

New Business Opportunities (Electricity & Mutli-Utilities)

1. Distributed Energy Areas (Residential/Commercial Customers)

a. Distributed Generation (PV, MicroCHP, Home Storage Systems (<100 kWh) etc.)

ZES Solar Solutions: Since 2016, under the ZES brand, we have been active in the solar business, providing our customers with efficiency-enhancing smart system equipments such as PV modules, inverters, and optimizers, as well as catering to microgrid demands for residential and industrial installations. For more information, please visit, <https://zes.net/pv/tr/anasayfa>

b. Energy Efficiency (Smart Appliances/home systems, prosumer services, energy audits, energy management services etc.)

There are systems in place such as SCADA, AMI (Automated Meter Infrastructure), Call Center, Customer Management System, Geographic Information System, and SAP PM support that create records for notifications from users and faults and/or outages detected by the remote monitoring system for supply continuity. These systems also enable the forwarding of relevant information to repair teams when necessary, ensure that details regarding detection, actions taken, and outcomes are recorded, and facilitate the sharing of data with other systems.

In our distribution region, the data of 8,847 active lighting subscribers can be remotely read via the Automated Meter Reading System (AMR). The remote reading system contributes to emission reduction and labor efficiency.

FlexiGRID Project: FLEXIGRID project aims to improve the integration of renewable energy sources by increasing the efficiency and flexibility of electricity grids in Europe. The project, initiated in 2019 with EU funds, supports an energy system transition using digital technologies, smart grid solutions, IoT and blockchain. The project has a broad scope beyond energy storage and aims to provide optimization between PV, storage unit, V2G and V1G vehicles and the grid, particularly by using a smart charging management platform.

The project, which aims to improve energy efficiency by enabling electricity networks to integrate renewable energy sources more efficiently and flexibly, was officially finalized in August 2023.

For the purpose of the project, V2G compatible vehicles and charging stations were tested for the first time in Türkiye at OEDAŞ Tepebaşı Life Village in Eskişehir and a battery storage system with a capacity of 336 kWh was commissioned. ZESRoof PV and EV integrated Energy Management System was also tested in cooperation with Inovat. Please refer to the IAR'23 page 111.

c. Fuel Switching (EV, charging network)

ZES & Electrip EV Charging Networks: Two brands of Zorlu Enerji, ZES (doing business in Turkey) & Electrip (doing business in global markets) do business in EV charging infrastructure network installation and service provider.

Eskişehir Electrical Panel Plant: We are proud to make a significant contribution to the ZES Electric Vehicle Ecosystem with our Panel Production Plant which we put into operation in Eskişehir in 2023. The plant was primarily designed to meet the operational requirements of ZES charging stations by producing the specific electrical panels required by electric vehicle charging stations, and it further contributes to the spread of electric vehicle charging stations and the electric vehicle revolution. For more information, please refer to IAR'23, page 48, 108.

d. Smart Meter Usage

MASS Project: As part of the National Smart Meter Project (MASS), which has been implemented nationwide, smart meters are used for users on the distribution network with an annual consumption of 10 MWh or more. In 2024, the usage rate of smart meters is 65%, and for customers using smart meters, remote meter reading and automatic billing are implemented.

2. Demand-Side Management (Industrial/Commercial Customers)

a. Energy Efficiency (Energy audits, Energy Management Services, other efficiency investments)

Installation of Electrical Submersible Pumps: One of the projects we developed by giving priority to energy efficiency issues in our operations is the ESP (Electric Submersible Pumps) project. As water is drawn from wells in geothermal power plants, it may be necessary to improve the power of the pumps due to the decrease in water pressure over the years. For this purpose, replacing the pumps with more powerful models is an important step to improve energy efficiency. The hot well ESP application, which we first started in our Kızıldere geothermal field, was sustained in 2023 with transition to ESP in the further hot wells determined. We realized ESP installation investments in 12 wells in our Kızıldere geothermal field and in 5 wells in our Alaşehir geothermal field. With the ESP investments we have realized since 2020;

- At 16 wells of Kızıldere II Power Plant, extra 2.06 MWe net electricity generation contribution was achieved with an additional flow rate of 155 ton/hr on average,
- At 11 wells of Kızıldere III Power Plant, extra 2.4 MWe net electricity generation contribution was achieved with an additional flow rate of 165 ton/hr on average,
- At 6 wells of Alaşehir Power Plant, extra 1 MWe net electricity generation contribution was achieved with an additional flow rate of 105 ton/hr on average.

