

## Power engineering projects

### Biomass combustion power generating units

- Steam boiler power output ranging from 10 to 60 t of steam/hour
- Superheated steam generated in the steam boiler is supplied to the condensing turbine with controlled off-take, consisting of a counter-pressure stage and a condensing stage
- The unit includes all necessary technology, such as fuel conveying, fuel management and ash management
- The unit includes condensate management, cooling and outlet line to high voltage substations.
- Delivery includes all connecting pipes and fittings required for safe and reliable operation
- Standard solution with modifications according to customer requirements



### Gas engine power generating units

- Modular systems with a total output range from 10 to 50 MWe, each motor generator stage providing an output ranging from 4 to 10 MWe
- The motor generators supply superheated steam via an exhaust gas heat exchanger to the condensing turbine
- High electrical efficiency of the energy units, which also include water treatment systems, cooling, power outlets
- Supplied in cooperation with manufacturers of gas engines, including exhaust gas exchangers



### Fossil fuel combustion power generating units

- Steam boiler power output ranging from 10 to 80 t of steam/hour
- Generated superheated steam is supplied to the condensing turbine with controlled off-take, consisting of a counter-pressure stage and a condensing stage
- The unit is complemented with purification of combustion gases or possibly with desulphurisation and other required technology for compliance with emission limits
- Standard solution with modifications according to customer requirements



### Upgrades in power industry

- Modifications and upgrades of burner systems
- Modification of the regulation and control of boiler combustion processes
- Reconstruction and modifications of non-pressure boiler parts
- Modification of ducts and combustion and flue ways
- Solutions for cleaning of surfaces susceptible to clogging
- Upgrades and repairs of boiler pressure parts, also in relation to an improvement in efficiency



## Reference projects

### Žarnovica – Slovak Republic, 2013

Supported grate boiler, combustion of chips. Combustion takes place at water-cooled vibrating grate. The boiler includes three membrane passes and two uncooled sheet metal passes. Recirculation of flue ash and combustion gases.



Boiler output (t/h): 35  
Steam pressure (MPa): 3.78  
Steam temperature (°C): 475

### Krnov – Czech Republic, 2009

Steam boiler, combustion of chips on counter-travelling grate. The boiler includes two cooled membrane passes and two uncooled sheet metal passes. Recirculation of ash and combustion gases is used.



Boiler output (t/h): 35  
Steam pressure (MPa): 3.75  
Steam temperature (°C): 475

### Domoradice – Czech Republic, 2011

Full boiler plant delivery. Supported boiler, combustion of chips, travelling grate stoker, three membrane passes and two uncooled sheet metal passes. Installed recirculation of flue ash and combustion gases. Delivery of fuel drier.



Boiler output (t/h): 35  
Steam pressure (MPa): 6.9  
Steam temperature (°C): 470

### Pforzheim – Germany, 2005

Steam boilers, combustion of contaminated wood chips. Including purification of flue gases, ash recirculation etc.



Boiler output (t/h): 52.5  
Steam pressure (MPa): 6.2  
Steam temperature (°C): 450

### Kutná Hora – Czech Republic, 2011

Steam boiler, straw combustion on sliding grate. Three vertical membrane passes and one uncooled sheet metal pass. Flue gas purification using cloth filter.



Boiler output (t/h): 30  
Steam pressure (MPa): 4  
Steam temperature (°C): 400

### Wicker – Germany, 2005

Steam boilers, combustion of contaminated wood chips. Including purification of flue gases, ash recirculation etc.



Boiler output (t/h): 55  
Steam pressure (MPa): 6.7  
Steam temperature (°C): 450

# Power industry





## Industrial boilers

### Biomass-fired boilers Fossil fuel-fired boilers

- Output from 10 to 80 t of steam/hour
- Typical design of the steam boiler:
  - 2 vertical membrane passes – the first pass is designed as a radiation heating surface, The second membrane pass is equipped with three superheaters
  - 1 uncooled pass – EKA bundles, air heaters
- Biomass combustion:
  - Grate of travelling design or vibration design, air supply under the grate and at several levels above the grate
  - Combustion chamber protection against chlorine corrosion through metal coating or ceramic material coating
- Fossil fuel combustion:
  - Grate combustion or fluidized bed combustion
  - Boiler is designed in a manner preventing flue ash sticking on convection surface bundles and abrasion of surfaces
- Accessories: fans, blowers, connecting pipes, fittings, instrumentation, electric installations, control system

