

GAS TURBINE REPLACEMENT



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Why choose a Gas Turbine Replacement?

There is still no fast track to a future low-carbon, reliable, top-efficiency power generation system: the transformation of national and global energy landscapes is a long and winding road that may take a variety of directions, which, to a large extent, are still very hard to predict with confidence.



Current energy systems are very much a work in progress, but they must remain firmly rooted in those power generation options that can serve as a bridge to the energy of the future

Still accounting for a substantial part of the energy mix, natural gas-fired power provides such an option; even in the greenest medium to long-term energy scenario, gas-fired plants will be bound to play an increasingly valuable role to compensate for the inherent intermittency of renewable sources.

Gas-fired plant owners, however, need a wise investment strategy to keep their gas-fired facilities competitive, clean and ready for change as more renewables make their way onto the grid. With gas turbine replacement our Customers are given a cost-effective option to enhance their assets and unlock their lifetime extension potential, whatever their ultimate goal – keeping their facilities efficient and emission-compliant until renewables finally overtake fossil fuels, or extending plant life/improving heat rates and flexibility to better serve an expanding market during a transition that may take much longer than foreseen.

Replacing an obsolete, ageing or no longer competitive gas turbine unit with a new, more advanced version provides power plant owners with an opportunity to boost the plant's overall performance while leaving most of the existing plant equipment intact.

Gas turbine replacement, therefore, gives an answer to the needs of gas plant operators looking to reach multiple efficiency, emissions, and capacity targets by investing sensibly in a quick and effective solution that will help them tackle whatever opportunities or challenges the energy transition may bring.

How you can benefit

Gas turbine replacement is the right fit for investors needing to implement an ad-hoc solution to cut energy costs and curb emissions at their facilities with minimum impact on the rest of the existing assets.

Also, turbine replacements can help overcome the limitations of repairs or other remedial measures carried out on an as-needed basis, by enabling an all-round system improvement and helping keep the remaining existing equipment in good working order.

Turbine replacement measures entail lower investment costs; on top of other advantages, they can facilitate access to finance for your plant improvement program, offering a higher return on investment as compared to other available options.



Our solutions

Our gas turbine replacement programs are based on a feasibility study developed by Ansaldo Energia as gas turbine manufacturer in cooperation with the Customer. Through an in-depth and complete preparatory phase, we identify the solution that fits best with the existing plant's features, the plant operator's requirements and the specific installation setting.

Retaining the main equipment foundations already in place and partially reusing existing components, thus saving time and cutting costs, is not the only reason why our turbine replacement projects stand out as an advantageous option. Cost-effectiveness and quick implementation are also matched with a reduced impact on normal plant operation (projects involving multiple units can be carried one unit at a time, keeping the rest of them running) and space allocation (no additional space is required for this solution, which is vital for plants that have no room for further expansion).

Far less expensive than plant dismantling and subsequent reconstruction, turbine replacement projects are all the more attractive in that they can usually be brought to completion within a short timeframe



Our team has the right competence and know how to handle the project's multifaceted aspects, guaranteeing successful project delivery including in particularly challenging environments
(e.g. works carried out in confined or narrow spaces and/or next to equipment in operation)

Landmark projects

ROSIGNANO (Italy)

Gas Turbine Replacement



After the upgrade, the gas-fired combined cycle power plant's efficiency, heat and electrical output have all improved. Training on the new unit was also provided

In 2017 Ansaldo Energia replaced an old gas turbine unit with the turnkey supply of a new AE94.2 gas turbine generator unit at a Solvay facility in Rosignano, Italy.

Solvay, Marubeni Europe and Ansaldo Energia formed a joint venture to finance and operate the new gas turbine, AE94.2 model. Ansaldo Energia provided support to the Customer from the project's early stages by performing a feasibility study.

The original power generation system consisted in a combined cycle power plant, 2+1 configuration, two AE94.2 gas turbines, two HRSGs, and one steam turbine. The upgraded plant configuration features a new gas turbine unit connected to the existing HRSG, with all the steam being delivered to the Solvay plant. A second old gas turbine unit is available as a cold back-up unit. The Project's scope of works included the removal of old equipment and the supply, construction, commissioning, and start-up of an AE94.2 gas turbine with the related generator and auxiliaries. Regarding the main civil works, new foundations were built only for the gas turbine generator auxiliary skids, while the main existing equipment's pedestal was reused.

Project implementation had to fulfil a set of specific requirements that included carrying out the works within a very short timeframe, in narrow or confined spaces and giving top priority to workforce safety and environmental aspects.

During the first two weeks, the dissociation of the GT2 Control and Excitation/SFC (Static Frequency Converter) Systems was performed, removing the interconnections between the GT1 and GT2 systems in order to allow for the start-up of existing unit 2 and its operation during the project activities carried out on Unit 1. The dismantling of the existing Unit 1 began in parallel with the above-mentioned activities. Priority was given to those activities which had to be performed while both units were shutdown, such as the demolition of the old auxiliary skid foundations.

In order to remove the old equipment from the very narrow available space next to Unit 2 - which remained in operation for the whole construction period - Ansaldo Energia created an opening on the gas turbine hall roof, and handled the materials using a mobile crane. The main old machines were removed from their pedestals by means of a skidding systems.

