



kayzer enerji

Gökyüzünden Gelen Enerji

# ELECTRICITY GENERATION FROM SOLAR ENERGY

# ELECTRICITY GENERATION FROM SOLAR ENERGY

- System that produce electricity from solar energy are basically three types: Off-Grid (Not Connected to the Grid), On-Grid (Grid Connected) and Hybrid (Hybrid) where these two systems are together.
- Off-Grid systems must consume produced energy instantly or store.

# ELECTRICITY GENERATION FROM SOLAR ENERGY

- ⦿ Since it is not possible to act dependent on the sun to meet our electricity needs, the main difference between Off-Grid systems and On-Grid systems is STORAGE.
- ⦿ The storage of electricity can be done by batteries.
- ⦿ In hybrid systems, there is a public grid connection as well as batteries.

# ELECTRICITY GENERATION FROM SOLAR ENERGY

- Conversion of solar irradiation into electrical energy begins with Photovoltaic panels
- Photovoltaic panel consist of cells.they called pv panels ,modules or panels



# ELECTRICITY GENERATION FROM SOLAR ENERGY

- Panels consist of cells (solar cells) connected in series and parallel.
- As a result of the photons in the solar radiation hitting the cells, voltage and current occur in these cells.
- As a result ;LIGHT is important for generating electricity from solar energy not the heat of the sun.

# ELECTRICITY GENERATION FROM SOLAR ENERGY

- Energy generated by the panels varies according to the intensity of the sunlight coming to the surface of the panels, the angle of arrival of the sun rays and the exposure time to sunlight.



# ELECTRICITY GENERATION FROM SOLAR ENERGY

- Panels are basically have divided into three types according to their cell structure: Monocrystalline (Single Crystalline), Polycrystalline and Thin Film solar panels.
- There are efficiency and cost differences between panel types.
- Polycrystalline panels are predominantly used in the Solar Power Plants established. (nowadays monocrystalline)



# ELECTRICITY GENERATION FROM SOLAR ENERGY

- Solar power production need solarpanels and conversion device called inverter.

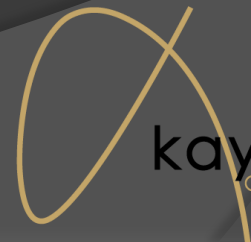


# ELECTRICITY GENERATION FROM SOLAR ENERGY

- ⦿ Direct Current (DC) occurs at the output of panels .
- ⦿ The electricity in our public grids form is Alternating Current (AC).
- ⦿ The main task of the inverter is to convert the DC to AC.

