



The largest Italian  
Original Technology  
Boiler Manufacturer





**AC** BOILERS S.p.A.  
formerly **Ansaldo Caldaie**

# AC BOILERS

## in the Energy Evolution

### Energy is evolving

Customers urgently need to face key challenges in profitability of operations with proven reliability and high performance

AC Boilers reliably provides customized steam generators designed according to proprietary leading technologies for power plant applications, proven by our track records:

- utility boilers for a full range of fuel combinations, power ratings and applications,
- heat recovery steam generators for combined cycles

Pressure Parts manufacturing capabilities include Own shop fabrication facilities in Europe and Global Sourcing from Certified Suppliers, give AC Boilers' clients time and cost flexibility. Global operational and procurement offices are found in Italy, USA, Egypt and China

#### Shuaibah Power Plant

SWEC (Saudi Arabia)  
3 x 630 MW Utility Boiler  
Crude Oil fired





#### **Aprilia Combined Cycle**

Sorgenia (ITALY)

2 HRSG behind

2 x 260 MW GT

### **Performance**

- Optimized, Efficient, State-of-the-Art designs for the toughest operations, up to Ultra-Supercritical conditions for utility boilers and up to the largest gas turbine capacities for combined cycles

### **Reliability**

- Proven track record of integrated design, manufacturing & construction approach

### **Research & Product Development**

- Direct ownership of one of the largest european R&D centers for boilers combustion technology allows for full scale testing and innovation capabilities

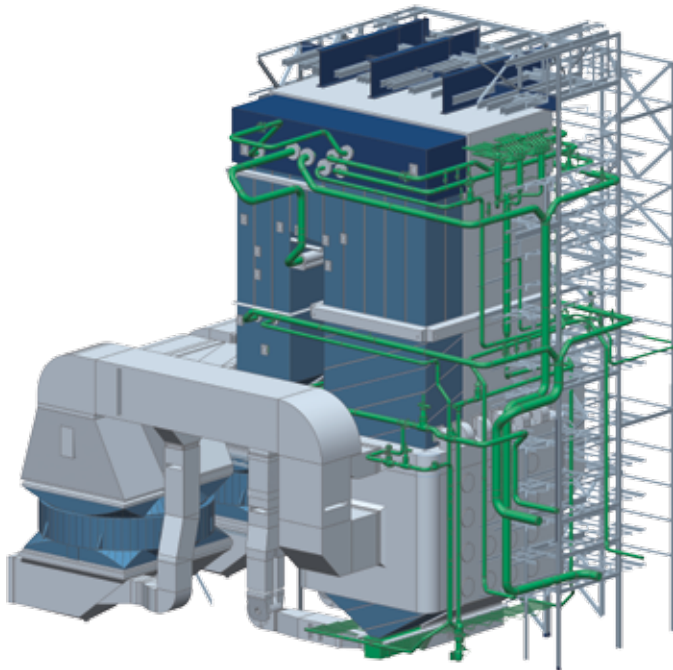
# UTILITY BOILERS

## Design & Manufacturing Capabilities

Since its inception, AC Boilers supplied more than 1000 units (80 GW) worldwide, of which 18GW Super-Critical Utility Boilers, and has been Global Market Leader of SC Oil & Gas Fired Boilers in the last 30 years

AC Boilers has a base of Proprietary Know-How and Original design codes, integrated with Benson® Once-Through Licenses for Ultra Super-Critical and Super-Critical Designs

AC Boilers customizes its boilers depending on Fuels to be fired, operating modes, as well as site peculiarities





**Torvaldaliga  
North**

Enel (ITALY)  
USC Coal Fired  
Benson Boiler  
3 x 660 MW,  
252 bar,  
604/612 °C

# Ultra-Supercritical & Supercritical Technology

In a Carbon Stranded New Energy Scenario, Supercritical (SC) and Ultra Super-Critical (USC) technology allow the Highest Power Plant Efficiencies whilst reducing CO<sub>2</sub> and pollutant emissions

AC Boilers proven experience includes Coal Fired Ultra-Supercritical boilers, successfully operating in one the most advanced Clean Coal fired Plants in the world, acting as important part of the backbone of the Italian electric grid

The consolidated experience in SC Boilers for more than 50 years includes multi-fuel units firing coal, heavy oil and natural gas. AC Boiler reference design incorporates a complete range of State-of-the-Art solutions upto the maximum proven steam temperatures for coal SC and USC boilers as well Heavy Oil/Gas SC boilers



