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Design and Analysis of the Possibility of Building a Photovoltaic Farm for University Campus in Adana

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Abstract

Title: Design and Analysis of the Possibility of Building a Photovoltaic Farm for the University Campus in Adana.

Mankind has always been needed energy from it is first existence to the present time. At the beginning, the energy required only as heat source. But in time, the use of energy has turned to be demand as mechanical and then electrical energy.

Last two decades, fossil fuels are identified by communities as; Limited reserves, economical fluctuations on its price and its damage to the environment. These are enough to search for alternative energy sources rather than conventional fossil fuel powered energy sources. Furthermore, transportation problems and foreign source dependency of conventional energy sources has led to preference of renewable energy sources. Therefore, in the recent decade developing countries has been trying to increase the share of renewable energy among its energy production capacities in order to ensure their energy independency. Turkey has high dependence on imported fossil fuels because of energy production systems rely on fossil fuels mostly. But also, the country has high potential for solar energy generation due to its geographical location. Turkey is planning to use solar energy generation potential for evaluate of power generation and country's independence purposes.

In this Thesis, it is planned to be built 9.5 MW PV system in province of Turkey, Adana and design and feasibility analysis carried out for this system for either meet the demand of the university's electricity consumption and sell the overproduction to the grid for payback of the budget of the system.

Keywords: Renewable Energy, Solar Energy, PV technology, PV system, Solar power generation system, Feasibility of PV system, Design of PV system.

Streszczenie

Tytuł: Projekt i analiza możliwości budowy farmy fotowoltaicznej dla kampusu uniwersyteckiego w Adanie.

Ludzkość potrzebowała energii od początku istnienia do chwili obecnej. Na początku, energia potrzebna była tylko jako źródło ciepła. Jednak z czasem zużycie energii stało się popytem na energię mechaniczną, a następnie elektryczną.

W ostatnich dwóch dekadach, społeczności z ograniczonymi rezerwami oraz ekonomicznymi wahaniami wychwytują ceny oraz szkody dla środowiska powodowane przez paliwa kopalniane. To są wystarczające powody dla szukania alternatywnych źródeł energii zamiast konwencjonalnych źródeł energii zasilanych paliwami kopalnianymi. Ponadto problemy transportowe i zależność od konwencjonalnych źródeł energii od zagranicznych źródeł doprowadziły do preferowania odnawialnych źródeł energii. Dlatego w ostatnim dziesięcioleciu, kraje rozwijające się starają się zwiększyć udział energii odnawialnej w swoich zdolnościach wytwarzania energii, aby zapewnić sobie niezależność energetyczną. Turcja jest w dużym stopniu uzależniona od importowanych paliw kopalnianych, ponieważ systemy produkcji energii opierają się głównie na paliwach kopalnianych. Ten kraj ma również duży potencjał do wytwarzania energii słonecznej ze względu na swoje położenie geograficzne. Turcja planuje wykorzystać ten potencjał generowania energii słonecznej do oceny wytwarzania energii oraz do uzyskania wiecej niezależności.

W niniejszej pracy, planuje się budowę systemu fotowoltaicznego o mocy 9,5 MW w prowincji Tureckiej Adana oraz przeprowadzenie analizy projektu i wykonalności tego systemu w celu zaspokojenia zapotrzebowania na energię elektryczną uniwersytetu i sprzedaży nadprodukcji do sieci w celu zwrotu budżetu systemu.

Słowa klucze: Energia Odnawialna, Energia Słoneczna, Technologia PV, System PV, System Wytwarzania Energii Słonecznej, Wykonalność Systemu PV, Projekt Systemu PV.

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INTRODUCTION

Energy, which is defined as one of the main factors for the survival of humanity. With the developing technology, energy, which has an ever-increasing effect on our daily lives, has become an indispensable concept. In the simplest terms, energy is needed in every area, from transportation to heating, lighting to communication and for operation of the devices we do our ordinary work. While our connection with energy is so strong and there is an ever-increasing demand, energy sector has shown a significant change and development from past to present.

After the 1973 petroleum crisis, the importance of the energy came to be the most important topic all around the world. Countries were to be afraid of come around of such a crisis and to stay away from problem in energy security, they set off on a quest of alternative energy sources. Renewable energy sources are chosen as a best alternative of fossil fuels. However, researches and developments had started in earliest 20th century due to the easy accessibility, way of use and its low-cost unit by produced energy of fossil fuels, there was no need to use of renewable energy sources. But also, with the help of present technological developments and continuous bad intention use of the fossil fuels with politics are accelerated the demand of renewables since 2000s.

In order to respond to the increasing energy demand in our country, the current resources should be used effectively. In this direction, many studies are carried out to use renewable energy sources. Due to its geographical location, there is a high potential for solar energy in our country. Especially with this method, electricity generation is increasing day by day. The installation of photovoltaic systems, which do not produce waste during electricity generation. Because of its simple usage and maintain installation of photovoltaic systems is becoming widespread in Turkey.

Within the scope of this thesis, solar power generation system is designed and analyzed and after this step, its feasibility analysis is carried out. Main purpose is to meet the electricity consumption and payback itself as soon as possible. But also, trying to decrease the carbon footprint and set the university good example and encourage the other universities for such an investment.

This Thesis consist of four main chapters. In the first chapter includes not only the basic overview of the country but also covers the brief information about such as climate and geography of the region that system planned to be built at. After the first chapter, at the second chapter Turkey’s solar energy generation approach and solar energy potential has mentioned. But also, this chapter has touched briefly on the Turkey’s primary energy sources and solar utilization. The third chapter covers the information about solar energy, PV technology, working principles and related components to build a solar power generation system. In the fourth chapter which is last chapter of the thesis, design and detailed feasibility analysis carried out and concluded with the help of CAD and HELIOSCOPE simulation software.

CHAPTER 1: TURKEY

1.1. Turkey: An Overview.

Turkey, officially the Republic of Turkey is a transcontinental country located on the Anatolian peninsula, with a smaller portion in Southeast Europe. The part of Turkey in Europe, is separated from Anatolia by the Sea of Marmara, the Bosphorous and the Dardanelles. Turkey is bordered by Greece and Bulgaria to its northwest, the Black Sea to its north, Georgia to its northeast, Armenia, the Azerbaijani exclave of Nakhichevan and Iran to its east, Iraq and Syria to its southeast, the Mediterranean Sea to its south, and the Aegean Sea to its west. Istanbul is the largest city in the country while Ankara is the capital. Approximately 70 to 80 per cent of the country's citizens identify as Turkish, while Kurds are the largest minority at anywhere from 15 to 20 percent of the population. [1]

1.1.1. Mediterranean Region of Turkey.

Mediterranean region takes its name from the Mediterranean Sea and occupies 15% of the total land of Turkey with its 120.000 square kilometers . The population is mostly concentrated at the locations suitable for tourism, industry, agriculture and commerce. Provinces in this region: Antalya, Adana, Mersin, Hatay, Isparta, Burdur, Kahramanmaras, Osmaniye. [3]

Figure 1 : Mediterranean Region of Turkey.[3]

1.1.2. Geography of Mediterranean Region of Turkey.

Mediterranean Region is a mountainous region. Taurus Mountains, which is a mountain chain , covers most of the mediterranean region. Another mountain chain is called Amonos Mountains which is at the east of the region. The mountains run in parallel to sea and in almost every places. The coastal areas were formed in the lower courses of the rivers. The most important coastal area is Çukurova in the eastern part of the mediterranean region. It was formed by three rivers, Berdan, Seyhan and Ceyhan. Main lakes of the region, like Lake Beyşehir, Lake Eğridir and Lake Burdur which are in the north west of this region.[2]

The plains of this region are extremely rich for agricultural. Fertile soils and suitable climate make the area suitable for growing grapes and citrus fruits and in irrigated areas cotton and rice. Droughts are not uncommon, and Summers are hot. Other industrial and agricultural products of the area are aluminum and steel and wheat, tobacco, green houses, barley. 80% of total of Turkey's citrus fruits are grown here, meanwhile anamur bananas are specific only to Mediterranean region.[3]

1.1.3. Climate of Mediterranean Region of Turkey.

The Mediterranean Region has a Mediterranean climate at the coast, with mild to cool, wet winters and hot, dry summers and a semi-arid continental climate in the interior with cold, snowy winters and hot, dry summers.[2]

1.1.3.1. Adana: an overview.

Adana is a major city in southern Turkey. The city is populated around the the Seyhan river, which is 35 km inland from the Mediterranean. Adana Province has a population of 1.75 million making it the 5th most populated city in Turkey.[4]

Adana lies in the heart of Çukurova also as known as Cilicia, a geo-cultural region. Home to six million people, Çukurova is one of the largest population concentrations in Turkey, as well as the most productive area in terms of agriculturally, owing to its large stretch of flat and fertile land [4].

1.1.3.2. Geography of Adana.

Adana is located at the eastern side of the Mediterranean, where it serves as the gateway to the Çukurova plain. This large stretch of flat, fertile area lies southeast of the Taurus Mountains.

From Adana, crossing the Çukurova west direction, the road from Tarsus enters the foothills of the Taurus Mountains, eventually reaching an altitude of almost 1,200 m. It goes through the famous Cilician Gates, the rocky pass through which armies have coursed since the dawn of history, and continues to the Anatolian plain.

Seyhan reservoir surrounds the north of the city. The Seyhan Dam, that completed in 1956, was constructed for hydroelectric power and for irrigation the lower Çukurova plain. Two irrigation channels in the city flow to the plain, passing through the city center from east to west. There is another canal which is irrigating the Yüreğir plain and to the southeast of the city. The 37th parallel north passes through the city.[4]

1.1.3.3. Climate of Adana.

Adana has a hot-summer Mediterranean climate under both the Köppen classification, and a dry-hot summer subtropical climate under the Trewartha classification. Winters are mild and wet. Summers are long, hot, humid and dry. The highest recorded temperature was on 8 July 1978 at 45.6 °C and the lowest recorded temperature was −8.1 °C. [4]

CHAPTER 2: SOLAR ENERGY IN TURKEY

2.1. Aproach to Solar Electricity Generation in Turkey

The rapid economic growth experienced in recent years in Turkey, rapid population growth and rising living standards, has brought a significant increase in energy demand. mostly from fossil energy sources to meet energy demand, Turkey, is largely dependent on external energy sources in terms of primary energy is imported every year, spending billions of dollars. The high utilization of fossil fuels brings with it the problem of foreign dependency in energy and high import costs as well as environmental problems. Energy supply security of energy supply and reduce emissions from its importance in terms of more efficient use of Turkey's renewable energy potential is increasing with each passing year. while offering a high potential of solar energy in renewable resources, be considered as a new resource for meeting Turkey's growing electricity needs is of paramount importance.

2.2. Turkey’s Solar Energy Potential

Turkey’s current geographic location is very efficient in terms of solar energy potential. According to Turkey’s Solar Energy Potential Atlas, total sunshine duration in year is 2.737 hours (daily 7.5 hours), total solar energy in year is 1.527 kWh/m^2 (daily 4,2 kWh/m^2) had been identified.[5] Turkey’s Solar Energy Potential Atlas is given below the figure 2.

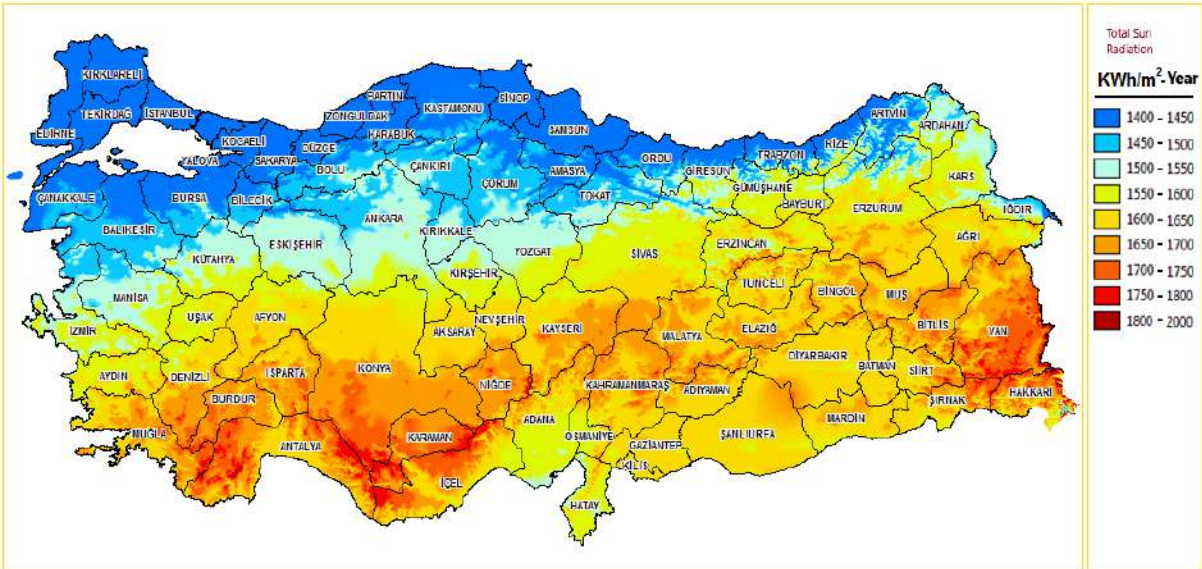

Figure 2: Turkey’s Solar Energy Potential Atlas. [6]

As we can see from the Figure 2 when we go from south side to north side Radiation potential of the sun is gradually decreasing. Due to excess of cloudy and rainy days/seasons also the geographical location of Black Sea region (north side) has the lowest potential of radiation. On the other hand, Part of Aegean region (southwest side), Mediterranean region (south side), Inner Anatolian region (middle side), East Anatolian (east side) and South East Anatolian region (south east side) has more potential of radiation. To invest Solar Power in these five regions of Turkey is more feasible and paying off in short term When we compare to northern part of Turkey. Sun Radiation of the regions are shown at table 1 which is given below.

Table 1: Solar Energy and Radiation Time for Every Region.[7]

REGION	TOTAL SOLAR ENERGY (kWh/m^2-year)	SUN RADIATON TIME (hour/year)
South East Anatolia	1.460	2.993
Mediterranean	1.390	2.956
East Anatolia	1.365	2.664
Inner Anatolia	1.314	2.628
Aegean	1.304	2.738
Marmara	1.168	2.409
Black Sea	1.120	1.971

Germany is heading country at solar energy and their higher solar radiation value is 1200 kWh/m^2 per year. [8] This radiation value is approximately the same with the lowest value of the Black Sea Region of Turkey. From this side point of view, we could say that Turkey is not using the benefits of its own advantages for solar energy.

2.3. Primary Energy Sources and Solar Utilization

Primary energy is an energy when used directly without any conversion and includes renewables and non-renewables. Solar, Wind and other known renewable energy sources are primary energy sources. Petrol, Natural Gas, Coal are non-renewable Primary energy sources.

According to Republic of Turkey Ministry of Energy and Natural Resources data balance tables (2018) Turkey's primary energy sources supply is in total 143.666 thousand TOE [11] and % 1,13 drop when compared to previous year. Turkey's primary energy sources are gas, oil, coal, lignite, geothermal, hydro, bioenergy, wind, solar and asphaltite figure 3 given below as a pie chart as percentage.

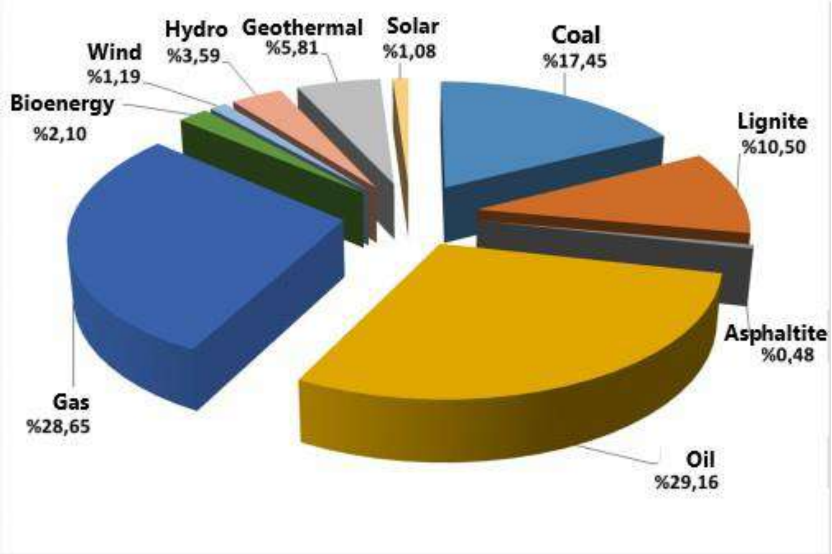

Figure 3: Turkey Distribution of Energy Supply by 2018 Primary Sources. [9]

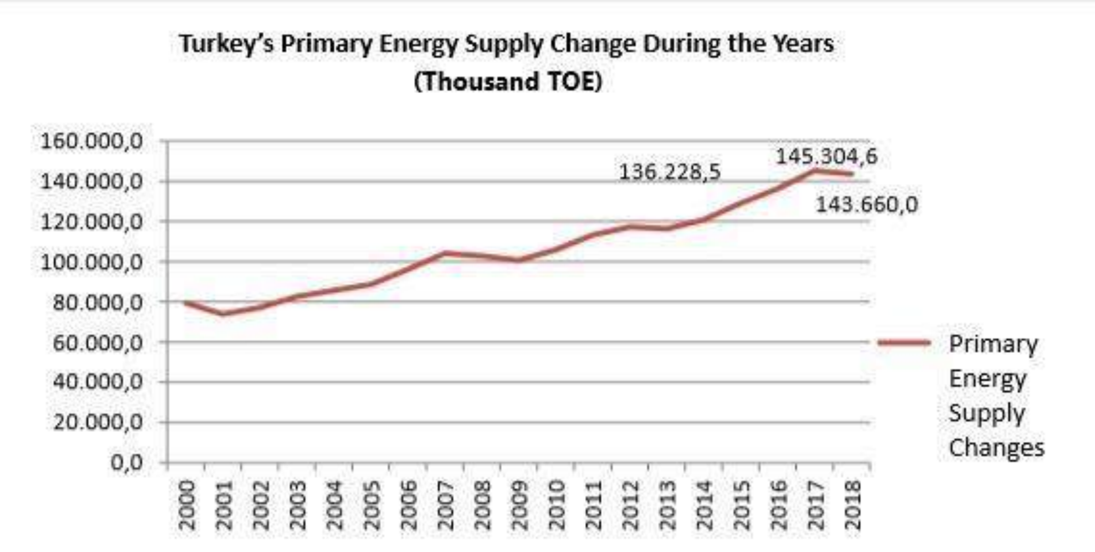

Figure 4: Turkey's Primary Energy Supply Change During the Years. [9]

In 2016 the value of 136.228 thousand TOE is announced by the Turkey Ministry of Energy and Natural Resources but after a year Turkey has seen greatest value of the primary energy supply with 145,304.6 thousand TOE. In 2018 This value has decreased to 143.660 thousand TOE. This data shows that Turkey's energy requirement is declined when compared to previous year. When we check the domestic production values in years, 2016 is 35.374 thousand TOE, 2017 is 35.357 Thousand TOE and in 2018 is 39.675 thousand TOE are observed in Republic of Turkey Ministry of Energy and Natural Resources data balance tables. The reason of this domestic production amounts is getting higher year by year is totally connected to use of renewable energy percentage increases in total of production. [11]

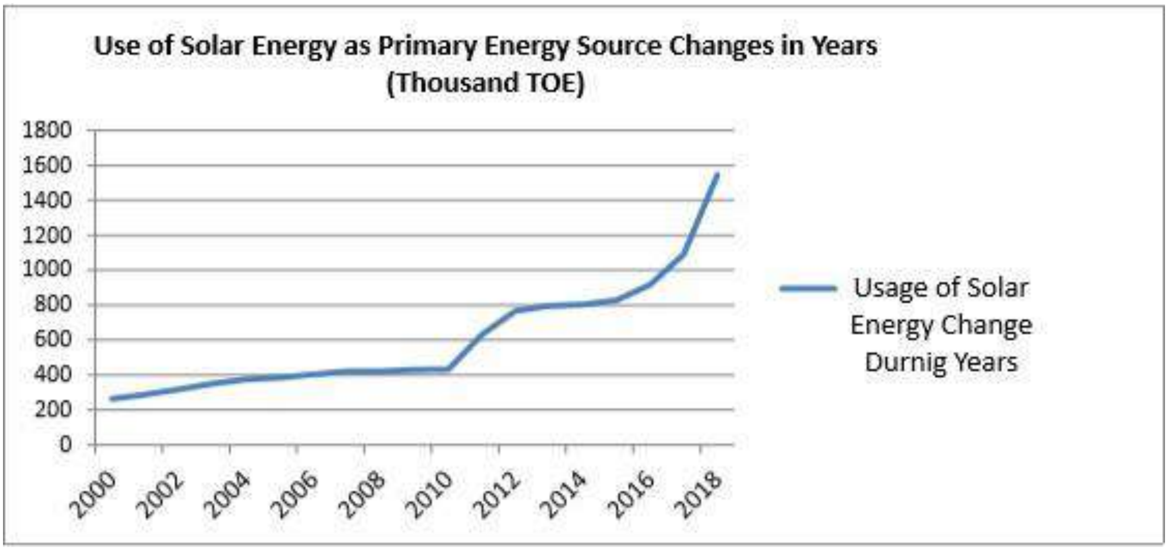

Figure 5: Use of Solar Energy in Primary Energy Source Change Graph by Years. [10]

The use of Solar energy in primary energy source change graph by years is given in figure 5. Especially after 2010 it raised rapidly. Also, the use of solar energy has reached up to 1.547,35 thousand TOE in 2018, this peak values shows that in following years we will come across with more projects in RES and governmental positive regulations for usage of solar energy. Before the 2014, Solar energy had been used for just hot water production for home and Industrial processes such as preheating and dehydration cycles. After 2015, addition to these usages with potential and developing technologies solar energy has started to use for production of electricity. This breakpoint influenced the slightly increased use of solar energy. Government is expecting the sharp increase in this energy sector following years. [11]

CHAPTER 3: SOLAR ENERGY

3.1. Solar Energy

As it is known, the solar system is consisting of Sun and the surrounding planets. Sun is the primary also major energy source of this whole as well as for the world. In particularly, it is an undeniable fact that the sun is an indispensable resource for living things on Earth. Most of the various energy sources used today are caused or are created by sun. The world can be illuminated with solar energy; water cycle can be provided by precipitation and most importantly, living life can be sustained by photosynthesis. This star (Sun), which is vital for our world, can also help to produce industrial energy.

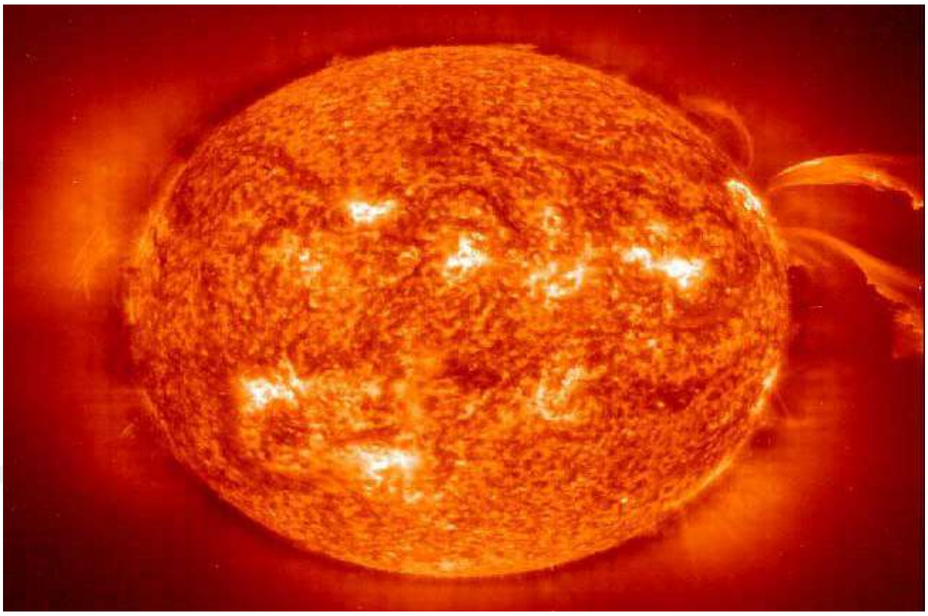

Figure 6: Sun. [17]

The sun is a star with a diameter of 1,400,000 km (approximately 110 times the world's diameter), mass 2x1030 kg (approximately 330,000 times the earth mass) and rotates around its own axis. It is known that in the center of the sun, a fusion reaction occurs mainly by the fusion of hydrogen nuclei and the temperature reaches approximately 15-16 million ° C. In this context, it is stated that approximately 90% of the Sun is made up of hydrogen.[12]

In the core of the sun, hydrogen nuclei are fused to form helium nuclei, resulting in a great energy as a result of this reaction. Since the total radiation of the sun is $3.8x10^{26}$ J / second, about 600 million tons of protons, i.e. hydrogen, are consumed in the sun in one second. Although this number may seem frightening at first glance, considering that the mass of the Sun and almost 90% of this mass are formed by protons, it turns out that there is a period of approximately 5 billion years to consume hydrogen fuel in the Sun. In this respect, it is stated that the Sun is an inexhaustible energy source for humanity.[13]

Solar energy reaching the world comes from a cooler (about 6000 ° K) and a narrow upper region of sun which is several hundred kilometers. This zone consists of low-density ionized gases and is defined as a zone that does not transmit visible light. The atoms in this region radiate in proportion to their temperature and thus cause the radiation of this region.

The Earth is approximately 150 million km away from the Sun. The earth rotates in an elliptical orbit, both around itself and around the Sun. In this respect, the energy coming from the sun to the world changes both on a daily basis and throughout the year. In addition, as the rotational axis of the Earth itself rotates at an angle of 23.5º with the orbital plane around the Sun, the sun intensity falling on the earth changes throughout the year and thus the seasons are formed.

Approximately 4x1026 J energy is transmitted to the Earth from the Sun in seconds. This is quite a small value given the total energy emitted by the sun. However, even this amount is approximately 15-16 thousand times the total energy used by mankind in the world today. Solar energy coming to the earth is composed of radiation of various wavelengths and reaches the world by crossing the Sun-Earth in about 8 minutes. The radiation travels at a speed of 300,000 km per second, in other words, at the speed of light.

Solar energy, which comes out of the atmosphere on an area per square meter perpendicular to the sun's rays, is called the Solar Invariable (S) and its value is S = 1373 W / m^2. This value, by definition, can be taken literally throughout the year. Because the surface perpendicular to the incoming sun rays should always be considered. However, since the Earth's orbit around the Sun is not a circle but an ellipse, there is a 3.3% change in this value throughout the year. 832 W / m^2 part of this energy reaches the earth due to absorption and reflection events.[14]

It is calculated that the amount of solar energy reaching the world in approximately one hour is enough to meet the annual global energy demand. However, it can be said that solar energy has not been provided to sufficient use yet due to its low density, interruption and efficiency in current technology. Figure 7 presents a graphical comparison of annual solar energy reaching the world with the amount of energy obtained from other energy sources or other energy types and annual global energy demand.

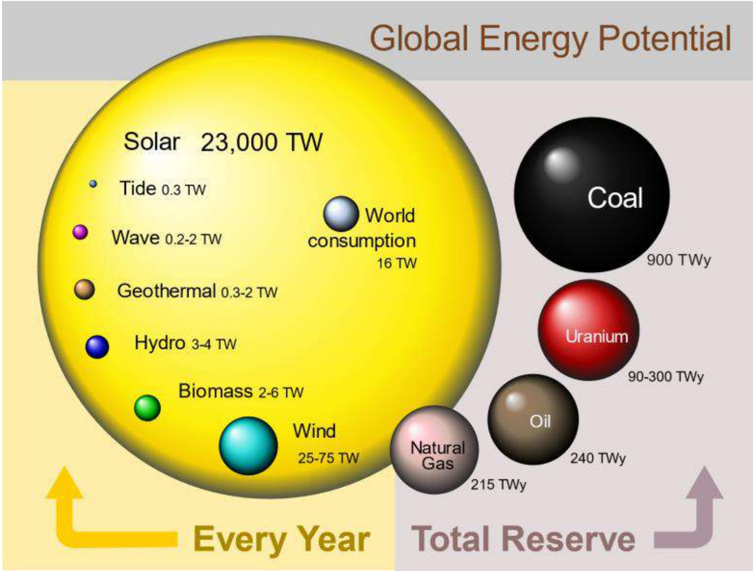

Figure 7: Global Energy Potential. Comparison of renewable and conventional energy sources. For renewable, the amount of energy is shown per year, while for conventional sources the total reserve is displayed. [15]

It is known that not all of the solar energy falling on earth turns into useful energy. Some of these rays are absorbed by the atmosphere, while others are reflected back from the clouds. Figure 8 shows the distribution of sun rays falling on Earth.

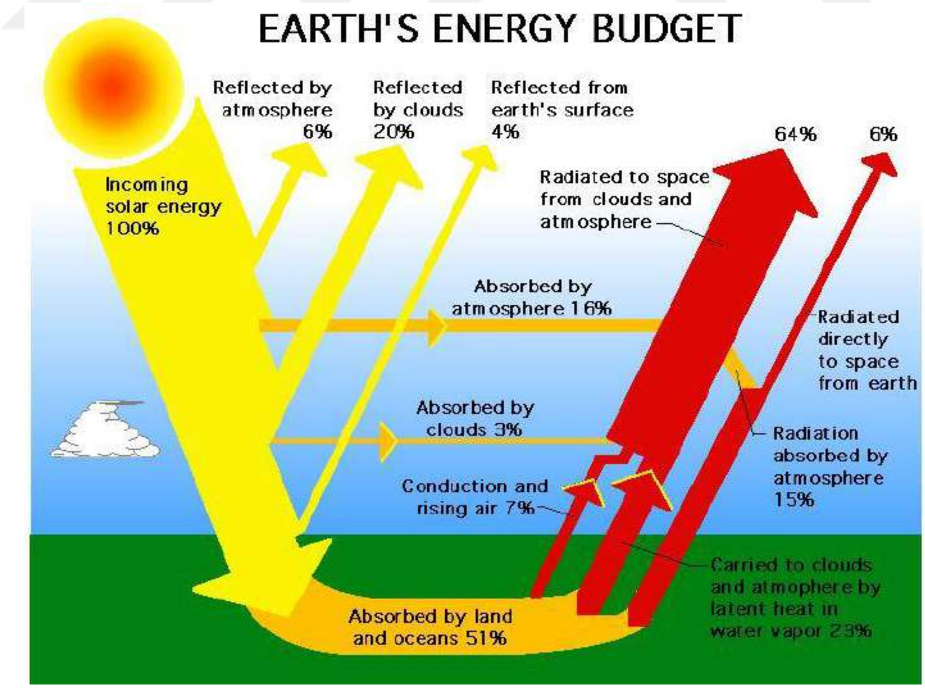

Figure 8 : Distribution of the sun's rays falling on the earth. [16]

While making calculations related to solar energy, it is named in different ways according to the way the solar beam falls on the world. These.

