

# DIGITAL SOLUTIONS



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*A way to deliver people expertise daily*

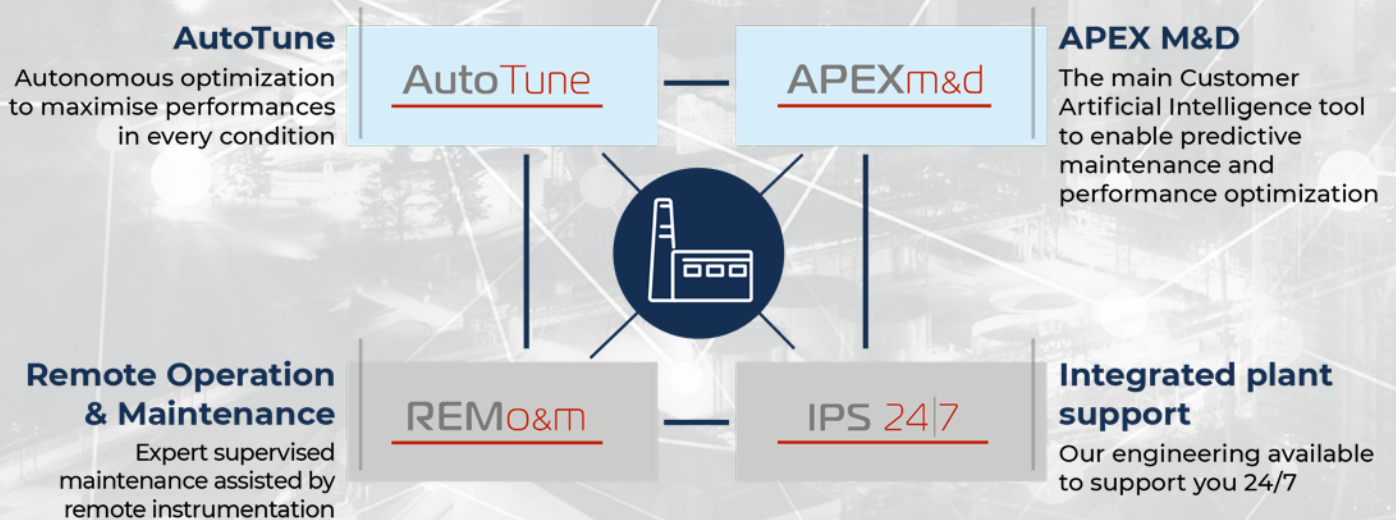
Ansaldo Energia service fleet is made of 300 equipment in 15 different countries worldwide, permanently connected and monitored from our network.

100 gas turbines for 35 GW of power are under M&D services: a flow of 130.000 data is downloaded every second in real time.

Combining our scientist capabilities with the deep expertise in the design and behaviour of rotating equipment and power plants, Ansaldo Energia develops continuously set of intelligent algorithms for anomaly detection and engine modelling, in a order to get predictive warning in case of parameters are out of normal behaviour.

## Ansaldo Energia Digital Products

Ansaldo Energia Digital Offering guarantees the real time connection between Ansaldo Energia OEM expertise and your Power Plant.



We offer our people expertise daily to your service.

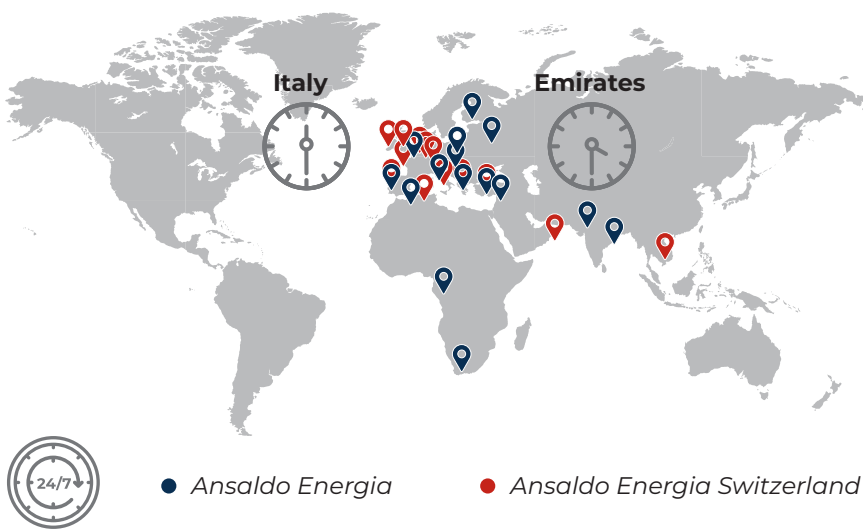
# Integrated Plant Support

Integrated Plant Support (IPS) increases reliability and availability of your power plant, while improving plant efficiency and flexibility. Our Remote Monitoring & Diagnostics centres offer:

