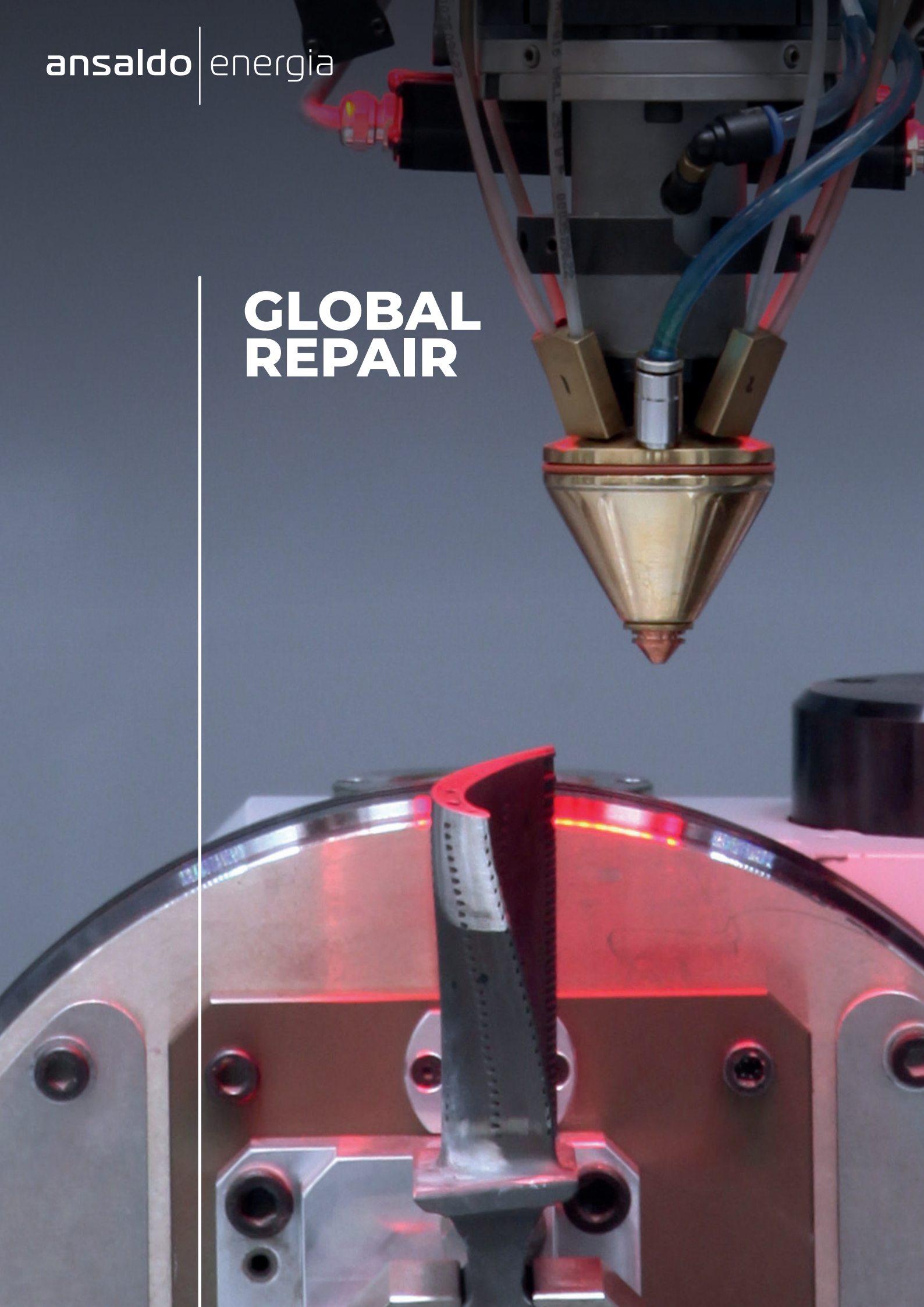


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# GLOBAL REPAIR



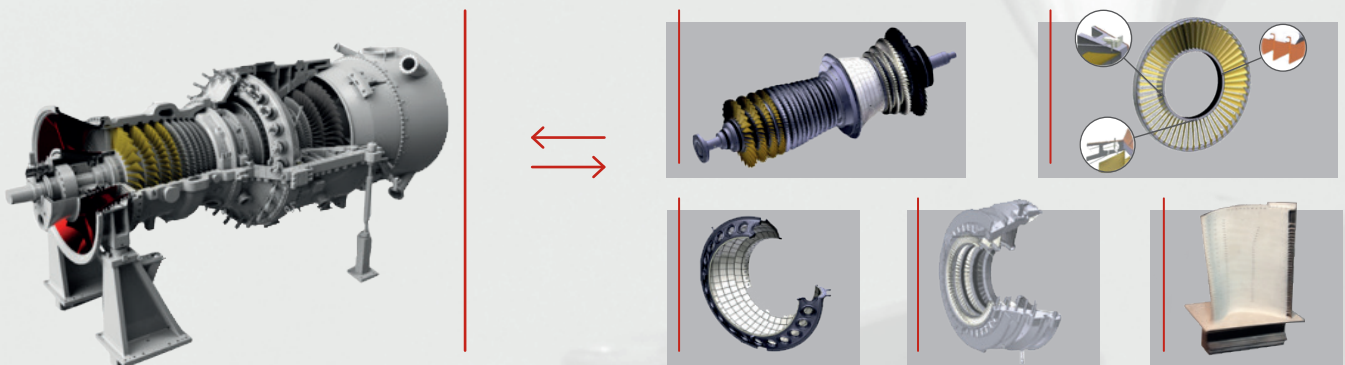
# GLOBAL REPAIR

In today's highly competitive energy market, power producers need to achieve peak performance while minimizing life cycle costs. Ansaldo Energia can help with a full spectrum of parts repair services - all backed by our engineering and advanced technology. These state-of-the-art repair services can extend the life of your components and optimize your maintenance budget.

## Innovative Approach

A tailor-made approach guarantees flexibility in scope and contractual coverage, such as:

- Your machinery availability is maximised by a pit stop outage with spare strategic components (eg GT bladed rotor) ready on site before the overhaul



- Off line reconditioning of your spare strategic components
- The rental of our spare strategic components is an alternative available option.

## Repair Services Backed by Engineers

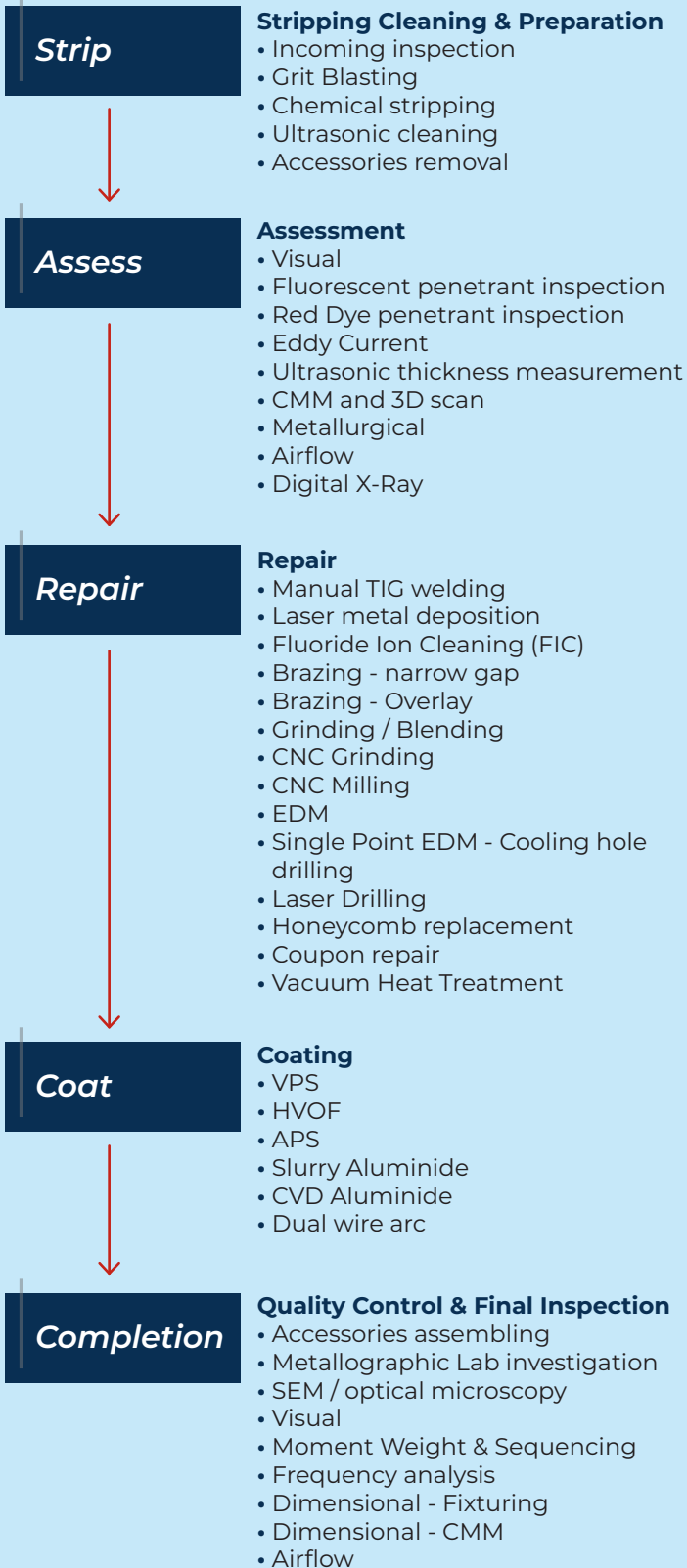
Thanks to the state-of-the-art inspection techniques such as digital x-ray, coordinate measuring machines, Non-Destructive Testing (NDT), and testing laboratory, it is possible to accurately inspect and assess the condition of our customers' assets.