Direct Radiation: This radiation value defines the radiation received directly from the sun. It is especially used in condensed solar energy systems and solar energy heat calculations.

Diffused Radiation: This radiation value is formed by the dispersion of the Sun as it passes through the earth's atmosphere and includes the amount of radiation reflected from the surface and the radiation reflected from the atmosphere.

Global Radiation: It is the sum of direct and diffused radiation and is widely used especially in photovoltaic system calculations.[18]

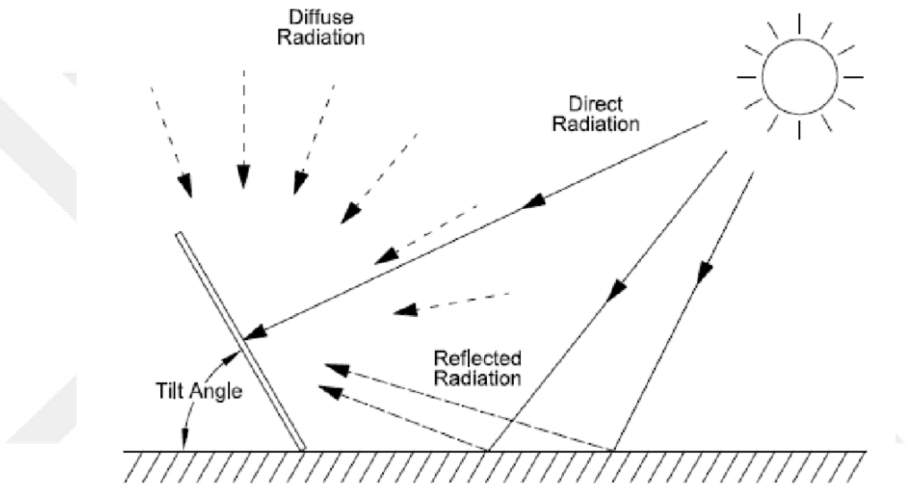

Figure 9 : Types of Solar Radiations.[19]

The biggest energy source of the world is the sun. Solar energy systems are an inexhaustible type of energy that does not give harmful gases to the environment. The use of solar energy provides great advantages since it does not harm the environment, it is an inexhaustible and very cheap energy source. If we list the advantages of solar energy as substances:

- First of all, the sun is an abundant and inexhaustible source of energy.
- It is a clean energy type, it does not pollute the environment, does not have smoke, gas, carbon monoxide, sulfur and radiation.
- It is suitable for local applications. It is possible to utilize solar energy almost everywhere where energy is needed. The energy needs of a clock, a calculator or a lighthouse, a forest watchtower can be met.
- As it is not dependent on the outside, it is far from the possible economic crisis.
- For many applications, complex technology is not required. Operating costs are very low.

In addition to its many advantages, solar energy is available in some limitations. If we list these limitations:

- Since the solar radiation coming to the unit surface is low, a large surface is needed
- Since solar radiation is not continuous, it requires storage. Storage facilities are limited.
- In winter, when the energy need is high, there is little solar radiation and there is no nighttime.
- For the system that makes use of solar radiation to receive sunlight continuously, the environment must be open and not shaded.

3.2. Electricity Generation Technologies from Solar Energy

Technologies used in electricity production from solar energy; It is divided into two main groups: photovoltaic (photovoltaic-PV) and condensed power systems (concentrated solar power-CSP). Detailed information on photovoltaic technology is given below.

3.2.1. Photovoltaic Technology

Photovoltaic (PV) effect; It is the electrical potential formed between the common junction of two different materials exposed to solar radiation. With this effect, the PV cell directly converts light into electricity. This effect was found by the French physicist Becquerel in 1839.[9] Solar cells can be used in any application where electrical energy is required. Solar cell modules depending on the application; They are used in conjunction with accumulators, inverters, battery charge monitoring devices and various electronic support circuits to form a solar cell system (photovoltaic system). These systems are used especially in areas that are far from residential areas, without electricity grids, when it is difficult and expensive to transport fuel to the generator. Apart from that, it is also possible to mix them with diesel generators or other power systems. A photovoltaic system converts solar energy into electrical energy in order to feed the load that operates with direct current (DC) or alternating current (AC). The produced electricity is DC. A direct current load can be fed from here. Since solar radiation is not continuous and stable, there may be situations where the load is insufficient in feeding. In addition, there may be times when the generated energy is more than the system needs.

This excess surplus energy can be stored in the batteries, providing energy for time periods when the solar radiation is insufficient. The load to be operated may be operating with alternating current. In this case, an inverter is used to convert direct current to alternating current. Photovoltaic systems can be built independently from the local electricity grid to feed electrical charges located at distant locations. However, photovoltaic systems located close to the local electricity grid can be arranged to transfer energy to the grid.[20]

PV system technology is ready for installation as a result of bringing together PV panels and system stabilizers. Depending on the basic material (semiconductor) type and commercial maturity level, PV system technologies are classified into three groups: crystal silicon, thin film and developing new PV technologies.

3.2.2. History of PV evolution

Although solar energy has been used in different ways by human beings for centuries, it is seen that the first studies required to obtain electricity from solar energy started in the middle of the 19th century. For the first time in 1839, French scientist Becquerel found the Photovoltaic phenomenon by observing that the tension between the electrodes immersed in the electrolyte is dependent on the light falling on the electrolyte.[21] A similar event in solids was firstly made in 1876 on selenium crystals by G.W. Adams and R.E. It is known to be shown by Day. In literature scans, the efficiency of photovoltaic cells was observed to be 1% in 1914. In 1954, it is stated that three American scientists, Chapin, Fueller and Pearson, achieved 6% efficiency value on the silicon solar cell and succeeded in commercializing the conversion from solar to electrical energy.[22]

In the following years, which was accepted as a turning point for photovoltaic power systems, research and first designs were made for power systems to be used in spacecraft. It is known that photovoltaic power systems have been the reliable source of space studies since the early 1960s.

It is observed that until the early 1970s, the applications of solar panels were limited. Although research and development efforts for the use of solar panels as an electrical power system on earth began in 1954, the real interest occurred in the years following the "first oil crisis" in 1973.

Large-scale and comprehensive research and development projects have been launched in the US, Europe and Japan, but much less semiconductor material is required, and efforts to increase the efficiency of solar panels based on proven silicon crystals in space studies, and therefore Studies on thin film solar panels, which can be produced cheaper, have been accelerated.[23]

3.2.3. Working Principle of Solar Cells

Semiconductor technology forms the basis of electronics. The most basic electronic materials such as diodes and transistors operate depending on the semiconductor technology. The ability of a material to conduct current is based on electrons located in orbits around the atomic structure of the material. The number of electrons that each orbit can carry is determined by the formula $2n^2$. [24] According to this, the conductor is called as the conductor because there is an electron in the last orbit of the copper atom, the semiconductor for the 4 atom electrons in the last orbit of the silicon atom, and the insulator because there are 8 electrons in the last orbit of the neon atom. [25]

Figure 10 shows the energy levels of the forbidden band between the conductivity band and the valence band of semiconductor and insulating materials. The smaller the forbidden bandwidth between the conductivity band of the atoms and the valence band, the more conductive it is considered. As this bandwidth increases, it evolves from atomic conductivity to insulating. The forbidden bandwidth of semiconductors is between atoms considered conductive and insulating. [24]

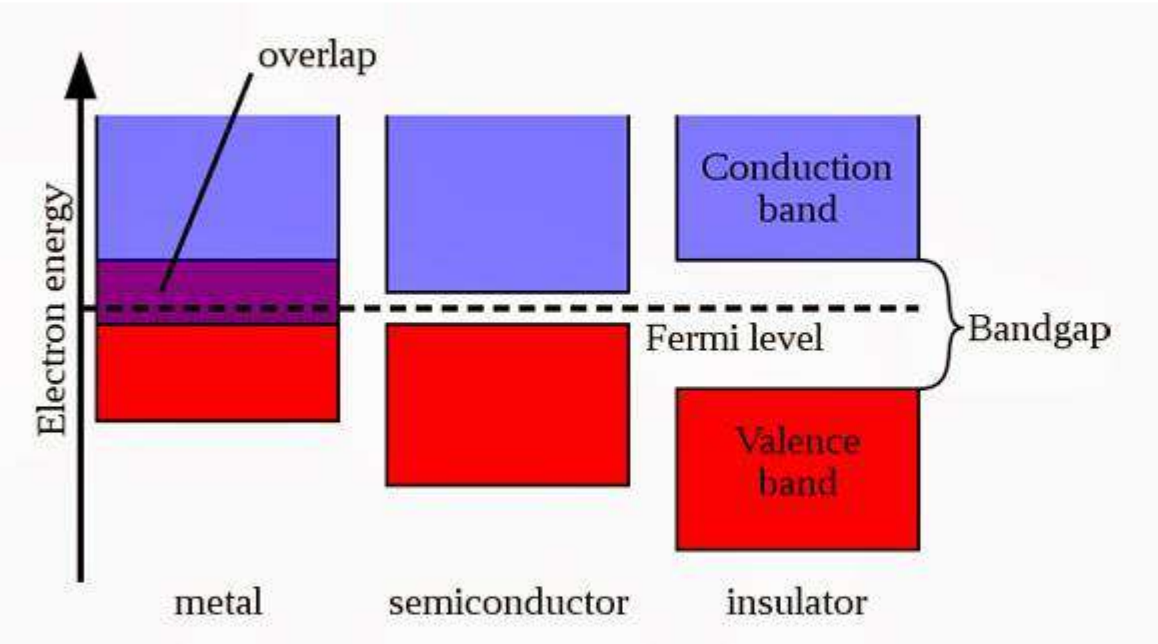

Figure 10: Energy Levels of Conductor, Semiconductor and Insulator.[26]

Most photovoltaic cells are made of silicon, an element that is at the heart of all modern electronics. Silicon is special because of the arrangement of its electrons it has four out of the possible eight electrons in its outermost shell. This means that it makes perfect covalent bonds with four other silicon atoms, forming a lattice structure. Figure 11 shows Silicon Atom and its chemical structure.

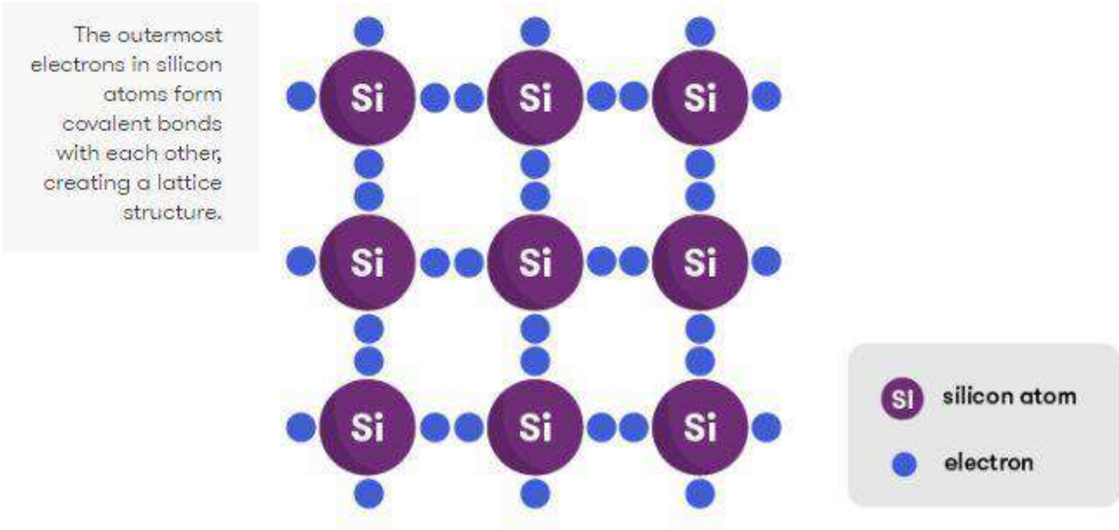

Figure 11: Silicon Atom and its Chemical Structure.[27]

This bonding mechanism means there are very few free electrons floating about, which is what we need to create electricity. That is what electricity is, after all the flow of electrons. Because of the arrangement of bonds in its crystal structure, silicon in its pure form does not have very many free electrons, so we ‘dope’ it. [27]

In order to make the semiconductor materials to transmit the electric current well, the doping process is done. For the doping process, phosphorus is selected from the 5A group of the periodic table and boron from the 3A group. As shown in figure 12, silicon added with phosphorus selected from 5A group turns into n-type material. Here, it tries to bond with 5 electrons of phosphorus that can bond, with 4 electrons of silicon that can bond. After the mutual bond pairings are established, one electron of phosphorus is exposed and an n-type material is formed, which is rich in electron. As shown in Figure 13, when silicon is added to the boron from the 3A group, as a result of the bonding of mutual electrons, an electron of the silicon stays idle and a part called the cavity is formed opposite the electron it cannot match. This material is called p-type material.

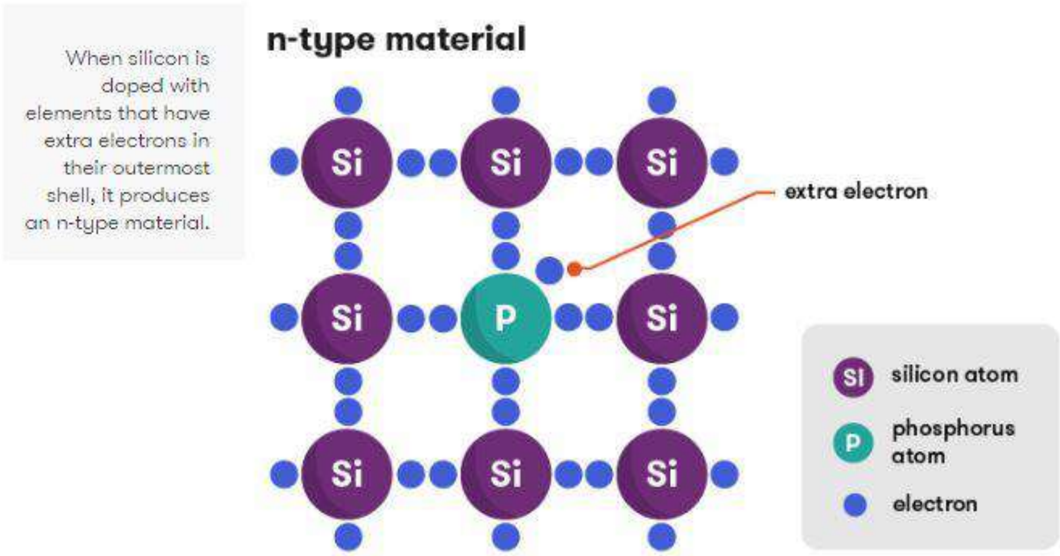

Figure 12: Obtaining n-type material after doping process. [27]

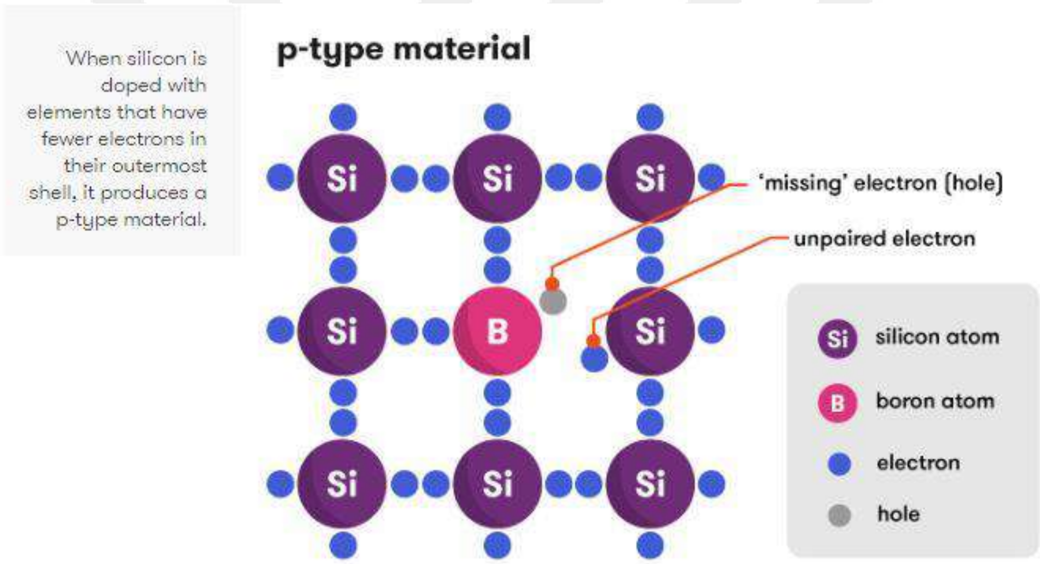

Figure 13: Obtaining p-type material after doping process. [27]

The extra electrons and holes will float round the lattice; they are 'shared' by all the atoms within the structure. This provides every doped material an overall slight preference to either give or receive electrons. this can be referred to as electronegativity a measure of how powerfully an atom or material hangs on to its electrons.

Through doping, and therefore the resulting changes in electronegativity, silicon is become a conductor of electricity.

However, when we place the p-type and therefore the n-type materials in contact with each other which is shown at figure 14, one thing interesting (and useful) happens. At the purpose wherever the two types meet the junction electrons from the n-type layer diffuse over into the p-type layer, yield a region with a small positive charge within the n-type layer. The reverse happens within the p-type layer holes diffuse into the n-type layer, yield a small negative charge during a region of the p-type layer. This creates an electrical field, which can direct the flow of electrical current.

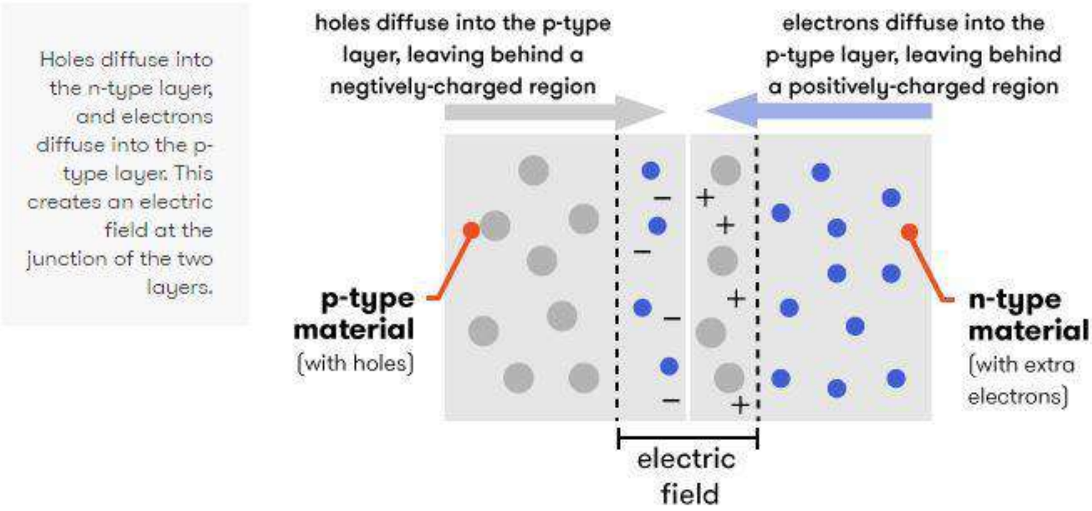

Figure 14: Combination of P type and N type material. [27]

When we consider a photovoltaic cell made of a thin combination of p-type silicon arranged over a layer of n-type silicon. once daylight hits our cell, the energy of its photons excites electrons into states known as ‘electron-hole pairs’. once these are shaped within the neighborhood of the electrical field at the junction of the p-type and n-type layers, the electrical field pulls the pair apart (they kind a ‘charge-separated’ state). Controlled by the force of the electrical field, the electrons travel to the n-type side, and the holes to the p-type side.

The photon’s energy can even create electron-hole pairs in different components of the doped semiconducting material. Sometimes, these electron-hole pairs can simply pair up once more (recombine) with the additional energy emitted as heat. However, if they notice themselves close to the electrical field at the junction of the p- and n-type layers, the electrical field can send electrons to the n-type layer, and holes to the p-type layer.

If you produce an external association (using electrodes and a wire) between the two layers, the electron can then travel back through the wire to the p-type layer, as an electrical current that will usefully work. the total factor acts rather like an electrical battery, continually recharged by the daylight.

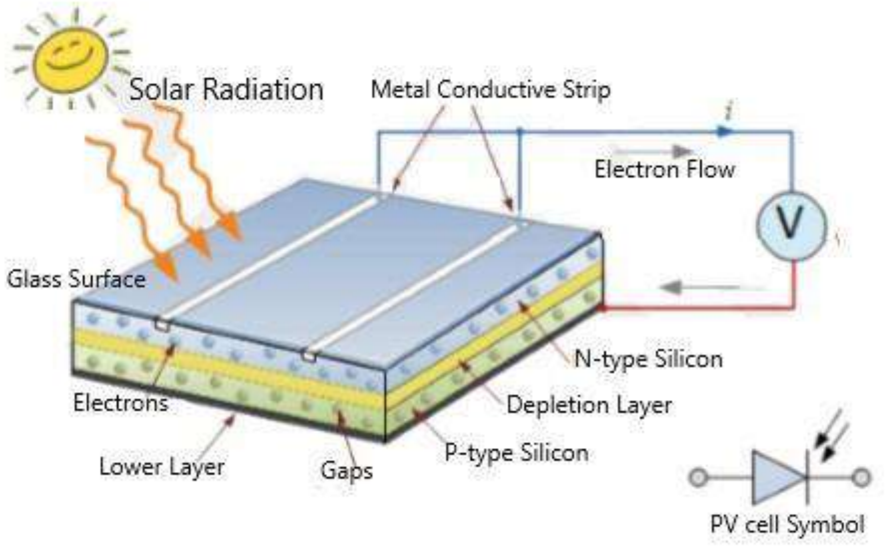

Figure 15 : Presentation of a Solar Cell

3.2.4. Photovoltaic Solar Panels According to Production Type and Structure

FV solar panels can be obtained from different materials and different methods. The variety of methods and raw materials in production depends on technological progress and economic reasons. Solar cells can be categorized as 1st, 2nd and 3rd generation solar cells. First Generation solar cells, also known as conventional solar cells, are silicon-based cells and are called monocrystalline silicon and polycrystalline silicon. These first-generation solar cells are dominantly sold in the market and have a large production area. second Generation solar cells: It is made of materials such as amorphous silicon (a-Si), copper indium gallium selenide (CIGS) and cadmium telluride (CdTe), and is used commercially in solar power plants, small-scale grid-independent systems. Third Generation solar cells are the studies that are carried out with a few thin film technologies, which are not commercially produced but whose R&D studies continue.[28] Solar cells: crystalline silicon cells, thin film solar cells and other cells are considered in 3 groups.

3.2.4.1. Crystalline Silicon Cells

Crystal silicon cells: It has different types such as monocrystalline silicon, polycrystalline silicon and ribbon silicon. These differences occur again according to the production methods. Silicon-based cells are the most preferred cells in the market because they have been working on for many years and developing in parallel with the microelectronics market. Other reasons why it is common are; it can be counted as being abundant in the world, containing no toxic substances, being available for many years outside, being able to reach high yields, and lowering production costs.[29]

3.2.4.1.1. Monocrystalline Silicon Cells

Silicon is one of the most common atoms on earth. Sand and quartz forms are the most common in nature. However, quartz material is more suitable for production since the silicon in sand is quite low. Silicium ratio in quartz is approximately 90% and 99% purity are obtained by certain processes. Silica is processed through several processes.[30] Monocrystalline silicon cells are the oldest solar cells. It dates to the 1950s and is produced using a method known as the "Czochralski method". In the application of this method, the crystal of the vaccine that is constantly rotating into the high purity molten silicon is immersed and pulled upwards. A nugget with a single crystalline molecule is formed from the molten silicon. These ingots are sliced into sections of approximately 0.5 mm thickness to be very thin. Although monocrystalline silicon cells are more efficient than other silicon cells, they are not so preferred because they have an expensive and complex production process. Their efficiency varies between 15-20%.[31] Figure 16 which is shown below presents monocrystalline silicon cells.

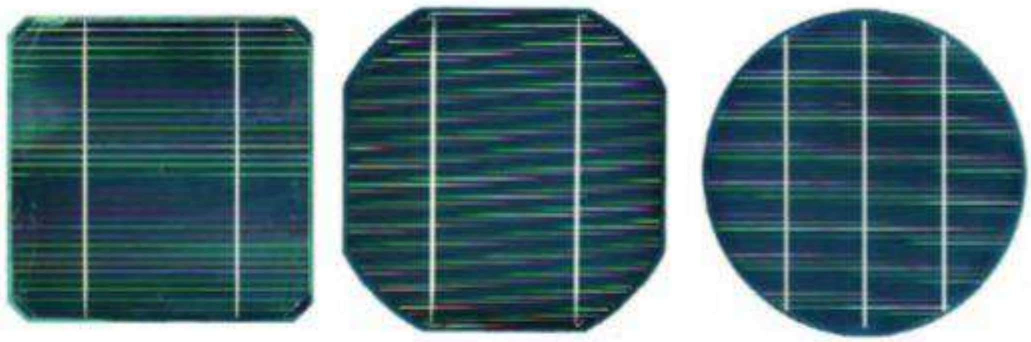

Figure 16 : Monocrystalline silicon cell example.[35]

3.2.4.1.2. Polycrystalline Silicon Cells

The increase in the solar panel market has increased the need for cheaper and easier production methods. Polycrystalline silicon cells began to become widespread since the 1980s, when industrialization was accelerating in solar panels. Polycrystalline silicon cells are obtained from pure molten silicon using a casting process. Silicon does not have a homogeneous distribution, as in monocrystals, and therefore their efficiency is lower. It is the most preferred silicone cell type on the market. It is easier to manufacture and more cost effective. Their efficiency varies between 11-15%.[32] However, although both cost and efficiency are low, it is preferred due to cost benefit. Figure 17 represents Comparison of crystalline solar cells. The ones on the left are made of polysilicon (poly-Si) while the ones on the right are made of monocrystalline silicon (mono-Si). [33]

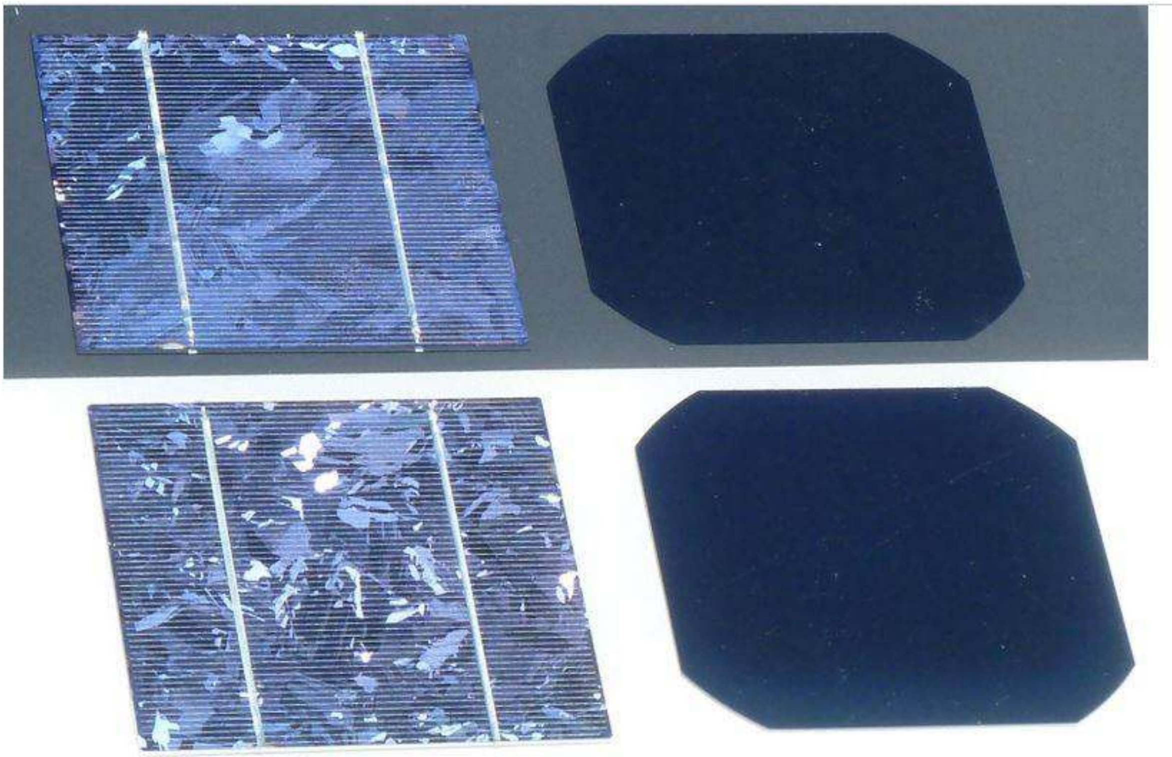

Figure 17: Representations of Polycrystalline Silicon Cells (left side) and Monocrystalline Silicon Cells (right).[33]

3.2.4.1.3. Thin Film Cells

These cells are formed by coating semiconductor material on materials such as glass and iron with a thickness of 1-2 micrometers. Commercially widely used types include amorphous silicon (a-Si), cadmium telluride (CdTe) and copper indium gallium selenide (CIGS). Although it is more affordable than crystalline silicon cells in terms of cost, it is not preferred because its efficiency is still between 5-8%. [28]

3.2.5. Solar Photovoltaic System Components

Apart from solar panels, different equipment is also used within solar energy systems and each of them plays a significant role in the system. Since solar panels produce direct current due to their structure, the alternating current used in industry or houses needs to be obtained through some conversion processes. While performing this conversion process, components are used in the system. It is stated that these components can be diversified for purposes such as increasing the reliability of the system, monitoring system data and providing remote control. Introducing main components independently could help to imagine entire system and some working mechanism at whole. This section refers to the following main components of the photovoltaic system.