- 24/7 plant support expert data analysis for supervision of health parameters
- Troubleshooting, event analysis, recommendations through dedicated hardware for vibrations and combustion analysis and Distributed Control System (DCS) connections.

Daily checks of health parameters and periodic reports are carried out as well as feedback for maintenance optimization; our team helps you to make the right decision quickly also in case of any unexpected events.

## Two front end Remote Monitoring & Diagnostic centres



### 24/7 Plant Support

- Root cause analysis, recommendations and solutions to troubleshooting requests
- Expert know-how from a single source
- Inspection & recommissioning support to Ansaldo personnel

### Monitoring & Diagnostic (M&D)

- Calculation and supervision of health parameters
- Early warning messages, assessments & recommendations
- Predictive Diagnostics
- Daily check of machinery parameters
- Periodic Report

### Specialized M&D packages

- Remote vibration assessment of GT/CC powertrains
- Generators condition monitoring
- GT control tuning
- GT combustion tuning
- GT restart assistance



*Highest reliability and highest availability for optimum performance*



### Client benefits

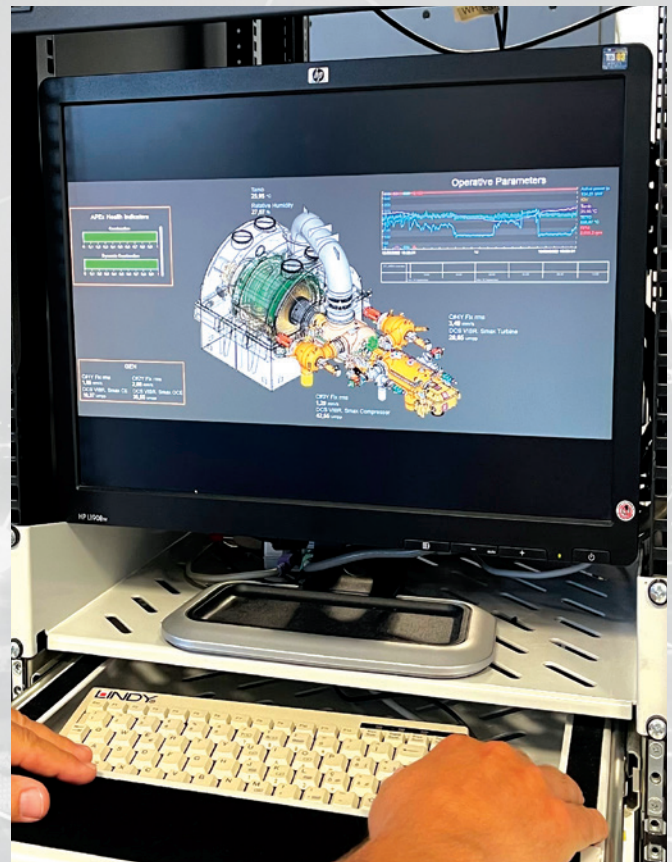
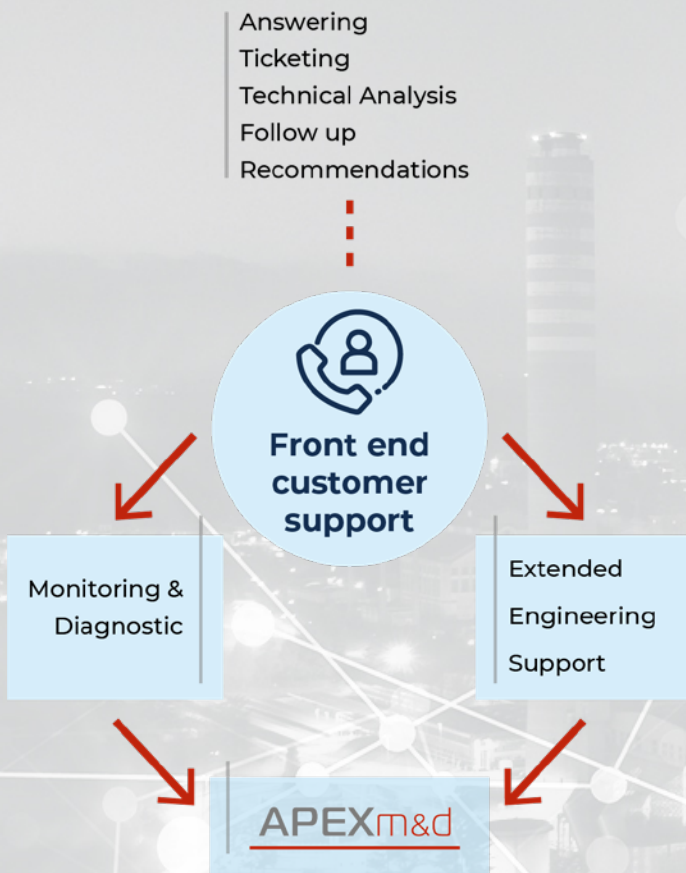
- Continuous Customer Support and condition monitoring
- Vibrations and Combustion analysis by experts data sharing
- Assistance to plant operators
- APEX enabler

