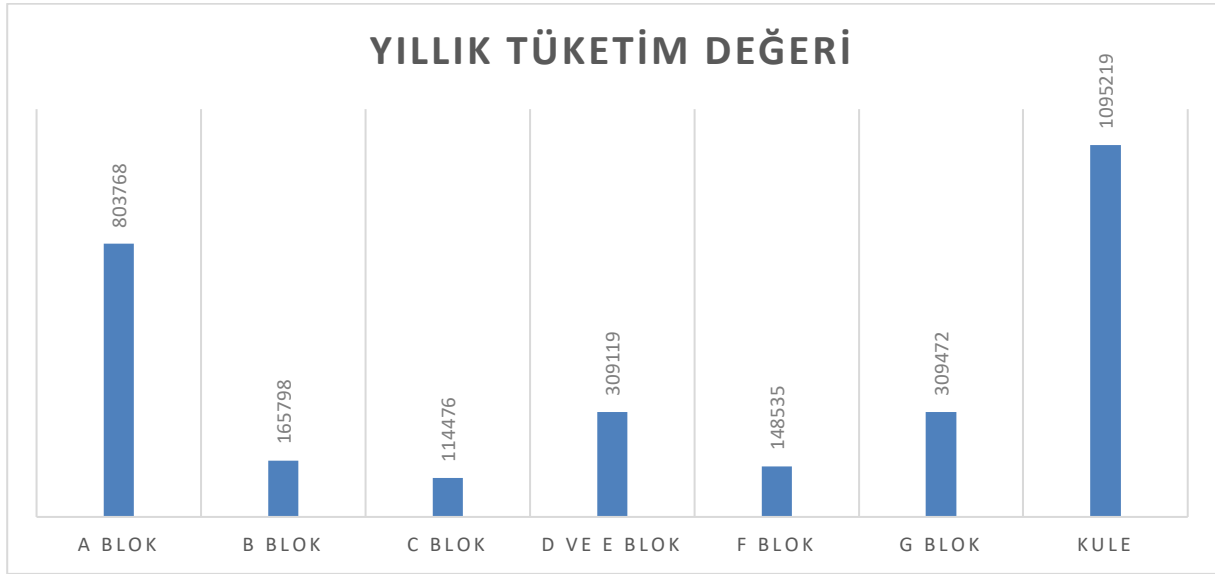
<b>Campus Name</b>	<b>Building Name</b>	<b>Covered Area (m2)</b>	<b>Year of Construction</b>	<b>Type of Its Use Before It Became an Educational Institution</b>	<b>Date of Opening as an Educational Institution</b>
BLOCK A	Rectorship	39114	1997	Business Concern	2012
BLOCK B	SBYO	11755	1996	Business Concern	2012
BLOCK C	SHMYO	10445	1996	Business Concern	2012
BLOCK D	MMF	12353	1991	Business Concern	2013
BLOCK E	GSF	9836	1991	Business Concern	2013
BLOCK F	YD	8285	1995	Business Concern	2011
BLOCK G	MYO	29536	1998	Business Concern	2015
TOWER		91054	1999	Business Concern	2018

## 2. EVALUATION OF THE USE OF ENERGY

### 2.1 Energy Consumption

The data to be used at this plan comprise the period ranging from the date of January 01, 2018 up to December 31, 2018. This period summarises our standing in the year of 2018, and will come forth as a guiding light in the determination of necessary measures that should be taken in 2019. As a consequence, this period will be used as a means of comparison and determine a direction on the determination of targets. The main objective of the Istanbul Gelişim University is the reduction of the rates of energy usages for 2019 in a gradual way. The saving measures are designed within the direction of this target and they are explained in detail at the related chapter of the report.