The best method of repair is then selected using the most advanced equipment to perform the repair activity.

We offer specialized repair processes for turbine Blades & Vanes and main strategic components.

# Repair of turbine blades & vanes and strategic components

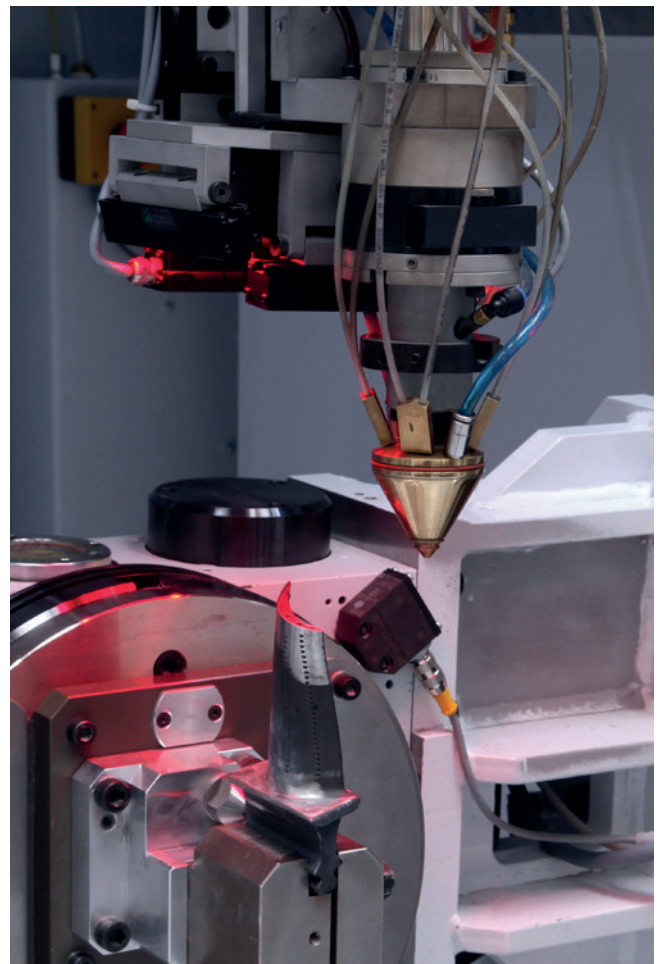
## *Turbine blades & vanes refurbishment*



**Repair Innovation:** Coupon repair, selective laser melting, new materials and techniques for repair, extension of life time (multireco) and operating range. We stay committed to the development of further technologies.

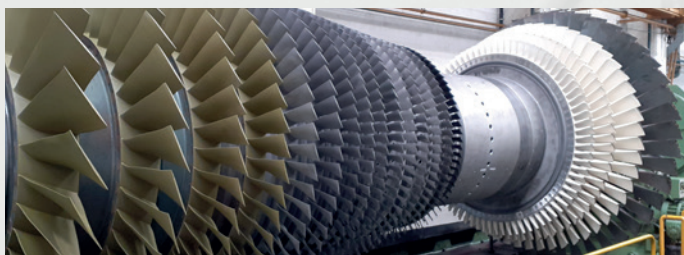
**The Customer's life cycle** cost can be optimized by parts pooling, life time extension, scrap rate reduction, parts upgrade.

**Global repair** operates by a network of leading edge technology centres. Repair at all levels of complexity is offered on Ansaldo Energia OEM and OEM-like machinery, for heavy-duty gas turbines.



