

Emerson and Mitsubishi Help to Maintain Stability of Colombia's Electricity Market Through Successful Fuel Conversion at Termocandelaria Power Plant

RESULTS

- Maximized generating revenue through improved startup reliability
- Avoided financial penalties by fulfilling regulatory obligations with the Colombian Energy System
- Achieved commercial operation within aggressive 11 month schedule



APPLICATION

320-megawatt plant with two 160-megawatt Westinghouse 501F combustion turbines

CUSTOMER

Termocandelaria Power Ltd., Termocandelaria Power Plant located near Cartagena, Colombia, South America

CHALLENGE

The Colombian electricity market is served primarily by hydro-electric plants located in the center of the country. When there is drought, transmission issues or high demand, these plants are not always able to generate sufficient power to meet the region's needs. In these instances, the Colombian government typically calls on power plants utilizing other fuel sources, such as Termocandelaria, to provide additional megawatts. Conversion to dual-fuel capability was necessary to improve Termocandelaria's reliability and maximize revenue. Project goals included:

- Implement within an aggressive schedule without additional plant downtime
- Provide a low-risk and cost-effective strategy
- Improve unit starting reliability to fulfill regulatory contracts

“Startup reliability has been greatly enhanced. With the dual-fuel capability now in place, Termocandelaria is able to produce megawatts on demand. The significance of this cannot be underestimated, as the plant's ability to be a reliable source of back-up power plays an important role in maintaining grid stability.”

Miguel Angel Perez Ghisays
Plant Manager
Termocandelaria Power Ltd.
Termocandelaria Power Plant

SOLUTION

Termocandelaria selected the team of Emerson and Mitsubishi Power Systems Americas, Inc. (MPSA) to implement the fuel exchange project.

For this project, Emerson co-developed with MPSA a new control strategy for the dual fuel conversion project, which included logic for water injection, fuel gas, and fuel oil systems. In addition to the new logic required to accommodate a second fuel source, Emerson also migrated the existing gas combustion controls from the previous generation WDPF distributed control system to its Ovation™ control system. As part of the migration, Emerson converted the existing logic to industry standard SAMA logic. This will enable Termocandelaria personnel to more easily modify control schemes in the future as changing circumstances dictate.

From the beginning, Emerson designed the Ovation system to allow a straightforward migration path for users of its WDPF systems. This proven, economical alternative to complete system replacement offers WDPF customers the latest technology while allowing them to retain much of their existing control system investment, including control logic, graphics, I/O cards, field cabling and terminations.

MPSA was responsible for dual fuel conversion, including new combustion system components, gas and oil fuel supply systems featuring Emerson control valves and instrumentation, as well as civil and electrical design of the expanded balance of plant equipment for water and oil treatment and storage equipment. MPSA also provided installation and commissioning support for the project to achieve a certificate of completion by demonstrating power supply capabilities on oil fuel. Water-injected diffusion flame combustors (fuel nozzles, combustor baskets & transition pieces) were supplied to maximize the unit's output and simplify the fuel conversion process.

The retrofit also included MPSA's new dual-fuel system, which utilizes a duplex liquid fuel nozzle to eliminate the need for a flow divider and improve start-up and low load particulate emissions and opacity. Purge air systems and Mitsubishi's high energy ignition system were also applied to assure high starting reliability.



Termocandelaria plant operations are controlled and monitored from the new Ovation control room.