3.2.5.1. Solar Photovoltaic Modules

Solar panels, the most basic part of photovoltaic systems, are the part where electricity is produced from the sun. It converts solar energy into electrical energy through solar cells made of semiconductor silicon material that it contains in the solar panel. There are solar panels in different capacities. These vary according to the areas of solar cells and their arrangement. Figure 18 represents a single mono crystalline module.

Figure 18 : Mono Crystalline 400W Solar Module.[34]

3.2.5.2. Array Mounting Racks

Solar panels can be installed in places such as buildings, industrial facilities and open fields. Specially designed structures are used for the placement of the panels. It is observed that these structures are produced from materials such as galvanized steel, aluminum, stainless steel, wood, and composite.

The angles of the mounting structures are determined according to the region where the solar panels will be placed, and the solar panels are placed on top of these structures. In this way, it is calculated that the panels will collect the maximum energy from the sun throughout the year.

Solar panel assembly structures can take many different forms. Figure 19 shows 9 different assembly structures that can be used for solar panels.

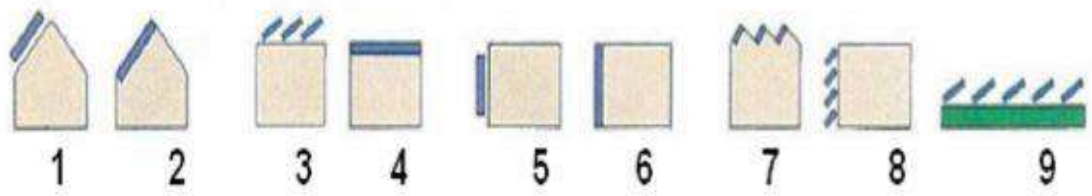

Figure 19 : Different Assembly Structures for Solar Panels.[35]

These assembly structures,

For roof

1. With an additional structure on the roof cover,
2. As roof cover
3. Saw tooth on terrace roof
4. Terrace roof cover

For facade

5. With an additional structure on the facade surface
6. As facade cladding material

For different building sections

7. Parapet
8. Sunshades

For standalone systems

9. On soil background

3.2.5.3. Inverter

Inverters are electronic devices that convert DC electrical energy into AC electrical energy. For off-grid photovoltaic systems; square wave, sine and modified sine full three types are available. Modified sine and full sine models are frequently used in solar systems.

Inverters full sine models are two types, MPPT and PWM. New generation inverters used in solar systems are smart inverters that also include a charge controller. This type of inverters shows the user the production information of the solar panel, battery voltage values, electricity usage. These inverters contain a convector (AC-DC converter) so that batteries can be charged with mains or generator support.[36]

Figure 20 : An Inverter for Off-grid PV system.[36]

On-Grid, that is, inverters used in grid-connected photovoltaic systems are different. These inverters are specially produced for grid connections. It has features such as being able to work in coordination with the grid, providing electricity transfer from the network to the load as a result of the power drop in the panels. These are available in single and three phases. In these systems, the inverter power should be parallel to the panel power, unlike off-grid systems. On-Grid inverters have remote monitoring capability. The user can monitor the parameters such as the production of panels during the day, daily electricity consumption and total electricity production from a distance. The user can track its production and consumption wherever in the world. [36]

Figure 21: An Inverter for On-grid PV system.[36]

3.2.5.4. Grounding Equipment

Grounding equipment provides a well-defined, low-resistance path from photovoltaic system to the ground to protect your system from current surges from lightning strikes or equipment malfunctions. Grounding also stabilizes voltages and provides a common reference point. The grounding harness is usually located on the roof when it is mounted top of the buildings, on the other hand if the system is placed in a field it is connected direct to the earth.[37] Figure 22 which is shown below represents how it is grounded to earth soil.

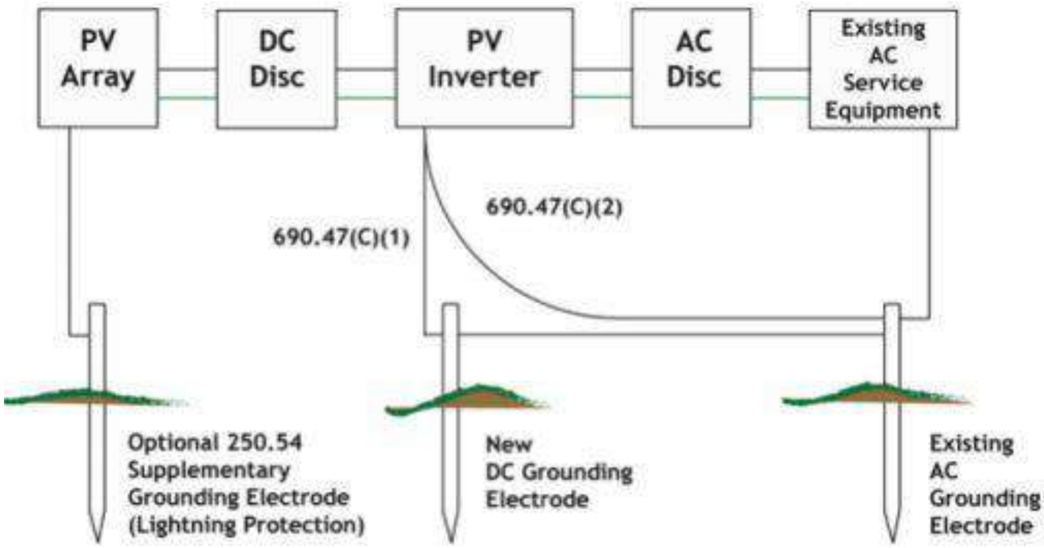

Figure 22: Photovoltaic System Grounding Method.[42]

3.2.5.5. Combiner Box

Wires from individual PV modules or strings are run to the combiner box, typically located on the roof. These wires may be single conductor pigtails with connectors that are pre-wired onto the PV modules. The output of the combiner box is one larger two wire conductor in conduit. A combiner box typically includes a safety fuse or breaker for each string and may include a surge protector.[37] Figure 23 Represents a solar string combiner for PV application.

Figure 23 : Solar String Combiner for PV application.[43]

3.2.5.6. Surge Protection

Surge protectors help to protect your system from power surges that may occur if the PV system or nearby power lines are struck by lightning. A power surge is an increase in voltage significantly above the design voltage. [37]

3.2.5.7. Disconnects

Automatic and manual safety disconnects protect the wiring and components from power surges and other equipment malfunctions. They also ensure the system can be safely shut down and system components can be removed for maintenance and repair. For grid connected systems, safety disconnects ensure that the generating equipment is isolated from the grid, which is important for the safety of utility personnel. In general, a disconnect is needed for each source of power or energy storage device in the system.

For each of the functions listed below, it is not always necessary to provide a separate disconnect. For example, if an inverter is located outdoors, a single DC disconnect can serve the function of both the array DC disconnect and the inverter DC disconnect. Before omitting a separate disconnect, however, consider if this will ever result in an unsafe condition when performing maintenance on any component. Also consider the convenience of the disconnects' location. An inconveniently located disconnect may lead to the tendency to leave the power on during maintenance, resulting in a safety hazard. [37]

3.2.5.8. Charge Controller

The charge controller regulates the dc energy from the solar panel and stabilizes it and creates a stable dc electrical energy for the charging of the batteries. In order to charge the batteries from a dc source, the charging current and voltage must be regulated constant. The voltage and current produced by the solar panel are not constant, so a charge controller is required for efficient charging of the batteries. Charge controllers also prevent reverse current from flowing from the battery to the panels. It protects the battery from overcharging. The charge controller cuts off electricity from the solar panel when the battery is full. It has two types. These; PWM (Pulse Width Modulation) and MPPT (Maximum Power Point Tracking) are charge control devices.[36]

3.2.5.9. Solar Energy System Cables

Solar panels are defined as generators that provide electricity from sunlight due to their structure. Because of these features, solar panels and other equipment connected to them are exposed to sun rays. It is stated that the cables, which connect the solar panels to each other and provide higher power, are affected by the sun's rays and high temperatures. Given that the working life of solar energy systems is more than 25 years, it is revealed that the cables connecting these systems must meet these conditions at least. However, due to the wear that may occur over the years, it is necessary to have special cables that connect the solar panels to minimize cable losses. In this context, with the development of the solar industry, cable manufacturers have started to manufacture special cables for these systems. The general characteristics of this type of cables are shown as their resistance against the harmful effects of sun rays and high temperatures and they carry DC electricity. Solar system cables are generally able to operate at temperatures between -40 ° C and + 120 ° C. These types of cables are commonly called "Solar Cable".[38] Figure 24 Shows specific cable type for Photovoltaic systems.

Figure 24 : An Example for Solar Cable [44]

3.2.5.10. Battery

Battery quality is very important for off grid photovoltaic systems with solar storage. The battery should have high charge-discharge efficiency and a long life. It must be resistant to temperature and adverse environmental conditions. We will discuss the technical details of these in another article. Batteries commonly used in solar systems; gel batteries, special opzs type aqueous batteries and some deep cycle lead acid batteries. [36]

3.2.6. Photovoltaic Systems by Usage

Photovoltaic solar systems are divided into two types according to their usage. These are grid independent and grid connected systems.

3.2.6.1. Grid Independent Systems (off-grid)

As the name implies, grid independent systems are PV systems that can meet the energy needs of a house or a consumption point separately from the grid. These systems are mostly preferred in areas remote to electricity generation facilities or distribution facilities, in regions where electricity is not yet available or costly to reach. In our country, such systems are predominantly preferred in vineyard houses, villages without electricity subscription, irrigation areas. The biggest advantage of these systems is that electricity produced from solar energy is consumed on-site without much loss. [39, 40]

Figure 25 shows the process flow chart of a grid-independent PV solar energy system. The electrical energy produced from the solar panels goes to the DC load via the charge controller via solar cables and the energy that is not consumed as DC is stored in the batteries. The charge controller acts as a control device here, directing the energy to the DC load when necessary, to the battery, and cutting the battery charge when the battery is fully charged. At the same time, it prevents energy loss by preventing the battery from discharging at night when electrical energy is not produced. In order to feed the AC loads in the system, conversion from DC to AC is performed with the inverter.[40]

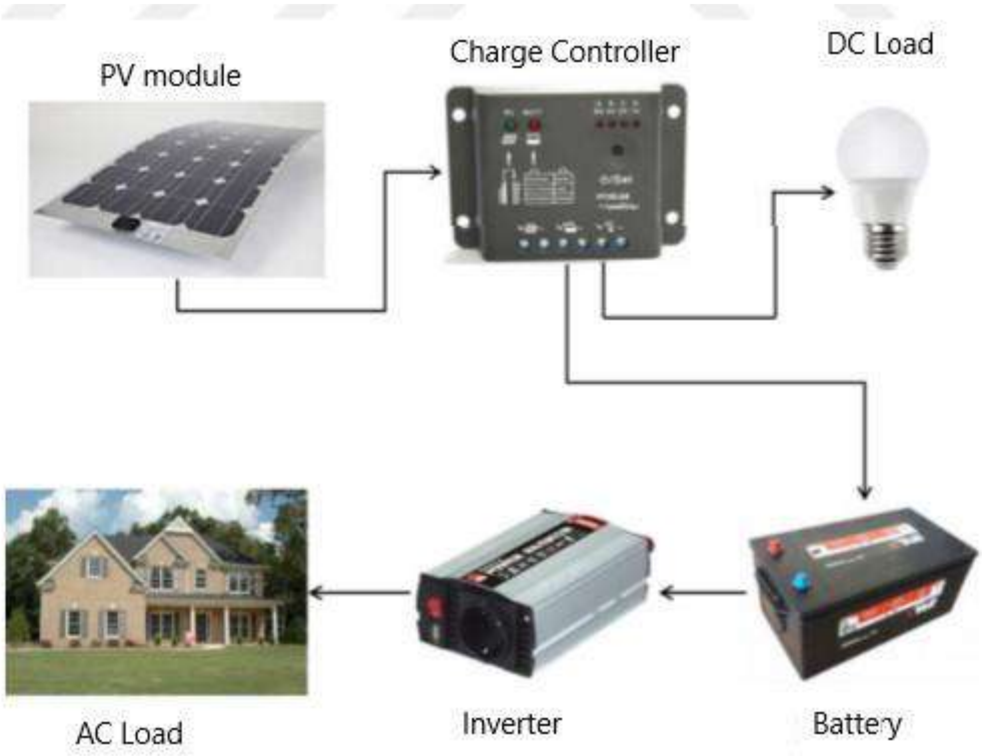

Figure 25 : Simple Off-grid system flow diagram.

3.2.6.2. Grid Connected Systems (on-grid)

Grid-connected PV systems are power generation facilities where there is an electricity line but where the energy generated is consumed, excess incoming energy is supplied to the grid, and the remaining energy is supplied from the grid. These systems can be installed and used on land or on the roofs of buildings. The components of this system are shown in Figure 21. Accordingly, electricity is produced through PV panels thanks to photons coming from the sun. The produced electricity passes through the inverter and converts from DC form to AC form. The converted electricity consumption is sent to the main panel of the consumption point and the need of the consumption point is provided by this generated energy. Another energy provider connected to the main panel is the grid. If the energy produced from the PV panels is insufficient, the remaining need of the energy and the consumption point is supplied continuously. If the energy produced from the PV panels is more than the need of the point of consumption, the excess energy generated is fed back into the grid. A bidirectional counter is provided on the grid side of the main panel of the consumption point in order to record the excess energy produced to the grid or to supply the energy that is missing for consumption from the grid. At the end of the month, the bidirectional meter takes the difference of the energy coming from the grid and the energy coming from the PV panel, revealing that the PV plant owner is in the position of producer or consumer. This is called offsetting and offsetting is done at kWh, not at the price of electrical energy. [39,41]

Some facilities are very large, and a small part of the energy produced is used in domestic consumption. These facilities are mostly set up to generate profit from electricity generation and charge the electricity sold from electricity distribution companies every month. Most of the facilities in our country are works like this.

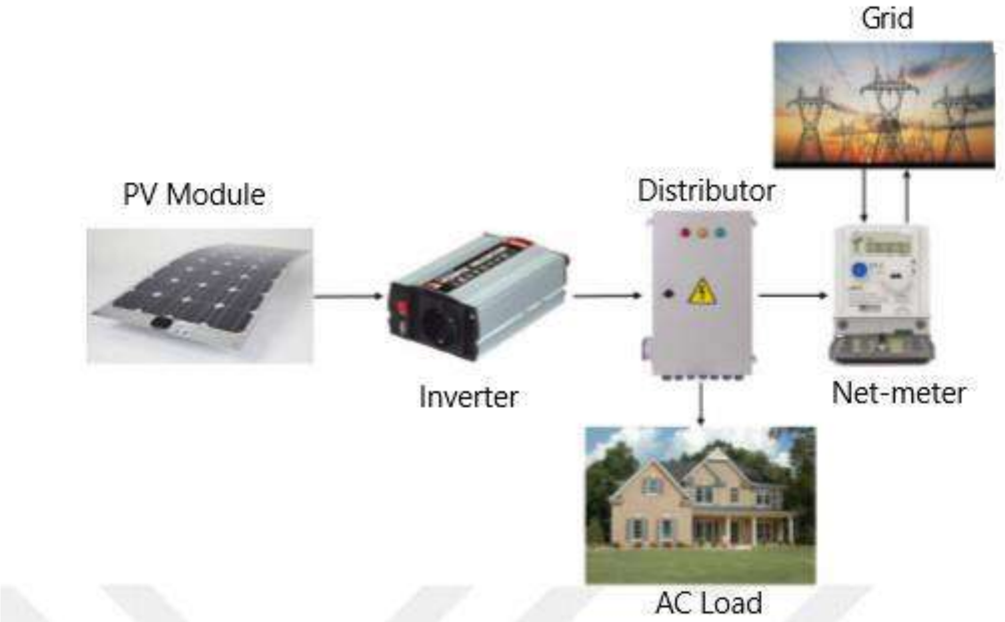

Figure 26 : Simple On-grid system flow diagram.

4. CHAPTER 4: CASE STUDY

4.1. Aim and General Information of the Project

This study is dedicated to design and implementing Photovoltaic electricity generation system in order to supply electricity for a university campus and selling overproduction to payback itself. The study mostly covers feasibility and best scenario of profitability. The used Materials and data are mostly realistic except deviations of simulation program which has been used.

The installed power of the solar power plant, which will be designed is planned as 9.5 MW. Adana province, known to have high solar energy potential, was chosen for the installation of the solar power plant.

The purpose of the solar power plant, which is planned to be installed, is to sell electricity directly to the grid also to meet the electricity needs of the university campus. The energy to be obtained from the solar power plant will be sent to the transformer which is inside the university and distributed to consumers from there. Within this scope, Weather condition data provided from Meteonorm software. To carry out the simulation with HELIOSCOPE software, consumption values per month and installed power agreement gathered from electricity bills which is obtained from university's general directorate of construction (Appendix 1). With these data simulation has generated. To design the lay out of the settlements of the solar modules area dimensions and suitable area information gathered from also university's general directorate of construction (Appendix 2). Design both generated in CAD and HELIOSCOPE the reason for making design at the two different programs is obtaining realistic design in CAD and cabling data and single line diagram in HELIOSCOPE. Electricity unit prices are obtained from EPDK and Electricity bills. With the data so far, economic analysis has been made. For payback time calculation, budget analysis will be carried out with the necessary information from the generated and obtained data. Budget offer information will be asked from the company that gives consultancy for setup process of renewable energy systems which name is ADAME. The data has been obtained thus far, such as the layout of the whole design, electrical schematic diagrams, the quantity of every component (solar modules, inverters and used cable length) These whole data will be sent to the ADAME company to ask an offer for projected system without any profit (Appendix 3).

When everything has considered,

- Is the Adana in the Mediterranean Region of Turkey suitable location for implement a solar power generation system?
- Is the area for settlement of the system enough for Installed power?

- Is this project feasible in terms of economically?
- Is this project applicable in real life?

4.2. Location

For this project Alparslan Turkes Science and Technology State University have been selected which is located in Adana, Turkey. The coordinates of the campus are (37.0394426099, 35.3848455917) (GMT 3.0). A satellite view of the location is given in the figure 27 below.

Figure 27: Alparslan Turkes Science and Technology State University,Adana(HELIOSCOPE)

4.3. Solar Radiation

Solar radiation data is defined as one of the most important parameters for solar power plants. During the feasibility studies, while calculating the amount of energy produced by a solar power plant, the radiation values obtained from the measurement stations are used. However, data obtained from a single measuring point may cause erroneous results due to errors that may occur at the measuring stations. Therefore, it is beneficial to use the data obtained from different measurement stations that are accepted while conducting solar feasibility studies. However, taking one-to-one measurements through a measuring station to be installed in the region where the power plant will be installed is shown as factors that will increase the sensitivity of the feasibility studies.

Meteonorm is a commonly used weather source for international locations. This satellite weather source provides a uniform methodology for calculating irradiance and will always be within 10 km of the design site. In this study These data are provided by Meteonorm which is providing global irradiance database. Also, meteorological information of the powerplant area is almost near to meteorology station which is in US Military Airbase which is shown figure 28 below.

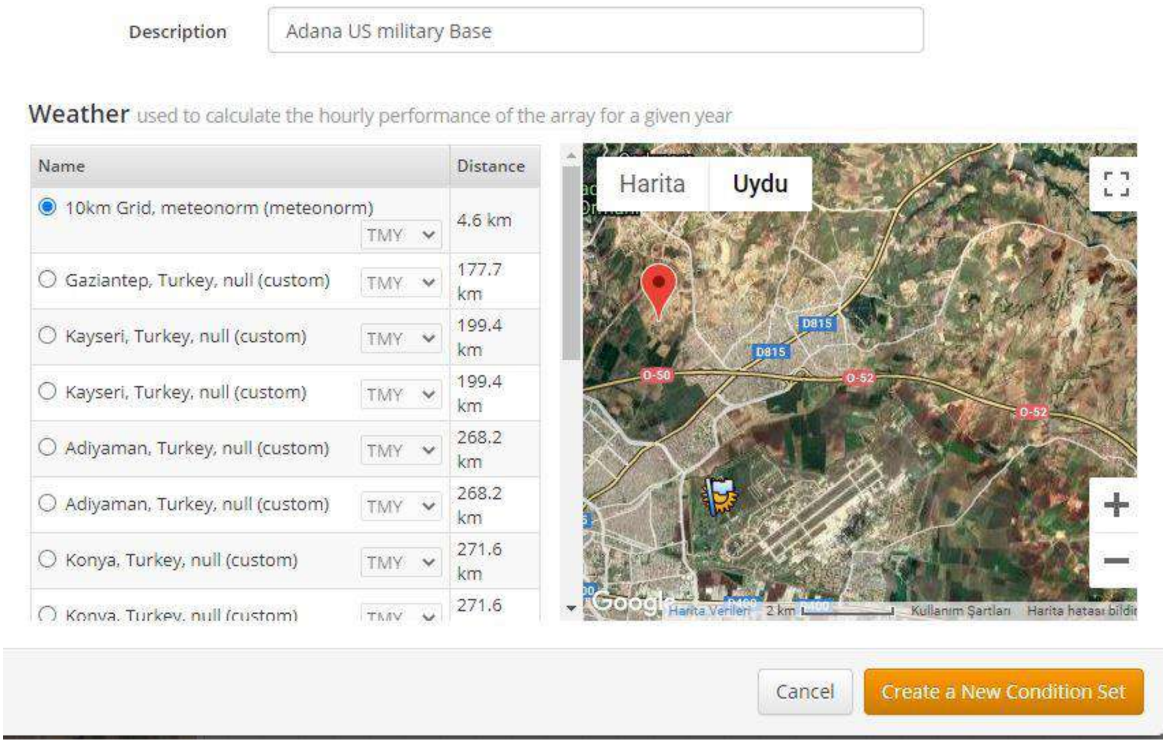

Figure 28 : Selecting Weather Condition Set for Determining Radiation (HELIOSCOPE)

After selecting the weather condition set Helioscope gives the monthly global irradiance values which is given in Table 2 and represented by chart in figure 29 shown below.

Table 2 : Monthly Global Irradiance Values

	January	February	March	April	May	June	July	August	September	October	November	December
kWh	66,9	77,9	118,6	147,2	187,8	205	205,3	211,8	148,3	110,7	70,9	59,1

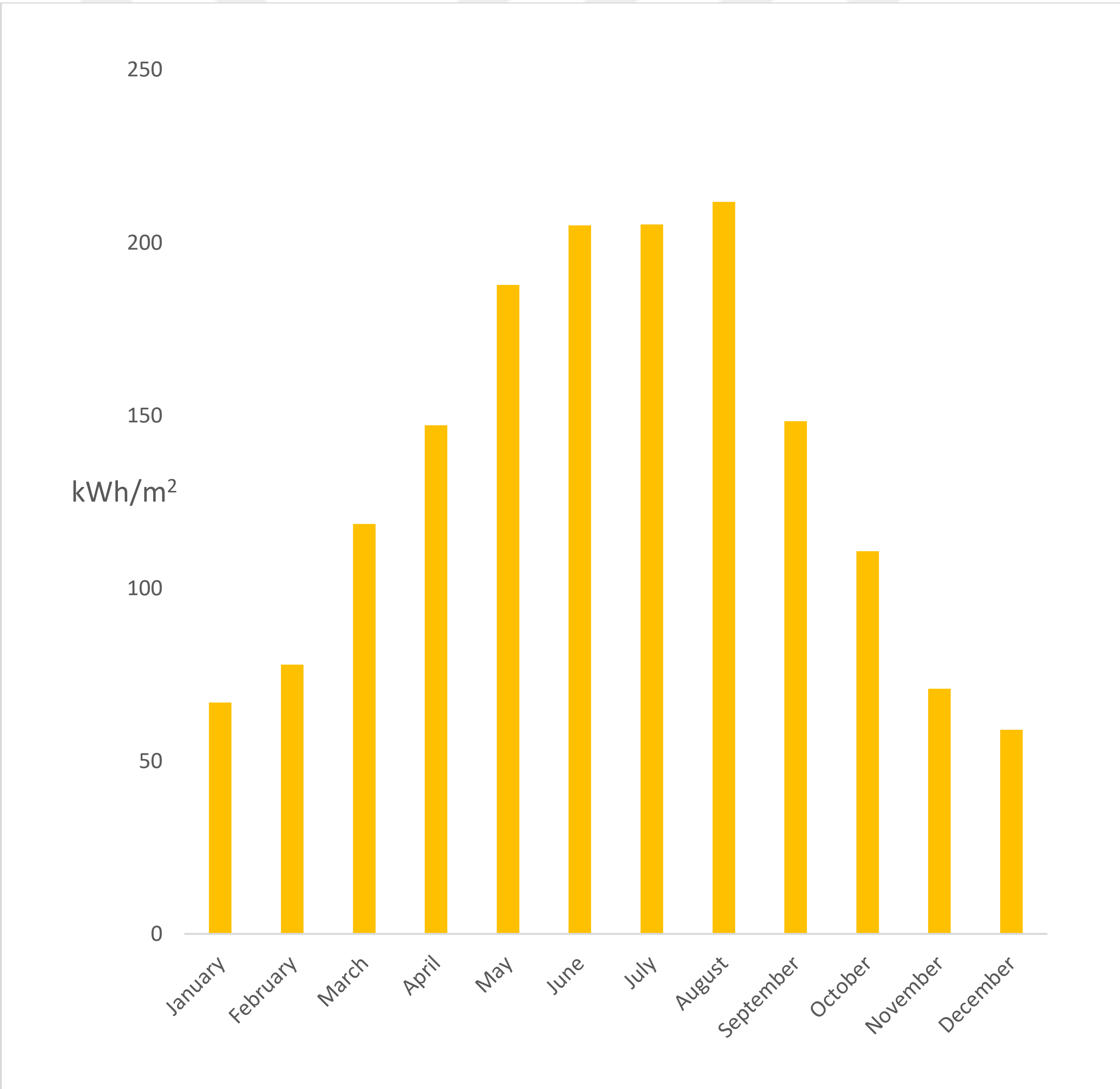

Figure 29 : Monthly Global Irradiance Values

4.4. Installed Power and Monthly Consumption

From electricity bills and agreement of distribution company with the university, installed power is obtained as 9.504 kW. Transformers are already placed in university for further application.

Consumption values per month also obtained by electricity bills which is obtained from university's general directorate of construction. Table 3 and figure 30 which is shown below represents monthly consumption data of the campus:

Table 3: Consumption Data of The Campus

	January	February	March	April	May	June	July	August	September	October	November	December
kWh	281.024,10	238.755,30	220.386,60	172.323,90	164404,8	185314,5	232262,1	210999,6	223719,3	166603,5	178346,7	250028,1

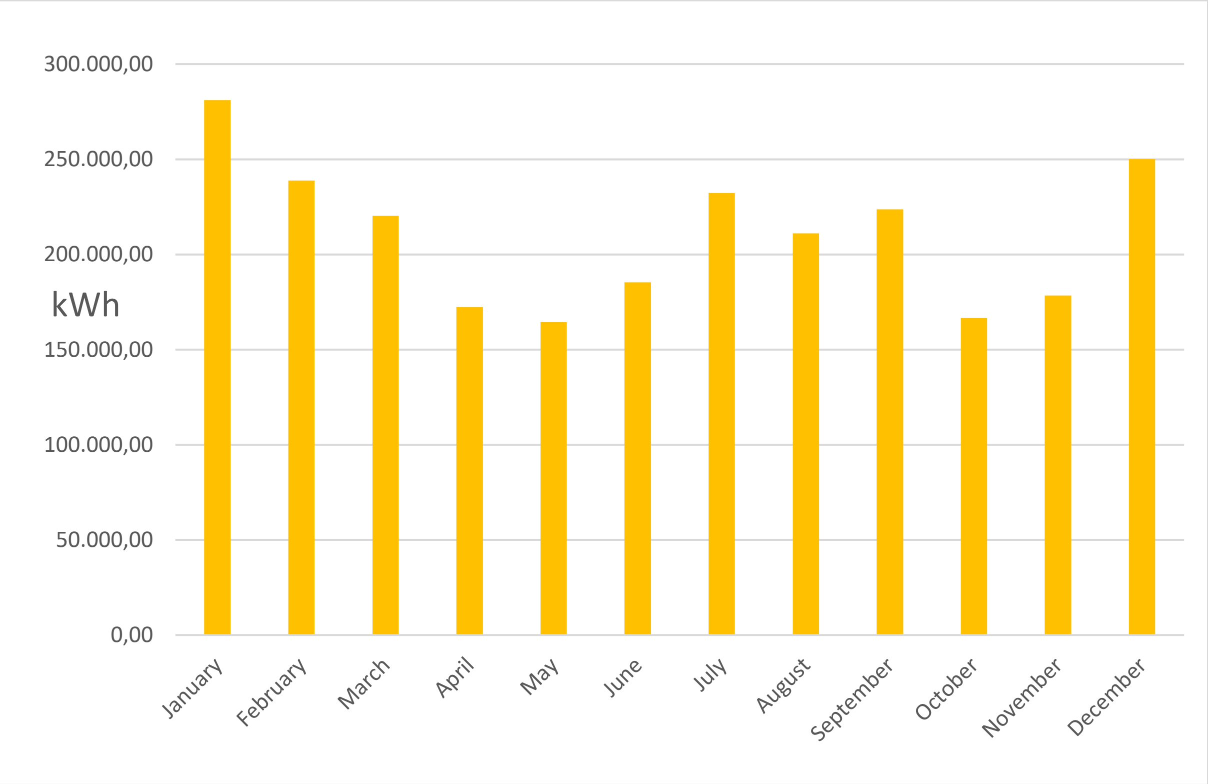

Figure 30 : Monthly Consumption of the Campus.