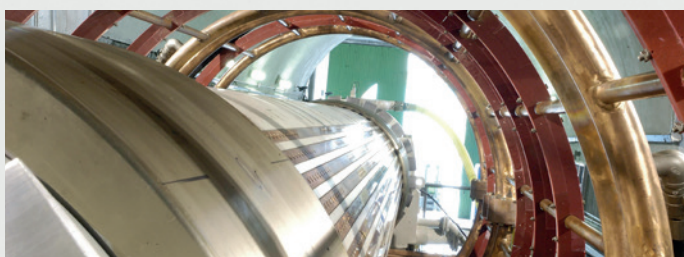
## ***Strategic components repair***

Rotors, casings, stators, combustion chambers and other strategic components repair leverages the new units equipment available in our factory.

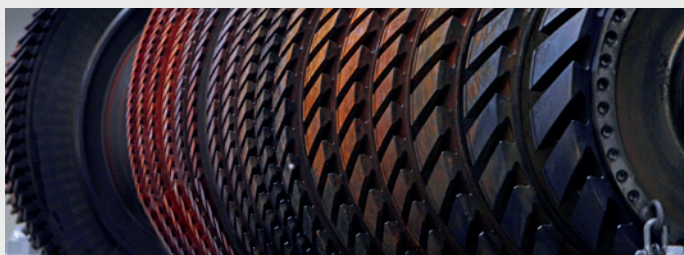


### **REPAIR INNOVATION**

welding repair, coupon repair, advanced dimensional checks.  
We stay committed to the development of further technologies.



**WORKSHOPS** – leveraging on the same new components equipment, with heavy repair capabilities ( e.g. generator re-windings) and low and high speed balancing facility.



### **THE CUSTOMER'S LIFE CYCLE**

cost can be optimized by strategic parts rotation (e.g. rotor refurbishment and “rotation”), life time extension, upgrades.

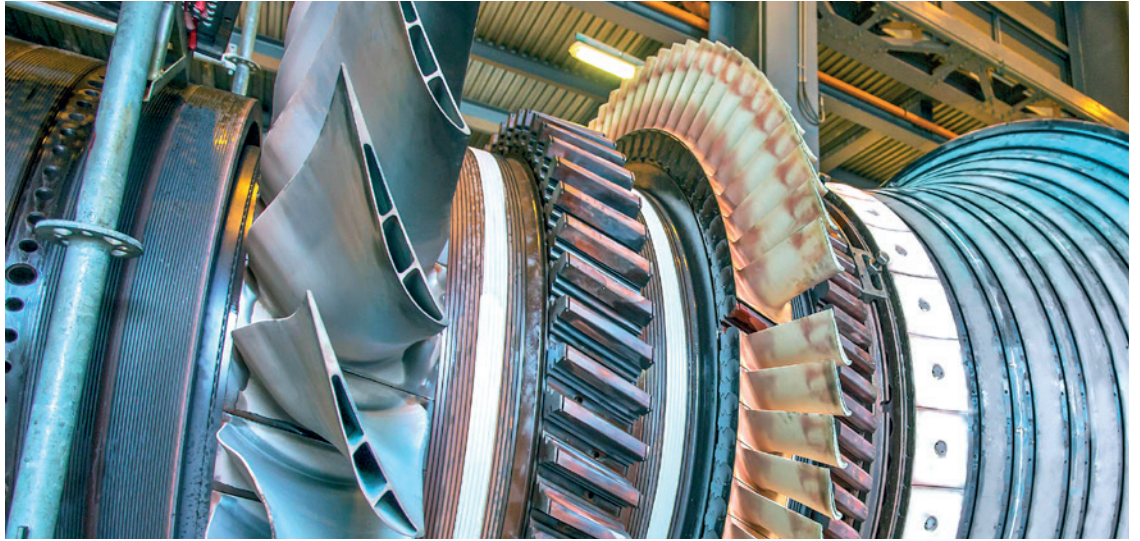
## **Gas Turbine**

Ansaldo Energia has a long history of gas turbine overhaul, advanced repairs and upgrades.

We provide multi-platform service at worldwide locations:

- Standard rotor overhaul - including compressor re-blading and coating if required
- Rotor component repair or replacement
- Casings and carriers repair
- Combustion chamber repairs
- Burners and fuel nozzles repairs
- Upgrades
- Residual Life Assessment

All of our customers' requirements can be complemented by site-to-site shipping and logistics, site activities and re-commissioning service if required.



