Non OEM Turbine Retrofit & Modernization Projects

Building your tomorrow today

Doosan Škoda Power

INTRODUCTION

Doosan Škoda Power is a leading supplier of advanced systems, components and services in the field of design and manufacturing of power generating. Our areas of service expertise include retrofit and modernization (R&M) of existing installed equipment, commissioning and long-term service including spare parts delivery.

Besides its own turbines, Doosan Skoda Power, R&M Department focuses on turbine retrofit and modernization of all global producers. Our services are provided to customers with individual tailor made approach worldwide.

Deregulation, competitive markets, new emission regulations, increasing demand for power go hand in hand with an aging generating fleet and rising fuel prices, which is the cause of turbulent changes on global energy markets. All these factors create the need for flexible strategy for future growth. Optimisation of operating characteristics, life time extension of the power plant, and increase of output at lower operating costs or reduction of production of harmful emissions – these are the main reasons why turbine retrofits are merits of our focus.

STEAM TURBINE RETROFIT AND MODERNIZATION

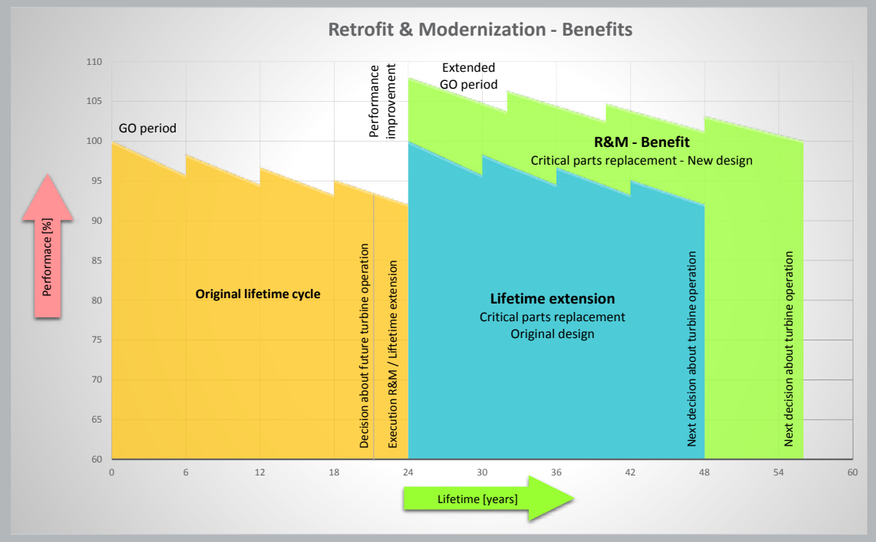
With demands for increasing electricity production, plant operators are looking for ways to effectively improve the efficiency and operation of existing facilities. Further reason for steam turbine R&M is usually forthcoming end of equipment's lifetime. Despite of the regular overhauls and non-scheduled repairs it is basically impossible to achieve originally projected parameters and performance without major renovations.

Time to plan power plant rehabilitation is approximately after 25 years of operation, (200 000 operating hours), hence the average lifetime of the most loaded equipment is limited by 30 years. Scope of R&M depends on the present plant conditions.

Application of new solutions begins with an essential replacement of existing labyrinth seals with new ones with advanced sealing properties, through steam path retrofit and ends with the complete replacement of the turbine with the use of existing foundation.

New flow path with improved characteristic is an example of steam turbine retrofit which is accommodated and fitted to the original design preconditions. The aim is to reuse as many of the existing turbine components as possible.

All R&M solutions provide short investment's payback period. In most cases the return of investment is three to five years.



TECHNOLOGY

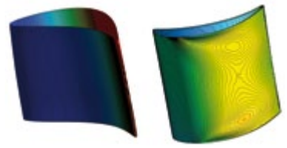
In R&M projects,the state-of-the-art solutions are applied, proven new build projects knowledge and technologies are used together with the combination of own in-house R&D. Our wealth of knowledge and experience with steam turbines is applied also on turbine retrofitting.

LP last stage blade solution

- Improved profile efficiency
- Optimised aerodynamics
- Selection from wide family of last stage blades, based on project-specific ,, cold end“ solution
- Usage of approved modular solution
- High availability and long lifetime

