CASE STUDY:

DIGITAL SOLUTIONS EXPAND BANDIRMA-1'S ABILITY TO PROFIT FROM ANCILLARY SERVICES.

TOMONI®
Performance Improvement
Flexible Operation
IGV Optimization
Power Augmentation
Ramp Rate Maximization

PLANT DETAILS

- Bandirma-1 Combined Cycle Power Plant
- 936 MW Thermal Power Plant
- Owned by Enerjisa Enerji Uretim A.S.
- Bandirma, Turkey

EQUIPMENT NOTES

- Mitsubishi Power Plant Monitoring
- Digital Solutions Installed: 2014, 2015, 2017

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CHALLENGE

Like many plants, Bandirma-1 Combined Cycle Power Plant faced challenges from the penetration of renewable energy in the Turkish power market. It was originally designed for base-load operation but began operating at partial load more often. The plant needed to operate more flexibly and find other ways to drive revenue.

SOLUTION

Three digital upgrades were chosen for Performance Improvement and Flexible Operation. Ramp rate maximization and power augmentation were applied in 2014 and 2015 to give the plant more secondary frequency control reserve capacity to earn the plant additional income. Ramp rate maximization is used to improve gas turbine ramp-up rate. Power augmentation is used to improve the combined cycle ramp-up rate while under frequency control. It regulates the increase of gas turbine airflow to compensate for the steam turbine load-up delay in a two-on-one configuration. These solutions increase the opportunity for revenue from ancillary services markets.

The TOMONI IGV Optimization Solution was implemented in April 2017 to improve partial load efficiency. It combines hardware modifications with new digital control strategies to more precisely control inlet guide vane (IGV) closing to maximize exhaust temperature at partial loads while maintaining combustion stability.

RESULT

These modifications increased Bandirma-1's revenue from ancillary services markets and average efficiency, saving fuel costs. The pairing of ramp rate maximization and power augmentation allowed the plant to earn an average of US$650,000 of additional income annually. IGV Optimization reduced fuel consumption, which led to a savings of US$230,000 annually.

"TOMONI solutions gave us the ability to be more competitive in a market affected by renewable power generation and allowed us to make additional revenue. Not only did they improve our dispatch priority on the grid, but they also increased our profitability."

Idris Akraba
Plant Manager, Bandirma-1
Combined Cycle Power Plant

TOMONI® is a suite of intelligent solutions that accelerates decarbonization with power plant design, O&M and system knowledge, together with strong customer and partner collaborations. TOMONI leverages advanced controls, artificial intelligence and machine learning with multi-layered cybersecurity to make energy systems smarter, more profitable and ultimately more autonomous on the road to a sustainable future.

TOMONI®

■ **Data Foundation & Enablers**
■ **O&M Optimization**
■ **Performance Improvement**
■ **Flexible Operations**