# SOLAR POWER PLANT (SPP)

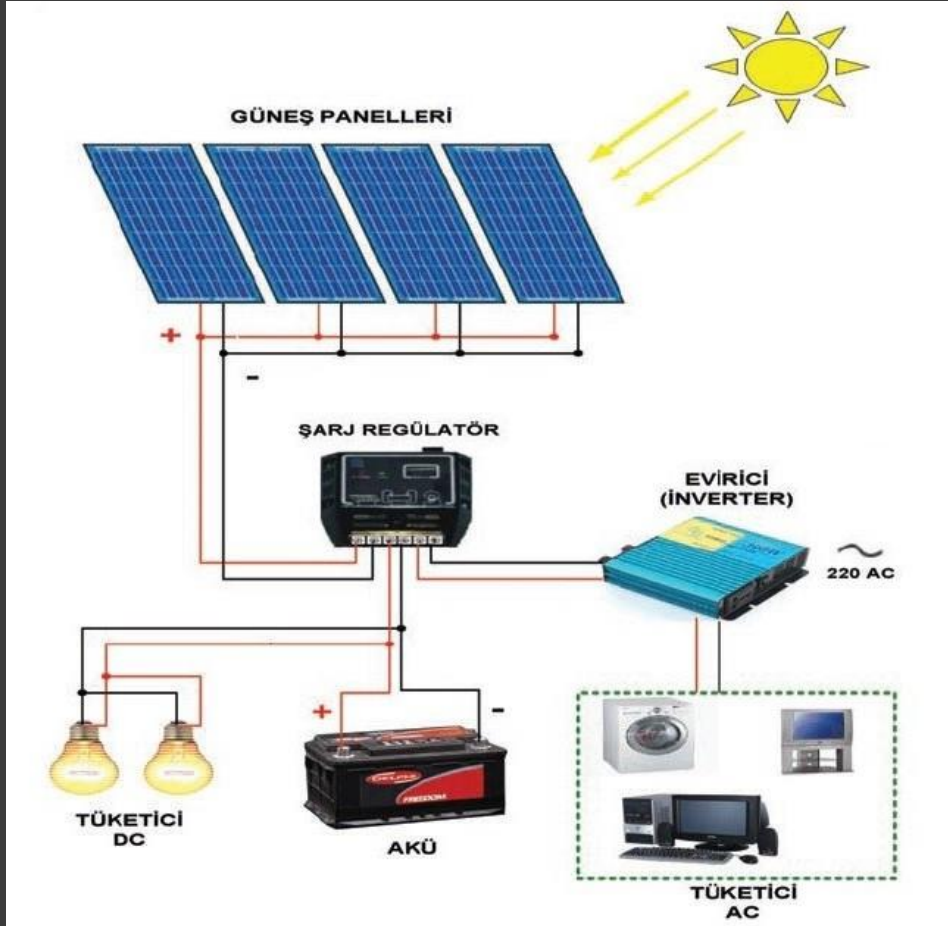
2014/15 DÖNEM BİTİRİMLERİ (2014/15)



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# SOLAR POWER PLANT (SPP)