**Table - 2:** Consumption date for the Year of 2018



#### Annual consumption value

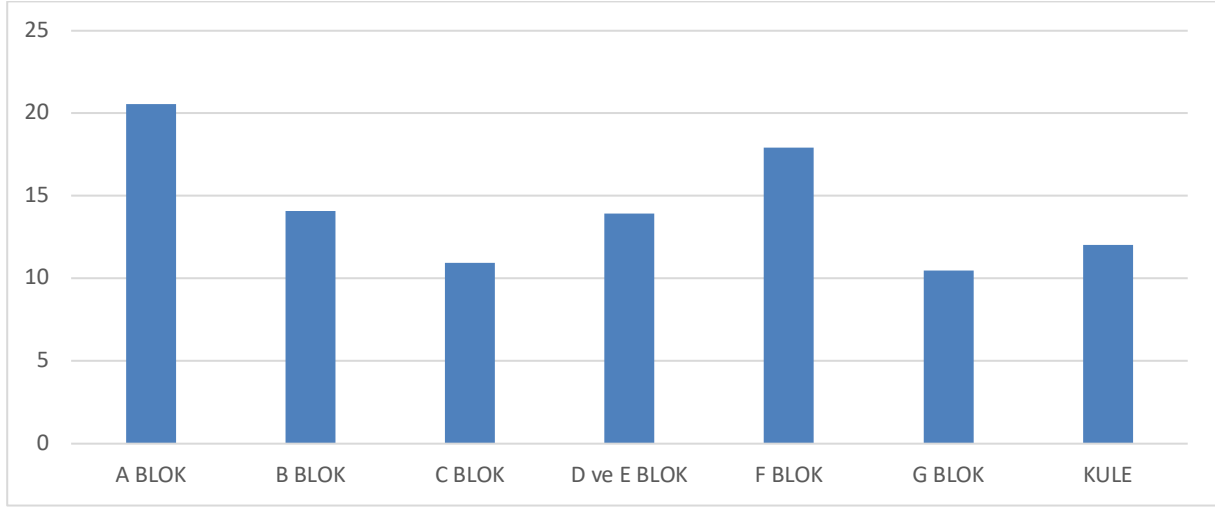
BLOCK A - BLOCK B - BLOCK C – BLOCKS D AND E – BLOCK F – BLOCK G TOWER

The total consumption value for 2018 of our university, consisted of eight blocks that are situated on a land of 323.133 square meters ( $m^2$ ), is 2.946.391 kWh.

### 2.2. Importance of the Energy Consumption Analysis

The consumption values and utilization dispersion of consumption are of importance from the effective use of sources in order that the plan gives efficient results. For instance, the consumption of our Tower campus at the Table 2 is more than that of the Block A, however, if we examine this as a consumption value per  $m^2$ , we see that the consumption at the Block A of the Table 3 is higher. The reason for these consumption values is because of the fact that a great proportion of our offices conducting administrative works are located there since it is the rectorship building.

**Table: 3 – Consumption Value for 1 m<sup>2</sup>**



BLOCK A - BLOCK B - BLOCK C – BLOCKS D AND E – BLOCK F – BLOCK G TOWER

### 3. CARBON FOOTPRINT

The carbon footprint is a term that is used to reveal the amount of carbon that every human being may cause it to be dispersed (venting) over the atmosphere as a result of his transportation, heating, energy consumption and any sorts of products, purchased by the same. The most important factor affecting the carbon footprint is the energy. Therefore, they are taken into consideration as a whole since the reduction of the energy efficiency will bring down the carbon footprint as well.

The carbon footprint consists of two parts such as the primary and secondary carbon footprints;

- ▶ **Primary carbon footprint;** This is defined as a direct measurement of CO<sub>2</sub> emissions occurring as a result of burn of fossil fuels, used as a consequence of energy consumption and transportation activities.
- ▶ **Secondary carbon footprint;** This is indicated as the measurement of CO<sub>2</sub> emissions occurring within the time of the entire lifecycle ranging from the production up to the deterioration of the products, used (consumed) by us.

#### 3.1. Calculation of the Carbon Footprint

##### 3.1.1. Objectives and Limits of Calculation

The objective of calculation is to make a calculation of the carbon footprint of the Istanbul Gelişim University and determine the state of available emission, and to constitute a basis for the Carbon Management Plan and produce a solution for the reduction of the emission. The

calculation limits are the calculation of only the primary carbon footprint and data of 2018 of all departments of the Istanbul Gelişim University.