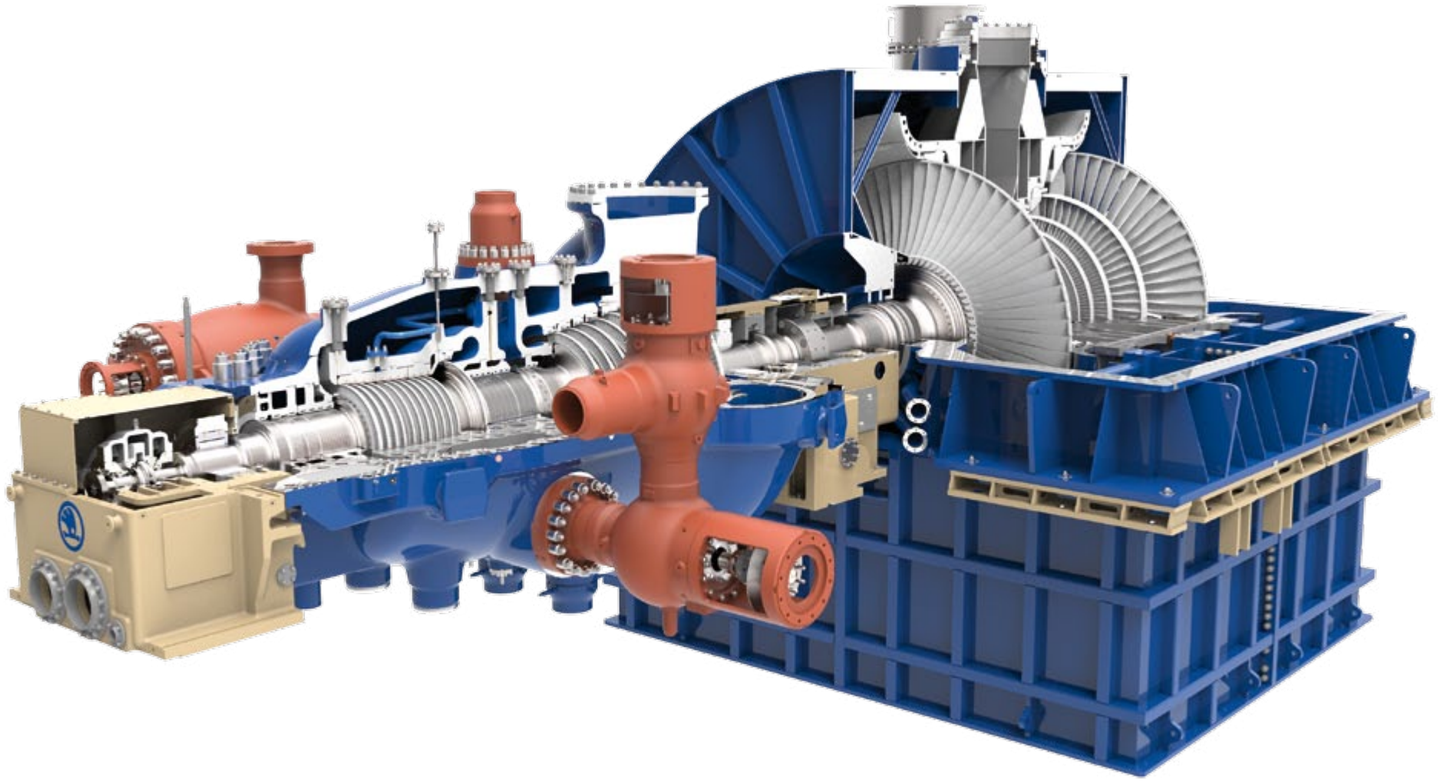
3D optimized blading

- Reduction of aerodynamic losses in turbine stages
- Inccreased efficiency compared to types of blading used in the past
- Improved specific heat consumption



LP diaphragms

- Hollow stationary blade with groove for water separation on suction and pressure surfaces
- Welded design
- Moisture removing in the area of last LP stages

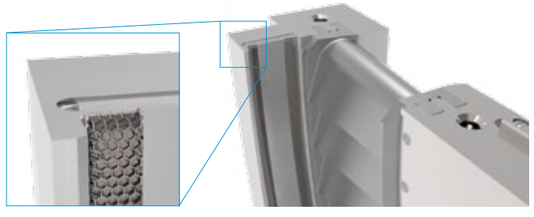


Solid-forged and welded rotors

- Use of materials with optimal properties for different parts of rotor at specific operating conditions
- Reduced weight of welded parts, which can be forged more precisely than large parts
- Higher metallurgical accuracy, economically attractive solution
- Reduced heat load, faster start-up

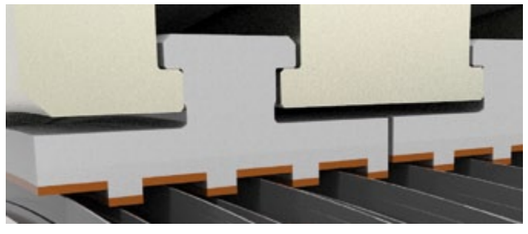
HP / IP assembled design diaphragms

- Precise assembly
- Bucket-tip ,,honeycomb type“ sealing
  - Improved efficiency through reduced clearences
  - Spring-back option for sustaining high efficiency during lifetime



Abradable inter-stage labyrinth sealings

- Stator coating creates a rubbing tolerant sealing
- Improved efficiency through reduced clearences
- Minimized damage or wear of sharp edges
- Spring-backed as default solution
- Patented retractable design for peaking and solar turbines