## Off-Grid SPP Energy Flow Chart

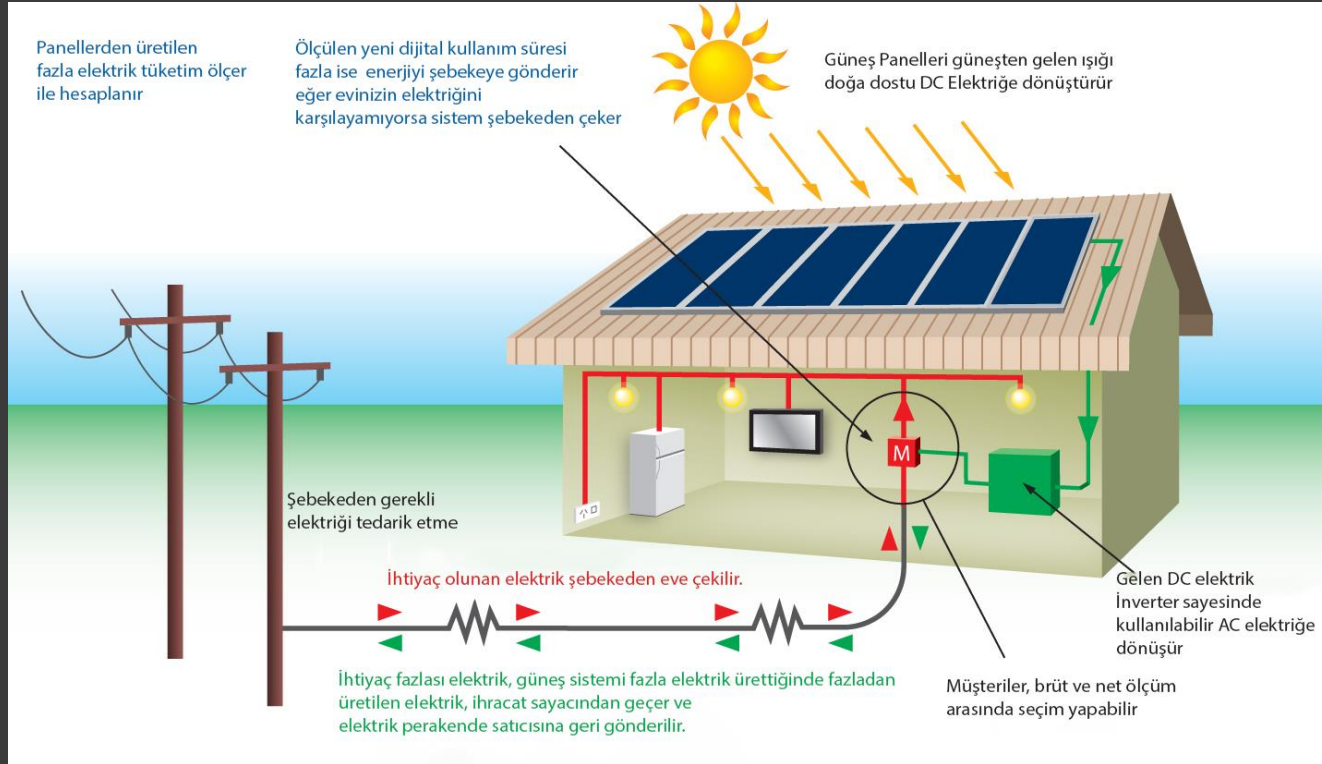


# SOLAR POWER PLANT (SPP)

- The generated electrical energy is stored in batteries and consumption is made from batteries via an inverter.
- Due to the cost of storage, Off-Grid systems are more expensive than On-Grid Systems.
- In addition, the energy to be consumed in Off-Grid systems is limited by the energy stored in the batteries.

# SOLAR POWER PLANT (SPP)

## On-Grid SPP Energy Flow Chart



# SOLAR POWER PLANT (SPP)

- Energy flow in On-Grid SPPs varies according to the energy produced and the energy consumed.
- In case the energy consumed is more than the energy produced, the lacking part of the energy produced is withdrawn from the electricity public grid.
- If the energy produced is more than the energy consumed, the surplus energy given to the public grid.

# SOLAR POWER PLANT (SPP)

- In On-Grid SPPs, the inverter located at the electricity production facility, will be connected is after the Electricity Meter located at the point where the system will be connected to the grid.
- The Electricity Meter, which is already in use connected to the public grid, is one-way and only measures the electricity consumption.



# SOLAR POWER PLANT (SPP)

- With the establishment of the Solar Power Plant, one-way electricity meter have to Exchange with two-ways electricity meters.
- In this way, it is possible to measure all the ways of flows the energy .

# SOLAR POWER PLANT (SPP) BILLING THE PRODUCED AND CONSUMED ENERGY

# SOLAR POWER PLANT (SPP)

- In the first phase of the SPP applications planned to be established, one or more electricity consumption facility subscriptions must be declared.
- SPP power planned to be established is limited to the consumption facility power declared in the application.

# SOLAR POWER PLANT (SPP)

- The pricing of electricity generated by the SPP to be established varies with the subscription type of the consumption facility used in the application.
- The energy consumed is called in the direction of delivery if the production is more than the consumption, and in the direction of the withdrawal if the consumption is more than the production or when there is no production.

# SOLAR POWER PLANT (SPP)

- Electricity energy measured by bidirectional electricity meters in the direction of supply and draw will be billed by electricity distribution companies on a monthly basis.
- While determining the energy amounts for billing, firstly, the electrical energy amounts in the direction of delivery and withdrawal are offset.

# SOLAR POWER PLANT (SPP)

- The amount of energy determined after clearing will be invoiced over the amount to be calculated according to the unit prices in the Energy Price Tariff issued by EMRA and the subscription type specified in the first application.

# KAYZER ENERJİ AND SOLAR POWER PLANT (SPP)

# KAYZER ENERJİ

- It is an ENGINEERING and AFFIDAVIT company established in 2013 to operate in the fields of project, engineering, consultancy and contracting in the energy sector.
- According to the needs of customers, TEDAŞ has carried out activities in the fields of project approval, consultancy and public tenders in the SPP sector.