An electric submersible pump that went down to a depth of 1700 meters in the KD-62A well and operated at a flow temperature of 235°C was recorded as the example that reached the deepest point at the highest temperatures in the world. This pump makes a significant contribution to the Kızıldere III Geothermal Power Plant and therefore to the country's electricity generation.

With ESP project; more reliable, safe electricity can be produced, and providing a 10-15% increase in efficiency in energy production, in our geothermal fields. For more information, please refer to IAR, page 44 and page 111.

b. Load Optimization (Smart Grid technology, Tariff measurement, micro-grids, Large Scale Storage (>100 kWh))

Load Optimization Efforts: In our distribution region, a positive connection opinion has been granted for 24 storage facilities with a total installed capacity of 536.6 MW.

The SCADA system enables rapid fault detection, remote energy connection/disconnection operations, resulting in gains such as labor and time efficiency, increased customer satisfaction, and the elimination of on-site occupational health and safety risks since field visits are not required.

The Integrated Outage Management System, planned to be developed under the R&D project, will be equipped with independent integration capability and a rich modular structure. The system will ensure accurate and reliable outage management by transmitting all signals simultaneously to the network model, provide user-friendly interfaces for practical use in the field, offer gradual or non-gradual options in energizing processes, and create a standard integration catalog. It will also enable automatic outage coordination and routing to the appropriate team without operator intervention, use artificial intelligence for meteorological forecasting, and enhance the reliability of notifications by coordinating network data in real time and accurately identifying and informing subscribers.

The following R&D projects led by the R&D department can be highlighted: FlexiGrid, BD4OPEM, BD4NRG, E-depo, Geo Spatial Demand Forecasting Software, data collection, processing, and on-site evaluation application with the Mass Protocol and TM/DM Station Devices, the Digital Maturity project, and the Remote Secure Activation System for Rural Area Street Lighting

Power Plant Projects with Large Scale Storage Capacity (>100kWh): Within the scope of our preliminary license applications for the Thrace region, which is efficient with wind power, we received pre-license for the Tekirdağ Yeniçiftlik and Lüleburgaz Hamitabat projects and the wind energy power plant with storage unit of 375 MW in total. Immediately after obtaining the pre-license, we started our engineering work by installing wind measurement poles. Our 240 MWp solar energy pre-license application regarding the installation of solar energy power plants with storage unit is also being evaluated by EMRA. Energy storage systems, which will assume a significant role in the energy industry of the future, will help stabilize supply and demand by storing the excess energy generated during low-demand periods and release it when demand is high. This will further support the most efficient use of renewable resources and help stabilize energy supply demand by providing a more consistent and reliable power supply in the long term. With the Yeniçiftlik WPP that will be established in Tekirdağ and the Hamitabat WPP to be established in Kırklareli, Zorlu Enerji will add electricity generation facilities with storage units to its portfolio for the first time. The company will have a wind power plant with storage unit with a total capacity of 375 MWe based on the investments to be realized with the preliminary licenses it has received. For more information, please refer to IAR, page 44.

Hybrid Power Plants: We are further working to transform our geothermal, wind and hydroelectric power plants into Combined Cycle Renewable Energy Power Plants by installing solar energy. We first commissioned the 3.75 MWp solar power plant at Alaşehir Geothermal Power Plant at the beginning of 2023. At the end of the capacity increase in other power plants, we will have installed another 104 MWp solar power plant in total. For more information, please refer to IAR, page 44.

nGEL Project: Main goal of the nGEL project is to develop flexible tri-generation geothermal power plants by integrating heating, cooling and additional power generation systems. This integration aims to improve the overall efficiency of power plants. To overcome fluctuations in power grids with the spread of renewable energy systems, nGEL geothermal power plants are designed to operate effectively in reserve markets. This approach aims to maximize the efficiency in energy generation while also providing solutions to the volatility problems faced by power networks.

SEHRENE Project: The SEHRENE project set out with the goal of ensuring energy efficiency and a climate neutral future in Europe. For the purpose of the project, which is planned to be commissioned in 2024, it is aimed to use energy more efficiently by developing renewable energy and heat storage concepts. The aim is to optimize energy management and storage with innovative electrothermal energy storage systems and digital twin technologies to be used in the project. For more details about energy efficiency- projects, please refer to IAR'23, page 111.