CASE STUDY:

HIGH-FIDELITY SIMULATION ACCELERATES FUEL DIVERSIFICATION UPGRADE.

Control System Simulation Capability

PLANT DETAILS
- San Juan Combined Cycle Plant
- Owned by Puerto Rico Electric Power Authority
- San Juan, Puerto Rico

EQUIPMENT NOTES
- W501FC with DF42 Fuel Oil Combustion System
- 2 (1X1) Combined Cycle Units
- TOMONI® Solution Installed: 2019

CHALLENGE

In September of 2017, two hurricanes, Irma and Maria, devastated Puerto Rico and caused widespread and prolonged power outages. This natural disaster led to a desire for more reliable and resilient power. The San Juan Combined Cycle Plant had units GT5 and GT6 operating with liquid fuel. Working together with Mitsubishi Power, the Puerto Rico Electric Power Authority (PREPA), owner of the power plant, determined that a fuel conversion from diesel to natural gas would provide 400 MW of power to the area and put the plant in a better position for future natural disasters. The company was also looking for ways to become more competitive and environmentally friendly while offering better energy rates to the Puerto Rico community.

SOLUTION

As part of the fuel diversification planning process, Mitsubishi Power utilized a high-fidelity digital simulator to remotely build, test and optimize new logic and graphics for the fuel conversion. This reduced commissioning time and trips to the plant. A customer factory acceptance test (FAT) was performed to implement suggestions prior to the outage and ensure all changes to the site's control system were approved.

The control system's importing process was tested on the simulator by using coincident images of the control system. This reduced issues when changes were imported into the site's system and eliminated having to create and change the logic and graphics on site. At the start of the outage, the simulator was set up in the site's control room, so the operators could train and ask questions prior to restarting the gas turbines.

Simulator Workstation

RESULT

The fuel conversion made the San Juan Combined Cycle Plant more competitive and environmentally friendly while lowering electricity rates for Puerto Rico residents. Control system digital simulation reduced the time on site and the expenses associated with travel and increased the reliability of the control logic change while optimizing and anticipating potential issues prior to the outage installation.

High-fidelity simulation is one of many intelligent analytics and visualization solutions and capabilities available from Mitsubishi Power to optimize the O&M of the entire plant.

"Mitsubishi Power and PREPA partnered to rapidly implement dual-fuel capability at San Juan units GT5 and GT6. Mitsubishi Power used simulators to complete FAT validating on the control system design. This greatly accelerated commissioning, enabling a quick return to service, which saved PREPA seven days, equating to approximately $700,000 per day."

Jaime Arturo Umpierre Montalvo
Head of Engineering and Technical Services Division
Puerto Rico Electric Power Authority (PREPA)

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**