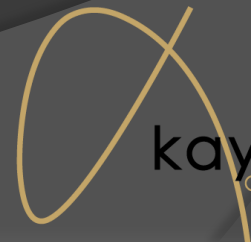


# KAYZER ENERJİ

- System partner of FRONIUS, which is one of the most important inverter brands in the SPP sector.
- As a partner of Fronius, experienced about commissioning, maintenance and repair all around Türkiye.

# OUR REFERENCES

OUR REFERENCES



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# KAYZER ENERJİ

- 3 kW Off-Grid, Roof Type SPP Installation-Commissioning, Kocasinan Belediyesi – 2014/KAYSERİ
- 4 kW Off-Grid, Roof Type SPP Installation-Commissioning, Sabri GÜDÜKOĞLU – 2014/KAYSERİ
- 1 MW On-Grid Land Type SPP TEDAŞ Proje, Menderes BOYNUUZUN – 2015/ÇORUM
- 1 MW On-Grid Roof Type SPP Commissioning, HASÇELİK KABLO, 2015/KAYSERİ
- 1 MW On-Grid Roof Type SPP Commissioning, HASÇELİK OPGW, 2015/KAYSERİ
- 1 MW On-Grid Roof Type SPP Commissioning, COREAL, 2015/KAYSERİ
- 1 MW On-Grid Roof Type SPP Commissioning, METAL MATRİS, 2015/KAYSERİ
- 10 kW On-Grid Roof Type SPP Commissioning, Cafer VURAL, 2015/KAYSERİ

# KAYZER ENERJİ

- 1 MW On-Grid Land Type SPP Commissioning, Özkardeş Enerji Köprübaşı 2 GES, 2015/KAYSERİ
- 1 MW On-Grid Land Type SPP Commissioning, Özkardeş Enerji Köprübaşı 3 GES, 2015/KAYSERİ
- 4 MW On-Grid Land Type SPP TEDAŞ Proje, Kayzer 1 Enerji, 2015/YOZGAT
- 220 kW On-Grid Roof Type SPP Commissioning, Ersen DOĞAN, 2016/KAYSERİ
- 287 kW On-Grid Roof Type SPP Commissioning, Melikgazi BELEDİYESİ KEYKUBAT PAZARYERİ, 2016/KAYSERİ
- 1 MW On-Grid Roof Type SPP Maintenance-Malfuction, GİMSA, 2016/ANKARA
- 900 kW On-Grid Roof Type SPP Commissioning, ERSAN GALVANİZ, 2016/ANKARA
- 1 MW On-Grid Land Type SPP Consultancy, TEDAŞ Kabul, ALTUNGES ENERJİ, 2016/KAYSERİ

# KAYZER ENERJİ

- 1 MW On-Grid Land Type SPP Commissioning, ECOTURCA, 2016/ADIYAMAN
- 25 kW On-Grid Roof Type SPP Commissioning, Adem ABEŞ, 2016/KAYSERİ
- 2 MW On-Grid Land Type SPP Commissioning-Maintenance-Malfunction, GÜNSU-TAY GES, 2016/BURDUR
- 1 MW On-Grid Land Type SPP Commissioning-Maintenance-Malfunction, TAY-2 GES GES, 2016/ISPARTA
- 560 kW On-Grid Land Type SPP Commissioning, SERİNYAKA GES, 2016/ANTALYA
- 200 kW On-Grid Roof Type SPP Commissioning, SERİK BELEDİYESİ, 2016/ANTALYA
- 520 kW On-Grid Roof Type SPP Maintenance-Malfunction, ALPU AHİR-ERSAN GURUP, 2016/ESKİŞEHİR