### Sorted municipal waste-fired boilers

- Output from 20 to 80 t of steam/hour
- Own development and construction, optimum design has been developed for the best possible combustion
- Maximum protection against adverse effects of combustion, in particular with regard to potential chlorine corrosion
- Maximum suppression of NOx generation is achieved through the design of the combustion chamber, emissions are further reduced using the SNRC method (selective non-catalytic reduction)

### Hot water boilers

- Output from 10 to 100 MWt
- Horizontal or vertical design
- The boiler is delivered as a single unit, fully factory-assembled; boilers with outputs above 30 MWt are delivered in blocks which are easy to assemble on site
- The burner allows automatic operation, i.e. programmed start, power control and blocking by safety components of the boiler and the burner
- Components of a standard delivery: supporting structure, inlet and outlet connecting pipes and fittings, field instrumentation and control systems for the boiler and burners

### Waste heat boilers

- Output from 5 to 80 MWt
- Waste heat boilers installed downstream from gas turbines, gas engines and other units
- Boilers generating steam or hot water
- Boiler design options: horizontal, water-tube, single- up to three-pressure boilers
- Components of a standard delivery: duct system, boiler and chimney with damper, channel burner for reheating

### Container boilers

- Boiler plants are delivered in the form of containers, ready for connection to external power lines
- Output in modules by 0.6 MW, up to 6 MW
- Boilers are powered by gas or light heating oil

### Oil/gas boilers

- Oil and gas-fired steam boilers with the output ranging from 20 - 250 t/h and hot water boilers with the output over 10 MW
- Boiler parameters and design are set depending on specific operating conditions in the operator's heating plant:
  - Single-pass, double or multiple pass
  - Vertical or horizontal design
  - One or two drums
  - Natural or forced circulation
- Components of a standard delivery:
  - Thermal water treatment and feeders at the water inlet to the boiler
  - Steam lines including fittings at the steam outlet from the boiler
  - Combustion gas management including burners and related systems (ducts, chimney).

## Boiler services

- Elaboration of assembly design documentation and energy unit commissioning design documentation
- Elaboration of guarantee testing design documentation
- Elaboration of plant conservation design documentation
- Technical assistance in commissioning of energy units
- Discharging of boilers and steam lines
- Chemical cleaning of new and operated boilers
- Boiler conservation
- Training of client's staff for external customers

## Ecologization of boilers

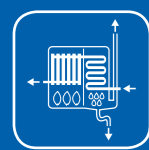
- Low emission powder burners and modified distribution of combustion air so that combustion takes place in an optimum manner with regard to the generation of nitrogen oxides and achievement of low values of carbon monoxide, including solutions with recuperation of combustion gases
- Reduction of nitrogen oxides and compliance with emission limits required in 2018 is achieved by applying a non-catalytic method or catalytic method (SNCR and SCR)
- Installation of electrostatic or cloth filters to reduce emissions of solid pollutants
- Dry wash or lime wash for the reduction of sulphur oxides

## Turbines

### One hundred years of tradition in the development and manufacture of turbines

For our customers we provide

- Development and manufacture of turbines of lower outputs, generally from 100 kW to 30 MW, in particular:
  - STG I and STG II steam back pressure turbines (100 kW to 8 MW)
  - STG I and STG II steam back pressure turbines (1 MW to 15 MW)
  - CSTG extraction condensing turbines (700 kW to 3 MW)
  - TG axial extraction condensing turbines (2 MW to 30 MW)
  - Low pressure condensing turbines (500 kW to 15 MW)
  - Gas expansion turbines (300 kW to 12 MW)
  - Power turbines
- Supply of complete plant equipment and EPC projects
- Overhauls of complete turbo sets, measuring and check of important turbo set components (bearings, blades, etc.) and elaboration of final report, including supply of original spare parts



### We manufacture industrial boilers

- Own design
- Various fuel types
- Wide range of power engineering applications



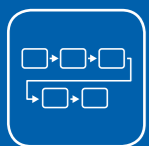
### We build power and heating units

- Complete construction on a turnkey basis



### We develop new and innovative solutions

- Development of own boiler equipment, including boiler control systems
- Combustion of fuels from new renewable resources, such as phytomass, plant pellets, sludge from wastewater treatment plants
- Fluidized bed combustion
- Attention to ecology and emission reduction



### We provide a wide range of services for boilers and power units

- Design according to customers' specifications
- Services in the construction period
- Commissioning and operation itself
- Maintenance and design services
- Repairs, reconstruction and modernization



### Our long experience guarantee the highest quality

- Manufacturer of steam boilers with over 200 years of tradition
- Certification of internal quality management system according to ISO 9001
- Collaboration with numerous prestigious domestic and foreign partners