On the other hand, from the electricity bills its assumed that the night-time usage as energy supplied from the grid monthly. It is also known as consumption made offset from production which is shown below as a table 4 and figure 31.

Table 4 : Consumption Made Offset from Production

January	February	March	April	May	June	July	August	September	October	November	December
37.262,7	71.911,1	74.865,4	63.134,8	57.860,5	57.598,4	65.033,4	59.079,9	62.641,4	58.445,1	63.829,1	19.654,3

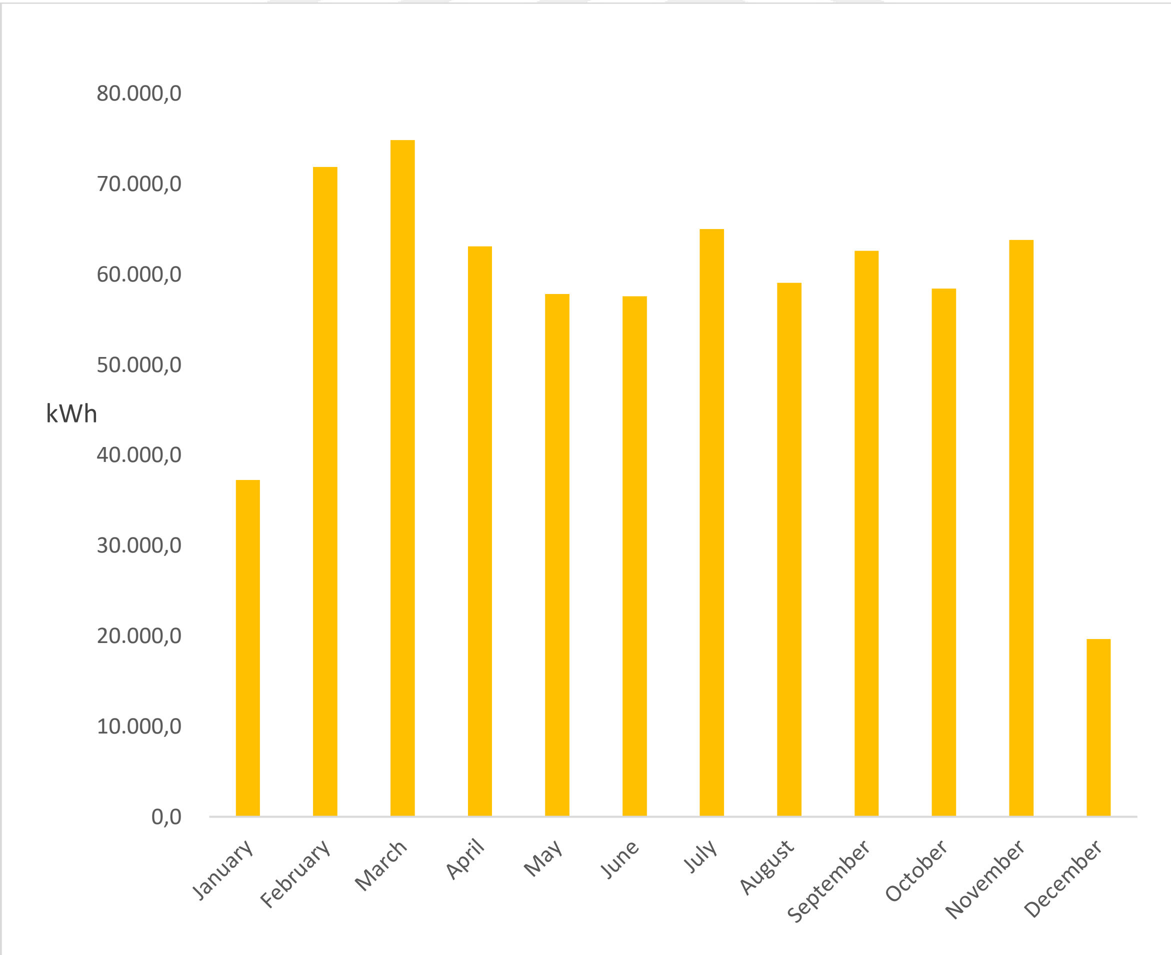

Figure 31 : Consumption Made Offset from Production.

4.5. Energy Analysis and Production of The Solar Power Plant

Annual energy production of the solar power plant is stated as one of the most important parts of the further economic analysis of the solar power plant. For this study energy analysis carried out with Helioscope Simulation Software. As we mention previously, we are going to obtain necessary global irradiance data from Meteonorm Software.

Also, the data which is collected from GEPA (Solar Energy Potential Atlas) of the Turkey shows that suitable panel type is monocrystalline solar panels. Which is shown figure 32 below.

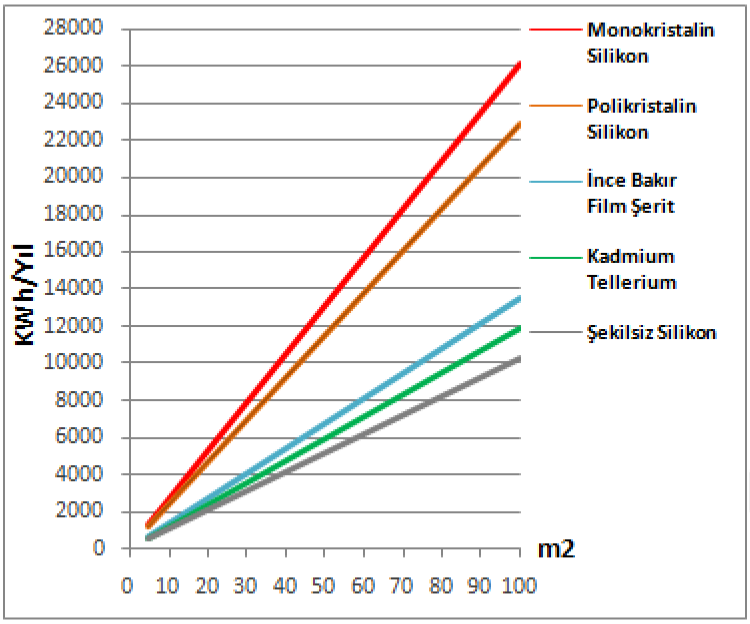

Figure 32 : Types of modules and its performance lines kWh/year per m2. (GEPA)

Solar Module and inverter type are selected in Helioscope which are shown table 5 below.

Table 5 : Selected Solar Module and Inverter.

Components

Component	Name	Count
Inverters	SUN2000-100KTL-M1 (380/400) (Huawei)	77 (7.70 MW)
Module	AE Solar, AE400M6-72 (2020) (400W)	23,760 (9.50 MW)

Modules have 400 Wp Monocrystalline features. Inverters have adjustable Ac output features. The system is designed has 9504 kWp Dc power output and 7680 kWe Ac power output.

When Helioscope carried out the calculation and made the simulation, monthly production data is obtained as it shown in figure 33 below.

Month	GHI (kWh/m^2)	POA (kWh/m^2)	Shaded (kWh/m^2)	Nameplate (kWh)	Grid (kWh)
January	66.9	33.6	31.5	261,196.0	234,896.2
February	77.9	51.0	48.4	414,792.0	381,740.2
March	118.6	87.7	84.0	732,882.1	671,234.2
April	147.2	120.8	116.2	1,030,440.6	935,622.3
May	187.8	167.5	161.5	1,446,667.0	1,291,582.5
June	205.0	189.1	182.6	1,643,507.9	1,443,216.8
July	205.3	185.9	179.2	1,609,464.7	1,403,156.8
August	211.8	176.0	170.7	1,520,168.3	1,324,276.6
September	148.3	112.3	108.1	947,807.3	834,915.9
October	110.7	69.6	66.5	564,505.9	499,193.1
November	70.9	39.7	37.6	315,197.3	280,445.2
December	59.1	27.4	25.6	213,614.8	188,762.7

Figure 33 : Monthly Production Which is obtained from Helioscope.

As we can see from figure 33 which is shown above, annually production total is 9.489.042,5 kWh. Also, System metrics of the simulation is given in Figure 34.

System Metrics	
Design	Design 1
Module DC Nameplate	9.50 MW
Inverter AC Nameplate	7.70 MW Load Ratio: 1.23
Annual Production	9.489 GWh
Performance Ratio	79.2%
kWh/kWp	998.4
Weather Dataset	TMY, 10km Grid, meteonorm (meteonorm)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

Figure 34 : System metrics of the simulation from Helioscope.

4.6. Layout Design of Modules

Today’s technology allows us to see everything from space by satellites. University’s campus satellite images have been taken from google earth and using the layout of the rooftop plans and dimensions which is obtained from university’s general directorate of construction. The collected whole data transferred to CAD program and roof mounted part of the study has done (Figure 35).

Figure 35 : Roof mounted Layout, Satellite Image from Google Earth with CAD Program.

Roof Mounted modules and inverters counted as 2646 modules and 8 inverters. This Number is not sufficient for total energy generation that desired. Inert area of university’s campus also has been used for placement.

Ground mounted area has selected by university's general directorate of construction and after that same process carried out for that area either. Ground mounted modules and inverters are counted as 21114 modules and 69 inverters which can be observed in figure 36.

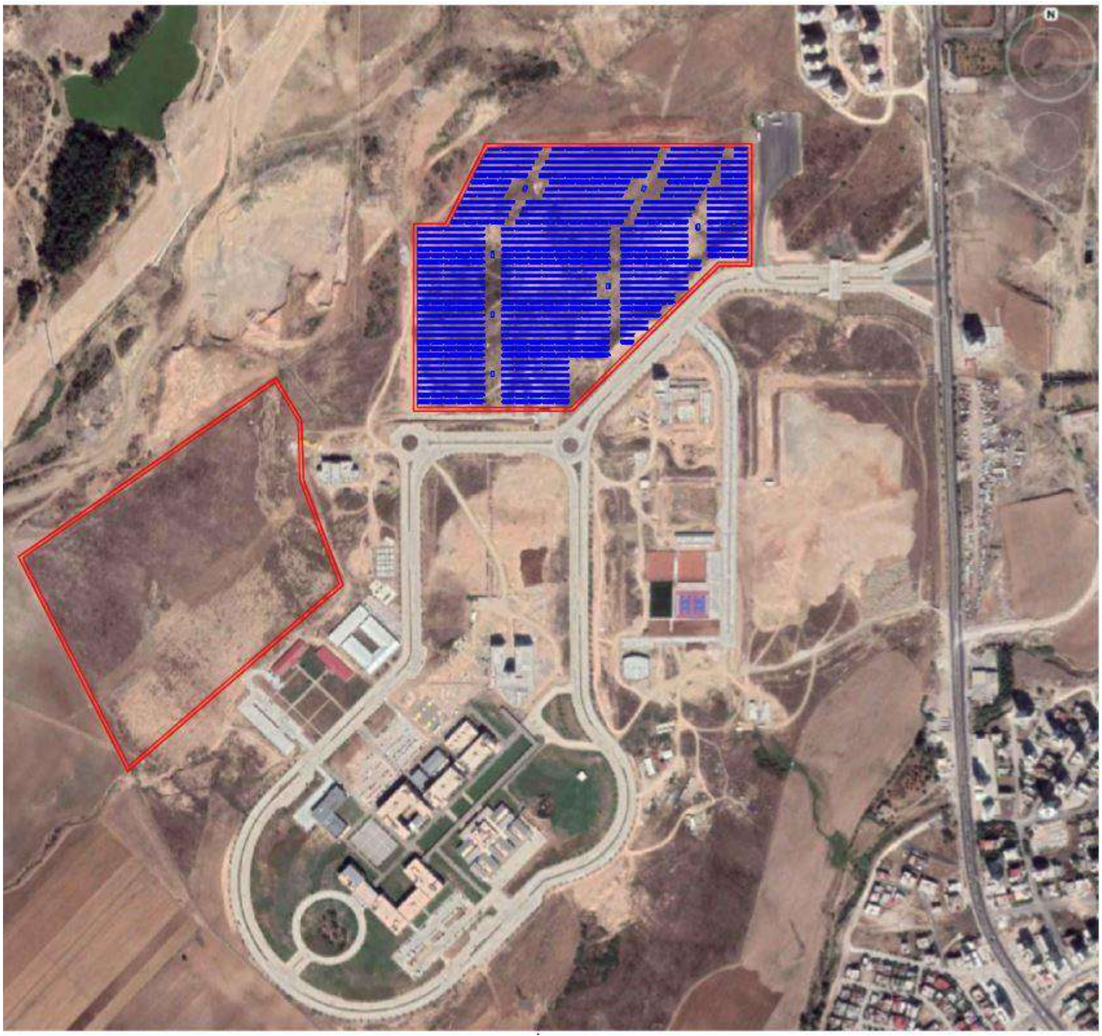

Figure 36 : Ground Mounted Layout, Satellite Image from Google Earth with CAD Program.

Number of panels that roof mounted and ground mounted are 23760 solar panels. Also, the number of inverters that used for this system is 77 in total. In figure 36 we can see the other inert area, which is shown empty with red border lines, university's general directorate of construction told that University will have more faculties and building in the future. If the design cannot meet the needs in the near future, we can make a project for that area either.

4.7. Economic Analysis of the Solar Power Plant

4.7.1. General

During the financial analysis of the 9.5 MW solar power plant, detailed financial analysis will be presented for the system, which is created by specifying the general definitions regarding the investment cost, project income and project expenses.

The establishment of the planned system of economic life of 25 years. Since the Connection Agreements to be made with the Distribution Company for the system planned to be made in connection with the grid are 10 years, the economic analysis was made to cover the 10 years with the Connection Agreement period. After the project approval of the university is received from the government institutions, the university will sign a connection agreement with the distribution company it is affiliated with. With the signing of the connection agreement, the distribution company guarantees that the established solar energy plant will receive the remainder of the electrical energy it will produce for 10 years after its internal consumption.

4.7.2. Currency Used in Financial Analysis

The general used currency is Turkish lira; however, some analyzes and total cost in this project were made on the basis of US Dollar ($) and it was accepted that the US Dollar exchange rate was 6.85 TL / US Dollar(2020,July).

According to inflation and devaluation occurred in Turkey in the past years, except for the period of crisis, these two rates was almost equal, in other words, it is observed that prices remained almost constant in dollar terms that is why foreign currency is used. as the main reason for this situation, raw material production in Turkey and / or semi-manufactured and / or used equipment / installations noteworthy is shown a portion of that is imported. To put it briefly, after the devaluation, the manufacturer, who bought more expensive goods / equipment / tools in Turkish Lira, naturally reflects this increase in purchase prices to the consumer; this results in increased inflation. For this reason, it was accepted that the inflation and devaluation rates would increase almost equally during the project period, so there would be no significant change in the prices of non-imported materials and labor on the basis of Dollars, and therefore, in some of the financial analyzes, Dollars was used.

4.7.3. Projected Annual Fixed Expenses

Solar power plant is mostly constructed with electronical components and it may be affected by natural disasters because of that we need to make insurance for covering our unexpected incidents. There are several Insurance Companies who does Solar Power Plant Insurance in Turkey. The average given price per year is 13.700 Turkish Liras for 1MW. Furthermore, the plant needs to have workforce for security, maintain and cleaning the panel surfaces for better performance. For this purpose, 5 workers needed, and minimum wage is 2.603 Turkish Liras per month. Table 6 shows total expense per year.

Table 6 : Total Annual Fixed Expenses.

	total expense per year
Insurance	130.150 TL
Workforce	156.180 TL

4.7.4. Unit Prices Used in the Project

During the Economic analysis of this study, Average unit price of the energy and distribution price are determined from university's electricity bills and EPDK's (Republic of Turkey Energy Market Regulatory Authority) energy prices is taken from its website. Table 7 shows the average unit prices of the energy and distribution price.

Table 7 : Unit Prices is Used for Study.

Unit Prices	
Energy Unit Price (Average)	0,417897 TL
Distribution Price (Average)	0,121495 TL
EPDK Energy Unit Price (Average)	0,520613 TL
US Dollar Currency	6,85 TL

The annual projected increase in unit prices used in the preparation of the economic analysis is given in Table 9. Table 8 is used for finding the ratio with using the old price.

Table 8 : Electricity Unit Price Between 2014-2020.

Year	Energy price (100kWh)	Percentage difference	Distribution Cost (100 kWh)	Percentage difference	Total (1 kWh)
2014	20,80 TL	-	7,75 TL	-	0,29 TL
2015	22,41 TL	7,71%	8,91 TL	14,86%	0,31 TL
2016	21,34 TL	-4,75%	10,32 TL	15,81%	0,32 TL
2017	21,41 TL	0,30%	10,25 TL	-0,63%	0,32 TL
2018	23,10 TL	7,90%	11,31 TL	10,33%	0,34 TL
2019	41,02 TL	77,59%	13,22 TL	16,92%	0,54 TL
2020	52,06 TL	26,91%	19,79 TL	49,64%	0,72 TL

According to EPDK (Republic of Turkey Energy Market Regulatory Authority) data, the rate of increase made is shown in the table previously. Also, graphical illustration of the increase in the electricity unit price is shown in Figure 37. Considering the increase rate compared to the previous year, annual average corresponds to an increase of around 17%.

Figure 37 : Electricity Unit Price Between 2014-2020.

When considering the annual increases of unit prices, it should not be forgotten that fixed expenses will increase at a certain rate annually. 10% was selected for the use of further calculations, as indicated in Table 8. For staying at the safe zone during the study these ratios of increases are also selected 10%.

Table 9 : Selected Annual Rate of Increase in Prices.

Annual Rate of Increase in Prices	
Electricity Unit Price Increase Rate	10,0%
Distribution Price Increase Rate	10,0%
Annual Fixed Expenses Increase Rate	10,0%

4.7.5. Consumption and Production Balance

Consumption data is gathered from University's electricity bills and mentioned at section 4 with table 3 which shows 12 months consumption values of the campus. Electricity bills are detailed specifically as day and night consumption either, with the help of that numbers we could calculate more accurately balances. Because, at the nighttime we must supply the needs from the grid directly due to not producing electricity from solar system.

On the other side, Production data is gathered from Helioscope simulation software and pointed at the section 5 with the figure 33 which shows monthly electricity production from simulated system.

Table 10 shows in detail about the consumption and production information of the solar power system during the period of 12 months and other necessary information such as offsetting values for further calculations.

Table 10 : The Consumption and Production Information of The Solar Power System During the Period of 12 Months.

Months	Consumption from Electricity Bills	Production from Simulation	Electricity Purchased from Grid after Offsetting	Electricity Sold to Grid after Offsetting	Electricity Consumed before Passing the Meter	Consumption Made Offset from Production
	kWh	kWh	kWh	kWh	kWh	kWh
January	-281.024,1	234.896,2	-46.127,9	0,0	197.633,5	37.262,7
February	-238.755,3	381.740,2	0,0	142.984,9	166.844,2	71.911,1
March	-220.386,6	671.234,2	0,0	450.847,6	145.521,2	74.865,4
April	-172.323,9	935.622,3	0,0	763.298,4	109.189,1	63.134,8
May	-164.404,8	1.291.582,5	0,0	1.127.177,7	106.544,3	57.860,5
June	-185.314,5	1.443.216,8	0,0	1.257.902,3	127.716,1	57.598,4
July	-232.262,1	1.403.156,8	0,0	1.170.894,7	167.228,7	65.033,4
August	-210.999,6	1.324.276,6	0,0	1.113.277,0	151.919,7	59.079,9
September	-223.719,3	834.915,9	0,0	611.196,6	161.077,9	62.641,4
October	-166.603,5	499.193,1	0,0	332.589,6	108.158,4	58.445,1
November	-178.346,7	280.445,2	0,0	102.098,5	114.517,6	63.829,1
December	-250.028,1	188.762,7	-61.265,4	0,0	169.108,4	19.654,3
∑	**-2.524.168,5**	**9.489.042,5**	**-107.393,3**	**7.072.267,3**	**1.725.459,1**	**691.316,1**

From the table 10, Total annually consumption of the campus is calculated as 2.524.168,5 kWh and annually Production from the Solar Power Generation System is 9.489.042,5 kWh. When production and consumption information is compared, it is clear that the system to be installed is appropriate in terms of profitability. Because system is producing more than enough electricity that campus of the university consumes.

Furthermore, from the table 10 the electricity which is bought for meet the consumption value is just 107.393,3 kWh. The reason for this excess amount of the energy which is bought from the grid, in January and December global irradiance value is not enough for to produce electricity to meet the demand for these months. Moreover, the total amount of electricity which is consumed before passing the net-meter from produced electricity is 1.725.459,1 kWh annually.

Nevertheless, electricity which is sold to grid after offsetting is 7.072.267,3 kWh annually. It means that almost 75% of the produced electricity is sold to the grid.

It is known that sunshine duration of a region depends on the seasons and the earth's curvature. For instance, for Turkey's longest sunshine duration happens on June 21^{st,} which is more than 12 hours, shortest sunshine duration happens on 21st of December. Except those days, on the September 23rd and March 21st day and night-time is equal to each other. So, when duration of the sunshine and working hours of the university considered, sometimes, we need to buy energy from grid to compensate the gap which is observed after sunshine usage. the Last column of the table 10 represents the value of the electricity which is supplied from the grid when the system is not producing electricity. The total number of the consumption made offset from production is 691.316,1 kWh annually.

4.7.6. Economical View After the System is Installed

This section mostly covers yearly income and expenses according to calculation after use of table 10. Electricity cost per kWh is accepted which is shown in table 10 which obtained from EPDK (Republic of Turkey Energy Market Regulatory Authority) and selling price for offsetting obtained from electricity distributors. When we gather and use together the table 10 and table 11, Economy of the system will be obtained.

Table 11 : Unit Price of Electricity for Calculation.

	2019	**2020**	**Selling Price For offsetting**
January	₺0,55	₺0,61	₺0,49
February	₺0,56	₺0,61	₺0,49
March	₺0,56	₺0,61	₺0,49
April	₺0,56	₺0,62	₺0,50
May	₺0,57	₺0,63	₺0,51
June	₺0,56	₺0,62	₺0,50
July	₺0,64	₺0,71	₺0,57
August	₺0,64	₺0,71	₺0,58
September	₺0,64	₺0,71	₺0,58
October	₺0,57	₺0,63	₺0,50
November	₺0,57	₺0,63	₺0,51
December	₺0,58	₺0,63	₺0,51

Electricity per kWh purchase price from the grid is represented in first column and second column of the table 11. Moreover, for offset selling price per kWh to the grid is represented in third column. Fixed expenses annually obtained from table 6 and separated per month. After making the necessary calculations using the data from table 10 and 11, the economic situation arises monthly in table 12.

Table 12 : Cash Flow After the System Installed

Months	Cash Flow After the System Installed							
	Consumption Price According to 2019 Electricity Price	Consumption Price According to 2020 Electricity Price	New Expense According to Electricity Consumption		Income from Electricity Produced	Savings Provided by the Energy Consumption Without Passing the Net-Meter	Fixed Expenses	Net Cash Flow
			Bought	Made Offset				
	₺	₺	₺	₺	₺	₺	₺	₺
	A	B	C	D	E	F	G	H
January	-155.655,50 ₺	-171.221,05 ₺	-27.369 ₺	-2.489,97 ₺	0,00 ₺	119.053,44 ₺	-23.860,83 ₺	115.405,87 ₺
February	-132.946,69 ₺	-146.241,36 ₺	0 ₺	-4.805,25 ₺	74.439,80 ₺	102.194,66 ₺	-23.860,83 ₺	192.015,08 ₺
March	-122.866,37 ₺	-135.153,01 ₺	0 ₺	-5.002,66 ₺	234.717,12 ₺	89.241,48 ₺	-23.860,83 ₺	341.006,64 ₺
April	-97.285,87 ₺	-107.014,46 ₺	0 ₺	-4.218,80 ₺	397.383,07 ₺	67.807,25 ₺	-23.860,83 ₺	476.317,90 ₺
May	-94.075,14 ₺	-103.482,66 ₺	0 ₺	-3.866,35 ₺	586.823,36 ₺	67.063,08 ₺	-23.860,83 ₺	662.578,84 ₺
June	-104.310,40 ₺	-114.741,44 ₺	0 ₺	-3.848,84 ₺	654.880,29 ₺	79.078,17 ₺	-23.860,83 ₺	741.912,05 ₺
July	-148.975,46 ₺	-163.873,00 ₺	0 ₺	-4.345,66 ₺	609.583,00 ₺	117.988,56 ₺	-23.860,83 ₺	745.249,51 ₺
August	-135.740,72 ₺	-149.314,79 ₺	0 ₺	-3.947,84 ₺	579.586,48 ₺	107.506,65 ₺	-23.860,83 ₺	701.092,60 ₺
September	-143.658,05 ₺	-158.023,86 ₺	0 ₺	-4.185,83 ₺	318.196,90 ₺	113.777,18 ₺	-23.860,83 ₺	448.174,09 ₺
October	-95.075,16 ₺	-104.582,68 ₺	0 ₺	-3.905,42 ₺	173.150,47 ₺	67.894,70 ₺	-23.860,83 ₺	249.966,89 ₺
November	-102.225,36 ₺	-112.447,90 ₺	0 ₺	-4.265,19 ₺	53.153,81 ₺	72.203,56 ₺	-23.860,83 ₺	137.475,69 ₺
December	-143.838,39 ₺	-158.222,23 ₺	-36.351 ₺	-1.313,34 ₺	0,00 ₺	107.132,81 ₺	-23.860,83 ₺	94.396,24 ₺
∑	**-1.476.653,13 ₺**	**-1.624.318,44 ₺**	**-63.720 ₺**	**-46.195,14 ₺**	**3.681.914,30 ₺**	**1.110.941,54 ₺**	**-286.330,00 ₺**	**4.905.591,41 ₺**

University’s 2019 electricity expense is shown in table 12 as column ‘A’ and as can be seen from the table total expense for electricity is 1.476.653,13 TL, from column ‘B’ 1.624.318.44 TL in 2020. For calculating this expenses unit price of the electricity is taken from table 2.

University’s new electricity expense will be derived from the sum of the two columns which are ‘C’ and ‘D’. The price that university should pay for the electricity distribution company is totally 109.915,14 TL.

Column ‘D’ is the difference between two price which is from electricity purchase price to electricity sell price while calculating the offset electricity.

Column ‘E’ represents the income from the sold electricity to distribution company.

Column ‘F’ represents the savings due to electricity consumption without passing the net-meter.

Column ‘G’ represents the fixed expenses which is explained in section 3.

Column ‘H’ finally shows the Net cash flow sum of column ‘E’,’F’ and saving from offset electricity which is 399.065,57 TL.

When everything is considered from the table 12. Annually net cash flow after the system is installed is 4.905.591.41 TL.

Table 13 shows the Consumption Cost before the system Installed which contains electricity bills before electricity generation, Consumption Cost after the system Installed that represents electricity bills after the usage of electricity generation this value can be zero sometimes do to overproduction of the generation system and lastly the Total Saving after the system Installed values which is net cash flow or total savings of the system .For better illustration total of these values Figure 38 illustrates with graph.

Table 13 : Costs and saving from consumption and production.

	January	February	March	April	May	June	July	August	September	October	November	December
Consumption Cost before the system Installed	-155.655,50 ₺	-132.946,69 ₺	-122.866,37 ₺	-97.285,87 ₺	-94.075,14 ₺	-104.310,40 ₺	-148.975,46 ₺	-135.740,72 ₺	-143.658,05 ₺	-95.075,16 ₺	-102.225,36 ₺	-143.838,39 ₺
Consumption Cost after the system Installed	-₺29.859,08	-₺4.805,25	-₺5.002,66	-₺4.218,80	-₺3.866,35	-₺3.848,84	-₺4.345,66	-₺3.947,84	-₺4.185,83	-₺3.905,42	-₺4.265,19	-₺37.664,00
Total Saving after the system Installed	115.405,87 ₺	192.015,08 ₺	341.006,64 ₺	476.317,90 ₺	662.578,84 ₺	741.912,05 ₺	745.249,51 ₺	701.092,60 ₺	448.174,09 ₺	249.966,89 ₺	137.475,69 ₺	94.396,24 ₺

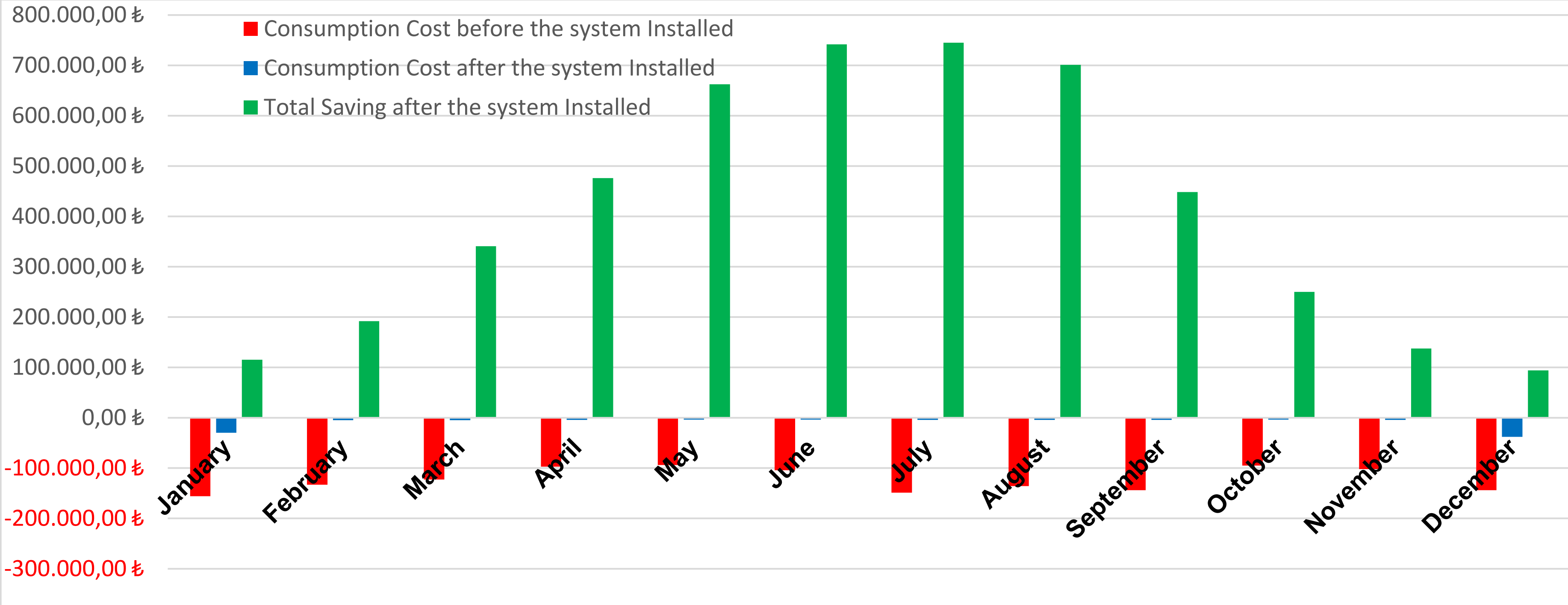

Figure 38 : Balance Graph for Income and Expense.