# Ansaldo Predictive EXpert System (APEX)

Ansaldo Predictive EXpert System (APEX) as a plant digital twin, provides real time modelling of key components to enable predictive maintenance and performance optimization, as well as early warning notifications to implement corrective actions before deviation of normal behaviour could impact on operations.

This system includes the wide information existing in our data base, the knowledge of our specialist, combined with advanced machine learning techniques.

## Power plants



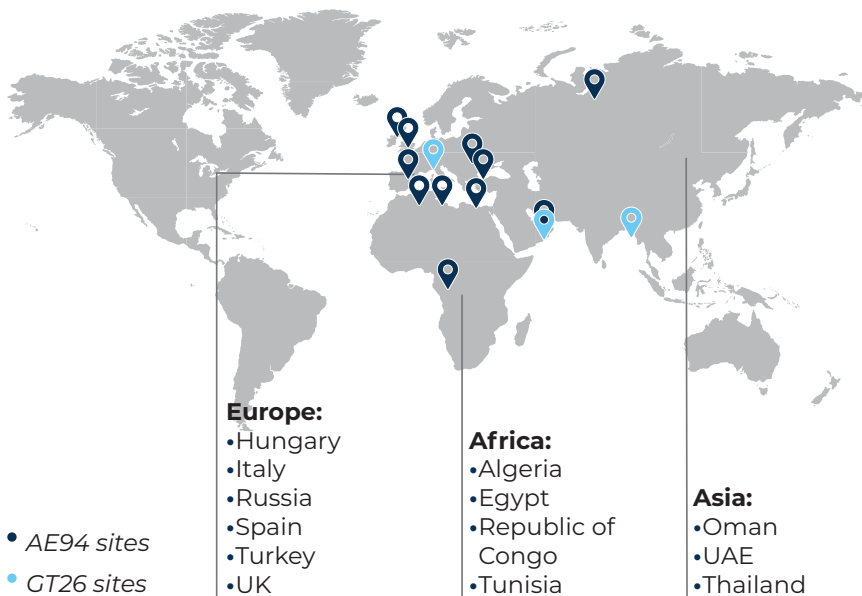
## Client benefits

- **Predictive maintenance**  
Help customer to plan in advance, to optimize duration and schedule of maintenance activities of power plant key components. Scenario based decision.
- **Performance Optimization**  
Enable customer to detect any early stage of performance degradation and identify the best corrective actions.
- **Reliability & Availability Enhancement**  
Allow customer to improve the reliability and the availability of components / equipment.

## Remote Operation & Maintenance

We organize maintenance supervision, remote commissioning and engine adjustments all over the world. Ansaldo Energia experts can offer plant operational optimization and specialized support through remote connection to smart devices, control systems and specific analysis tools.

We also support customers in implementing the connectivity infrastructure and cyber security .



### **Some numbers:**

*We perform remote activities in more than 40 power plants*

*In the last 2 years we have operated around 100 interventions totally or partially from remote*



### **Client benefits**

- **Time Saving**  
Reduced intervention time (logistic time saving and problem solving promptness)
- **Staff Optimization**  
Team of experts available from headquarter to deliver competence
- **Cost Saving**  
Logistic cost saving

# AutoTune

## Ansaldo Energia On-Line Optimization

The long proven Ansaldo Energia AutoTune increases the flexibility of your power plant while improving efficiency and power output. Fully retrofittable, it requires minimum downtime to install and allows versatile integration with existing plant infrastructures.