Landmark project

ROSIGNANO (Italy)

Gas Turbine Replacement



Main Project Milestones and Achievements:

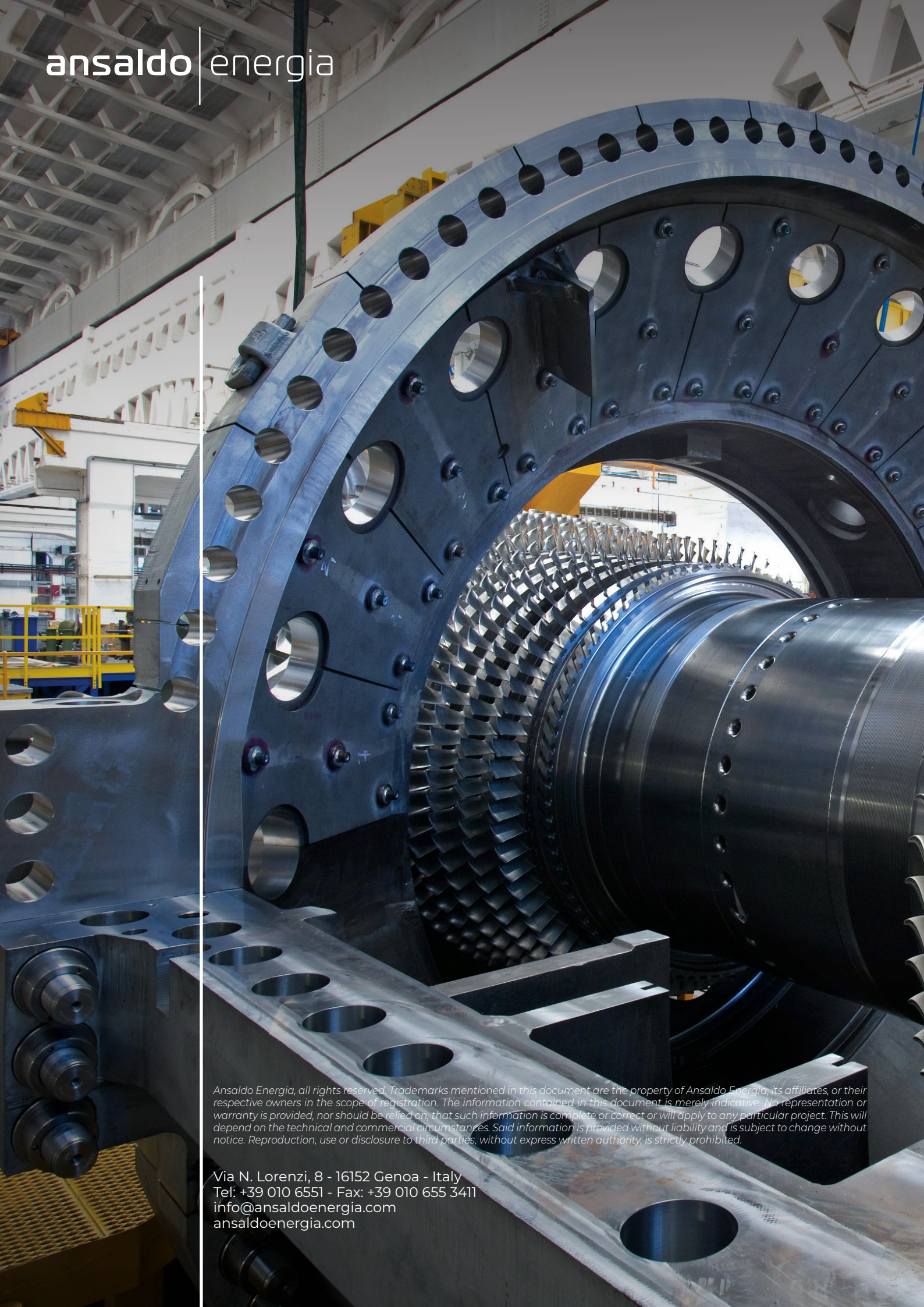
- **7 DECEMBER 2016**
Supply Contract and Notice to Proceed signed
- **15 May 2017**
Full site access
- **2 June 2017**
Existing Unit 2 start-up
- **1 July 2017**
New gas turbine generator unit on foundation
- **22 September 2017**
Beginning of commissioning activities
- **25 October 2017**
New gas turbine generator unit on turning gear
- **13 NOVEMBER 2017**
Gas turbine first firing
- **2 December 2017**
Gas turbine first synchronization
- **30 December 2017**
Successful completion of the Reliability Run
- **16 January 2018**
PG tests successfully performed and opening ceremony of the power plant
- **19 JANUARY 2018**
Issue of Provisional Acceptance Certificate

Project Details

Location	Rosignano Solvay, Italy
Plant owner	Solvay Chimica Italia S.p.A.
Purpose of unit	Steam and electrical power supply
Configuration	1 Gas Turbine, 1 HRSG
Cooling system	Direct cooling (Sea water)

Gas Turbine

Type	Ansaldo Energia AE94.2
Fuel type	Natural gas
Gross Electrical Power Output	175.700 MW guaranteed 179.572 MW measured
Gross Heat Rate	10,149 kJ/kWh guaranteed 9,927 kJ/kWh measured
Gross Efficiency	35.47% guaranteed 36.26% measured



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