4.7.7. Economical View for 10 Years

After having some concrete values from previous section and as far as it is known that 10 years is a threshold value of such a study which is in meaning of profitability and reasonability in investment projects. In this part of this study, it is assumed as the loss ratio for every year is 0,7% for production. Loss ratio is used because, from the moment solar panels are used, they start to lose their production performance. It is accepted at the previous sections of this study electricity prices and fixed expenses are increasing 10% every year. Economical view of this study consists of basically production of the electricity, consumption of the electricity and Income from the electricity which is sold to grid. When necessary ratios applied to the results of the calculations in previous chapters, Economical view will arise. From the table 14 and figure 39 which is shown below, economical view for a decade can be observed.

Table 14 : Economical View for A Decade

YEARS	Annually Consumption According to Electricity Bills	Production According to Simulation	Expenses According to 2019 Electricity price	Expenses According to 2020 Electricity price	New Expenses According to Production	Income from Sold Electricity to Grid	Net Cash Flow
	kWh	kWh	₺	₺	₺	₺	₺
1.	-2.524.168,5	9.489.042,5	-1.476.653,1 ₺	-1.624.318,4 ₺	-109.914,9 ₺	3.681.914,30 ₺	4.905.591,41 ₺
2.	-2.524.168,5	9.422.619,2	-1.624.318,4 ₺	-1.786.750,3 ₺	-122.624,0 ₺	4.013.765,14 ₺	5.357.955,65 ₺
3.	-2.524.168,5	9.356.660,9	-1.786.750,3 ₺	-1.965.425,3 ₺	-136.762,4 ₺	4.375.446,83 ₺	5.852.030,92 ₺
4.	-2.524.168,5	9.291.164,2	-1.965.425,3 ₺	-2.161.967,8 ₺	-152.488,0 ₺	4.769.632,86 ₺	6.391.662,95 ₺
5.	-2.524.168,5	9.226.126,1	-2.161.967,8 ₺	-2.378.164,6 ₺	-169.975,1 ₺	5.199.235,49 ₺	6.981.051,96 ₺
6.	-2.524.168,5	9.161.543,2	-2.378.164,6 ₺	-2.615.981,1 ₺	-189.417,7 ₺	5.667.426,99 ₺	7.624.785,43 ₺
7.	-2.524.168,5	9.097.412,4	-2.615.981,1 ₺	-2.877.579,2 ₺	-211.030,1 ₺	6.177.662,78 ₺	8.327.873,74 ₺
8.	-2.524.168,5	9.033.730,5	-2.877.579,2 ₺	-3.165.337,1 ₺	-235.050,3 ₺	6.733.706,56 ₺	9.095.789,17 ₺
9.	-2.524.168,5	8.970.494,4	-3.165.337,1 ₺	-3.481.870,8 ₺	-261.741,8 ₺	7.339.657,72 ₺	9.934.508,45 ₺
10.	-2.524.168,5	8.907.700,9	-3.481.870,8 ₺	-3.830.057,9 ₺	-291.396,5 ₺	7.999.981,19 ₺	10.850.559,32 ₺
∑	**-25.241.685**	**91.956.494**	**-23.534.047,9 ₺**	**-25.887.452,7 ₺**	**-1.880.400,9 ₺**	**55.958.429,86 ₺**	**75.321.809,0 ₺**

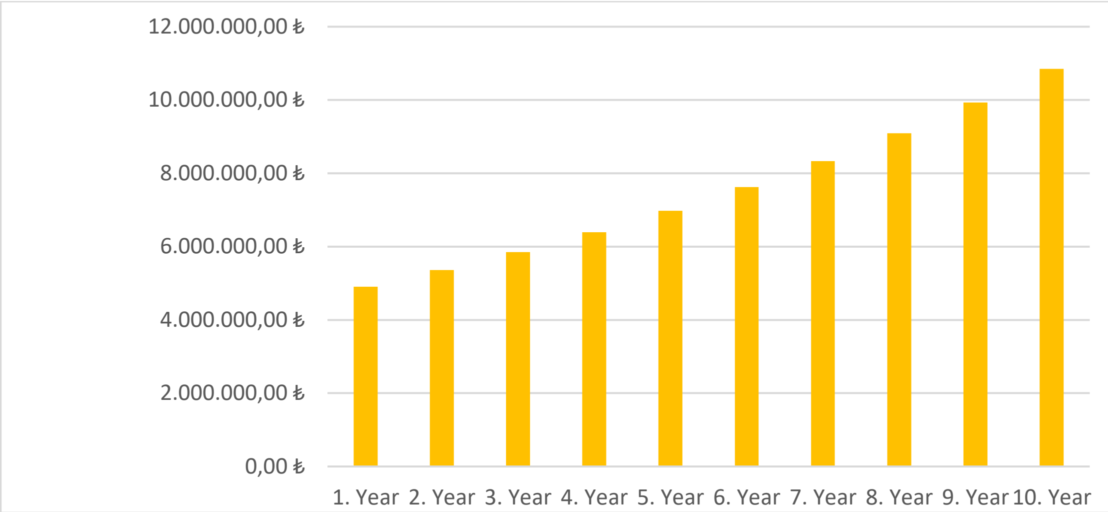

Figure 39: Economical View for A Decade

The figure above shows the amount of earnings with the system's savings for each year. The amount of earnings increases due to increases in the electricity bill each year. Cumulatively, total savings at the end of the 10th year are estimated at 75,321,808.99 TL.

4.7.8. Setup Process and Budget Analysis

In this section of this study, it is mentioned about the possible setup process which is consist of basics steps for setting up a solar power generation system in Turkey.

First, University needs to apply for invitation letter for 7680 kW AC installed power to the electricity distribution company which is signed the contract with before. Then, invitation letter will be provided the electricity distribution company to the university.

Secondly, After the invitation letter provided to the university, the university needs to send the related project about solar power generation to the Turkey's Electricity Distribution Co. (TEDAS) to be accepted. Necessary discoveries and studies will be carried out before project approval, and project approval will be obtained as a result of these studies.

Third, After the getting approval of the project from Turkey's Electricity Distribution Co. (TEDAS), connection agreement needs to be signed with the electricity distribution company which is signed the contract with before.

Last, with the approval from Turkey's Electricity Distribution Co. (TEDAS) and connection agreement with distribution company, University can start to setup and produce electricity.

Budget analysis will be carried out with the necessary information from the previous chapters and information from the company gives consultancy for setup process of renewable energy systems which name is ADAME. From the simulation software the layout of the whole design, electrical schematic diagrams, the quantity of every component (solar modules, inverters and used cable length) obtained. These data are sent to the ADAME company to offer a price for projected system without any profit. The reason of using such a company for price offer is when a company used for such a project can use the benefits of governmental incentives. One of these incentives is deduction of Value-added tax. Another reason, these companies being qualified for the money to be spent on the details of the installation. Such as workforce, cables, necessary equipment and instruments. The budget list is provided from ADAME company has given in appendix 3.

The price for needs to installment for this study is provided from ADAME company is 544,2 $ per kW. The study has 9504 kW and total budget arises as 5.172.076,80 $.

4.7.9. Payback time

From the previous section of this study the project budget is showed up as 5.172.076,80$. It is equal to 35.428.726.1 TL. From the table 14 the first 6 years income is equal to 37.113.078,32 TL. Project will payback itself after installation approximately in 6 years. The threshold for this study is selected 10 years and when the government's 10 year buying guarantee is considered, the project is completely suitable to make it in real life.

CONCLUSION

Limited reserves and fluctuations in fossil fuel resources prices, energy-related greenhouse gas emissions have been led to a transformation in favor of renewable energy resources. Developing countries are building solar power plants not only because of it is safe, environment friendly and sustainable. But also, they are building such power plants to protect themselves from a possible energy crisis and its negative impacts at their economy. The plants that they are planning to build helps to strengthen their economies and create new employment areas. For this purpose, with the incentive policies are developed in many countries. Either the power generation industry from solar energy has qualified more and the installed power of the solar power plants has increased rapidly. Research and development processes that have been made intensively since past to present about PV technologies has led to increase in production efficiency as well as lifespan of the solar power generation systems. Furthermore, the unit price of these systems is decreasing day by day which is also make these systems more attractive for investors in energy industry. As far as it is known with the use of developed and newest technologies some areas which has high irradiance value are producing almost the same energy as much as conventional systems when it is compared to unit price of the electricity.

On the other hand, Turkey is a country that energy needs increase every year and meet the large portion of these needs with imported resources. Therefore, this situation makes the Turkey with a high dependence on imported energy. For this purpose, solar power plants are serious option for Turkey due to decreasing unit cost of the building a plant. What makes it also attractive for investors is that the government will buy every kWh of energy produced for 15 years with incentives at a guaranteed price. Moreover, Saricam is developing part of Adana province, it will be easier to reduce transmission and transportation losses due to meeting the increasing energy need of the Saricam region with an energy producing facility directly within the province's borders.

As a result of the studies conducted within the scope of this thesis, it is concluded that Adana province is efficient enough for possible investment in building a solar power plant. Moreover, University has enough suitable location for mounting the solar panels which is observed when layout design is carried out with CAD software. Furthermore, GEPA indicates that monocrystalline solar modules are the most suitable for selected region. Energy analysis which is done with HELIOSCOPE simulation software shows that system works effectively and generates enough energy with global irradiance values which is obtained from METEONORM software. What is more, when we used gathered electricity bills data, layout data and simulation data all together economical result has arisen. This economic data can be frightening at the first sight but when we carry out with budget cost to calculate payback time implementing such a power plant is possible. Profitability and carried out analysis make the project applicable to real life.

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Acronyms and Abbreviations

AC:Alternating Current

a-Si:Amorphous Silicon

B:Boron

°C: Celsius

CAD: Computer Aided Design

cdTe:Cadmium Telluride

CIGS:Copper Indium Gallium Selenide

CSP:Concentrated Solar Power

DC:Direct Current

°:degree

EPDK:Republic of Turkey Energy Market Regulatory Authority

GEPA: Solar Energy Potential Atlas

GMT:Greenwich Mean Time

HELIOSCOPE: Design and Simulation Sofware

J:Joule

°K: Kelvin

kg:Kilogram

km:Kilometer

kW:Kilowatt

kWh:Kilowatt-hour

MW:Megawatt

m: Meter

Meteonorm: Weather Database Program

Mono-Si:Monorcrystalline Silicon

MPPT:Maximum Power Point Tracking

OPZS: Ortsfest PanZerplatte Flüssig (Stationary Tubular Plate Flooded)

P:Phosphorus

PV:Photovoltaic

Poly-Si:Polycrystalline Silicon

PWM:Pulse Width Modulation

RES:Renewable Energy Source

R&D: Research and Development

Si:Silicon

S:SolarInvariable

₺:Turkish lira

TL: Turkish Lira

TOE:Tonne of Oil Equivalent

TW:Terrawatt

US: United States

Σ :Sum symbol

List of Figures

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List of Appendices

Appendix 1 : Electricity Bills and Installed Power Agreement

REF: [illegible] 2017

TOROSLAR EDAŞ YATIRIM PLANLAMA MÜDÜRLÜĞÜ
ADANA/OSMANİYE AG/YG BAĞLANTI PLANLAMA KOMİSYONU
BAĞLANTI GÖRÜŞÜ FORMU

TARİH:

Toroslar

BAŞVURU TARİHİ	BAĞLANTI GÖRÜŞÜ KARAR TARİHİ	BAĞLANTI GÖRÜŞÜ KARAR NO	TALEP SAHİBİ / VEKİLİ / TEMSİLE YETKİLİ ADI VE ÜNVANI
17.03.2017	21.03.2017	2017/22-14	T.C.ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ

[illegible]	ADA	PARSEL	TİCARETHANE	MESKEN	YAPI ADEDİ	ŞANTİYE	BİLDİRİM TÜRÜ	TOPLAM KURULU GÜÇ	TOPLAM TALEP GÜÇ (kW)	[illegible]	[illegible]
452043	202	10	1		3		Y1-CRM-0004	[illegible]	[illegible]		

TALEBİN ADRESİ			POSTA ADRESİ
	GÜLTEPE MAH. ÇATALAN CADDESİ NO:201/2	SARIÇAM ADANA	GÜLTEPE MAH. ÇATALAN CADDESİ NO:201/2 SARIÇAM/ADANA

TALEP BÖLGESİNE AİT DAĞITIM TESİS BİLGİLERİ

TRAFO MERKEZİ/TM	OM/KÖK	YG FİDER ADI	TRAFO POSTASI (TRP-DOT)	TRP/DOT GÜCÜ (kVA)	YG GERİLİM (kV)	TRP/DOT YÜKÜ (PUANT) (A)	R	S	T	YG HAT MÜLKİYETİ
CIHADİYE	YDM-9/A	F-3600			31,5	0				DAĞITIM ŞİRKETİ

ŞEBEKE KABLO KESİTİ	HAVAİ HAT İLETKEN KESİTİ	ŞALTER / SİGORTA AKIMI (A)	TALEP İLE İLGİLİ AG FİDER ADI	AG FİDER KOLU YÜKÜ (PUANT) (A)	TARİH	SAAT	ENERJİ TÜKETİM ÖLÇÜM SEVİYESİ	ÖNERİLEN/PLANLANAN YATIRIM YILI
3x(1x240/25) XLPE							YG	2017

YAPI İLE PARSEL SINIRI ARASI (~M)	PARSEL SINIRI İLE DAĞ. ŞEB. ARASI (~M)	DAĞ. ŞEB. İLE TRP/DOT ARASI (~M)	BAĞLANTI HAT UZUNLUĞU (~M)	YOL İMARI (AÇIK / YOK)	SAĞ. KONTAK GÖSTERİLDİ	YATIRIMA SEVK EDİLDİ	TALEP YERİ ENJ. BAĞ. DURUMU
10	-		60	AÇIK	EVET	EVET	İNŞAAT

TALEP BÖLGESİ VAZİYET PLANI/KROKİSİ/GÖRÜNTÜSÜ

Karar: Bağlantı Planlama Komisyonumuzun 20.09.2016 tarih ve 2016/37-10 nolu alınan kararda belirtilen tüm şartların yerine gelmesi koşulu ile 180 takvim günü süre uzatımı verilmiştir.

BAĞLANTI PLANLAMA KOMİSYONU

TOROSLAR ELEKTRİK DAĞITIM A.Ş. TOROSLAR EDAŞ

EK-1: Güç Tahsis Koşulları (6 sayfa)
Bu Bağlantı Görüşü 180 Takvim Günü geçerli olup, GTK'nın 12. Maddesine bakınız.

ENERJİSA

MÜŞTERİ BİLGİLERİ

SÖZLEŞME HESAP NO	1014969806
TESİSAT NO	4010887923
MÜŞTERİ NO	208934564
MÜŞTERİ ADI SOYADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İDARİ VE MALİ
VERGİ DAİRESİ - VKN / TCKN	ZİYAPAŞA VD - 0070600644
MÜŞTERİ GRUBU	Tek Terimli Tek Zamanlı Ticarethane OG (Orta Gerilim)/ Son Kaynak Tarifesi Serbest Tüketicisi
TESİSAT ADRESİ	GÜLTEPE MAH. ÇATALAN CD. NO 201/1/BTÜ KAMPÜS MERKEZ SARIÇAM ADANA
OTOMATİK ÖDEME TALİMATI	YOKTUR
FATURA TARİHİ / DÖNEMİ	31.12.2017 17:11 /Aralık 2017

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Fatura Seri, Sıra No: 3M12017000183526

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BAĞLARBAŞI MAH. REFAHEVLER SOK.
A BLOK NO:2/1 MALTEPE/İSTANBUL
KÜÇÜKYALI V.D. 8560386451

Mersis No	: 856036645100015
Tic. Sic. No	: 921047
Tel / Faks	: (0216) 579 05 00 / (0216) 579 05 30
Web Sitesi	: www.toroslarepsas.enerjisa.com.tr
	: online.enerjisa.com.tr

ORTALAMA TÜKETİM (kWh/gün)

Tarih: 9.Ocak.2018 Sayı: 364

TÜKETİM BİLGİLERİ

	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		47,383	15,448	20,552
Son Endeks		57,314	17,605	23,890
Endeks Farkı		9,931	2,157	3,338
Çarpan		6.300,000	6.300,000	6.300,000
Aktif Tüketim (kWh)	97.183,800	62.565,300	13.589,100	21.029,400
Ek Tüketim (kWh)				
Trafo Boşta Kaybı (kWh)				
Ek Trafo Boşta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ

	Endüktif	Kapasitif
İlk Endeks	3,189	14,852
Son Endeks	4,713	15,021
Endeks Farkı	1,524	0,169
Çarpan	6.300,000	6.300,000
Reaktif Tüketim (kVARh)	9.601,200	1.064,700
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI

Sayaç Demand Değeri	
Çarpan	
Demand (Güç)	
Anlaşma Gücü (kW)	2.880,000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI

Tek Zaman	Tek Zaman Aktif Tüketim	0,21616700
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gündüz	Gündüz Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Puant	Puant Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gece	Gece Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
	İNDİRİM ORANI	

SİSTEM KULLANIM BİRİM FİYATLARI

Dağıtım	0,10041700
Güç	
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

DİĞER BİLGİLER

Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80087278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Akım Trafo Oranı - Gerilim Trafo Oranı	100,0/ 5,00 - 31.500/ 100,0
Saymanlık Adı	
Tekil Kod	4010887923

OKUMA BİLGİLERİ

İlk Okuma Tarihi	06.12.2017
Son Okuma Tarihi	20.12.2017
Sonraki Okuma Dönemi	12.2017
Ort.Tük. (kWh/gün)	6.478,920
Önceki Yıl Tük(kWh)	
Cari Yıl Tük. (kWh)	622.496,700
Sayaç Okuma Birimi	T11Z0020

MESAJINIZ VAR

BEDELLER

ENERJİ TÜKETİMİ (₺) 21.007,93

Tek Zaman Tüketim Bedeli	21.007,93
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tüketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/-) Tutar	

SİSTEM KULLANIM (₺) 9.758,91

Dağıtım Bedeli	9.758,91
Güç Bedeli	
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçtan K/B Bedeli	

DİĞER (₺) 155,08

Gecikme Zammı Bedeli (%1,40)	155,08
Dağıtım Bağlantı Bedeli	
Per. Abn. K/B Bedeli	

VERGİ/FONLAR (₺) 7.549,10

Enerji Fonu	210,08
TRT Payı	420,16
Elektrik ve Havagazı Tüketim Vergisi	1.050,40
KDV	5.868,46

FATURA TUTARI (₺) 38.471,02

Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	
Damga Vergisi	-309,07

YALNIZ
OTUZSEKİZBİNDÖRTYÜZYETMİŞBİRTLİKİKR

ÖDENECEK TUTAR (₺)

38.161,95

Elektrik faturalarınızı www.epdk.gov.tr adresinden kontrol edebilirsiniz.

VERGİLER TOPLAMI:	7.549,10
KDV MATRAHI:	32.602,56

SON ÖDEME TARİHİ 17.01.2018

ESKİ BORÇ/BAKİYE (₺) 0,00

Ödemelerinizi zamanında yaptığınız için teşekkür ederiz.

ETTN :C2883B27-E702-1EE7-BBC8-8FF860889688

...BİLGİLERİ	
...LEŞME HESAP NO	1014969806
...SİSAT NO	4010887923
MÜŞTERİ NO	208934564
MÜŞTERİ ADI SOYADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İDARİ VE MALİ
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FATURA TARİHİ / DÖNEMİ	

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Mersis No	: 856036645100015
Tic. Sic. No	: 921047
Tel / Faks	: (0216) 579 05 00 / (0216) 579 05 30
Web Sitesi	: www.toroslarepsas.enerjisa.com.tr
	: online.enerjisa.com.tr

ORTALAMA TÜKETİM (kWh/gün)

Tarih: .... Sayı: 370

TÜKETİM BİLGİLERİ

	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		57,314	17,605	23,890
Son Endeks		64,102	19,573	26,612
Endeks Farkı		6,788	1,968	2,722
Çarpan		6.300,000	6.300,000	6.300,000
Aktif Tüketim (kWh)	72.311,400	42.764,400	12.398,400	17.148,600
Ek Tüketim (kWh)				
Trafo Boşta Kaybı (kWh)				
Ek Trafo Boşta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ

	Endüktif	Kapasitif
İlk Endeks	4,713	15,021
Son Endeks	5,909	15,151
Endeks Farkı	1,196	0,130
Çarpan	6.300,000	6.300,000
Reaktif Tüketim (kVARh)	7.534,800	819,000
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI

Sayaç Demand Değeri	
Çarpan	
Demand (Güç)	
Anlaşma Gücü (kW)	2.880,000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI

Tek Zaman	Tek Zaman Aktif Tüketim	0,21616700
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gündüz	Gündüz Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Puant	Puant Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gece	Gece Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
	İNDİRİM ORANI	

SİSTEM KULLANIM BİRİM FİYATLARI

Dağıtım	0,10041700
Güç	
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

DİĞER BİLGİLER

Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80087278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Akım Trafo Oranı - Gerilim Trafo Oranı	100,0/ 5,00 - 31.500/ 100,0
Saymanlık Adı	
Tekil Kod	4010887923

OKUMA BİLGİLERİ

İlk Okuma Tarihi	21.12.2017
Son Okuma Tarihi	31.12.2017
Sonraki Okuma Dönemi	01.2018
Ort.Tük. (kWh/gün)	6.573,764
Önceki Yıl Tük(kWh)	694.808,100
Cari Yıl Tük. (kWh)	
Sayaç Okuma Birimi	T11Z0020

MESAJINIZ VAR

Abonelik ve tahliye işlemlerinizi hızlı yapabilmeniz için bu belgelere ihtiyaç duyabilirsiniz: Eski evliş yerine ait tesisat ya da sayaç no, Yeni evliş yerine ait tesisat ya da sayaç no, DASK poliçe no(Yalnızca mesken), Güvence bedeli, Varsa IBAN/Hesapno,Tapu ya da kira kontratı(tüketim noktasında enerji açık ise işleminizi hızlandıracaktır), Yetkilinin nüfus cüzdanı, İş yerine ait yetki belgesi ya da vekâletname ve imza sirküleri Detaylı bilgi: 444 4 372 www.toroslarepsas.enerjisa.com.tr

BEDELLER

ENERJİ TÜKETİMİ (₺)	**15.631,34**
Tek Zaman Tüketim Bedeli	15.631,34
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tüketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/-) Tutar	
SİSTEM KULLANIM (₺)	**7.261,29**
Dağıtım Bedeli	7.261,29
Güç Bedeli	
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçtan K/B Bedeli	
DİĞER (₺)	**0,00**
Gecikme Zammı Bedeli (%1.40)	
Dağıtım Bağlantı Bedeli	
Per. Abn. K/B Bedeli	
VERGİ/FONLAR (₺)	**5.596,28**
Enerji Fonu	156,31
TRT Payı	312,63
Elektrik ve Havagazı Tüketim Vergisi	781,57
KDV	4.345,77
FATURA TUTARI (₺)	**28.488,91**
Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	
Damga Vergisi	-228,88

YALNIZ YİRMİSEKİZBİNDÖRTYÜZSEKSENSEKİZTLDOKSANBİRKR

ÖDENECEK TUTAR (₺)

28.260,03

Elektrik faturalarınızı www.epdk.gov.tr adresinden kontrol edebilirsiniz.

VERGİLER TOPLAMI	5.596,28
KDV MATRAHI	24.143,14
SON ÖDEME TARİHİ	**19.01.2018**
ESKİ BORÇ/BAKİYE (₺)	**38.161,95**

Ödemelerinizi zamanında yaptığınız için teşekkür ederiz.

ETTN :CE07165D-6E02-1EE7-8BF3-6346FD5AC9CD

YEPAŞ

Yeşilırmak Elektrik Perakende Satış A.Ş.

E-ARŞİV FATURA
Fatura Seri,Sıra No:
YE62018000003156

444 55 23

MÜŞTERİ NO	[illegible]
MÜŞTERİ GRUBU	[illegible]
SÖZLEŞME NO	[illegible]
SÖZLEŞME HESABI	[illegible]
TESİSAT NO	[illegible]
MÜŞTERİ ADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ
MÜŞTERİ ADRESİ	GÜLTEPE MAH.ÇATALAN [illegible] KAMPÜS [illegible] Adana
VERGİ DAİRESİ	ZİYAPAŞA
TC VERGİ NO	[illegible]
İL KOORDİNATÖRLÜĞÜ	Adana
SAP FATURA NO	[illegible]
FATURA TARİHİ	28.02.2018 [illegible]

SAYAÇ BİLGİLERİ / OKUMA BİLGİLERİ

Aktif Sayaç Marka / Seri No	MAKEL / [illegible]	İlk Okuma Tarihi	01.02.2018	Günlük Ort. Tük. (kWh/gün)	[illegible]
Endüktif Sayaç Marka / Seri No	MAKEL / [illegible]	Son Okuma Tarihi	23.02.2018	Abone Tarife Grubu	
Kapasitif Sayaç Marka / Seri No	MAKEL / [illegible]	Fatura Dönemi	02.2018	Sayaç Okuma Birimi	[illegible]
Demand Sayaç Marka / Seri No		Sonraki Okuma Dönemi	[illegible]	Ekip	[illegible]
		Kurulu Güç	[illegible]	Dağıtım Trf. Oranı	

ENDEKS VE TÜKETİM BİLGİLERİ

	Aktif (kWh)	Gündüz (kWh)	Puant (kWh)	Gece (kWh)	Endüktif (kVarh)	Kapasitif (kVarh)	Demand
İlk Endeks	148.231	83.656	25.660	34.962	9.296	[illegible]	
Son Endeks	178.[illegible]	102.772	29.230	41.339	11.124	15.656	
Çarpan	6300.000	6300.000	6300.000	6300.000	6300.000	6300.000	
Tüketim	190575.000	120415.200	[illegible]	43985.500	11516.400	1612.800	

AKTİF TÜKETİM VE BİRİM FİYATLAR

	Tüketim	Ek Tüketim	Birim Fiyat	Toplam Tutar
Tek Zaman Aktif Tüketim	190575.000	0.000	0.240182	45.773,99 TL
Dağıtım Bedeli	190575.000	0.000	0.113104	21.554,79 TL
Reaktif Tutar	0.000	0.000	0.000000	0.00 TL

NOTLAR

[illegible]

BEDELLER

DİĞER (₺)

Yük. Fiyat Farkı Tutarı	[illegible] TL

VERGİ/FONLAR (₺)

Elektrik Tük. Ver.	2.288,53 TL
TRT Payı Tutarı	915,48 TL
Enerji Fonu Tutarı	457,73 TL

TOPLAM TUTAR (₺) 77.690,29 TL

KDV	13.984,25 TL

FATURA TUTARI (₺) 91.674,54 TL

Mahsup Miktarı	0.00 TL
[illegible]	0.04 TL
[illegible]	0.00 TL
Damga Vergisi	0.00 TL

ÖDENECEK TUTAR (₺)

91.674,50 TL

Elektrik faturalarınızı www.epdk.gov.tr adresinden sorgulayabilirsiniz.

SON ÖDEME TARİHİ 12.03.2018

ESKİ BORÇ BAKİYE (₺) 97994.5

ÖDEME NOKTALARI

YEPAŞ Vezne, Anlaşmalı Bankalar, [illegible]

YEPAŞ

Yeşilırmak Elektrik Perakende Satış A.Ş.

E-ARŞİV FATURA
Fatura Seri,Sıra No:
YE52018000008491

444 55 23

YEPAŞ
CUMHURİYET MAH. ATATÜRK BULV
No:368-370/ 55200ATAKUM/ SAMSUN TÜRKİYE
GAZİLER:2380600299
Tel: 0362 311 88 00 Faks: 0362 299 29 79
Mersis No: 2380063290000018
İşletme Merkezi: ATAKUM
Web Sitesi: www.yesilirmakepas.com

KULLANICI BİLGİLERİ

MÜŞTERİ NO	5000411018
MÜŞTERİ GRUBU	TekTerimli TekZamanlı Ticarethane OG
SÖZLEŞME NO	5400480200
SÖZLEŞME HESABI	4003423983
TESİSAT NO	4201990471
MÜŞTERİ ADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ ID
MÜŞTERİ ADRESİ	GÜLTEPE MAH ÇATALAN CD.NO.201 BTÜ KAMPÜS SARIÇAM Adana
VERGİ DAİRESİ	ZİYAPAŞA
TC / VERGİ NO	0070600644
İL KOORDİNATÖRLÜĞÜ	Adana
SAP FATURA NO	YE 011003024656
FATURA TARİHİ	31.03.2018 16:02

SAYAÇ BİLGİLERİ / **OKUMA BİLGİLERİ**

Aktif Sayaç Marka / Seri No	MAKEL / 80087278	İlk Okuma Tarihi	01.03.2018	Günlük Ort. Tük. (kWh/gün)	5294,848
Endüktif Sayaç Marka / Seri No	MAKEL / 80087278	Son Okuma Tarihi	31.03.2018	Akım Trf. Oranı	
Kapasitif Sayaç Marka / Seri No	MAKEL / 80087278	Fatura Dönemi	03/2018	Sayaç Okuma Birimi	01ST0010
Demand Sayaç Marka / Seri No		Sonraki Okuma Dönemi	00/0000	Etüp	
		Kurulu Güç	4800,000	Gerilim Trf. Oranı	

ENDEKS VE TÜKETİM BİLGİLERİ

	Aktif (kWh)	Gündüz (kWh)	Puant (kWh)	Gece (kWh)	Endüktif (kVarh)	Kapasitif (kVarh)	Demand
İlk Endeks	178,631	107,772	29,330	41,628	11,124	15,658	
Son Endeks	204,688	124,042	33,077	47,488	13,148	16,860	
Çarpan	6300,000	6300,000	6300,000	6300,000	6300,000	6300,000	
Tüketim	164140,200	102501,000	34236,100	37403,100	8432,300	7581,600	

AKTİF TÜKETİM VE BİRİM FİYATLAR

	Tüketim	Ek Tüketim	Birim Fiyat	Toplam Tutar
Tek Zaman Aktif Tüketim	164140,200	0,000	0,240182	39.423,44 TL
Dağıtım Bedeli	164140,200	0,000	0,113184	18.584,91 TL
Reaktif Tutar	0,000	0,000	0,000000	0,00 TL

NOTLAR

Tarife Sınırlılığı Anlaşma
Taahhüdün sona erme tarihi:31.12.2018.
Taahhüt süresi 11 aydır. Taahhüdünüzün 3. ayındasınız.