AutoTune is especially appropriate for plants with seasonal or daily variations of ambient conditions, for users who can profit from increased power output or need to optimize emissions, pulsations and performance and enhance availability during C-cycles.

AutoTune:

- **Optimize** the balance
- **Predict** instabilities
- **Learn** the proper correction to obtain optimal behaviour at a given operating condition

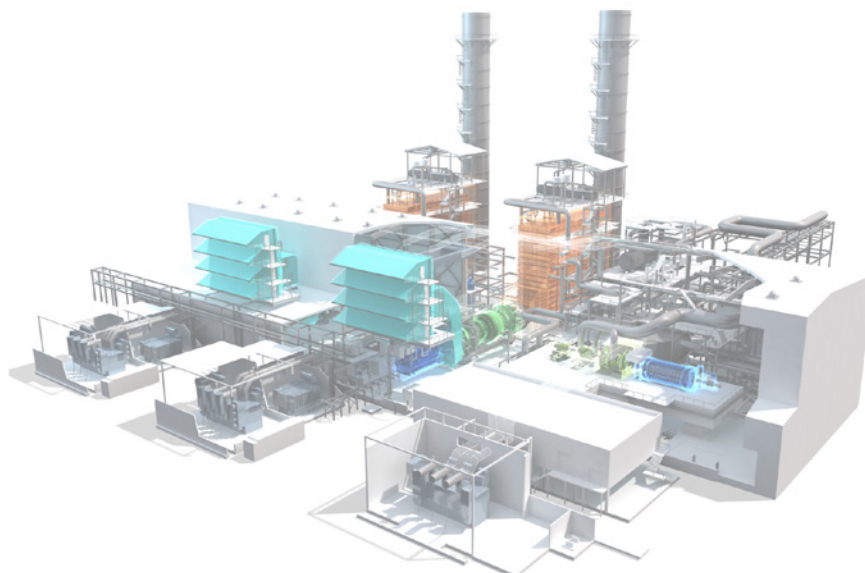


### **Client benefits**

- Improved emissions control year round
- Increased power output
- Self-learning and adjusting tuning logic
- Reduced risk of lean blowout unit trips, improving parts lifetime
- Reduction tuning activities
- Safe and reliable stand-alone system with 50+ installations

# A Whole Plant Approach

		Performance optimization	Online optimization	Predictive maintenance	Reliability/Availability improvement
<b>AE-SGT Gas Turbine</b>	Rotor dynamics	■	■	■	■
	Emission	■	■	■	■
	Exhaust gas temperature	■	■	■	■
	Combustion dynamics	■	■	■	■
	Performance	■	■	■	■
	Compressor washing	■	■	■	■
	Filtering system	■	■	■	■
	Secondary air cooling system	■	■	■	■
<b>GT26 Gas Turbine</b>	Rotor dynamics	■	■	■	■
	Emission	■	■	■	■
	Exhaust Gas temperature	■	■	■	■
	Combustion health monitoring	■	■	■	■
	Ignition monitoring	■	■	■	■
	TATI sensor health monitoring	■	■	■	■
	Filtering system	■	■	■	■
	Performance	■	■	■	■
<b>Generator</b>	Rotor dynamics	■	■	■	■
	Stator temperature monitoring	■	■	■	■
	Single shaft GEN rotor dynamics	■	■	■	■
<b>Steam Turbine</b>	Rotor dynamics	■	■	■	■
	Performance	■	■	■	■
	Sealing system	■	■	■	■
	Auxiliary steam valves	■	■	■	■
<b>Balance of Plant</b>	Feed water pump	■	■	■	■
	Air condenser	■	■	■	■
	HRSG	■	■	■	■
	Selective catalyst reductor	■	■	■	■
	Water condenser	■	■	■	■



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Via N. Lorenzi, 8 - 16152 Genoa - Italy  
Tel: +39 010 6551 - Fax: +39 010 655 3411  
[info@ansaldoenergia.com](mailto:info@ansaldoenergia.com)  
[ansaldoenergia.com](http://ansaldoenergia.com)