### 3.1.2. Method of Calculation

The primary carbon footprint has been calculated by the use of the IPCC calculation method. As a consequence, the carbon footprint, arisen from electricity, transportation and heating causing the carbon emission of the University has been calculated. The carbon dioxide emission is easy since it is related to the burning of fuel. Various numbers of criteria are required for the calculation of other greenhouse gases. The IPCC calculation method consists of 3 different categories under the title of Tier. The Tier 1 approach is used at this study. For this approach;

1. The gasoline, diesel oil, LPG, natural gas and electricity consumption amounts were taken from the records of the University. The value of 0,584 ton/mWh being an IPCC carbon dioxide emission factor, indicated in the postgraduate study (thesis), prepared by Toröz (2015: 79) in the calculation of emission arising from the electricity generation.
2. The energy content is calculated by multiplying the conversion values, indicated in the IPCC guidance, with the values of fuels. The conversion values are the values taking place in the Communiqué on Monitoring and Reporting of the Greenhouse Gas Emissions, Published in the Official Gazette of July 22, 2014 having the issue number of 29068 and indicated in the IPCC 2006 Guidebook. These values are indicated in the Table no. 3.

**Table: 4 – Net Calorific Values of the Fuels (Source: ÇŞB, 2014:40)**

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

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

3. The carbon emission factors that are determined in the IPCC 2006 Guidebook are selected (average value) and then, through the use of this value, the total carbon content within the content of the fuel is calculated.

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

**Table: 5 - Emission Factor of the Fuels (Source: TÜİK, 2013:16)**

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

4. The amount of carbon that is not oxidized during burning is found and then, the carbon value that is entirely participated in burning is calculated.

$$\text{Carbon Emission (Gg C)} = \text{Carbon Content (Gg C)} \times \text{Carbon Oxidization Rate}$$

**Table: 6 - Oxidization Rates of Fuels (Source: ÇŞB, 2014:40)**

Type of Fuel	Oxidization Rate
Gasoline	0,99
Diesel Oil	0,99
Natural Gas	0,995

5. At this stage, the rate of 44/12 that is the rate of the molecule weight of carbon to the molecule weight of CO<sub>2</sub> is multiplied with the value, found in the preceding step and the emission value of CO<sub>2</sub>, arisen as a result of the burn of the fuel is found.

$$\text{CO}_2 \text{ Emission (Gg CO}_2\text{)} = \text{Carbon Emission (Gg C)} \times (44/12)$$

### 3.2. Calculation Result of the Carbon Footprint

Relevant calculations are made through the IPCC methodology Tier 1 approach and electricity, gasoline, diesel oil and natural gas consumption data of 2018, taken from the University, and the same is shown in the Table 6.

**Table: 7 – The Carbon Footprint Calculation of the Istanbul Gelişim University (for the Year of 018)**

Type of Energy	Amount of Consumption (for 2019)	Amount of Consumption (in Tonnes)	Net Caloric Value (TJ/Gg)	Carbon Emission Factor (t C/TJ)	Carbon Oxidization rate	Tonne CO <sub>2</sub>	Percentage (%)
<b>Gasoline</b>	1.642 Litre	1,22	44,3	18,9	0,99	3,708	0,196
<b>Diesel Oil</b>	12.672 Litre	11,38	43	20,2	0,99	35,881	1,895
<b>Natural Gas</b>	64.152 m <sup>3</sup>	51,28	48	15,3	0,995	133,430	7,046
<b>Electricity</b>	2.946.391 kWh					1.720,692	90,863
<b>Total</b>						1.893,711	

#### **4. PLANS TO RAISE THE ENERGY EFFICIENCY AND REDUCE THE CARBON EMISSION**

Raising the energy efficiency will directly reduce the carbon emission. As a consequence, the targets that will raise the energy efficiency are also valid for the carbon emission as well.

There are two areas having substantial potential that will ensure the efficient use of the energy.