Önceki Yıl Tüketim : 0,000 kWh
Cari Yıl Tüketim : 894,877,400 kWh
Tedil No : TR-001-1000000002

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir

ETTN:C3890707-8923-1ED8-8E9A-470484348A2F

Fatura Tutarı YETMİŞSEKİZBİNDÖRTYÜZYETMİŞÜÇ TL ALTMIŞYEDİ Kr. dır

BEDELLER

DİĞER (₺)

TÜİK Fiyat Farkı Tutarı	5.360,89TL

VERGİ/FONLAR (₺)

Elektrik Tük. Ver	1.971,17TL
TRT Fonu Tutarı	788,47TL
Enerji Fonu Tutarı	394,23TL
TOPLAM TUTAR (₺)	**66.503,11 TL**
KDV	11.970,56TL
FATURA TUTARI (₺)	**78.473,67 TL**
Mahsubat Mahsup	0,00 TL
Önceki Dönem Yuvarlama Farkı	0,00 TL
Yuvarlama Farkı	0,00 TL
Damga Vergisi	630,45- TL

ÖDENECEK TUTAR

77.843,22 TL

Elektrik faturalarınızı www.epdk.gov.tr adresinden kontrol edebilirsiniz

SON ÖDEME TARİHİ	16.04.2018
FATURA SIRA NO	0

ÖDEME NOKTALARI

YEPAŞ Vezne, Anlaşmalı Bankalar, N Kolay Noktaları, Anlaşmalı Noktalar 40034

YEPAŞ

Yeşilırmak Elektrik Perakende Satış A.Ş.

E-ARŞİV FATURA
Fatura Seri, Sıra No:
YE52018000008927

444 55 23

YEPAŞ
CUMHURİYET MAH. ATATÜRK BULV
No:368-370 / 55200ATAKUM / SAMSUN / TÜRKİYE
GAZİLER. 2350650299
Tel: 0362 311 68 00 Faks: 0362 999 29 79
Mersis No: 2350453299000019
İşletme Merkezi: ATAKUM
Web Sitesi: www.yesilirmakepas.com

MÜŞTERİ BİLGİLERİ

MÜŞTERİ NO	6006411018
MÜŞTERİ GRUBU	TekTerimli TekZamanlı Ticarethane OG
SÖZLEŞME NO	6500480200
SÖZLEŞME HESABI	4002423982
TESİSAT NO	4201990471
MÜŞTERİ ADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İD
MÜŞTERİ ADRESİ	GÜLTEPE MAH ÇATALAN CD NO 201 BTÜ KAMPÜS SARIÇAM Adana
VERGİ DAİRESİ	ZİYAPAŞA
TC / VERGİ NO	0070600644
İL KOORDİNATÖRLÜĞÜ	Adana
SAP FATURA NO	YB 011003044824
FATURA TARİHİ	30.04.2018 12:00

SAYAÇ BİLGİLERİ / **OKUMA BİLGİLERİ**

Aktif Sayaç Marka / Seri No	MAKEL / 80087278	İlk Okuma Tarihi	01.04.2018	Günlük Ort. Tük. (kWh/gün)	4428,690
Endüktif Sayaç Marka / Seri No	MAKEL / 80087278	Son Okuma Tarihi	30.04.2018	Akım Trf. Oranı	
Kapasitif Sayaç Marka / Seri No	MAKEL / 80087278	Fatura Dönemi	04/2018	Sayaç Okuma Birimi	0187001 0
Demand Sayaç Marka / Seri No		Sonraki Okuma Dönemi	05/2018	Ekip	
		Kurulu Güç	4800,000	Gerilim Trf. Oranı	

ENDEKS VE TÜKETİM BİLGİLERİ

	Aktif (kWh)	Gündüz (kWh)	Puant (kWh)	Gece (kWh)	Endüktif (kVarh)	Kapasitif (kVarh)	Demand
İlk Endeks	204,585	124,043	33,077	47,466	12,145	18,840	
Son Endeks	228,874	136,054	36,475	53,144	12,689	18,318	
Çarpan	5300,000	6300,000	6300,000	6300,000	6300,000	6300,000	
Tüketim	132880,700	75679,600	21413,700	35771,400	3238,200	9155,400	

AKTİF TÜKETİM VE BİRİM FİYATLAR

	Tüketim	Ek Tüketim	Birim Fiyat	Toplam Tutar
Tek Zaman Aktif Tüketim	132880,700	0,000	0,243747	32.384,63 TL
Dağıtım Bedeli	132880,700	0,000	0,109263	14.515,43 TL
Reaktif Tutar	0,000	0,000	0,000000	0,00 TL

NOTLAR

Tarife Sınıfı (kili) Anlaşma
Taahhüdün sona erme tarihi: 31.12.2018
Taahhüt süresi 11 aydır. Taahhüdünüzün 4. ayındasınız.

Önceki Yıl Tüketim : 0,000 kWh
Cari Yıl Tüketim : 726 838,100 kWh
Tekil No : TR-001-1000000002

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

ETTN: C1B01717-085A-1ED8-93FC-F7867EAD885F
Fatura Tutarı ALTMIŞDÖRTBİNDOKUZYÜZYETMİŞYEDİ TL YİRMİYEDİ Kr

BEDELLER

DİĞER (₺)

TUIK Fiyat Farkı Tutarı	8.574,87 TL

VERGİ/FONLAR (₺)

Elektrik Tük. Ver	1.619,22 TL
TRT Fonu Tutarı	647,69 TL
Enerji Fonu Tutarı	323,84 TL

TOPLAM TUTAR (₺) 55.065,48 TL

KDV	9.911,79 TL

FATURA TUTARI (₺) 64.977,27 TL

Muhtelif Mahsup	0,00 TL
Önceki Dönem Yuvarlama Farkı	0,00 TL
Yuvarlama Farkı	0,00 TL
Damga Vergisi	522,02- TL

ÖDENECEK TUTAR (₺)

64.455,25 TL

Elektrik faturalarınızı www.epdk.gov.tr adresinden kontrol edebilirsiniz

SON ÖDEME TARİHİ	15.05.2018
ESKİ BORÇ BAKİYE (₺)	77843.22

ÖDEME NOKTALARI

YEPAŞVezne,AnlaşmalıBankalar,N KolayNokt.Al,şanlaşmasınumarası4002

YEPAŞ
Yeşilırmak Elektrik Perakende Satış A.Ş

444 55 23

E-ARŞİV FATURA
Fatura Seri, Sıra No:
YE62018000009276

YEPAŞ
CUMHURİYET MAH. ATATÜRK BULV
No:368-370 / 55200ATAKUM / SAMSUN / TÜRKİYE
GAZİLER: 2250549299
Tel: 0362 311 59 90 Faks: 0362 999 29 79
Mersis No: 2250549299900019
İşletme Merkezi: ATAKUM
Web Sitesi: www.yesilirmakepas.com

TÜKETİCİ BİLGİLERİ

MÜŞTERİ NO	5000411916
MÜŞTERİ GRUBU	TekTerimli TekZamanlı Ticarethane OG
SÖZLEŞME NO	5500480200
SÖZLEŞME HESABI	4002423982
TESİSAT NO	4201990471
MÜŞTERİ ADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ ID
MÜŞTERİ ADRESİ	GÜLTEPE MAH ÇATALAN CD.NO:201 BTÜ KAMPÜS SARIÇAM Adana
VERGİ DAİRESİ	ZİYAPAŞA
TC / VERGİ NO	0070600844
İL KOORDİNATÖRLÜĞÜ	Adana
SAP FATURA NO	YB 011003066948
FATURA TARİHİ	31.05.2018 17:18

2Ld. [signature]

SAYAÇ BİLGİLERİ

Aktif Sayaç Marka / Seri No	MAKEL / 80087278
Endüktif Sayaç Marka / Seri No	MAKEL / 80087278
Kapasitif Sayaç Marka / Seri No	MAKEL / 80087278
Demand Sayaç Marka / Seri No	

OKUMA BİLGİLERİ

İlk Okuma Tarihi	01.05.2018	Gün'lük Ort. Tük. (kWh/gün)	6147,303
Son Okuma Tarihi	31.05.2018	Alım Trf. Oranı	
Fatura Dönemi	05/2018	Sayaç Okuma Birimi	01BT0010
Sonraki Okuma Dönemi	00/0000	Ekip	
Kurulu Güç	4800,000	Gerilim Trf. Oranı	

ENDEKS VE TÜKETİM BİLGİLERİ

	Aktif (kWh)	Gündüz (kWh)	Puant (kWh)	Gece (kWh)	Endüktif (kVarh)	Kapasitif (kVarh)	Demand
İlk Endeks	228,674	136,064	36,476	53,144	12,629	18,318	
Son Endeks	251,002	151,918	40,284	58,802	13,276	19,836	
Çarpan	6300,000	6300,000	6300,000	6300,000	6300,000	6300,000	
Tüketim	169566,400	99930,600	23990,400	35646,400	3906,000	8583,400	

AKTİF TÜKETİM VE BİRİM FİYATLAR

	Tüketim	Ek Tüketim	Birim Fiyat	Toplam Tutar
Tek Zaman Aktif Tüketim	169566,400	0,000	0,243747	38.893,88 TL
Dağıtım Bedeli	169566,400	0,000	0,109253	17.433,11 TL
Reaktif Tutar	0,000	0,000	0,000000	0,00 TL

NOTLAR

Tarife Biruh İstil Anlaşma
Taahhüdün sona erme tarihi 31.12.2018.
Taahhüt süresi 11 aydır.Taahhüdünüzün 5. ayındasınız.

Önceki Yıl Tüketim : 0,000 kWh
Cari Yıl Tüketim : 888.604,600 kWh
Tekil No : TR-001-1000000002

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

ETTN: AA18FCC3-3302-1ED8-8A88-8C788874C0BA
Fatura Tutarı SEKSENDÖRTBİNKIRKDÖRT TL ALTMIŞSEKİZ Krş. tur

BEDELLER

DİĞER (₺)

TÜİK Fiyat Fark. Tutarı	11.785,62 TL

VERGİ/FONLAR (₺)

Elektrik Tük. Ver	1.644,69 TL
TRT Fonu Tutarı	777,88 TL
Enerji Fonu Tutarı	388,94 TL

TOPLAM TUTAR (₺)	71.224,30 TL
KDV	12.820,38 TL
FATURA TUTARI (₺)	84.044,68 TL
Muhtelif Mahsup	0,00 TL
Önceki Dönem Yuvarlama Farkı	0,00 TL
Yuvarlama Farkı	0,00 TL
Damga Vergisi	676,21- TL

ÖDENECEK TUTAR (₺)

83.368,47 TL

Elektrik faturalarınızı www.epdk.gov.tr adresinden kontrol edebilirsiniz

SON ÖDEME TARİHİ	18.06.2018
ESKİ BORÇ BAKİYE (₺)	0

ÖDEME NOKTALARI

YEPAŞVezne,AnlaşmalıBankalar,N Kolay Nokt.Bİşanlaşmasınumarası40024

YEPAŞ

444 31 23

e-ARŞİV FATURA

TÜKETİCİ BİLGİLERİ

MÜŞTERİ NO

MÜŞTERİ GRUBU

SÖZLEŞME NO

SÖZLEŞME HESABI

TESİSAT NO

MÜŞTERİ ADI

MÜŞTERİ ADRESİ

VERGİ DAİRESİ

TC / VERGİ NO

İŞ KOORDİNATÖRLÜĞÜ

SAP FATURA NO

FATURA TARİHİ

SAYAÇ BİLGİLERİ

OKUMA BİLGİLERİ

ENDEKS VE TÜKETİM BİLGİLERİ

AKTİF TÜKETİM VE BİRİM FİYATLAR

NOTLAR

BEDELLER

DİĞER (₺)

VERGİ/FONLAR (₺)

TOPLAM TUTAR (₺) 82.749,56 TL

FATURA TUTARI (₺)

ÖDENECEK TUTAR (₺)

96.860,13 TL

SON ÖDEME TARİHİ

ESKİ BORÇ/BAKİYE (₺)

ÖDEME NOKTALARI

YEPAŞ
Yeşilırmak Elektrik Perakende Satış A.Ş

E-ARŞİV FATURA
Fatura Seri, Sıra No: YE52018000011398

444 55 23

YEPAŞ
CUMHURİYET MAH. ATATÜRK BULV. No:368-370 / 55200ATAKUM / SAMSUN / TÜRKİYE
GAZİLER: 2250559299
Tel: 0362 311 58 00Faks: 0362 999 29 78
Mersis No: 2250559299000019
İşletme Merkezi: ATAKUM
Web Sitesi: www.yesilirmakepas.com

TÜKETİCİ BİLGİLERİ

MÜŞTERİ NO	5000411016
MUŞTERİ GRUBU	TekTerimli TekZamanlı Ticarethane OG
SÖZLEŞME NO	5500480200
SÖZLEŞME HESABI	4002423982
TESİSAT NO	4201990471
MÜŞTERİ ADI	ADANA BİLİM VE TEKNOLOJİ UNİVERSİTESİ ID
MÜŞTERİ ADRESİ	GULTEPE MAH.ÇATALAN CD NO:201 BTU KAMPÜS SARIÇAM Adana
VERGİ DAİRESİ	ZİYAPAŞA
TC / VERGİ NO	0070600643
İL KOORDİNATÖRLÜĞU	Adana
SAP FATURA NO	YB 011003077767
FATURA TARİHİ	31.07.2018 13:09

2h/, Cattaci

SAYAÇ BİLGİLERİ

Aktif Sayaç Marka / Seri No	MAKEL / 80087278
Endüktif Sayaç Marka / Seri No	MAKEL / 80087278
Kapasitif Sayaç Marka / Seri No	MAKEL / 80087278
Demand Sayaç Marka / Seri No	

OKUMA BİLGİLERİ

İlk Okuma Tarihi	01.07.2018	Günlük Ort. Tük. (kWh/gün)	8168,456
Son Okuma Tarihi	31.07.2018	Akım Trf. Oranı	
Fatura Dönemi	07/2018	Sayaç Okuma Birimi	01ST0010
Sonraki Okuma Dönemi	08/2018	Ekip	
Kurulu Güç	4800,000	Gerilim Trf. Oranı	

ENDEKS VE TÜKETİM BİLGİLERİ

	Aktif (kWh)	Gündüz (kWh)	Puant (kWh)	Gece (kWh)	Endüktif (kVarh)	Kapasitif (kVarh)	Demand
İlk Endeks	279,435	171,003	44,170	64,262	13,824	21,279	
Son Endeks	319,629	199,489	49,414	70,726	15,046	21,978	
Çarpan	6300,000	6300,000	6300,000	6300,000	6300,000	6300,000	
Tüketim	253222,200	179461,600	33037,200	40723,200	7698,600	4403,700	

AKTİF TÜKETİM VE BİRİM FİYATLAR

	Tüketim	Ek Tüketim	Birim Fiyat	Toplam Tutar
Tek Zaman Aktif Tüketim	253222,200	0,000	0,243747	61.722,20 TL
Dağıtım Bedeli	253222,200	0,000	0,169253	17.665,29 TL
Reaktif Tutar	0,000	0,000	0,000000	0,00 TL

NOTLAR

Tarife Sınıfı(ikili) Anlaşma
Taahhüdün sona erme tarihi 31.12.2018.
Taahhüt süresi 11 aydır.Taahhüdünüzün 7. ayındasınız.

Önceki Yıl Tüketim : 0.000 kWh
Cari Yıl Tüketim : 1318 854,600 kWh
Tekil No : TR-001-1000000002

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

ETTN: AA18FD08-ED03-1ED8-A686-4682FA6E5305
Fatura Tutarı YUZ KIRKBİNDORTYUZON TL SEKSENYEDİ Kuruştur

BEDELLER

DİĞER (₺)

TÜIK Fiyat Farkı Tutarı	24.667,00 TL

VERGİ/FONLAR (₺)

Elektrik Tük. Ver.	3.086,11 TL
TRT Fonu Tutarı	1.234,44 TL
Enerji Fonu Tutarı	617,22 TL

TOPLAM TUTAR (₺)	118.992,26 TL
KDV	21.418,61 TL

FATURA TUTARI (₺)	140.410,87 TL
Muhtelif Mahsup	0,00 TL
Önceki Dönem Yuvarlama Farkı	0,00 TL
Yuvarlama Farkı	0,00 TL
Damga Vergisi	1128.05- TL

Shyb Nedi

Yeşilırmak Elektrik Perakende Satış A.Ş

ÖDENECEK TUTAR (₺)

139.282,82 TL

Elektrik faturalarınızı www.epdk.gov.tr adresinden kontrol edebilirsiniz

SON ÖDEME TARİHİ	15.08.2018
ESKİ BORÇ/BAKİYE(₺)	0

ÖDEME NOKTALARI

YEPAŞVezne,AnlaşmalıBankalar,N'KolayNokt.&İşanlaşmasınumara

file:///D:/Users/samet.acar/Documents/SAP/SAP%20GUI/0806095.html 6.08.2018

YEPAŞ

Yeşilırmak Elektrik Perakende Satış A.Ş.

444 55 23

MÜŞTERİ NO	4002411214
MÜŞTERİ GRUBU	TekTerimli TekZamanlı Ticarethane OG
SÖZLEŞME NO	5500480259
SÖZLEŞME HESABI	4002423912
TESİSAT NO	4201990471
MÜŞTERİ ADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ D
MÜŞTERİ ADRESİ	GÜLTEPE MAH.ÇATALAN CD.NO:291 BTÜ KAMPUS SARIÇAM Adana
VERGİ DAİRESİ	ZİYAPAŞA
TC / VERGİ NO	0070800644
İL KOORDİNATÖRLÜĞÜ	Adana
SAP FATURA NO	YB 000192456013
FATURA TARİHİ	21.08.2018 15:26

E-ARŞİV FATURA
Fatura Seri, Sıra No:
YE72018000025974

Vergi / TCK No: 22505699900019
ATAKUM
www.yesilirmakepas.com

SAYAÇ BİLGİLERİ

Aktif Sayaç Marka / Seri No	MAKEL / 80087278
Endüktif Sayaç Marka / Seri No	MAKEL / 80087278
Kapasitif Sayaç Marka / Seri No	MAKEL / 80087278
Demand Sayaç Marka / Seri No	

OKUMA BİLGİLERİ

İlk Okuma Tarihi	01.08.2018	Günlük Ort. Tük. (kWh/gün)	7068,194
Son Okuma Tarihi	31.08.2018	Akım Trf. Oranı	
Fatura Dönemi	08/2018	Sayaç Okuma Birimi	01870010
Sonraki Okuma Dönemi	00.0000	Ekip	
Kurulu Güç	4600.000	Gerilim Trf. Oranı	

ENDEKS VE TÜKETİM BİLGİLERİ

	Aktif (kWh)	Gündüz (kWh)	Puant (kWh)	Gece (kWh)	Endüktif (kVarh)	Kapasitif (kVarh)	Demand
İlk Endeks	319.623	199.489	49.414	70.726	16,046	21,978	
Son Endeks	354,409	223,447	53,990	75,964	16,459	22,492	
Çarpan	6300,000	6300,000	6300,000	6300,000	6300,000	6300,000	
Tüketim	219114,000	150935,400	28879,200	39299,400	8901,900	3175,200	

AKTİF TÜKETİM VE BİRİM FİYATLAR

	Tüketim	Ek Tüketim	Birim Fiyat	Toplam Tutar
Tek Zaman Aktif Tüketim	219114.000	0.000	0,235789	51.664,55 TL
Dağıtım Bedeli	219114,000	0.000	0,117848	25.822,18 TL
Reaktif Tutar	0.000	0.000	0,000000	0,00 TL

NOTLAR

Tarife Sınıfı(kib) Anlaşma
Taahhüdün sona erme tarihi 31.12.2018
Taahhüt süresi 11 aydır.Taahhüdünüzün 8. ayındasınız

Önceki Yıl Tüketimi: 0.000 kWh
Cari Yıl Tüketimi: 1537.968.900 kWh
Tekil No: TR-001-1060000002

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

ETTN: AA11F006-ED03-1ED3-ACC4-1F1516CE0129
Fatura Tutarı: YÜZ ONSEKİZBİNİKİYÜZELLİSEKİZ TL YİRMİSEKİZ Kuruş'tur

BEDELLER

DİĞER (₺)

TÜRK Fiyat Farkı Tutarı	18.607,39 TL

VERGİ/FONLAR (₺)

Elektrik Tük. Ver.	2.583,23 TL
TRT Fonu Tutarı	1.033,29 TL
Enerji Fonu Tutarı	516,65 TL
TOPLAM TUTAR (₺)	**100.227,36 TL**
KDV	18.040,92 TL
FATURA TUTARI (₺)	**118.268,28 TL**
Muhtelif Mahsup	0,00 TL
Önceki Dönem Yuvarlama Farkı	0,00 TL
Yuvarlama Farkı	0,00 TL
Damga Vergisi	950,16- TL

ÖDENECEK TUTAR (₺)

117.318,12 TL

Elektrik faturalarınızı www.epdk.gov.tr adresinden kontrol edebilirsiniz

SON ÖDEME TARİHİ	17.09.2018
ESKİ BORÇ/BAKİYE(₺)	0

ÖDEME NOKTALARI

YEPAŞ Vezne, Anlaşmalı Bankalar, N'Kolay Noktaları, anlaşmasız numara

YEPAŞ

Yeşilırmak Elektrik Perakende Satış A.Ş.

E-ARŞİV FATURA
Fatura Seri, Sıra No:
YE42018000011110

444 55 23

YEPAŞ
[illegible]
Vergi No: 2250502990001[illegible]
Vergi Dairesi: ATAKUM
Web Sitesi: www.yesilirmakepas.com

MÜŞTERİ NO	5000411019
MÜŞTERİ GRUBU	TekTerimli TekZamanlı Ticarethane OG
SÖZLEŞME NO	5500480200
SÖZLEŞME HESABI	4002423932
TESİSAT NO	4201990471
MÜŞTERİ ADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ [illegible]
MÜŞTERİ ADRESİ	GÜLTEPE MAH.ÇATALAN CD.NO:201 BTU KAMPUS SARIÇAM Adana
VERGİ DAİRESİ	ZİYAPAŞA
TC / VERGİ NO	0070600944
İL KOORDİNATÖRLÜĞÜ	Adana
SAP FATURA NO	YS 011002039224
FATURA TARİHİ	30.09.2018 15:13

SAYAÇ BİLGİLERİ

Aktif Sayaç Marka / Seri No	MAKEL / 80087278
Endüktif Sayaç Marka / Seri No	MAKEL / 80087276
Kapasitif Sayaç Marka / Seri No	MAKEL / 80087273
Demand Sayaç Marka / Seri No	

OKUMA BİLGİLERİ

İlk Okuma Tarihi	01.09.2018	Günlük Ort. Tük. (kWh/gün)	7075,950
Son Okuma Tarihi	30.09.2018	Akım Trf. Oranı	
Fatura Dönemi	09-2018	Sayaç Okuma Birimi	01810010
Sonraki Okuma Dönemi	10-2018	Ekip	
Kurulu Güç	4800,000	Gerilim Trf. Oranı	

ENDEKS VE TÜKETİM BİLGİLERİ

	Aktif (kWh)	Gunduz (kWh)	Puant (kWh)	Gece (kWh)	Enduktif (kVarh)	Kapasitif (kVarh)	Demand
İlk Endeks	354,409	223,447	53,993	76,964	16,459	22,442	
Son Endeks	388,104	246,710	83,470	82,924	17,567	23,041	
Çarpan	6300,000	6300,000	6300,000	6300,000	6300,000	6300,000	
Tüketim	212278,500	146556,900	28173,600	37548,000	6980,400	3821,790	

AKTİF TÜKETİM VE BİRİM FİYATLAR

	Tüketim	Ek Tüketim	Birim Fiyat	Toplam Tutar
Tek Zaman Aktif Tüketim	212278,500	0,000	0,235734	50.041,21 TL
Dağıtım Bedeli	212278,500	0,000	0,117907	25.029,12 TL
Reaktif Tutar	0,000	0,000	0,000000	0,00 TL

NOTLAR

TAHLİYE FATURASIDIR
0,00 TL güvence bedelinden mahsup edilmiştir. Kalan güvence bedeli tutarı 0,00 TL dir.
Tarife Sınıfı İkili Anlaşma
Taahhüdün sona erme tarihi 31.12.2018
Taahhüt süresi 11 aydır. Taahhüdünüzün [illegible] aylındasınız

Önceki Yıl Tüketimi : 0,000 kWh
Cari Yıl Tüketimi : 1780.247,100 kWh
Tesil No : TR-001-1000000002

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir

ETTN: AA18FC08-2202-1E08-B1E8-0E347F028033
Fatura Tutarı: YÜZ ALTMIŞÜÇBİNYÜZ ONİKİ TL YİRMİİKİ Kuruştur

BEDELLER

DİĞER (₺)	
TÜFE Fiyat Farkı Tutarı	59.156,96 TL
VERGİ/FONLAR (₺)	
Elektrik Tük. Ver.	2.502,07 TL
TRT Fonu Tutarı	1.000,83 TL
Enerji Fonu Tutarı	500,41 TL
TOPLAM TUTAR (₺)	138.230,70 TL
KDV	24.881,52 TL
FATURA TUTARI (₺)	163.112,22 TL
Mahsup	0,00 TL
Önceki Dönem Yuvarlama Farkı	0,00 TL
Yuvarlama Farkı	0,00 TL
Damga Vergisi	1310,43- TL

ÖDENECEK TUTAR (₺)

161.801,79 TL

Elektrik faturalarınızı www.epdk.gov.tr adresinden kontrol edebilirsiniz.

SON ÖDEME TARİHİ 15.10.2018

ESKİ BORÇ BAKİYE(₺) 981,78

ÖDEME NOKTALARI

YEPAŞ Vezne Anlaşmalı Bankalar,İ/Kolay Nokt.,[illegible]

ENERJİSA

MÜŞTERİ BİLGİLERİ

[illegible]	1019937319
[illegible]	4010887923
[illegible]	203334384
[illegible]	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İDARİ VE MALİ İŞLER DAİRE BAŞKANLIĞI
[illegible]	ZİYAPAŞA VD - 0070020844
[illegible]	Tek Terimli Tek Zamanlı Ticarethane OG (Orta Gerilim) Son Kaynak Tarifesi Serbest Tüketici
[illegible]	GÜLTEPE MAH. ÇATALAN CD. NO:201 BTÜ KAMPÜS MERKEZ SARIÇAM ADANA
[illegible]	YOKTUR
[illegible]	31.10.2018 23:59 Ekim 2018

e-Arşiv Fatura

Fatura Seri Sıra No: 3E22018000002762

ENERJİSA ÇAĞRI MERKEZİ

444 4 372

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.
BAĞLARBAŞI MAH. REFAHEVLER SOK.
A BLOK NO:2/1 MALTEPE/İSTANBUL
KÜÇÜKYALI V.D. 8560366451

Mersis No	:0856036645100015
Tic.Sic.No	:921047
Tel / Fax	: (0216) 579 05 00 / (0216) 579 05 30
Web Sitesi	: www.toroslarepsas.enerjisa.com.tr
	: online.enerjisa.com.tr

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ

	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		246,710	58,470	82,924
Son Endeks		263,072	62,500	88,977
Endeks Farkı		16,362	4,030	6,053
Çarpan		6.300,000	6.300,000	6.300,000
Aktif Tüketim (kWh)	166.603,500	103.080,600	25.389,000	38.133,900
Ek Tüketim (kWh)				
Trafo Boşta Kaybı (kWh)				
Ek Trafo Boşta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ

	Endüktif	Kapasitif
İlk Endeks	17,567	23,041
Son Endeks	18,223	23,740
Endeks Farkı	0,656	0,699
Çarpan	6.300,000	6.300,000
Reaktif Tüketim (kVARh)	4.132,800	4.403,700
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI

Sayaç Demand Değeri	
Çarpan	
Demand (Güç)	
Anlaşma Gücü (kW)	2.880,000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI

Tek Zaman	Tek Zaman Aktif Tüketim	0,42682500
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gündüz	Gündüz Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Puant	Puant Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gece	Gece Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
	İNDİRİM ORANI	

SİSTEM KULLANIM BİRİM FİYATLARI

Dağıtım	0,11431600
Güç	
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

DİĞER BİLGİLER

Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80087278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Akım Trafo Oranı-Gerilim Trafo Oranı	100,0/ 5,00-31,500/ 100,0
Saymanlık Adı	
Tekil Kod	4010887923

OKUMA BİLGİLERİ

İlk Okuma Tarihi	12.10.2018
Son Okuma Tarihi	31.10.2018
Sonraki Okuma Dönemi	11.2018
Ort. Tük. (kWh/gün)	8.330,175
Önceki Yıl Tük(kWh)	594.808,100
Cari Yıl Tük.(kWh)	1.916.850,600
Sayaç Okuma Birimi	T1120030

MESAJINIZ VAR

BEDELLER

ENERJİ TÜKETİM (₺)	**71.110,54**
Tek Zaman Tüketim Bedeli	71.110,54
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tüketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/-) Tutar	
SİSTEM KULLANIM (₺)	**19.045,78**
Dağıtım Bedeli	19.045,78
Güç Bedeli	
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçtan K/B Bedeli	
DİĞER (₺)	**0,00**
VERGİ/FONLAR (₺)	**22.940,98**
Enerji Fonu	711,11
TRT Payı	1.422,21
Elektrik ve Havagazı Tüketim Vergisi	3.555,53
KDV	17.252,13
FATURA TUTARI (₺)	**113.097,30**
Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	
Damga Vergisi	-908,61

YALNIZ YÜZONÜÇBINDOKSANYEDİTLOTUZKR

ÖDENECEK TUTAR (₺)

112.188,69

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

VERGİLER TOPLAMI:	22.940,98
KDV MATRAHI	95.845,17
SON ÖDEME TARİHİ	**14.11.2018**
ESKİ BORÇ/BAKİYE (₺)	**0,00**

Ödemeleri zamanında yaptığınız için teşekkür ederiz.

