ANSALDO ENERGIA

Company Profile

ANSALDO ENERGIA GROUP

Ansaldo Energia Group is a leading international player in the power generation industry, to which it brings an integrated model embracing turnkey plants, turbomachinery (gas turbines, steam turbines, generators and microturbines), aftersales, nuclear sector.
Established in 1853 in Genoa, Ansaldo has deep roots in the world of energy: in 1912 it produced its first steam turbine and in 1923 the first electricity generation plant. Ansaldo then focused on growth in the mechanical and electrical industries, leveraging as always on innovation and technology as its points of strength and acquiring its current name of Ansaldo Energia in 1991. While being a licensee of General Electric steam turbines (1949), ABB steam turbines and generators (1989) and Siemens gas turbines (1991), in the meantime the Company developed its own centre of research and development excellence and by 2005 it had achieved full technological independence.
In 2007, Ansaldo Energia strengthened its position in the service market for both its own and third party machinery, with the acquisition of subsidiary Ansaldo Thomassen and the creation of the OSP™ concept, a "one stop shop" for third party gas turbine, steam turbine and generator components.
In 2016, with the acquisition of Alstom's cutting-edge heavy-duty gas turbine business and its subsidiary company Power System Manufacturing, Ansaldo Energia is positioned as a global leader in the field of both components and service activities, as well as being one of the world's most important research and development centers.

At present, Ansaldo Energia is 44.8% owned by CDP Equity - a long term investor controlled by CDP Group, the Italian National Promotional Institution supporting the country's economy since 1850 - and 40% by Shanghai Electric, the world-leading producer of power generation machinery and mechanical equipment.

Ansaldo Energia Group currently employs over 4,500 people and has set itself the goal of achieving sustainable growth through a portfolio of flexible, innovative solutions that meet the needs of the global energy market.

Ansaldo Energia Group has an international presence through local companies and branch offices in Italy, where Group headquarters, Ansaldo Nucleare and Ansaldo Sviluppo Energia are located, in China with the two joint ventures Ansaldo Gas Turbine Technology and Shanghai Electric Gas Turbine, in Switzerland with Ansaldo Energia Switzerland, in the Netherlands with Ansaldo Thomassen, in the United Kingdom with Ansaldo NES, in Russia with Ansaldo Energia Russia, in the United Arab Emirates with Ansaldo Thomassen Gulf (Abu Dhabi) and, finally, in Florida (USA), where PSM has its corporate headquarters.

The Group's broad-based presence allows it to react quickly to Customers' needs and gives it a deep understanding of local realities.

Plants

Ongoing research and development work enables us to offer our Customers peerless plant management expertise, with an approach that involves the Customer in the process right from the initial request through to providing the best possible maintenance and lifecycle solutions.

Ansaldo Energia supplies turnkey plants and power islands for both thermal and open or combined cycle plants. Driven by a flexible approach and decades of experience working on over one hundred power plant construction projects, Ansaldo Energia Group can handle the entire construction process, from plant design, environmental impact analysis and the management of purchasing, design and construction processes, to commissioning and guaranteed lifetime support through long term service agreements.

Model	Module Power Size, MW	Power Plant Number	Total Power, MW	Scope of Supply
Thermal PP	40 ÷ 1000	41	13,500	Power Island EPC
Open Cycle PP	78 ÷ 306(*)	16	6,600	Power Island EPC
Combined Cycle PP	116 ÷ 502(*)	48	22,900	Power Island EPC
	Total	**105**	**43,000**	

(*) Performance of power plant with 1 GT; higher power output can be reached with modular approach with multiple GTs.

Gas Turbines

Ansaldo Energia Group produces a comprehensive portfolio of heavy-duty gas turbines for power generation applications, offering Customers the ability to operate their open or combined cycle plants at maximum performance levels and with the best possible results in terms of output, reliability, efficiency, flexibility, emission levels and costs.

Decades of experience in the field of gas turbines, from production through to full fledged after-sales assistance and an international network of research centres working together to develop products and innovate in both production and service areas, allow Ansaldo Energia Group to offer Customers the confidence that their plants are being run in the best possible way and delivering the best return on investment.