# KAYZER ENERJİ

- 8x480 kW On-Grid Land Type SPP Maintenance-Malfunction, ÖZYER 1 GES, ÖZYER 2 GES, ÖZYER 3 GES, ÖZYER 4 GES, FETHİYE ENERJİ C1 GES, FETHİYE ENERJİ C2 GES, GÖREM B1 GES, GÖREM B2 GES, FETHİYE ENERJİ, 2016/MUĞLA
- 1 MW On-Grid Land Type SPP Commissioning, KÖKSALLAR MOBİLYA, 2017/YOZGAT
- 2,75 MW On-Grid Land Type SPP Commissioning, GÜLKENT GES, 2017/ISPARTA
- 260 kW On-Grid Roof Type SPP TEDAŞ Project Modification, Contractor, TEDAŞ Acceptance, MELİKGAZİ BELEDİYESİ GÖKKENT PAZARYERİ GES, 2017/KAYSERİ
- 340 kW On-Grid Roof Type SPP TEDAŞ Project Modification, Contractor, TEDAŞ Acceptance, MELİKGAZİ MUNICIPALITY DANIŞMENT PAZARYERİ GES, 2017 / KAYSERİ

# KAYZER ENERJİ

- 380 kW On-Grid Roof Type SPP Contractor, TEDAŞ Kabul, MELİKGAZİ BELEDİYESİ İLDEM PAZARYERİ GES, 2017/KAYSERİ
- 648 kW On-Grid Roof Type SPP Contractor, TEDAŞ Acceptance, MELİKGAZİ MUNICIPALITY HÜRRİYET PAZARYERİ GES, 2017 / KAYSERİ
- 320 kW On-Grid Roof Type SPP TEDAŞ Sub-Contractor, TEDAŞ Acceptance, MELİKGAZİ MUNICIPALITY MİMARŞİNAN TOKİ PAZARYERİ SPP, 2017 / KAYSERİ
- 500 + 500 kW On-Grid Land Type SPP Consultancy, Sub-Contractor, TEDAŞ Acceptance, HACİBEKTAŞ MUNICIPALITY GES, 2017 / NEVŞEHİR
- 450 kW On-Grid Land Type SPP Consultancy, TEDAŞ Kabul, HAMZALI 12 GES KLASS JEOTERMAL, 2018 / NEVŞEHİR
- 7.25 kW On-Grid 10 kW and Six Roof Type SPP, TEDAŞ Project Approval - Distribution Company Acceptance, Bademler GES-1, 2018 / KIRŞEHİR
- 5 kW On-Grid 10 kW and Six Roof Type SPP, TEDAŞ Project Approval - Distribution Company Acceptance, Bademler GES-2, 2018 / KIRŞEHİR

# KAYZER ENERJİ

- ◉ 7.25 kW On-Grid 10 kW and Below Roof Type SPP, TEDAŞ Project Approval - Distribution Company Acceptance, Bademler GES-3, 2018 /
- ◉ 5 MW On-Grid Terrain Type SPP Commissioning-Maintenance-Malfunction, AKGEN 1-2-3-4-5 SPP, 2018 / ADIYAMAN
- ◉ 5 kW On-Grid Roof Type SPP Installation and Commissioning, Mehmet Salih BİLGİN, 2018 / TRABZON
- ◉ 6 kW On-Grid 10 kW and Six Roof Type SPP, Distribution Company Project Approval, Installation, Commissioning, Distribution Company Acceptance, ÇİLLİ GES, 2019 / KOCAELİ
- ◉ 600 kW On-Grid Roof Type SPP (Self-Consumption) TEDAŞ Project Approval, NOCHE MADENCİLİK, 2019 / KIRŞEHİR
- ◉ 480 kW On-Grid Roof Type SPP (Self-Consumption) TEDAŞ Project Approval, AGT GES, 2019 / NEVŞEHİR
- ◉ 450 kW On-Grid Land Type SPP Consultancy, TEDAŞ Kabul, HAMZALI 11 GES KLASS JEOTERMAL, 2018 / NEVŞEHİR
- ◉ 500 kW On-Grid Land Type SPP TEDAŞ Project Approval, HACIBEKTAŞ MUNICIPALITY, 2019 / NEVŞEHİR (Ongoing)



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