

# ENIA Improves Gas Turbine Efficiency by 1% on Cogeneration Site using AMS™ Suite: Equipment Performance Monitor



## RESULTS

- 1% efficiency improvement in compressor section of gas turbine
- \$27,000/year benefits through new off-line washing strategy
- Optimum predictive maintenance cycle for filter changes developed
- Benchmarked gas turbine performance across individual component sections



## APPLICATION

Simple cycle cogeneration site exporting power to the national grid and part of a district heating system

## CUSTOMER

ENIA S.p.A. - Via Hiroshima, Reggio Emilia, Italy

## CHALLENGE

ENIA produces gas, electricity, water and heating to 74 municipalities. The Reggio Emilia site includes two cogeneration plants, an energy from waste plant and sixteen boilers, providing district heating for residential and commercial heating requirements.

ENIA is fully committed to providing a high value of service to its customers with particular attention paid to efficiency and the environment. The Reggio Emilia cogeneration plant includes gas turbine machinery which produces electricity and heat for the surrounding city during winter, while producing steam for site HVAC units (LiBr absorbers) and electricity to the national grid during summer.

During the previous year, ENIA invested in a program to drive the performance of the GE Frame 6B Gas Turbines. It was evident that the design efficiency of the gas turbine was below expected conditions creating the need to identify the contributions to the operating loss.

ENIA also required diagnosis of component causes of performance loss that could potentially cause load and efficiency loss on the gas turbine.

*“The use of AMS Performance Monitor has helped us realize our business goal to produce an effective strategy to improve the overall efficiency of the gas turbine.”*

**Franco Ghizzoni,**  
Plant Manager



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ENIA acquired the help of Emerson to understand the combustion issues and, at the same time, to provide a strategy of how they will improve the overall efficiency of the gas turbine. This included a solution that provided a full diagnostic and engineering service to understand the true performance of the machine.

### SOLUTION

Emerson's AMS Performance Monitor was selected to meet these requirements to analyze the thermodynamic performance of the gas turbine. Prior to the adoption of AMS Performance Monitor, ENIA followed a preventive maintenance strategy based on recommendations from the original equipment manufacturer. Now ENIA has begun to adopt a predictive maintenance strategy based on performance results and analysis provided by Emerson.

Engineers from ENIA, working alongside performance experts from Emerson, identified that the thermal efficiency of the gas turbine was below an optimum level. Combustion issues with fuel quality and a LHV were identified by understanding the fuel usage, emission diagnostics and the combustion temperature representation via radial exhaust spread plots.

The thermal efficiency was shown to be below design expectancy due to the combination of non optimal filter change timings along with on-line and off-line washes. The existing washing strategy was re-evaluated by Emerson to achieve the optimum fuel usage with load requirement. This task was carried out by analyzing the existing strategy employed. In terms of efficiency, the gas turbine did not show any significant improvement in performance following an on-line wash, while a significant efficiency recovery was shown following each off-line wash. By merging these considerations, AMS Performance Monitor has allowed ENIA to understand the optimum frequency via balancing performance improvement with off-line washes. The result was a new and more efficient strategy for maintenance that improved the net compressor section efficiency by 1%. The removal of unnecessary lower thermal performance with an extended maintenance interval equates to a cost saving of close to \$27,000/year.

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AMS Suite: Equipment Performance Monitor powers PlantWeb with predictive and proactive maintenance through performance monitoring of process and mechanical equipment to improve availability and performance.

***“Knowing the true performance of the gas turbine will allow us to more efficient in the planning of maintenance and washes in the future.”***

**Michele Borelli,**  
Maintenance Operator



*Reggio Emilia Cogeneration Site.*

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