# Drum Type Boilers

## **Abu Qir Power Plant**

WDEPC (EGYPT)

2 x 650 MW

Gas / Heavy Oil

AC Boilers is one of the global boiler makers with the largest experience in natural circulation boilers, firing coal as well oil & gas, operating at the highest sub-critical pressures at over 180 bar

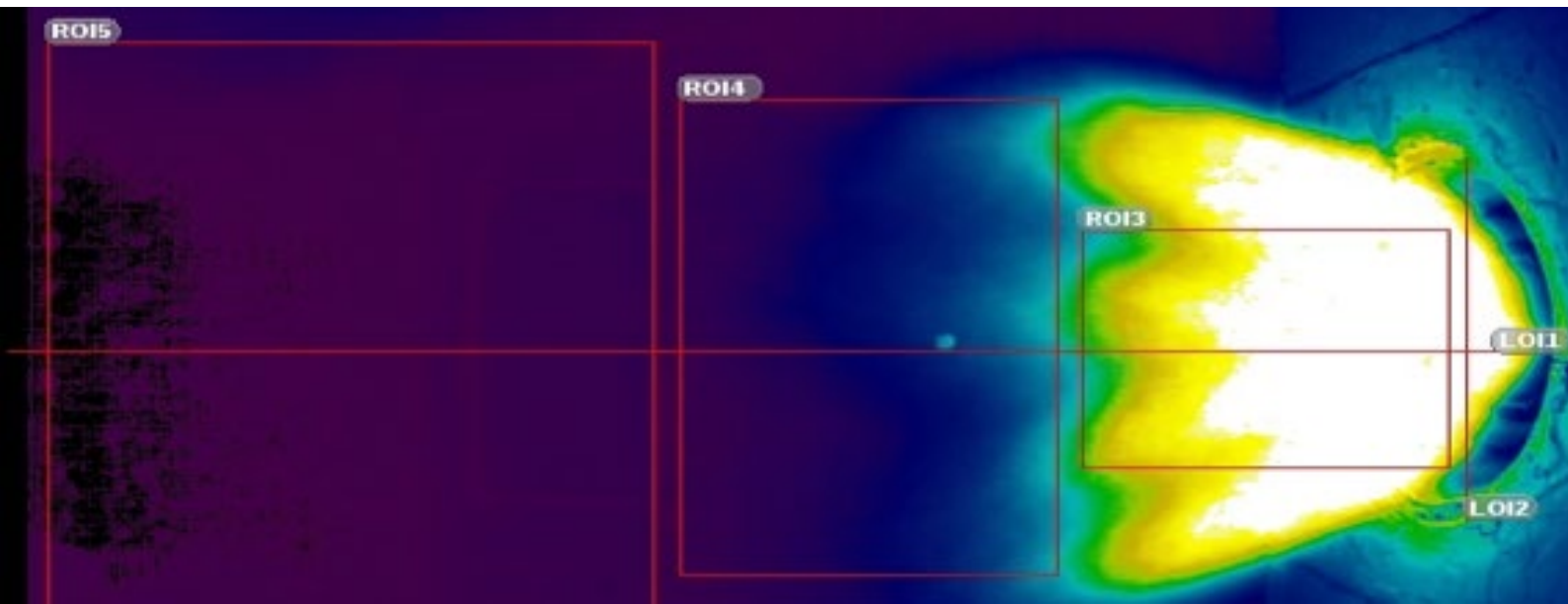
AC Boilers drum type solutions are based on well proven internally ribbed furnace tubes, in order to prevent the Departure of Nucleate Boiling phenomena (DNB)

# Firing Systems

AC Boilers is one of the front runners in Clean Combustion Technology, according to BAT emission levels, and has an extensive experience with:

- In-Furnace Emission Reduction Techniques for:
  - New Build
  - Service Projects
- Co-Firing solutions for:
  - Coal and Biomass
  - Coal and Solid “End of Waste” Fuels

Since the '90s AC Boilers low-Nox burner design has been validated at its own Combustion Research Centre, equipped with a 49 MWth boiler test rig used to validate individual burners in large scale operating conditions