- ▶ Lighting
- ▶ Heating/Cooling Systems

##### **Steps, planned in order to raise the energy efficiency;**

1. Lamps with sensors are used in most of our campuses. These are LED lights that last longer and consume less energy.
2. Hallways, toilets, etc. in the campuses, sensors are used to illuminate common areas.
3. It is planned to bring the heating/cooling systems into a position that may be controlled by the DDC systems.
4. There are lots of electric heaters available at the offices apart from the central heating. It is planned to conduct works that will bring down the use of them.
5. It is planned to increase the studies in the direction of increasing the studies for the use of renewable energy (wind and solar energy) and conduct the studies to put the university at a position to be able to generate its own energy.
6. It is planned to prefer new devices to be purchased for the campuses among those bearing the type of high energy saving ones.
7. It is planned to revise the compensation boards that do not meet the losses in order to prevent the losses affecting the total energy consumption and by doing so, to reduce the consumption.
8. Relevant works will be conducted in the direction of the use of electronic devices (air-conditioner and so on), used at the buildings, in the direction of use only at necessary points.
9. It is planned to maintain negotiations in order to sign up or execute a contract with the electricity distribution firm for consultancy within the scope of (energy) saving and deduction in unit price.
10. The use of tea/coffee makers at every office seriously affects the energy consumption. As a consequence, it is planned to conduct works to build up common kitchen units at the areas in every campus in order to reduce the energy consumption.
11. Annual training programs will be organized in certain intervals for the staff on the efficiency of energy.
12. It is planned to conduct relevant works to raise awareness in order to bring down consumption through warning signs and placards.



**Steps, planned to reduce the carbon emission;**

1. In order that the university brings the carbon footprint down and ensure the sustainable use of source, it is planned, before all else, to transmit the determination and support of the senior (top) management to the academic and administrative staff in an effective manner.
2. It is planned to conduct relevant training works and projects in order to raise the awareness of the stakeholders in the struggle with the environment problems and global climate change.
3. It is planned to produce waste at the most minimum level (reduction at its source) and develop the recycling systems within the scope of the waste management plans that will ensure the decomposition of wastes at their source.
4. Various works providing saving at water, electricity, heating and transportation in order to reduce the carbon footprint and in the meantime, it is planned to conduct relevant works for the fact that the products due to be purchased in this respect would be environment-friendly and provide energy saving and have low carbon emission.
5. It is planned to carry out various numbers of works for the prevalence of the use of recycling materials and use of environment-friendly products (cleaning materials, fuels and so on).
6. It is planned to extend the use of the types of plants resistant to draught and specific to the location in the use of indoor campus (ornamental) plants.
7. It is planned to develop projects for the reutilization of rainwaters and grey waters.
8. It is planned to conduct relevant substructure works necessary to plan the buildings due to be constructed anew as a green environment-friendly building.

## **5. CONSTRUCTION STANDARDS, PLANNED TO BE APPLIED AT CAMPUSES**

Relevant information is given at this section of the plan about the construction standards, planned to be applied in order to create environment-friendly areas by raising the energy efficiency and reduce the carbon emission at the campus sites due to be constructed anew and converted into a campus site from the buildings, constructed for different purposes.

### **5.1. Construction Standards, Planned To Be Applied at New Campus Sites**

Construction Standards, Planned To Be Applied;

- Sustainable energy solutions will be taken advantage thereof in order to meet the heating, cooling, ventilation and electricity requirements.
- Designs will be designated in a manner of benefiting from the maximum level of natural light.
- The plants taking place at the landscape will be selected among those that consume low level of water.
- Systems that will use the treated water for the irrigation of the garden after the treatment of wastewaters.
- It is absolutely necessary to take into consideration of the fact that the preferences of materials have to be in the direction of their saving feature.
- No environment-friendly buildings will be built up on agricultural lands, historical sites and regions that may destroy the environmental balance.
- It will be tried to use the methods that may bring the level of excavation to minimum level in order to ensure lower fuel consumption during the construction.
- The construction wastes will be revaluated through various methods and environmental pollution will be brought down to the minimum level.
- The environment-friendly approaches will be applied in the construction technique and selection of the environment-friendly material.
- The materials that do not bear the risk of exhaustion and are procured from the sources at close locations will be preferred.