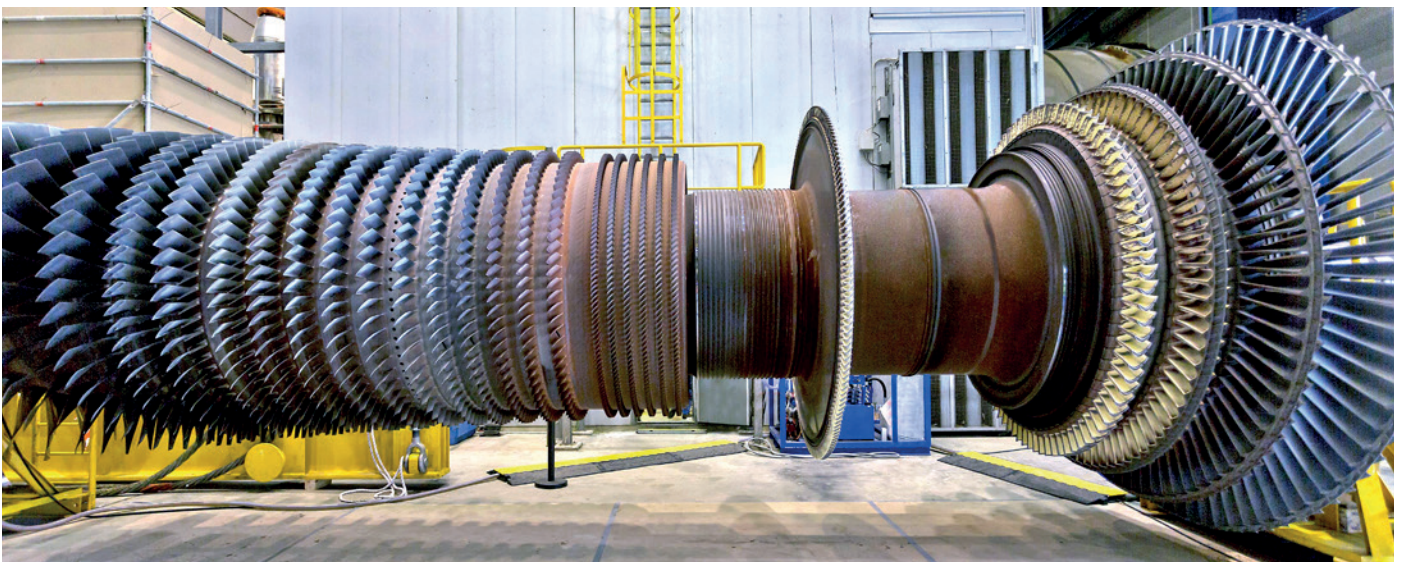
## Rotor Residual Life Assessment

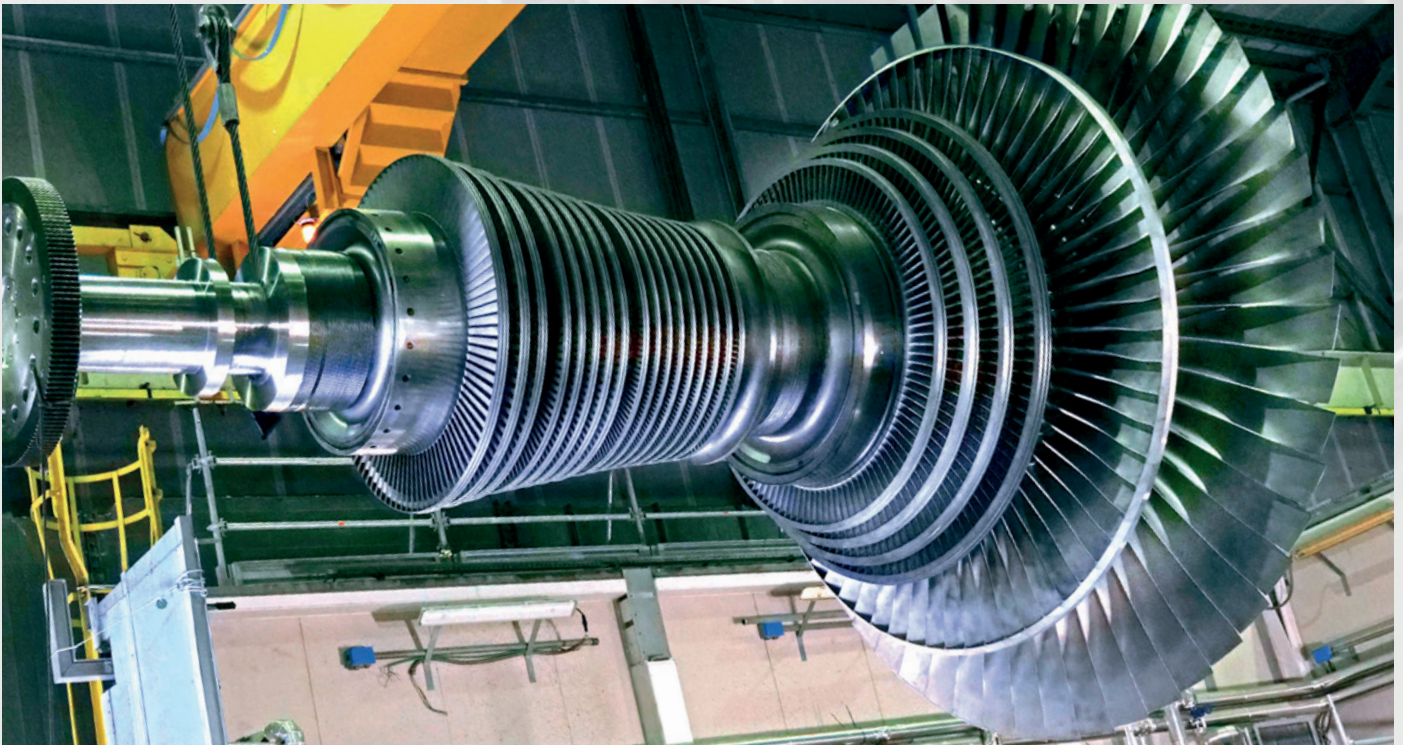
Ansaldo Energia's Rotor Residual Life Assessment (RLA) can extend the operating lifetime of your rotor. Thanks to the progresses in computing science, material properties and knowledge, fracture mechanics methodologies, inspection techniques, the rotors have the possibility to run beyond their original design limits.

Rotor RLA is enabled by:

- Advanced non-destructive inspection techniques to detect surface and volume defects
- Material characterization of all the rotor components
- Full 3D Finite Element Analysis (FEA) models for thermal & structural analysis
- Inspection results and operational history of the specific engine to feed the FEA Model

Any findings are analysed and a detailed report is issued including the residual life of the parts, empowering owners to make aware decisions about their rotor assets. Optional rotor modifications can be also applied to extend rotor lifetime.





## Shaft Line

A total plant solution, inclusive of repairs on generators and steam turbines, is offered using Ansaldo Energia's engineering and field service resources partnered with external service providers.

The offer includes:

- Integrated total plant solutions which utilize our global network of technology, experience and resource
- Multiple product lines, services and commercial teams, working together in unison with Ansaldo Energia as your single point of contact
- Competitive product and service offerings driven by customer demand – working on the solutions needed most by our customers