ETTN: 0AB6F732-CE02-1EE8-888A-607C16EBDACD

ENERJISA

ENERJİSA ÇAĞRI MERKEZİ

...ŞTERİ BİLGİLERİ

	1016997919
	4010887923
	208934564
	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İDARİ VE MALİ İŞLER DAİRE BAŞKANLIĞI
	ZİYAPAŞA VD - 0070600944
	Tek Terimli Tek Zamanlı Ticarethane OG Orta Gerilim Son Kaynak Tarifesi Serbest Tüketicisi
	GÜLTEPE MAH. ÇATALAN CD. NO:201/1 STE KAMPUS MERKEZ SARIÇAM ADANA
	YOKTUR
	30.11.2018 23:58 Kasım 2018

e-Arşiv Fatura

Fatura Seri Sıra No: 3E22018000003354

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.
BAGLARBAŞI MAH. REFAHEVLER SOK.
A BLOK NO:2 1 MALTEPE İSTANBUL
KÜÇÜKYALI V.D. 8560368451

Mersis No	:0856036845100015
Tic.Sic.No	:921047
Tel / Fax	: (0216) 579 05 00 / (0216) 579 05 30
Web Sitesi	: www.toroslarepsas.enerjisa.com.tr
	: online.enerjisa.com.tr

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		263,072	62,500	88,977
Son Endeks		280,371	66,892	95,595
Endeks Farkı		17,299	4,392	6,618
Çarpan		6.300,000	6.300,000	6.300,000
Aktif Tüketim (kWh)	178.346,700	108.983,700	27.669,600	41.693,400
Ek Tüketim (kWh)				
...o Boşta Kaybı (kWh)				
...Trafo Boşta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ	Endüktif	Kapasitif
İlk Endeks	18,223	23,740
Son Endeks	18,723	24,413
Endeks Farkı	0,500	0,673
Çarpan	6.300,000	6.300,000
Reaktif Tüketim (kVARh)	3.150,000	4.239,900
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI	
Sayaç Demand Degeri	
Çarpan	
Demand (Güç)	
Anlaşma Gücü (kW)	2.880,000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI		
Tek Zaman	Tek Zaman Aktif Tüketim	0,42682500
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gündüz	Gunduz Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Puant	Puant Aktif Tüketim	
	İndirimli Aktif Tüketim	
	...k Aktif Tüketim	
Gece	Gece Aktif Tuketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
	İNDİRİM ORANI	

SİSTEM KULLANIM BİRİM FİYATLAR	
Dağıtım	0,11431800
Güç	
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

DİĞER BİLGİLER	
Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80087278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Akım Trafo Oranı-Gerilim Trafo Oranı	100,0/ 5,00-31,500/ 100,0
Saymanlık Adı	
Tekil Kod	4010887923

OKUMA BİLGİLERİ	
İlk Okuma Tarihi	01.11.2018
Son Okuma Tarihi	30.11.2018
Sonraki Okuma Dönemi	12.2018
Ort. Tük. (kWh/gün)	5.944,890
Önceki Yıl Tük(kWh)	694.808,100
Cari Yıl Tük.(kWh)	2.095.197,300
Sayaç Okuma Birimi	T11Z0030

MESAJINIZ VAR

BEDELLER

ENERJİ TÜKETİM (₺)	**76.122,83**
Tek Zaman Tüketim Bedeli	76.122,83
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tuketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/–) Tutar	
SİSTEM KULLANIM (₺)	**20.388,24**
Dagıtım Bedeli	20.388,24
Güç Bedeli	
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçtan K/B Bedeli	
DİĞER (₺)	**452,39**
Gecikme Zammı Bedeli (%2,00)	452,39
VERGİ/FONLAR (₺)	**24.639,42**
Enerji Fonu	761,23
TRT Payı	1.522,46
Elektrik ve Havagazı Tüketim Vergisi	3.806,14
KDV	18.549,59
FATURA TUTARI (₺)	**121.602,88**
Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	
Damga Vergisi	-976,95

YALNIZ YUZYİRMİBİRBİNALTIYÜZİKİTLSEKSENSEKİZKR

ÖDENECEK TUTAR (₺)

120.625,93

Elektrik faturalarınızı ... adres ... kontrol edebilirsiniz.
e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

VERGİLER TOPLAMI	24.639,42
KDV MATRAHI	103.053,29
SON ÖDEME TARİHİ	**13.12.2018**
ESKİ BORÇ/BAKİYE (₺)	**0,00**

Ödemeleri zamanında yaptığınız için teşekkür ederiz.

ETTN: 0AB6F732-CE02-1ED8-BDDE-6CB1C85ADF76

RJISA

BİLGİLERİ

HESAP NO	1016907919
D	4010887923
NO	208934564
ADI SOYADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İDARİ VE MALİ İŞLER DAİRE BAŞKANLIĞI
DAİRESİ-VKN TCKN	ZİYAPAŞA VD - 0070600644
ETİCİ GRUBU	Tek Terimli Tek Zamanlı Ticarethane OG (Orta Gerilim)/Son Kaynak Tarifesi Serbest Tüketicisi
TESİSAT ADRESİ	GÜLTEPE MAH. ÇATALAN CD. NO:201/1 BTÜ KAMPÜS MERKEZ SARIÇAM ADANA
OTOMATİK ÖDEME TALİMATI	YOKTUR
FATURA TARİHİ / DÖNEMİ	31.12.2018 20:09 / Aralık 2018

e-Arşiv Fatura

Fatura Seri, Sıra No: 3E12018000105114

444 4 372

www.enerjisa.com.tr

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.
BAĞLARBAŞI MAH. REFAHEVLER SOK.
A BLOK NO:2/1 MALTEPE/İSTANBUL
KÜÇÜKYALI V.D. 8560366451

Mersis No	:0856036645100015
Tic.Sic.No	:521047
Tel / Fax	: (0216) 579 05 00 / (0216) 579 05 30
Web Sitesi	: www.toroslarepsas.enerjisa.com.tr
	: online.enerjisa.com.tr

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		280,371	66,892	95,595
Son Endeks		306,082	72,550	103,913
Endeks Farkı		25,711	5,658	8,318
Çarpan		6.300,000	6.300,000	6.300,000
Aktif Tüketim (kWh)	250.028,100	161.979,300	35.645,400	52.403,400
k Tüketim (kWh)				
afo Boşta Kaybı (kWh)				
Trafo Boşta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ	Endüktif	Kapasitif
İlk Endeks	18,723	24,413
Son Endeks	19,841	25,153
Endeks Farkı	1,118	0,740
Çarpan	6.300,000	6.300,000
Reaktif Tüketim (kVARh)	7.043,400	4.662,000
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI	
Sayaç Demand Değeri	
Çarpan	
Demand (Güç)	
Anlaşma Gücü (kW)	2.880,000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI	
Tek Zaman	
Tek Zaman Aktif Tüketim	0,42682500
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
Gündüz	
Gündüz Aktif Tüketim	
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
Puant Aktif Tüketim	
irimli Aktif Tüketim	
k Aktif Tüketim	
Gece	
Gece Aktif Tüketim	
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
İNDİRİM ORANI	

SİSTEM KULLANIM BİRİM FİYATLARI	
Dağıtım	0,11431800
Güç	
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

DİĞER BİLGİLER	
Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80087278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Akım Trafo Oranı-Gerilim Trafo Oranı	100,0/ 5,00-31.500/ 100,0
Saymanlık Adı	
Tekil Kod	4010887923

OKUMA BİLGİLERİ	
İlk Okuma Tarihi	01.12.2018
Son Okuma Tarihi	31.12.2018
Sonraki Okuma Dönemi	01.2019
Ort. Tük. (kWh/gün)	8.065,423
Önceki Yıl Tük(kWh)	2.345.225,400
Cari Yıl Tük.(kWh)	
Sayaç Okuma Birimi	T11Z0030

MESAJINIZ VAR

BEDELLER

ENERJİ TÜKETİM (₺)	106.718,24
Tek Zaman Tüketim Bedeli	106.718,24
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tüketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/–) Tutar	

SİSTEM KULLANIM (₺)	28.582,71
Dağıtım Bedeli	28.582,71
Güç Bedeli	
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçtan K/B Bedeli	

DİĞER (₺)	0,00

VERGİ/FONLAR (₺)	34.428,36
Enerji Fonu	1.067,18
TRT Payı	2.134,36
Elektrik ve Havagazı Tüketim Vergisi	5.335,91
KDV	25.890,91

FATURA TUTARI (₺)	169.729,31
Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	-0,01
Damga Vergisi	

YALNIZ YÜZALTMIŞDOKUZBİNYEDİYÜZYİRMİDOKUZTLOTUZBİR KR

ÖDENECEK TUTAR (₺)

169.729,30

Elektrik faturalarınızı adresinden kontrol edebilirsiniz
e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

VERGİLER TOPLAMI:	34.428,36
KDV MATRAHI:	143.838,40
SON ÖDEME TARİHİ	14.01.2019
ESKİ BORÇ/BAKİYE (₺)	-511,46

Ödemeleri zamanında yaptığınız için teşekkür ederiz.

ETTN: 0AB6F732-CE02-1EE9-83D6-267A0ECC444E

ENERJİSA

ENERJİSA ÇAĞRI MERKEZİ
444 4 372
www.enerjisa.com.tr

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.
BAĞLARBAŞI MAH. REFAHEVLER SOK.
A BLOK NO:3/1 MALTEPE/İSTANBUL
KÜÇÜKYALI V.D. 8840364481

Mersis No	884036448100015
Tic. Sic. No	121947
Tel / Faks	(0216) 579 35 00 / (0216) 579 05 30
Web Sitesi	www.toroslarepsas.enerjisa.com.tr online.enerjisa.com.tr

e-Arşiv Fatura

BİLGİLERİ

1016907913
4010887923
208834884
ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İDARİ VE MALİ İŞLER DAİRE BAŞKANLIĞI
ZİYAPAŞA VD - 0070690044
Çift Terimli Tek Zamanlı Ticarethane OG (Orta Gerilim)
Son Kaynak Tarifesi Serbest Tüketicisi
GÜLTEPE MAH. ÇATALAN CD. NO:201/1/BTÜ KAMPÜS
MERKEZ SARIÇAM ADANA
YOKTUR
21.01.2019 23:59/Ocak 2019

3E22019000000460

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ

	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		306,082	72,550	103,913
Son Endeks		336,257	78,527	112,368
Endeks Farkı		30,175	5,977	8,455
Çarpan		6.300,000	6.300,000	6.300,000
Aktif Tüketim (kWh)	281.024,100	190.102,500	37.655,100	53.266,500
Tüketim (kWh)				
Trafo Boşta Kaybı (kWh)				
Ek Trafo Boşta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ

	Endüktif	Kapasitif
İlk Endeks	19,841	25,153
Son Endeks	21,174	25,868
Endeks Farkı	1,333	0,715
Çarpan	6.300,000	6.300,000
Reaktif Tüketim (kVARh)	8.397,900	4.504,500
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI

Sayaç Demand Değeri	0,200
Çarpan	6.300,000
Demand (Güç)	1.260,000
Anlaşma Gücü (kW)	1.450,000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI

Tek Zaman	Tek Zaman Aktif Tüketim	0,40657900
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gündüz	Gündüz Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Puant	Puant Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gece	Gece Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	

İNDİRİM ORANI

SİSTEM KULLANIM BİRİM FİYATLARI

Dağıtım	0,10601400
Güç	2,56859700
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

BEDELLER

ENERJİ TÜKETİM (₺)	114.258,50
Tek Zaman Tüketim Bedeli	114.258,50
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tüketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/-) Tutar	
SİSTEM KULLANIM (₺)	33.516,96
Dağıtım Bedeli	29.792,49
Güç Bedeli	3.724,47
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçlan K/B Bedeli	
DİĞER (₺)	0,00
VERGİ/FONLAR (₺)	37.385,60
Enerji Fonu	1.142,59
TRT Payı	2.285,17
Elektrik ve Havagazı Tüketim Vergisi	5.712,93
KDV	28.244,91
FATURA TUTARI (₺)	185.161,06
Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	
Damga Vergisi	-1.487,57

YALNIZ YÜZSEKSENBEŞBİNYÜZALTMIŞBİRTLALTIKR

DİĞER BİLGİLER

Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80087278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Akım Trafo Oranı - Gerilim Trafo Oranı	100,0/ 5,00-31.500/ 100,0
Saymanlık Adı	
Tekil Kod	4010887923

OKUMA BİLGİLERİ

İlk Okuma Tarihi	03.01.2019
Son Okuma Tarihi	31.01.2019
Sonraki Okuma Dönemi	02.2019
Ort.Tük. (kWh/gün)	9.690,486
Önceki Yıl Tük(kWh)	2.345.225,400
Cari Yıl Tük.(kWh)	281.024,100
Sayaç Okuma Birimi	T11Z0030

MESAJINIZ VAR

ÖDENECEK TUTAR (₺)

183.673,49

Elektrik faturalarınızı ... e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

VERGİLER TOPLAMI	37.385,60
KDV MATRAHI	156.916,15
SON ÖDEME TARİHİ	14.02.2019
ESKİ BORÇ/BAKİYE (₺)	162.358,40

← Güvence Bedeli

ETTN:0AB6F45F-EC83-1EE9-8A8C-2346F2C10CDB

ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ
İDARİ VE MALİ İŞLER DAİRE BAŞKANLIĞI
GÜLTEPE MAH. ÇATALAN CD. NO:201
KAMPÜS
MERKEZ SARIÇAM ADANA
YOKTUR

e-Arşiv Fatura

3E22019000001524

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.
Barbaros Mah. Begonya Sok. Nida Kule Ataşehir Bat. Sit.
No: 1/1 Ataşehir / İstanbul
Kozyatağı V.D. 3560366451

Mersis No	0856 0366 4519 0015
Tic.Sic.No	921047
Tel / Fax	(0216) 579 05 00 / 0216 579 05 35
Web Sites	enerjisa.com.tr
	toroslarepsas.enerjisa.com

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ

	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		336.257	78.527	112.368
Son Endeks		361.722	83.618	119.753
Endeks Farkı		25.465	5.091	7.385
Çarpan		6.300.000	6.300.000	6.300.000
Aktif Tüketim (kWh)	239.028.300	160.429.500	32.073.300	46.525.500
Ek Tüketim (kWh)				
Trafo Boşta Kaybı (kWh)				
Ek Trafo Boşta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ

	Endüktif	Kapasitif
İlk Endeks	21.174	25.868
Son Endeks	22.178	26.682
Endeks Farkı	1.004	0.814
Çarpan	6.300.000	6.300.000
Reaktif Tüketim (kVARh)	6.325.200	5.128.200
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI

Sayaç Demand Değeri	0.172
Çarpan	6.300.000
Demand (Güç)	1.083.600
Anlaşma Gücü (kW)	1.450.000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI

Tek Zaman	Tek Zaman Aktif Tüketim	0.40657900
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gündüz	Gündüz Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Puant	Puant Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gece	Gece Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
	İNDİRİM ORANI	

SİSTEM KULLANIM BİRİM FİYATLARI

Dağıtım	0.18601400
Güç	2.56859700
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

DİĞER BİLGİLER

Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80037278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Akım Trafo Oranı-Gerilim Trafo Oranı	100,0/5.00-31.500/100.0
Saymanlık Adı	
Tekil Kod	4010887923

OKUMA BİLGİLERİ

İlk Okuma Tarihi	01.02.2019
Son Okuma Tarihi	28.02.2019
Sonraki Okuma Dönemi	03.2019
Ort. Tük. (kWh/gün)	8.536.725
Önceki Yıl Tük(kWh)	2.345.225.400
Cari Yıl Tük.(kWh)	520.052.400
Sayaç Okuma Birim	T1120038

MESAJINIZ VAR

BEDELLER

ENERJİ TÜKETİM (₺)	**97.183,89**
Tek Zaman Tüketim Bedeli	97.183,89
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tüketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/-) Tutar	
SİSTEM KULLANIM (₺)	**29.064,82**
Elk. Dağıtım Bedeli	25.340,35
Güç Bedeli	3.724,47
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçtan K/B Bedeli	
DİĞER (₺)	**0,00**
VERGİ/FONLAR (₺)	**31.898,93**
Enerji Fonu	971,84
TRT Payı	1.943,68
Elektrik ve Havagazı Tüketim Vergisi	4.859,19
KDV	24.124,22
FATURA TUTARI (₺)	**158.147,64**
Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	
Damga Vergisi	-1.270,54

YALNIZ YÜZELLİSEKİZBİNYÜZKIRKYEDİTLALTMIŞDÖRTKR

ÖDENECEK TUTAR (₺)

156.877,10

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

VERGİLER TOPLAMI	31.898,93
KDV MATRAHI	134.023,42
SON ÖDEME TARİHİ	**15.03.2019**
ESKİ BORÇ/BAKİYE (₺)	**-511,46**

Ödemenizi zamanında yaptığınız için teşekkür ederiz.

ETTN: 92869C90-4402-1ED9-8FE3-3E870D0286E8

ENERJİSA

ENERJİSA ÇAĞRI MERKEZİ
444 4 372
www.enerjisa.com.tr

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.
Barbaros Mah. Begonya Sok. Nida Kule
Ataşehir Batı Sit. No: 1/1 Ataşehir / İstanbul
Kozyatağı V.D. 856 030 6451

Mersis No	: 0856 0365 4510 0018
Tic. Sic. No	: 821047
Tel / Faks	: (0216) 579 05 00 / (0216) 579 05 30
Web Sitesi	: enerjisa.com.tr torostarapsas.enerjisa.com

e-Arşiv Fatura

...ERİ BİLGİLERİ

...LEŞME HESAP NO	1016907919
...ISAT NO	4010887923
...ŞTERİ NO	200934564
...ÜŞTERİ ADI SOYADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İDARİ VE MALİ İŞLER DAİRE BAŞKANLIĞI
VERGİ DAİRESİ - VKN / TCKN	ZİYAPAŞA VD - 0070600644
TÜKETİCİ GRUBU	Çift Terimli Tek Zamanlı Ticarethane OG (Orta Gerilim)/ Son Kaynak Tarifesi Serbest Tüketicisi
TESİSAT ADRESİ	GÜLTEPE MAH. ÇATALAN CD. NO:201/1/BTÜ KAMPÜS MERKEZ SARIÇAM ADANA
OTOMATİK ÖDEME TALİMATI	YOKTUR
FATURA TARİHİ / DÖNEMİ	31.03.2019 23:59/Mart 2019

Fatura Sıra No: 3E22019000002209

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ

	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		361,722	83,618	119,753
Son Endeks		383,852	88,461	127,762
Endeks Farkı		22,130	4,843	8,009
Çarpan		6.300,000	6.300,000	6.300,000
Aktif Tüketim(kWh)	220.386,600	139.419,000	30.510,900	50.456,700
Ek Tüketim (kWh)				
Trafo Bosta Kaybı (kWh)				
Ek Trafo Bosta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ

	Endüktif	Kapasitif
İlk Endeks	22,178	26,682
Son Endeks	23,242	27,294
Endeks Farkı	1,064	0,612
Çarpan	6.300,000	6.300,000
Reaktif Tüketim (kVARh)	6.703,200	3.855,600
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI

Sayaç Demand Degeri	0,160
Çarpan	6.300,000
Demand (Güç)	1.008,000
Anlasma Gücü (kW)	1.450,000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI

Tek Zaman	Tek Zaman Aktif Tüketim	0,40657900
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gündüz	Gündüz Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Puant	Puant Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gece	Gece Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
	İNDİRİM ORANI	

SİSTEM KULLANIM BİRİM FİYATLARI

Dağıtım	0,10601400
Güç	2,56859700
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

DİĞER BİLGİLER

Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80087278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Alım Trafo Oranı - Gerilim Trafo Oranı	100,0/ 5,00-31.500/ 100,0
Saymanlık Adı	
Tekil Kod	4010887923

OKUMA BİLGİLERİ

İlk Okuma Tarihi	01.03.2019
Son Okuma Tarihi	31.03.2019
Sonraki Okuma Dönemi	04.2019
Ort.Tük. (kWh/gün)	7.109,245
Önceki Yıl Tük(kWh)	2.345.225,400
Cari Yıl Tük.(kWh)	740.439,000
Sayaç Okuma Birimi	T11Z0030

MESAJINIZ VAR

BEDELLER

ENERJİ TÜKETİMİ (₺)	**89.604,56**
Tek Zaman Tüketim Bedeli	89.604,56
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tüketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/-) Tutar	
SİSTEM KULLANIM (₺)	**27.088,54**
Elk. Dağıtım Bedeli	23.364,07
Güç Bedeli	3.724,47
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçtan K/B Bedeli	
DİĞER (₺)	**0,00**
VERGİ/FONLAR (₺)	**29.463,43**
Enerji Fonu	896,05
TRT Payı	1.792,09
Elektrik ve Havagazı Tüketim Vergisi	4.480,23
KDV	22.295,06
FATURA TUTARI (₺)	**146.156,53**
Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	
Damga Vergisi	-1.174,21

YALNIZ YÜZKIRKALTIBINYÜZELLIALTITLELLIÜÇKR

ÖDENECEK TUTAR (₺)

144.982,32

Elektrik faturalarınızı ... adresinden kontrol edebilirsiniz.
e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

VERGİLER TOPLAMI:	29.463,43
KDV MATRAHI:	123.861,47
SON ÖDEME TARİHİ	**12.04.2019**
ESKİ BORÇ/BAKİYE (₺)	**-511,46**

Ödemelerinizi zamanında yaptığınız için teşekkür ederiz.

ENERJİSA

e-Arşiv Fatura

ENERJİSA ÇAĞRI MERKEZİ

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.
Barbaros Mah. Begonya Sok. Nida Kule Ataşehir Batı Sit.
No: 1.1 Ataşehir İstanbul
Kozyatağı V.D. 3560366451

Mersis No	0356 0366 4510 0015
Tic.Sic.No	921047
Tel / Fax	(0216) 579 35 00 (0216) 579 35 30
Web Sitesi	enerjisa.com.tr toroslarapsas.enerjisa.com

BİLGİLERİ

ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ
İDARİ VE MALİ İŞLER DAİRE BAŞKANLIĞI
ZİYAPAŞA VD
Çift Terimli Tek Zamanlı Ticarethane
Serbest Tüketici
GÜLTEPE MAH. ÇATALAN CD.
KAMPÜS
MERKEZ SARIÇAM ADANA
YOKTUR

3E2019000003293

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		383.852	88.461	127.782
Son Endeks		400.375	92.504	134.549
Endeks Farkı		16.523	4.043	6.787
Çarpan		6.300.000	6.300.000	6.300.000
Aktif Tüketim (kWh)	172.323.900	104.094.900	25.470.900	42.758.100
Ek Tüketim (kWh)				
Trafo Boşta Kaybı (kWh)				
Ek Trafo Boşta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ	Endüktif	Kapasitif
İlk Endeks	23.242	27.294
Son Endeks	24.112	27.911
Endeks Farkı	0.870	0.617
Çarpan	6.300.000	6.300.000
Reaktif Tüketim (kVARh)	5.481.000	3.887.100
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI	
Sayaç Demand Değeri	0.120
Çarpan	6.300.000
Demand (Güç)	756.000
Anlaşma Gücü (kW)	1.450.000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI	
Tek Zaman: Tek Zaman Aktif Tüketim	0.38571200
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
Gündüz: Gündüz Aktif Tüketim	
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
Puant: Puant Aktif Tüketim	
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
Gece: Gece Aktif Tüketim	
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
İNDİRİM ORANI	

SİSTEM KULLANIM BİRİM FİYATLARI	
Dağıtım	0.11775000
Güç	2.85293800
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

EBYS KAYDI YAPILMIŞTIR

Tarih : 2.15..19 Sayı : 2661

DİĞER BİLGİLER	
Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80087278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Akım Trafo Oranı-Gerilim Trafo Oranı	100.0 5,00-31.500/ 100.0
Saymanlık Adı	
Tekil Kod	4010887923

OKUMA BİLGİLERİ	
İlk Okuma Tarihi	01.04.2019
Son Okuma Tarihi	30.04.2019
Sonraki Okuma Dönemi	05.2019
Ort. Tük. (kWh/gün)	5.744.130
Önceki Yıl Tük(kWh)	2.345.225.400
Cari Yıl Tük.(kWh)	912.762.900
Sayaç Okuma Birimi	T11Z0030

MESAJINIZ VAR

BEDELLER

	68.190,64
Tek Zaman Tüketim Bedeli	68.190,64
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tüketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/-) Tutar	
SİSTEM KULLANIM	24.427,90
Elk. Dağıtım Bedeli	20.291,14
Güç Bedeli	4.136,76
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçtan K/B Bedeli	
DİĞER	0,00
VERGİ/FONLAR	23.108,53
Enerji Fonu	681,91
TRT Payı	1.363,81
Elektrik ve Havagazı Tüketim Vergisi	3.409,53
KDV	17.653,28
FATURA TUTARI	115.727,07
Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	
Damga Vergisi	-929,74

YALNIZ YÜZONBEŞBİNYEDİYÜZYİRMİYEDİTLYEDİKR

ÖDENECEK TUTAR (₺)

114.797,33

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

VERGİLER TOPLAMI	23.108,53
KDV MATRAHI	98.073,79
SON ÖDEME TARİHİ	13.05.2019
ESKİ BORÇ/BAKİYE (₺)	-511,46

ETTN: 0AB6F732-CE02-1ED9-9B9C-B6879915D716

ENERJİSA

e-Arşiv Fatura

Fatura Seri Sıra No: 3E22019000005137

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ

	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		400.375	92.504	134.549
Son Endeks		416.530	96.288	140.706
Endeks Farkı		16.155	3.784	6.157
Çarpan		6.300,000	6.300,000	6.300,000
Aktif Tüketim (kWh)	164.404,300	101.776,500	23.839,200	38.789,100
Tüketim (kWh)				
Trafo Boşta Kaybı (kWh)				
Ek Trafo Boşta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ

	Endüktif	Kapasitif
İlk Endeks	24.112	27.011
Son Endeks	24.538	25.769
Endeks Farkı	0.426	0.858
Çarpan	6.300.000	6.300.000
Reaktif Tüketim (kVARh)	2.683,800	5.405,400
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI

Sayaç Demand Değeri	0.132
Çarpan	6.300.000
Demand (Güç)	831,600
Anlaşma Gücü (kW)	1.450.000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI

Tek Zaman	Tek Zaman Aktif Tüketim	0.39571200
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gündüz	Gündüz Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Puant	Puant Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
Gece	Gece Aktif Tüketim	
	İndirimli Aktif Tüketim	
	Ek Aktif Tüketim	
	İNDİRİM ORANI	

SİSTEM KULLANIM BİRİM FİYATLARI

Dağıtım	0,11775000
Güç	2,85293680
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

DİĞER BİLGİLER

Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80087278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Akım Trafo Oranı-Gerilim Trafo Oranı	100,0/5,00-31.500/100,0
Saymanlık Adı	
Tekil Kod	401088?323

OKUMA BİLGİLERİ

İlk Okuma Tarihi	01.05.2019
Son Okuma Tarihi	31.05.2019
Sonraki Okuma Dönemi	06.2019
Ort. Tük. (kWh/gün)	5.303,381
Önceki Yıl Tük.(kWh)	2.346.226,400
Cari Yıl Tük.(kWh)	1.077.167,700
Sayaç Okuma Birimi	T1120030

MESAJINIZ VAR

BEDELLER

ENERJİ TÜKETİM (₺)	**65.056,95**
Tek Zaman Tüketim Bedeli	65.056,95
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tüketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/-) Tutar	
SİSTEM KULLANIM (₺)	**23.495,43**
Elk. Dağıtım Bedeli	19.358,67
Güç Bedeli	4.136,76
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçtan K/B Bedeli	
DİĞER (₺)	**1.080,12**
Gecikme Zammı/Faizi (% 2,00)	1.080,12
VERGİ/FONLAR (₺)	**22.275,23**
Enerji Fonu	650,57
TRT Payı	1.301,14
Elektrik ve Havagazı Tüketim Vergisi	3.252,85
KDV	17.070,67
FATURA TUTARI (₺)	**111.907,73**
Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	
Damga Vergisi	-899,06

YALNIZ YÜZONBİRBİNDOKUZYÜZYEDİTLYETMİŞÜÇKR

ÖDENECEK TUTAR (₺)

111.008,67

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

VERGİLER TOPLAMI	22.275,23
KDV MATRAHI	94.837,06
SON ÖDEME TARİHİ	**13.06.2019**
ESKİ BORÇ/BAKİYE (₺)	**-511,46**

Ödemelerinizi zamanında yaptığınız için teşekkür ederiz.