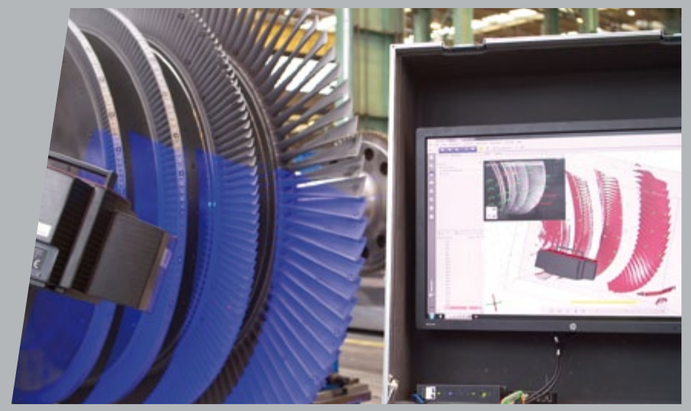
SPECIAL CAPABILITY TO PERFORM TURBINE RETROFIT & MODERNIZATION

Doosan Škoda Power is fully equipped to provide highly effective R&M solutions created by competent engineering team which is using sophisticated special tools and devices as reverse engineering and on-site machining.

Reverse engineering

Basic principle of reverse engineering method is to obtain design data of the original equipment, necessary for the R&M projects.

- Fundamental tool for retrofit and modernization
- Gathering and verification of design data
- Enable to fit new parts to original installation

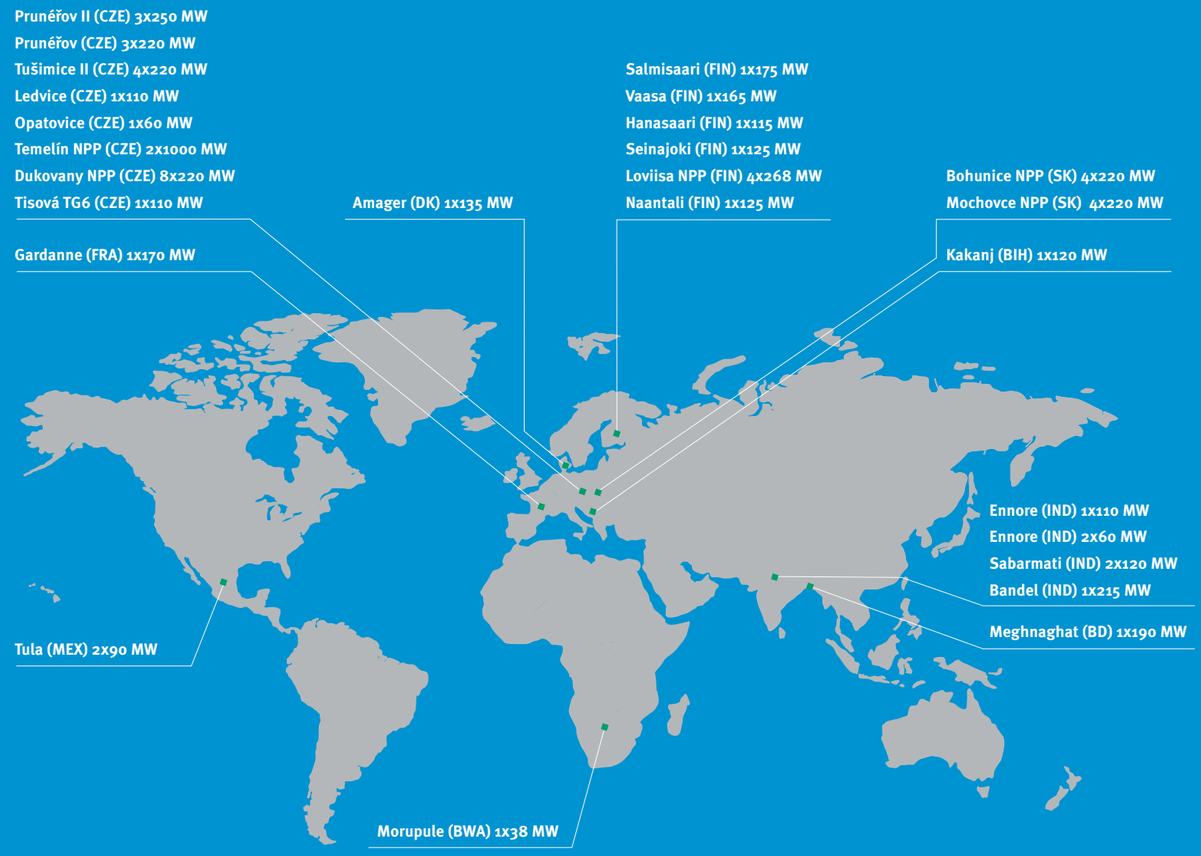


On-site machining

On-site machining is applied at power plant, where the original equipment modification is required.

- Machining at power plant
- Execution time shortening
- Worldwide utilization

R&M WORLDWIDE EXPERIENCE



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