

Integrated
Global Services



**Global Field Service
Network**

Ansaldo Energia Group

Ansaldo Energia is a leading provider of services and equipment for power plants, offering expertise at all levels of complexity for our own and third party machinery for heavy-duty Steam and Gas turbines, Generators, Nuclear, Micro turbines and Shaft Line. We provide global services including Repairs and Spare Parts, Field Service work including overhauls and upgrades, Plant Support with Remote Monitoring and Diagnostics, with transactional as well as comprehensive Long Term Service Agreements.

We are a global supplier of turn-key power plants, with a broad offering of the most reliable and best performing solutions available today, backed up by a dedicated Research and Development group and a global Service organization that assists customers with continuous product improvements, combined with the traditional reliability and robustness of Ansaldo Energia products.

The result is a unique and balanced value package based on innovation and reliability. Ansaldo Energia's solutions combine the company's proven designs, manufacturing capabilities and commissioning skills with its well-known flexibility in matching customer needs with tailored solutions.

At Ansaldo Energia, we recognize that the power market continues to be dynamic and challenging to our Customers. To remain profitable, operators expect global service organizations to offer solutions that improve the efficiency, operational flexibility, emissions, reliability and life-cycle maintenance costs of their power production assets.

Today, 160 years of Ansaldo Energia history are combined with a strategic assemblage of complementary service acquisitions. Not only can our Team provide advanced technology service solutions for your installed Ansaldo equipment, but our uniquely positioned Multi-OEM Platform technologies enable value-based offerings for any large frame GE, Siemens and Mitsubishi gas turbine, steam turbine or generator. This industry-first combination result? A flexible, multi-platform, full-scope service provider that can deliver competitive and proven answers to improve your equipment's life cycle maintenance costs.

With major operations in Genoa, Italy; Rheden, Netherlands; Jupiter, Florida, USA; Abu Dhabi, UAE; and field offices throughout Europe, Asia/Pacific, the Middle East, South and Central America, and the US, Ansaldo Energia offers customers localized service and global capacity to bring the highest level of value and capability to your plant.

We look forward to working with you as we create Power Together!





Supporting Customers by providing a Flexible, Reliable & Multi-Platform Field Service Portfolio

Ansaldo Energia's Field Service packages can encompass on-call daily technical representative field dispatching, to single or long term turn-key maintenance contracts, with a jointly agreed quality and duration guarantee. We offer fully integrated outage teams of highly experienced professionals capable of completing overhauls in a timely, safe and quality manner. Our Field Services support a wide range of power generation equipment including gas turbine, generator, steam turbine and auxiliary equipment. We can provide:

- Periodic Inspections
- Predictive Analysis
- Routine Maintenance
- Extraordinary Maintenance
- Safety and cost savings
- Concern for the environment



Ansaldo Energia's mission is to support our customers by providing a Flexible, Reliable & Multi-Platform Field Service Portfolio. To do this we:

- Perform site execution according to customer targets for quality and time
- Develop regional field service capabilities to be closer to customer needs
- Ensure the availability of qualified personnel on-time, at the right place and at competitive costs
- Optimize the utilization of global capacities and competencies with local capabilities
- Share best practices and foster synergies to leverage group capabilities



Field Services Offered:

- Power plants/components survey and condition assessment
- Components and parts life evaluation
- Life Time Extension
- Outages scheduling and technical planning
- Specialists dispatching
- Client support Hot Line
- Site survey
- Engineering and design
- Field inspection and fact finding
- Failure and root cause analysis
- All-levels field maintenance and overhauls, from day-by-day to turbogroup major overhauls
- Spare parts necessity assessment, procurement, delivery, installation and management
- Non Destructive Tests (NDT)

"SAFETY COMES FIRST": performing site execution according to Environmental, Health and Safety customer requirements and Ansaldo Energia policy is our first priority.