With the acquisition of technology owned by the former Alstom, Ansaldo Energia is now able to supply a complete portfolio of gas turbines in class E (AE 94.2), class F (AE 64.3A, AE94.3A and GT 26) and in class H with the development of the GT 36.

Model	Unit Power MW	Units	Total Power MW	Technology Class	Reliability
AE64.3A	78	37(*)	2,500(*)	F	>98%
AE94.2	185	114	18,600	E	>98%
AE94.2K	170	5	800	E	>98%
AE94.3A	310	74	20,720	F	>98%
GT26	345	104(**)	39,500(**)	F	>98%
	Total	**334**	**82,120**		

(*) Including E-Class previous version
(**) Including 28 GT26 pre 2006 rating and referring to former OEM up to Feb. 2016

Steam Turbines

Ansaldo Energia has more than a century of experience designing, building and installing steam turbines. Since it produced its first steam turbine in 1912, the company has installed over 600 units with a total output of almost 100 GW. Production includes reheat and non reheat steam turbines, with outputs ranging from 40 to 1000 MW, for fossil fuel, combined cycle, cogeneration and nuclear plants, as well as a line of geothermal turbines with outputs in the 20 to 150 MW range. The traditional reliability and solidity of Ansaldo Energia steam turbines, combined with our research and development centres and a worldwide service network, represent guarantees of long-lasting value and efficiency for Customers.

Model	Unit Power MW	Units	Total Power MW	STPP	CCPP	CHP	Geo
Geothermal	20 up to 150	31	1,000				■
Reaction Non Reheat	40 up to 350	18	3,000	■	■	■	
Reaction Reheat	90 up to 1,000	71	14,400	■	■	■	
Others Impulse and other Reaction Technologies		526	73,800	■	■	■	■
	Total	**646**	**92,200**				

Generators

Ansaldo Energia began working in the field of turbo generators over half a century ago, with the installation of the first units in hydroelectric plants. Since 1920, the company has focused its efforts on air-cooled generators. About 1,000 units in the 10 to 330 MVA range have left the company's Genoa production facility for installation worldwide. Since the 1950s, Ansaldo Energia has also gained extensive experience in the design and construction of hydrogen and hydrogen-water cooled turbo generators, manufacturing more than 200 units in the 40-1220 MVA range.
A total of over 1,300 turbo generators manufactured by Ansaldo Energia have an installed capacity of close to 150,000 MVA. Ansaldo Energia turbo generators can be used in various applications, including combined cycle, steam, geothermal and nuclear power plants and rotating synchronous compensators.

Model	Unit Power MVA	Units	Total Power MVA	GT	ST	Geo	Nuc	Hydro
Air Cooled Turbogenerator	up to 450	552	63,100					
H_2 Cooled Turbogenerator	up to 700	167	27,300					
H_2 / H_2O Cooled (2/4 poles) Turbogenerator	up to 1,200	62	31,000					
Hydrogenerator	up to 420	530	26,500					
	Total	**1,311**	**147,900**					

Service

Integrated player in the electricity value chain, Ansaldo Energia has been continuously updating and upgrading its service portfolio impacting on operations, maintenance, availability, reliability and reduction of emissions. Ansaldo Energia OEM Service portfolio works on heavy duty gas turbines, steam turbines, turbogenerators and hydrogenerators, helping its Clients to achieve better competitiveness. The comprehensiveness of the offered services, a flexible approach, an extensive practice in tailored service solutions and qualified engineering talents are Ansaldo Energia Service prime strengths.

Ansaldo Energia service portfolio

- Long Term Service Agreements
- Remote Monitoring & Diagnostic Center
- Solutions
- Field Service
- Repairs
- Spare Parts
- Training

Osp™

Ansaldo Energia, combining its expertise as an Original Equipment Manufacturer with the flexibility and efficiency of an Independent Service Provider, launched the OSP™ or Original Service Provider concept, a "one stop shop" for third party gas turbine, steam turbine and generator components.