ETTN: 9AB6F732-CE02-1ED9-A1C6-72D4DD4D80CE

[illegible]ERİ BİLGİLERİ

[illegible]LEŞME HESAP NO	[illegible]
[illegible]İSAT NO	[illegible]
[illegible]ŞTERİ NO	[illegible]
[illegible]ŞTERİ ADI SOYADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İDARİ VE MALİ İŞLER DAİRE BAŞKANLIĞI
VERGİ DAİRESİ VKN/TCKN	ZİYAPAŞA VD - [illegible]
TÜKETİCİ GRUBU	Çift Terimli Tek Zamanlı Tüketiciler OG [illegible] Gerilimden Kaynaklı Tarifeli Belirsiz Tüketiciler
TESİSAT ADRESİ	GÜLTEPE MAH. ÇATALAN CD. NO:[illegible] KAMPÜS MERKEZ SARIÇAM ADANA
OTOMATİK ÖDEME TALİMATI	YOKTUR
FATURA TARİHİ / DÖNEMİ	[illegible] Haziran 2019

e-Arşiv Fatura

Fatura Seri Sıra No: 3E22019000006118

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.
Barbaros Mah. Begonya Sok. Nida Kule Ataşehir Batı Sit.
No:1/1 Ataşehir İstanbul
Kozyatağı V.D. 3560386451

Mersis No	0356 0366 4510 0015
Tic.Sic.No	921047
Tel / Fax	(0216) 573 95 00 / (0216) 573 05 [illegible]
Web Sitesi	enerjisa.com.tr
	toroslarepsas.enerjisa.com

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ

	Tek Zaman	Gündüz	Puant	Gece
İlk Endeks		416.530	96.288	140.706
Son Endeks		436.040	100.100	146.799
Endeks Farkı		19.510	3.812	6.093
Çarpan		6.300.000	6.300.000	6.300.000
Aktif Tüketim (kWh)	185.314.500	122.913.000	24.015.600	38.385.900
Ek Tüketim (kWh)				
Trafo Boşta Kaybı (kWh)				
Ek Trafo Boşta Kaybı (kWh)				

REAKTİF TÜKETİM BİLGİLERİ

	Endüktif	Kapasitif
İlk Endeks	24.538	28.769
Son Endeks	25.697	29.482
Endeks Farkı	1.159	0.713
Çarpan	6.300.000	6.300.000
Reaktif Tüketim (kVARh)	7.301.700	4.491.900
Fatura Edilen Reaktif (kVARh)		
Ek Reaktif Tüketim (kVARh)		
REAKTİF TÜKETİM ORANI		

GÜÇ VE GÜÇ AŞIMI

Sayaç Demand Degeri	0.168
Çarpan	6.300.000
Demand (Güç)	1.058.400
Anlaşma Gücü (kW)	1.450.000
Güç Aşımı	
Ek Güç	
Ek Güç Aşımı	

AKTİF TÜKETİM BİRİM FİYATLARI

Tek Zaman Aktif Tüketim	0.39571200
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
Gündüz Aktif Tüketim	
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
Puant Aktif Tüketim	
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
Gece Aktif Tüketim	
İndirimli Aktif Tüketim	
Ek Aktif Tüketim	
İNDİRİM ORANI	

SİSTEM KULLANIM BİRİM FİYATLARI

Dağıtım	0,11775000
Güç	2,85293600
Ek Güç	
Güç Aşımı	
Ek Güç Aşımı	
Endüktif Reaktif	
Kapasitif Reaktif	
Ek Reaktif	
Trafo Boşta Kaybı	
Ek Trafo Boşta Kaybı	

DİĞER BİLGİLER

Aktif Sayaç Seri No/Marka	80087278/MAKEL
Endüktif Sayaç Seri No/Marka	80087278/MAKEL
Kapasitif Sayaç Seri No/Marka	80087278/MAKEL
Akım Trafo Oranı-Gerilim Trafo Oranı	100,0/5,00-31.500/100,0
Saymanlık Adı	
Tekil Kod	4010887923

OKUMA BİLGİLERİ

İlk Okuma Tarihi	01.06.2019
Son Okuma Tarihi	30.06.2019
Sonraki Okuma Dönemi	07.2019
Ort. Tük. (kWh/gün)	6.177,150
Önceki Yıl Tük(kWh)	2.345.225,400
Cari Yıl Tük. (kWh)	1.252.482.290
Sayaç Okuma Birimi	T11Z0030

MESAJINIZ VAR

BEDELLER

ENERJİ TÜKETİM (₺)	**73.331,17**
Tek Zaman Tüketim Bedeli	73.331,17
Gündüz Tüketim Bedeli	
Puant Tüketim Bedeli	
Gece Tüketim Bedeli	
Ek Aktif Tüketim Bedeli	
Trafo Boşta Kaybı Bedeli	
Ek Trafo Boşta Kaybı Bedeli	
(+/-) Tutar	
SİSTEM KULLANIM (₺)	**25.957,54**
Elk. Dağıtım Bedeli	21.820,78
Güç Bedeli	4.136,76
Ek Güç Bedeli	
Güç Aşımı Bedeli	
Ek Güç Aşımı Bedeli	
Reaktif Bedeli	
Ek Reaktif Bedeli	
Borçtan KİB Bedeli	
DİĞER (₺)	**0.00**
VERGİ/FONLAR (₺)	**24.794,43**
Enerji Fonu	733,31
TRT Payı	1.466,62
Elektrik ve Havagazı Tüketim Vergisi	3.666,56
KDV	18.927,94
FATURA TUTARI (₺)	**124.083,14**
Muhtelif Mahsup	
Önceki Dönem Yuvarlama Farkı	
Yuvarlama Farkı	
Damga Vergisi	-996,87

YALNIZ YÜZYİRMİDÖRTBİNSEKSENÜÇTLONDÖRTKR

ÖDENECEK TUTAR (₺)

123.086,27

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

VERGİLER TOPLAMI	24.794,43
KDV MATRAHI	105.155,20
SON ÖDEME TARİHİ	**12.07.2019**
ESKİ BORÇ/BAKİYE (₺)	**-511,46**

Ödemeleri zamanında yaptığınız için teşekkür ederiz.

ETTN: 92869C00-4402-1ED9-A79E-BECE62388021

ENERJİSA

MÜŞTERİ BİLGİLERİ

...ŞME HESAP NO	:1016907919
...AT NO / TEKİL KOD	:4010887923
...TERİ NO	:208934564
...ŞTERİ ADI SOYADI	:ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İDARİ VE MALİ İŞLER DAİRE BAŞKANLIGI
...ERGİ DAİRESİ – VKN	:ZİYAPAŞA VD 0070600644
TÜKETİCİ GRUBU	:Çift Terimli Tek Zamanlı Ticarethane OG (Orta Gerilim)/Son Kaynak Tarifesi Serbest Tüketicisi
TESİSAT ADRESİ	:GÜLTEPE MAH. ÇATALAN CD. NO:201/1/BTÜ KAMPÜS MERKEZ SARIÇAM ADANA
OTOMATİK ÖDEME TALİMATI	:YOKTUR
FATURA DÖNEMİ / TARİHİ	:Temmuz 2019 / 31.07.2019 23:59

T.C. Hazine ve Maliye Bakanlığı
Gelir İdaresi Başkanlığı

e-Arşiv Fatura

Fatura Seri No: 3E22019000007137

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.
Barbaros Mah. Begonya Sok. Nida Kule
Ataşehir Batı Sit. No: 1/1 Ataşehir/İstanbul
Kozyatağı V.D. 856 036 6451
Mersis No : 0856 0366 4510 0015
Tic.Sic.No : 921047
Tel : (0216) 579 05 00
Faks : (0216) 579 05 30
Web Sitesi : enerjisa.com.tr
toroslarepsas.enerjisa.com

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ VE BEDELLERİ

ENDEKS BİLGİLERİ	İLK ENDEKS	SON ENDEKS	FARK
Tek Zaman			15,818
Gündüz	0,008	11,338	11,330
Puant	0,000	1,856	1,856
Gece	0,000	2,632	2,632
Endüktif	0,000	0,398	0,398
Kapasitif	0,000	0,375	0,375

ENERJİ BİLGİLERİ	TÜKETİM	BİRİM FİYAT	BEDEL (TL)
Tek Zaman	99.653,400	0,46396800	46.235,99
Ek Aktif Tük. Tek Zaman	132.608,700	0,46396800	61.526,19
AKTİF TOPLAM	232.262,100		107.762,18
Elk. Dağıtım	232.262,100	0,12640100	29.358,16
Güç	1.450,000	3,06255500	4.440,70
SİSTEM KUL. TOPLAM			33.798,86
TOPLAM			141.561,04

ÖZET BİLGİLER

Enerji Bedelleri Toplamı	141.561,04
Vergi / Fonlar Toplamı	35.653,73
FATURA TUTARI	177.214,77

YALNIZ YÜZYETMİŞYEDİBİNİKİYÜZONDÖRTTLYETMİŞYEDİKR

Damga Vergisi	-1.423,73
ÖDENECEK TUTAR	**175.791,04**
SON ÖDEME TARİHİ	**15.08.2019**
ESKİ BORÇ / BAKİYE (TL)	- / -

Ödemelerinizi zamanında yaptığınız için teşekkür ederiz.

e-Arşiv izni kapsamında elektronik ortamda iletilmiştir.

SAYAÇ VE OKUMA BİLGİLERİ

İlk / Son Okuma Tarihi	01.07.2019 / 31.07.2019
Okuma Gün Farkı	31
Sonraki Okuma Dönemi	08.2019
Sayaç Okuma Birimi	T11Z0030
Akt/End/Kap Sayaç Marka/Tip/Seri No	LUNA/67494682
Akım - Gerilim Trafo Oranı	100 / 5 - 31.500 / 100
Sayaç Demand Değeri / Anl. Gücü	957,600 / 1.450,000
Çarpan	6.300,000
ETSO/EIC	40Z000047453442Q

TÜKETİMLERİNİZ (kWh/gün)

DÖNEM	TOPLAM	GÜNLÜK ORTALAMA
2018	2.345.225,400 (kWh)	6.643,698 (kWh/gün)
2019	1.494.744,300 (kWh)	7.117,830 (kWh/gün)

DİĞER | BEDEL (TL)

MESAJINIZ VAR

VERGİ / FONLAR

VERGİ / FONLAR	BEDEL (TL)
Enerji Fonu	1.077,62
TRT Payı	2.155,24
Elekt. ve Hvg. Tük. Ver.	5.388,11
KDV %18 (Matrah: 150.182,01 TL)	27.032,76
TOPLAM	35.653,73

ETTN: 92869C00-4402-1EE9-ADEA-86A5CAC44FD3

ENERJİSA

MUSTERİ BİLGİLERİ

SOZLESME HESAP NO	1016907919
TESISAT NO / TEKİL KOD	4010387523
MUSTERI NO	203934564
MUSTERI ADI SOYADI	ADANA BİLİM VE TEKNOLOJİ UNİVERSİTESİ İDARİ VE MALİ İSLER DAİRE BASKANLIĞI
VERGİ DAİRESİ - VKN	ZIYAPASA VD 0070600644
TUKETICI GRUBU	Cift Terimli Tek Zamanl Ticarethane OG (Orta Gerilim) Son Kaynak Tarifesi Serbest Tuketicisi
TESİSAT ADRESİ	GULTEPE MAH. CATALAN CD. NO:201/1 BTU KAMPUS MERKEZ SARIÇAM ADANA
OTOMATIK ODEME TALİMATI	YOKTUR
FATURA DONEMİ / TARİHİ	Agustos 2019 / 31.08.2019 23:59

T.C. Hazine ve Maliye Bakanlığı

e-Arşiv Fatura

Fatura Seri No: 3E22019000003047

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIS A.S.
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: (0216) 579 05 30
: enerjisa.com.tr
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ORTALAMA TÜKETİM (kWh/gün)

TUKETIM BİLGİLERİ VE BEDELLERİ

ENDEKS BİLGİLERİ	İLK ENDEKS	SON ENDEKS	FARK
Tek Zaman			33,492
Gunduz	11,338	34,368	23,030
Puant	1,856	5,983	4,127
Gece	2,632	8,967	6,335
Enduktif	0,398	1,244	0,846
Kapasitif	0,375	1,386	1,011

ENERJİ BİLGİLERİ	TUKETİM	BİRİM FİYAT	BEDEL (TL)
Enerji Tuk. Bed. (ETB)	210.999,600	0,59036900	124.567,62
ENERJİ TUKETIM TOPLAMI	210.999,600		124.567,62
Guç	1.450,000	3,06255500	4.440,70
SİSTEM KUL. TOPLAMI			4.440,70
TOPLAM			129.008,32

DİGER	BEDEL (TL)

VERGİ / FONLAR	BEDEL (TL)
Enerji Fonu	978,97
TRT Payı	1.957,94
Elekt. ve Hvg. Tük. Ver.	4.994,85
KDV %18 (Matrah: 136.840,03 TL)	24.631,21
TOPLAM	32.462,97

ÖZET BİLGİLER

Enerji Bedelleri Toplamı	129.008,32
Vergi / Fonlar Toplam	32.462,97
FATURA TUTARI	161.471,29

YALNIZ YUZALTMISBIRBINDORTYUZYETMİSBIRTLYIRMIDOKUZKR

Damga Vergisi	1.297,24
ÖDENECEK TUTAR	**160.174,05**
SON ÖDEME TARİHİ	**12.09.2019**
ESKİ BORÇ / BAKİYE (TL)	/

Ödemelerinizi zamanında yaptığınız için tesekkur ederiz.

e-Arsiv İzni kapsamında elektronik ortamda iletilmistir.

SAYAÇ VE OKUMA BİLGİLERİ

İlk / Son Okuma Tarihi	01.08.2019 / 31.08.2019
Okuma Gün Farkı	31
Sonraki Okuma Dönemi	09.2019
Sayaç Okuma Birimi	T11Z0030
Akt/End/Kap Sayaç Marka Tip/Seri No	LUNA 67494682
Akım Gerilim Trafo Oranı	100 / 5 31.500 / 100
Sayaç Demand Değeri / Anl. Gücu	1.058,400 / 1.450,000
Carpan	6.300,000
ETSO/EIC	40Z000047453442Q

TÜKETİMLERİNİZ (kWh/gün)

DÖNEM	TOPLAM	GUNLUK ORTALAMA
2018	2.345.225,400 (kWh)	6.643,698 (kWh/gun)
2019	1.705.743,900 (kWh)	7.077,776 (kWh/gun)

MESAJINIZ VAR

ETTN: 0AB6FF0C-F102-1EE9-B3AE-8B9C1569C068

ENERJİSA

MUŞTERİ BİLGİLERİ

E HESAP NO	1016907919
VD TEKİL KOD	4010837523
RI NO	208934564
ERİ ADI SOYADI	ADANA BİLİM VE TEKNOLOJİ ÜNİVERSİTESİ İDARİ VE MALİ İŞLER DAİRE BAŞKANLIĞI
Gİ DAİRESİ - VKN	ZİYAPAŞA VD 0070506844
KETİCİ GRUBU	Çift Terimli Tek Zamanlı Ticarethane OG (Orta Gerilim) Son Kaynak Tarifesi Serbest Tüketicisi
TESİSAT ADRESİ	GULTEPE MAH. ÇATALAN CD. NO 201 1 BTU KAMPÜS MERKEZ SARIÇAM ADANA
OTOMATİK ÖDEME TALİMATI	YOKTUR
FATURA DÖNEMİ TARİHİ	Eylül 2019 30.09.2019 21:59

T.C. Hazine ve Maliye Bakanlığı

e-Arşiv Fatura

Fatura Seri No: 3E22019000009369

ENERJİSA TOROSLAR ELEKTRİK PERAKENDE SATIŞ A.Ş.
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: enerjisa.com.tr
toroslarepsas.enerjisa.com

ORTALAMA TÜKETİM (kWh/gün)

TÜKETİM BİLGİLERİ VE BEDELLERİ

ENDEKS BİLGİLERİ	İLK ENDEKS	SON ENDEKS	FARK
Tek Zaman			35,511
Gunduz	34,368	59,175	24,807
Puant	5,983	10,194	4,211
Gece	8,967	15,460	6,493
Enduktif	1,244	2,574	1,330
Kapasitif	1,386	1,912	0,526

ENERJİ BİLGİLERİ	TÜKETİM	BİRİM FİYAT	BEDEL (TL)
Enerji Tuk. Bed. (ETB)	223.719,300	0,59036900	132.076,94
ENERJİ TÜKETİM TOPLAMI	223.719,300		132.076,94
Guç	1.450,000	3,06255500	4.440,70
SİSTEM KUL. TOPLAM			4.440,70
TOPLAM			136.517,64

ÖZET BİLGİLER

Enerji Bedelleri Toplamı	136.517,64
Vergi / Fonlar Toplamı	34.371,77
FATURA TUTARI	170.889,41

YALNIZ YUZYETMISBINSEKIZYÜZSEKSENDOKUZTLKIRKBIRKR

Damga Vergisi	1.372,91
ÖDENECEK TUTAR	**169.516,50**
SON ÖDEME TARİHİ	**14.10.2019**
ESKİ BORÇ / BAKİYE (TL)	-/-

Odemelerinizi zamanında yaptığınız için tesekkur ederiz

e-Arsiv izni kapsamında elektronik ortamda iletilmistir

SAYAÇ VE OKUMA BİLGİLERİ

İlk / Son Okuma Tarihi	01.09.2019 / 30.09.2019
Okuma Gün Farkı	30
Sonraki Okuma Dönemi	10.2019
Sayaç Okuma Birimi	T11Z0030
Akt/End/Kap Sayaç Marka/Tip/Seri No	LUNA/67494682
Akım - Gerilim Trafo Oranı	100 / 5 31.500 / 100
Sayaç Demand Değeri / Anl. Gucu	1.033,200 / 1.450,000
Çarpan	6.300,000
ETSO/EIC	40Z000047453442Q

DİĞER

DİĞER	BEDEL (TL)

TÜKETİMLERİNİZ (kWh/gün)

DÖNEM	TOPLAM	GUNLUK ORTALAMA
2018	2.345.225,400 (kWh)	6.643,698 (kWh/gun)
2019	1.929.463,200 (kWh)	7.119,790 (kWh/gun)

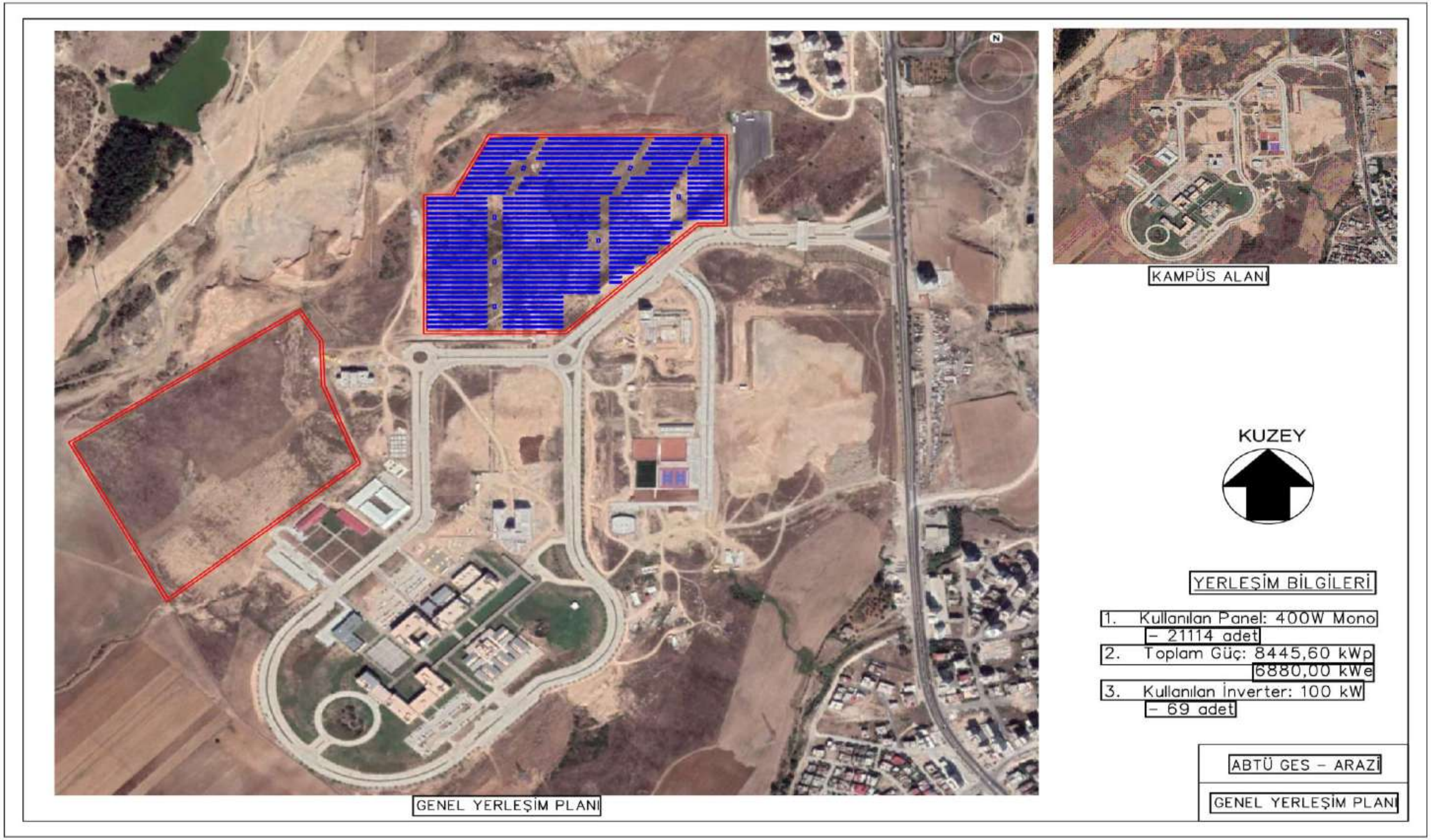
MESAJINIZ VAR

VERGİ / FONLAR

VERGİ / FONLAR	BEDEL (TL)
Enerji Fonu	1.037,99
TRT Payı	2.075,97
Elekt. ve Hvg. Tuk. Ver	5.189,93
KDV %18 (Matrah: 144.821,53 TL)	26.067,88
TOPLAM	34.371,77

ETTN: 0AB6F45F-EC02-1EE9-B9B8-69DFB920C542

Appendix 2 : Suitable Areas and Layout Information with a Map



GENEL YERLEŞİM PLANI

KAMPÜS ALANI

KUZEY

YERLEŞİM BİLGİLERİ

1. Kullanılan Panel: 400W Mono – 2646 adet
2. Toplam Güç: 1058,40 kWp 800,00 kWe
3. Kullanılan İnverter: 100 kW – 8 adet

ABTÜ GES – ÇATI

GENEL YERLEŞİM PLANI

Appendix 3 : Price Offer from ADAME for Budget Analysis.

İş Türü	No	Açıklama	Miktar	Birim
MEKANİK		**TAŞIYICI SİSTEM ve BAĞLANTI PARÇALARI**		
	1	Taşıyıcı Sistem Profil ve Aparatları(Alüminyum)	8,8	ton
	2	Taşıyıcı Sistem Profil ve Aparatları(Çelik)	460,0	ton
	3	Panel Klempleri ve Cıvatalar	1	set
ELEKTRİK		**SOLAR PANEL - (ANKARA SOLAR)**		
	1	Güneş Paneli - 400 Wp Mono Perc	9504,00	kW
		İNVERTER - (HUAWEİ)		
	2	İnverter - SUN2000 100 KTL-M1	77	adet
		SAHA PANOLARI (ALTINSOY, VERA)		
	3	Ana Toplama Panosu	8	adet
	4	Mevcut Pano Tadilatı	1	adet
		DC VE AC KABLOLAR (HELUKABEL, HES, PAMUKKALE, ÖZNUR)		
	5	1x6 mm2 PV1-F	161280	metre
	6	4x150 mm2 NAYY	4488	metre
	7	4x240 mm2 NYY	394	metre
	8	1x95 mm2 XLPE AL	10000	metre
	8	Ag Kablo Başlıkları, Makaron, Kablo yüzüğü	8	set
		HABERLEŞME VE İZLEME SİSTEMİ (ENDOKS, HUAWEİ)		
	9	Scada Sistemi	1	set
	10	Haberleşme Sistemi ve Uzaktan İzleme	1	set
		TOPRAKLAMA SİSTEMİ (RADSAN)		
	11	Topraklama Sistemi (Topraklama iletkeni ve kazıkları)	8	set
		SARF MALZEMELER		
	12	MultiContact	3080	adet
	13	Kablo Kanalı ve Tavası	8	set
	14	Uyarı İkaz İşareti ve Levhalar	8	set
		KURULUM ve İŞÇİLİK		
	15	İş Makinaları	1	set
	16	Nakliyeler	1	set
	17	Şantiye Gideri	1	set
	18	Mekanik İşçilik	1	set
	19	Elektrik İşçiliği	1	set
		Toplam :	**5.172.000,00 $**	
		KDV :	**930.960,00 $**	
		G Toplam :	**6.102.960,00 $**	
		Birim Fiyat :	**544,2 $**	

* Teşvik Kapsamındaki Kalemler İçin KDV Uygulanmayacaktır.
* Liste Proje Onayından Sonra Revize Edilecektir.
* Resmi Kurum Harçları Teklif Kapsamı Dışındadır.
* Trafodan Sonraki Malzeme ve İşlemler Dahil Değildir.
* Anahtar Teslim Toplam Fiyattır.

Appendix 4 : Simulation Summary

HelioScope

Annual Production Report produced by sureyya algan

Design 1 abtu, adana bilim ve teknoloji Üniversitesi

Report

Project Name	abtu
Project Description	1
Project Address	adana bilim ve teknoloji Üniversitesi
Prepared By	sureyya algan sureyyaalgan7@gmail.com

System Metrics

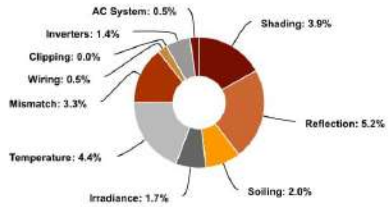
Design	Design 1
Module DC Nameplate	9.50 MW
Inverter AC Nameplate	7.70 MW Load Ratio: 1.23
Annual Production	9.489 GWh
Performance Ratio	79.2%
kWh/kWp	998.4
Weather Dataset	TMY, 10km Grid, meteonorm (meteonorm)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

Project Location

Monthly Production

Month	GHI (kWh/m²)	POA (kWh/m²)	Shaded (kWh/m²)	Nameplate (kWh)	Grid (kWh)
January	66.9	33.6	31.5	261,196.0	234,896.2
February	77.9	51.0	48.4	414,792.0	381,740.2
March	118.6	87.7	84.0	732,882.1	671,234.2
April	147.2	120.8	116.2	1,030,440.6	935,622.3
May	187.8	167.5	161.5	1,446,667.0	1,291,582.5
June	205.0	189.1	182.6	1,643,507.9	1,443,216.8
July	205.3	185.9	179.2	1,609,464.7	1,403,156.8
August	211.8	176.0	170.7	1,520,168.3	1,324,276.6
September	148.3	112.3	108.1	947,807.3	834,915.9
October	110.7	69.6	66.5	564,505.9	499,193.1
November	70.9	39.7	37.6	315,197.3	280,445.2
December	59.1	27.4	25.6	213,614.8	188,762.7

Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,609.6	
	POA Irradiance	1,260.6	-21.7%
	Shaded Irradiance	1,211.9	-3.9%
	Irradiance after Reflection	1,148.9	-5.2%
	Irradiance after Soiling	1,125.9	-2.0%
	Total Collector Irradiance	**1,125.9**	**0.0%**
Energy (kWh)	Nameplate	10,700,243.8	
	Output at Irradiance Levels	10,518,143.3	-1.7%
	Output at Cell Temperature Derate	10,053,860.1	-4.4%
	Output After Mismatch	9,725,192.1	-3.3%
	Optimal DC Output	9,673,077.6	-0.5%
	Constrained DC Output	9,672,148.1	0.0%
	Inverter Output	9,536,726.1	-1.4%
	Energy to Grid	**9,489,042.4**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		21.7 °C
	Avg. Operating Cell Temp		27.9 °C
Simulation Metrics			
		Operating Hours	4620
		Solved Hours	4620

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, 10km Grid, meteonorm (meteonorm)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters

Rack Type	a	b	Temperature Delta
Fixed Tilt	-3.56	-0.075	3°C
Flush Mount	-2.81	-0.0455	0°C

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
2	2	2	2	2	2	2	2	2	2	2	2

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	-2.5% to 2.5%
AC System Derate	0.50%

Module Characterizations

Module	Uploaded By	Characterization
AE400M6-72 (2020) (AE Solar)	Folsom Labs	Spec Sheet Characterization, PAN

Component Characterizations

Device	Uploaded By	Characterization
SUN2000-100KTL-M1 (380/400) (Huawei)	Folsom Labs	Spec Sheet

Components

Component	Name	Count
Inverters	SUN2000-100KTL-M1 (380/400) (Huawei)	77 (7.70 MW)
Strings	10 AWG (Copper)	1,232 (229,165.3 m)
Module	AE Solar, AE400M6-72 (2020) (400W)	23,760 (9.50 MW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	6-20	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
A1	Fixed Tilt	Landscape (Horizontal)	26°	0.929039°	0.6 m	1x1	12,469	12,469	4.99 MW
A2	Fixed Tilt	Landscape (Horizontal)	26°	0.929039°	0.6 m	1x1	8,649	8,649	3.46 MW
B1	Fixed Tilt	Landscape (Horizontal)	26°	136.14576283817507°	1.0 m	1x1	20	20	8.00 kW
B6	Fixed Tilt	Landscape (Horizontal)	26°	136.146°	1.0 m	1x1	20	20	8.00 kW
B2	Fixed Tilt	Landscape (Horizontal)	26°	136.146°	1.0 m	1x1	20	20	8.00 kW
B3	Fixed Tilt	Landscape (Horizontal)	26°	136.146°	1.0 m	1x1	20	20	8.00 kW
B4	Fixed Tilt	Landscape (Horizontal)	26°	136.146°	1.0 m	1x1	20	20	8.00 kW
B5	Fixed Tilt	Landscape (Horizontal)	26°	136.146°	1.0 m	1x1	20	20	8.00 kW
B7	Fixed Tilt	Landscape (Horizontal)	26°	315.0035603190495°	0.8 m	1x1	279	279	111.6 kW
C1	Fixed Tilt	Landscape (Horizontal)	26°	314.585°	0.9 m	1x1	875	875	350.0 kW
D1	Fixed Tilt	Landscape (Horizontal)	26°	314.585°	0.8 m	1x1	255	255	102.0 kW
E1	Fixed Tilt	Landscape (Horizontal)	26°	135°	1.1 m	1x1	547	547	218.8 kW
E2	Fixed Tilt	Landscape (Horizontal)	26°	135°	1.4 m	1x1	123	123	49.2 kW
E3	Fixed Tilt	Landscape (Horizontal)	26°	135°	1.0 m	1x1	311	311	124.4 kW
E4	Fixed Tilt	Landscape (Horizontal)	26°	135°	1.2 m	1x1	132	132	52.8 kW

Detailed Layout