### **5.2. Standards to Be Applied our Converted Constructions of Us**

- Related energy-saving led lightings will be used.
- It is absolutely necessary to take the sensor into consideration in the planning of common spaces.
- The environmental lightings will be checked through by photocell and as a consequence, unnecessary consumption arising only from the lack of attention of the staff will be prevented.
- The heating/cooling systems will be used out of the central control systems.
- Relevant sheathing will be made in order to prevent the loss of heat. Consequently, the uses of air-conditioners and heater utilizations will be brought down.
- All devices to be used hereunder will be the energy saving devices.
- The uses of the tea/coffee makers at the offices will be prevented upon constituting kitchen spaces for the common uses of the academicians and administrative staff.

## 6. CONCLUSION AND TARGETS

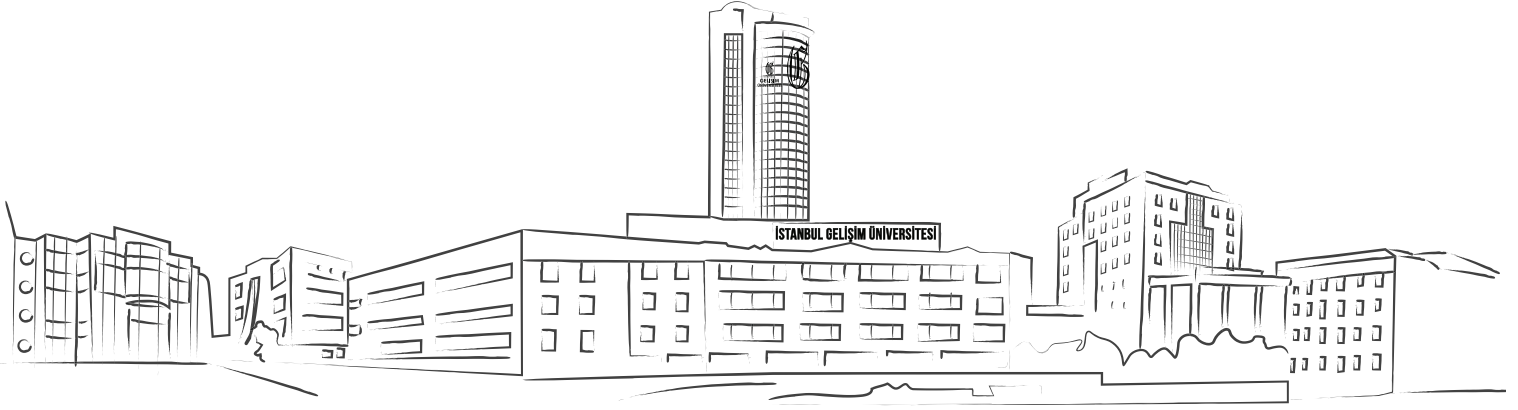
Within the sustainable and clean energy vision, the Gelisim University of Istanbul will conduct its work within the scope of its monitoring and prevention policy that it has developed in order to ensure the energy efficiency at its campus sites and reduce the carbon

emission and by doing so, bring the damage, inflicted on the environment, down to minimum level. The targets, determined within this scope are as follows:

- Organizing various trainings for the students and academic/administrative staff within the year in order to extend the policy for the improvement of the performance of the energy utilization policy;
- Formation of the job definition of an energy manager and appointment of a staff as the energy manager for the campus sites;
- Formation of an Environmental Management and Efficiency Team under the leadership of the energy manager;
- Development of green office standards for the work sites;
- Provision of a gradual energy saving referring to 10 % at the campus sites within a period of 2 years;
- Reduction of the rate of consumption 10 % at the campus sites where the energy consumption per  $m^2$  is high, on a gradual basis within a period of 2 years;
- Having effective communication with all stakeholders on quality, environment and energy matters and conduct of collaboration with the same;
- Development of a source management system covering natural sources as well as other sources through a sustainable development approach;
- Preference of highly-efficient equipment, systems and services conforming to the system at new projects and designs, and purchases;
- Dissemination of the recycling system and commencement of the substructure preparations for a zero waste system;
- Preparation of a detailed carbon management plan.



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