A Global Network... A Regional Organization

Our Global Network is available to our Clients:

- For the execution of contracts and tendering activities, to have the most efficient and effective contract set-up
- To coordinate and support local entities
- To define efficient and effective Field Service processes based on shared best practices

- To optimize the utilization of Global Field Service Network capacity
- To define and implement projects and network initiatives in order to improve network performance
- To manage tools and equipment globally

Regional Field Service and Tools Hubs provide services for a single product and/or technology or for multiple products and/or technologies.

Our Global Network is based on Three Pillars:



Technology	Process & Control	Execution
<ul style="list-style-type: none"> • Standard Procedures • Technical Support • Knowledge Mgmt • Critical Skills • Specialist Functions • Methods Developments • Special Tools & Equip. Developments • Commissioning Specialist • Training and Qualification 	<ul style="list-style-type: none"> • Management Process and KPI • Operation Reviews / Site Audits • Continuous Improvement Process • Process Innovation • Knowledge Sharing 	<ul style="list-style-type: none"> • Site Logistics • Site Execution • Local Field Service resources • Residents • Tools & Equipment Management • Local Vendors • Global Planning and Integrated Execution • Tools, Instruments, Equip Forecasts • Tools & Equipment Management



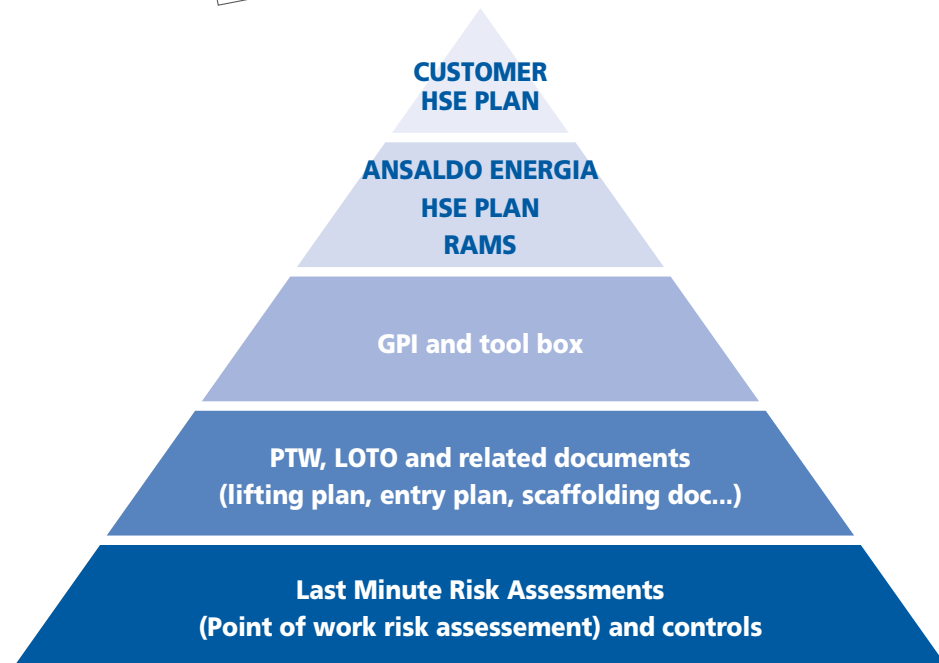
Safety Comes First... Zero Accident Mentality

Ansaldo Energia is committed to applying and continuously improving a world-class Environmental, Health and Safety Policy (EHS).

- We take care of the health and safety of ourselves, our subcontractors and the customers' employees
- We take care of the safety of both ours and our customers' equipment
- We take care of the Environment

Ansaldo Energia's personnel are engaged in a Management & Continuous Improvement Program, aiming for the achievement of our target.

Field Service employees are trained to our high in-house standards covering both technical and Environmental, Health and Safety (EHS) requirements.



We Know Our Job

Taking advantage of our vast technical and outage management experience, Ansaldo Energia is able to undertake Field Service on E to H Class GT OEM Fleet Steam Turbines, Generators and Balance of Plant, as well as on third party fleets with our Multi-OEM Platform network.

