

Artificial Intelligence Support from Akfen Renewable Energy to the Digital Transformation of Clean Energy

Akfen Renewable Energy is contributing to the digital transformation in renewable energy production with an artificial intelligence-based project implemented in collaboration with Başkent University Computer Engineering students. Developed using five years of real field data obtained from the Company's different power plants, the "Artificial Intelligence-Based Energy Generation Forecasting and Anomaly Detection System" aims to strengthen generation forecasting, anomaly detection, and data-driven decision-making processes.

As one of Turkey's leading renewable energy companies, Akfen Renewable Energy continues to support technology-, sustainability-, and digitalization-focused projects within the scope of university-industry collaborations. In this context, the graduation project titled **"Artificial Intelligence-Based Energy Generation Forecasting and Anomaly Detection System"** developed by **Başkent University Computer Engineering students** was implemented in collaboration with Akfen Renewable Energy.

Developed during the 2025-2026 spring semester under the supervision of Lecturer Dr. Oğul Göçmen by Alptekin Türedi, Sedef Koç, Zeynep Sude Çelik, and Berk Özbek, the project was designed using real field data in the renewable energy sector. **Within the scope of the project, five years of generation data obtained from Akfen Renewable Energy's different power plants were analyzed to create an artificial intelligence-based decision support system for forecasting and anomaly detection in energy generation processes.**

Based on the integrated analysis of data obtained from solar power plants and hydroelectric power plants, the system can make electricity generation forecasts, automatically detect unusual generation situations, and support energy managers in data-driven decision-making processes. Developed with a role-based access infrastructure, the system features special dashboards tailored for different user profiles such as plant officer, plant manager, regional manager, and executive manager.

While alarms, reporting, generation graphics, and analysis modules are presented in an integrated manner in the system, it is aimed to make energy management processes more traceable, measurable, and predictable. While the project contributes to the digitalization of ISO 50001 Energy Management System requirements, it also supports institutions in reaching their energy efficiency targets with AI-supported solutions.

With the project planned to be delivered to Akfen Renewable Energy at the end of the semester, it is aimed to test the system with real field data and evaluate it as a scalable decision support infrastructure in the renewable energy sector.

While the "Artificial Intelligence-Based Energy Generation Forecasting and Anomaly Detection System" stands out as a successful example of university-industry collaboration for the effective use of AI in



renewable energy management, it aims to contribute to the digital transformation of clean energy generation within the framework of the United Nations Sustainable Development Goals and the European Green Deal.

About Akfen Renewable Energy:

Akfen Holding laid the foundations of Akfen Renewable Energy Inc. in 2007, implementing Turkey's first renewable energy platform investing in sustainable energy consisting entirely of domestic and renewable resources. In 2016, the European Bank for Reconstruction and Development (EBRD) and International Finance Corporation (IFC) joined the company as partners, and after the share transfer carried out on 18.01.2023, Akfen Holding became the owner of all company shares. Akfen Renewable Energy has a balanced hydro, wind, and solar electricity generation portfolio of approximately 887 MW, consisting entirely of renewable resources positioned in regions with the most suitable natural resources for each technology across 18 provinces of Turkey. Following the public offering carried out in March 2023, the offered company shares (33.5% of total capital) began trading on Borsa Istanbul under the ticker AKFYE as of 16.03.2023.