Working together, Ansaldo Energia, Ansaldo Thomassen and PSM have created a network of research and development centers with the skills to develop solutions for all gas turbine, steam turbine and generator platforms, staffed by teams of motivated and flexible experts who can understand the problem and provide solutions for Customers wherever they are in the world, with a focus to increase component reliability, performance upgrades, life time extension, shaftline services and 24/7 monitoring.

Full service		Capabilities
9F		SGT5-4000F (V94.3A)
7F		SGT-1000F (V64.3A)
6F		SGT5-2000F (V94.2)
9E		
7E		
6B		
Frame 5		SGT6-5000F (W501F)
Frame 3		M501F

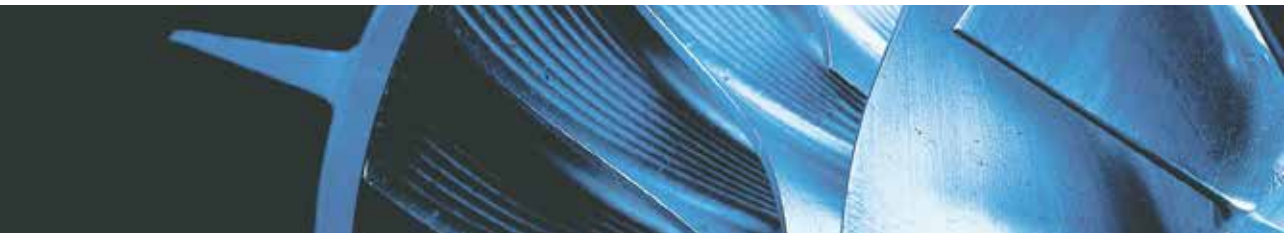
Microturbines

Ansaldo Energia Group also works in the distributed generation segment, producing the gas microturbines that represent the best solution for cogeneration and trigeneration plants.

The AE-T100 is available in versions fired by natural gas, biogas or external combustion. Designed for installation in cogeneration and/or trigeneration plants, it can supply electric and thermal power in parallel, with low noise, vibration and emissions levels. Delivering 100 kWel of electric power and about 2000 kWth of thermal power, the AE-T100 can achieve efficiency levels of 90%.

Over 400 units have been produced with an output of over 45,000 kW.

Model	Unit Power MVA	Units	Total Power kW	Power Gen.	CHP	CCHP
AE-T100NG Natural Gas	50 ÷ 100	354	35,400	■	■	■
AE-T100B Bio Gas	50 ÷ 100	73	7,300	■	■	■
AE-T100E External Heating	50 ÷ 75	41	3,000	■	■	
	Total	**468**	**45,700**			



Nuclear

With over fifty years of experience in the sector, Ansaldo Nucleare provides EPC services for new power plant projects (from design, engineering and components, to the management of purchasing and supply processes), service work, decommissioning and waste treatment, research and development work for IV generation nuclear reactors, and nuclear transmutation and fusion. Through its UK-based subsidiary Ansaldo NES, Ansaldo Nucleare is now able to offer an even broader range of skills, including the full range of solutions for nuclear decommissioning, defence and new plant constructions. With 400 employees operating in three different facilities in the United Kingdom, Ansaldo NES offers a huge range of projects for the nuclear power industry and the defence sector, as well as being closely involved in the design, realisation and startup of sophisticated decommissioning and waste treatment plants.

New Nuclear Power Plants (NPP)	Services to Nuclear Power Plants	Decommissioning & Radioactive Waste Management
• Technological Developments for New Nuclear Power Plants • EPC for Plants & Systems • Components & Equipment Design & Supply	• Safety Checks & Upgrading • Plant Life Assessment & Extension (PLEX) • Operational Services	• Decommissioning of NPP & Nuclear Facilities • Radioactive Waste Management • Temporary & National Storage Facilities

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Via N. Lorenzi, 8 - 16152 Genoa - Italy - Tel: +39 010 6551 - Fax: +39 010 655 3411 - info@ansaldoenergia.com - ansaldoenergia.com