We are able to serve:

- Ansaldo Energia OEM Fleet Gas Turbines (AE94.3A, AE94.2, AE64.3A, GT26)

- Ansaldo Energia Steam Turbines (Geothermal, Action, Reaction), Turbo Generators and Hydro Generator equipment
- General Electric technology (9F, 7F, 6F, 9E, 7E, 6B, Frame 5, Frame3)
- Siemens technology (SGT5-4000F/V94.3A, SGT-1000F/V64.3A, SGT5-2000E/V94.2, SGT6-5000F/W501F)
- MHI technology (M501F/701F) Gas Turbines, Steam Turbines and Generators.

Multi-OEM Platform

■ Full Capabilities

	GAS TURBINES	STEAM TURBINES	GENERATORS
Siemens	■	■	■
Alstom		■	■
GE	■	■	■
Mitsubishi	■	■	
Siemens	■	■	■
Alstom		■	■
GE	■	■	■
Mitsubishi	■	■	

@ 50 Hz @ 60 Hz

Ansaldo Energia has more than 160 years of know-how.

In a typical year, we perform:

- More than 800,000 manpower hours on sites all around the world performed by our 350 Field Service Engineer, TFA, Fact Finder, Specialized Technicians, Supervisors, Commissioning Engineers, Site Managers
- More than 340 Major Outages carried out on Gas Turbines, Steam Turbines, Generators BOP of different technologies in Europe, Africa, North and South America, Middle East and Asia
- 1 thousand minor inspections and various activities





With more than a century of experience in the power generation industry and thousands of outages, inspections and analyses to reference, we have the expertise, staff, diagnostics, tooling, manufacturing and repair capability to meet your plant's needs.



A Wide Range of Field Service Options

Ansaldo Energia is able to offer our Clients a wide range of field service options, based on the characteristics of each component of your Plant:

For Gas Turbines and Auxiliaries:

- **Minor Inspection:** a visual inspection on combustion chamber, 1st and 4th turbine stage, 1st compressor stage, exhaust gas duct, filter house and air intake. In case of humming, a short inspection includes a visual inspection on combustion chamber and 1st turbine stage.
- **Hot Gas Path Inspection (HGPI) :** we focus on the hot parts of the machine (turbine, combustion chamber), including checks/ inspection on combustion chamber, turbine stage (including replacement of coated blades/vanes), filter house, air intake. Rotor is left inside stator parts and only the turbine blade carrier is removed.
- **The Major Inspection:** It includes activities involved in the HGPI, plus the removal of stator parts and a thorough inspection of the blades/vanes, both compressor and turbine section. The rotor is removed from stator parts and visual inspection, Non Destructive Tests (NDT) and fact finding based repairing are carried out.
- Combustion inspection
- Borescopic inspection

For Generators:

We provide every type of maintenance, from a short inspection to a major overhaul, covering the machine, its auxiliaries (seal oil system, gas system, demi-water system, braking system on hydro) and the excitation/starting systems, irrespective of the technology and the manufacturer.

For Steam Turbine and Auxiliaries:

We are able to serve different technologies:

- AE OEM: GE, Westinghouse, Franco Tosi, ABB-Alstom,
 - Multi-OEM Platform: Rateau Schneider, BBC, Siemens, Toshiba, MHI, Skoda, LMZ, Hitachi
- **Minor inspection:** The scope of inspection is the observations during operation: check of the safety devices, visual inspection of L-0 blades
 - **Medium inspection** consists of an accurate observation and check performed on:
 - Steam turbine bearings
 - Stop and control valve (Main, reheat and third admission)
 - LP last-stage blades
 - Accessible turbine components (Endoscopic examination)
 - Turbine control system, oil pumps etc
 - Safety devicesMoreover we perform:
 - Check of the alignment
 - Inspection, in general, carried out each 50,000 EOH
 - **Major inspection:** is the comprehensive examination of the entire turbine. It includes the opening of all turbine casings. Inspection, in general, carried out each 50,000 EOH

For more information and to reach our sales Team, please go to www.ansaldoenergia.com

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