



EnergyFog Systems - Fogging Systems for Gas Turbines


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EnergyFog Systems (EFS) is a company acting in the field of power technology, specifically gas turbines. The main product supplied by EFS is fogging, specifically fogging systems for gas turbines.

Installation of fogging in gas turbines allows the recovery of a substantial part of the rated output of the gas turbine, in order to compensate the important loss of power due to the increase of ambient air temperature.

Fogging systems for gas turbines

Fogging is performed by the injection, in the gas turbine air intake, of high-pressure water (demineralised water required) whose adiabatic quick evaporation causes the air temperature to decrease, thus increasing the air mass flow and the gas turbine power output. Other systems allow the decrease of turbine air temperature, but fogging has proven to be the best solution.

EFS is able to design, procure, manufacture and install the fogging system in any type and size of gas turbine, either during the power station construction or as a back fitting of an operating station.

The design of a fogging system is based on the study of the power station site's historical meteorological conditions (temperature and humidity), in order to define the size and the operating features of the system suitable for the site itself. EFS is able to perform this base study for any type of site.

Once the site-related characteristics are defined, EFS will design the fogging system according to the type of gas turbine involved and the layout of the air intake. EFS is able to perform the design for any type of gas turbine and air intake.

Gas turbine fogging system components

The main components of a fogging system are:

- A rack of tubes holding the water injection nozzles installed in the air intake, immediately after the air filters
- An appropriate number of volumetric pumps feeding the nozzles with high-pressure water
- Tube and valves connecting the demineralised water circuit to the pumps and the pumps to the nozzles
- The I&C sub-system, according to a PLC logic

The rack and related connections is the only part installed inside the gas turbine air intake; all the other components are external and can be placed in any convenient adjacent area.

Support services for fogging systems

EFS can perform a fogging supply in a very limited time. Since 2005 EFS has supplied more than 20 fogging systems, applied to gas turbines of different types in different countries.

After the commissioning of the fogging system, even taking into account the very simple and economic maintenance required by the system itself, EFS is able to supply post-sale services, such as maintenance of the pumps and replacement of the nozzle if necessary (the expected life of the nozzle is 15,000hr).

Fogging system references - new units

EnergyFog Systems' technology is recognised as a second-generation fogging system



Example of water injection from EnergyFog nozzles.



Typical EnergyFog swirling nozzle.



Portion of the inside nozzle rack (in the background are the air filters).

design, which has been actively marketed since the middle of 2004. Our advanced technology has achieved rapid acceptance whenever a detailed technical analysis has been carried out and has been proven commercially in many large-size installations. Our reference list for new units is:

- GT model V94.3A2, GT output 260MW, for Tirreno Power's Vado Ligure plant in Italy (customer: Ansaldo Energia); commissioned June 2007
- GT model V94.3A2, GT output 260MW, for Tirreno Power's Vado Ligure plant in Italy (customer: Ansaldo Energia); commissioned September 2007
- GT model V94.3A4, GT output 279MW, for Enel-Viesgo's Escatron plant in Spain (customer: Ansaldo Energia); commissioned July 2007
- GT model V94.3A4, GT output 279MW, for Enel-Viesgo's Escatron plant in Spain (customer: Ansaldo Energia); commissioned September 2007
- Two GT model V94.3A4, GT output 279MW, for Enel-Viesgo's Algeciras plant in Spain (customer: Ansaldo Energia); commissioned 4Q/08
- GT model V94.3A4, GT output 279MW, for Enel's Livadia 1 plant (customer: Ansaldo Energia); commissioned 1Q/10

Fogging system references - retrofits

Most of our fogging units equip advanced-design, large-capacity gas turbines, which require the highest levels of quality, reliability, and safe operations. Our reference list for retrofit projects is:

- Two GT model GE 9E, GT output 120MW, for TAPCO's Taweelah B plant in Abu Dhabi (customer: Babcock Borsig Services); commissioned March 2006
- GT model V94.3A2, GT output 260MW, for EniPower's Ferrara Erbognone plant in Italy (customer: Ansaldo Energia); commissioned May 2006
- Two GT model GE 9E, GT output 111.5MW, for Dewa's Jebel Ali plant in Dubai (customer: The Kanoo Group); commissioned April 2009
- Two GT model V94.2, GT output 156MW, for Krec's Kerman plant in Iran (customer: E-man Serve); commissioned 2Q/09
- Three GT model PG5361, GT output 25MW, for S&Brec's Zahedan plant in Iran (customer: E-man Serve); commissioned 3Q/09
- GT model V94.3A2, GT output 260MW, for EniPower's Ferrara Erbognone plant in Italy (customer: Ansaldo Energia); commissioned July 2010
- Two GT model V94.3A2, GT output 260MW, for EniPower's Mantova plant in Italy (customer: Ansaldo Energia); commissioned September 2010/April 2011
- GT model V94.3A2, GT output 260MW, for EniPower's Ferrara plant in Italy (customer: Ansaldo Energia); commissioned September 2010/April 2011
- GT model V94.3A2, GT output 260MW, for EniPower's Ferrara plant in Italy (customer: Ansaldo Energia); commissioned April 2011



View of a typical pump rack (number of pumps up to five).



I&C cabinet, which includes the pump inverters.



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