- Demonstrated performance, flexibility, and on-time execution



# Repair Centers Network

Global repair service operates by a network of leading edge technology centres. The repair network includes Ansaldo Energia repair centers located in Genoa Headquarters, Italy, in the Middle East and China and qualified high-technology partners.

Leveraging our know how and expertise, we offer repairs at all levels of complexity on Ansaldo Energia OEM and OEM-like machinery, for heavy-duty gas and steam turbines and generators.

Ansaldo Energia Global Repair Services are key to support our Long Term Service Agreements and Field Service activities, with a dedicated R&D and engineering organization aimed to offer quick solutions and long term improvements.

## GENOA REPAIR CENTER

### Turbine Blades & Vanes

- End to end refurbishment
- Excellence center for rotor and stator parts repair
- Concurrent development with R&D

### Other components

- Repair of GT, ST and generators strategic components
- Leveraging new components production lines and technologies for repair

## AGT REPAIR CENTER

B&V

- End to end refurbishment for Chinese market

**Ansaldo Energia**  
Manufacturing &  
Repair Center  
Genova, Italy

**AGT**  
Repair Center  
Shanghai, China

**Ansaldo Energia Gulf**  
Repair Center  
Abu Dhabi, UAE

**MESH**  
• Service Hub  
• Repair Center  
Dubai, UAE

## ANSALDO ENERGIA GULF REPAIR CENTER

### Turbine Blades & Vanes

- End to end refurbishment
- Excellence center for rotor and stator parts repair

## MIDDLE EAST SERVICE HUB REPAIR CENTER

- Repair of GT and ST strategic components

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