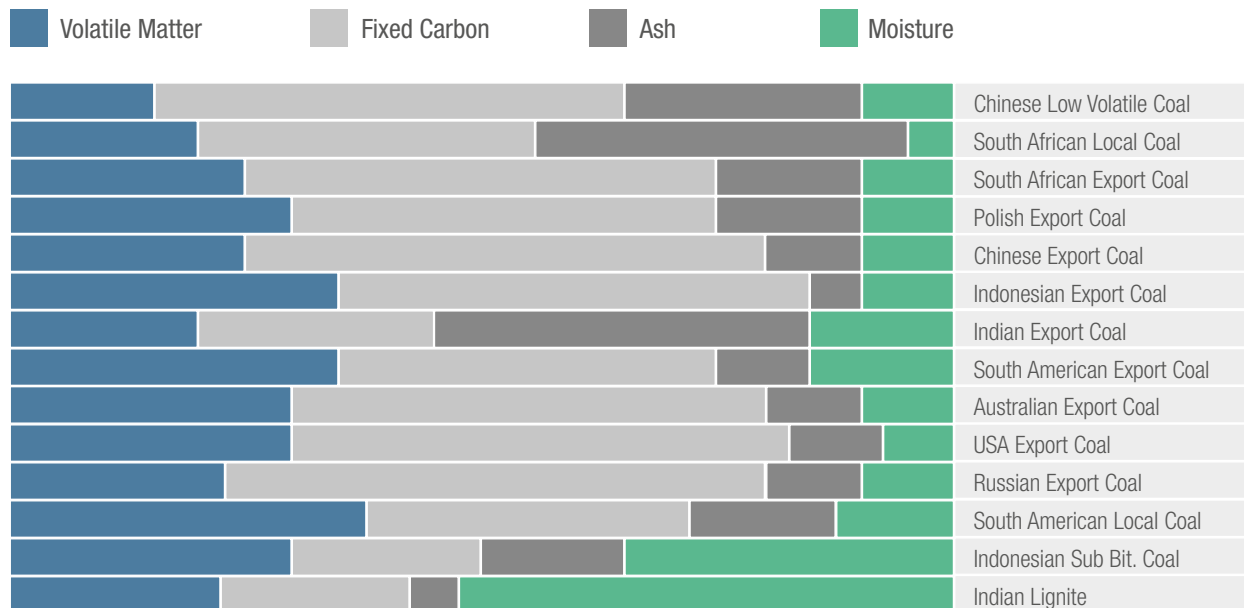




# Coal Firing

AC boilers has the knowledge and experience in firing internationally traded coal; 24GW of experience which spans from high-grade bituminous coals to the lowest-grade high-moisture lignites and the high-ash Indian coals

Reference design models are based on the two-pass arrangement, use of proven alloy steels for the highest steam temperatures and pressures, opposed wall firing for low emission clean coal firing.





# Oil & Gas Firing

## **El Tebbin Power Plant**

CEPC (EGYPT)

2 x350 MW

Gas / Heavy Oil

AC Boilers leading technology for Heavy Oil / Gas boilers is based on a unique experience record of more than 55 GWe of installed units

Reference design models includes box type as well as two-pass type arrangements

The highest steam temperatures are reached using proven high alloy steels, in order to withstand the HFO high temperature corrosion

State-of-the-Art Opposite-wall Low-Nox firing are used for major in-furnace reductions and the widest fuel and operational flexibility

# HEAT RECOVERY STEAM GENERATORS

In an ever-changing energy and regulatory environment, customers need to address key challenges in flexibility of operations, with proven performance and reliability

AC Boilers is an OEM with a huge number of HRSGs worldwide, delivering high performing HRSGs downstream of large capacity Gas Turbines of various models and sizes, firing a variety of fuels, up to the maximum ratings

AC Boilers proven design incorporates enhanced solutions to meet the demands for fast start-ups, changing load demands as well as purpose built, highly efficient optimized solutions for the most demanding steam pressure and temperature requirements of Advanced Combined Cycles

**Turano Lodigiano  
Combined Cycle**  
Sorgenia (ITALY)  
2 HRSG behind  
2 x 260 MW GT



# Horizontal Gas Flow HRSGs

AC Boilers has extensive experience and capabilities in Horizontal HRSG design and manufacturing

## BASIC DESIGN FEATURES

### Steam & water cycle

- Multiple Pressure Levels, with or without Reheat
- Up to the Highest Steam Pressures and Temperatures for Advanced Combined Cycles
- Natural Circulation, Drum Type

## CUSTOMISED DESIGN OPTIONS

- Supplementary Firing
- Fresh Air Auxiliary Firing Mode
- SCR – CO catalyst
- By-pass stack
- Boiler House

### Operation:

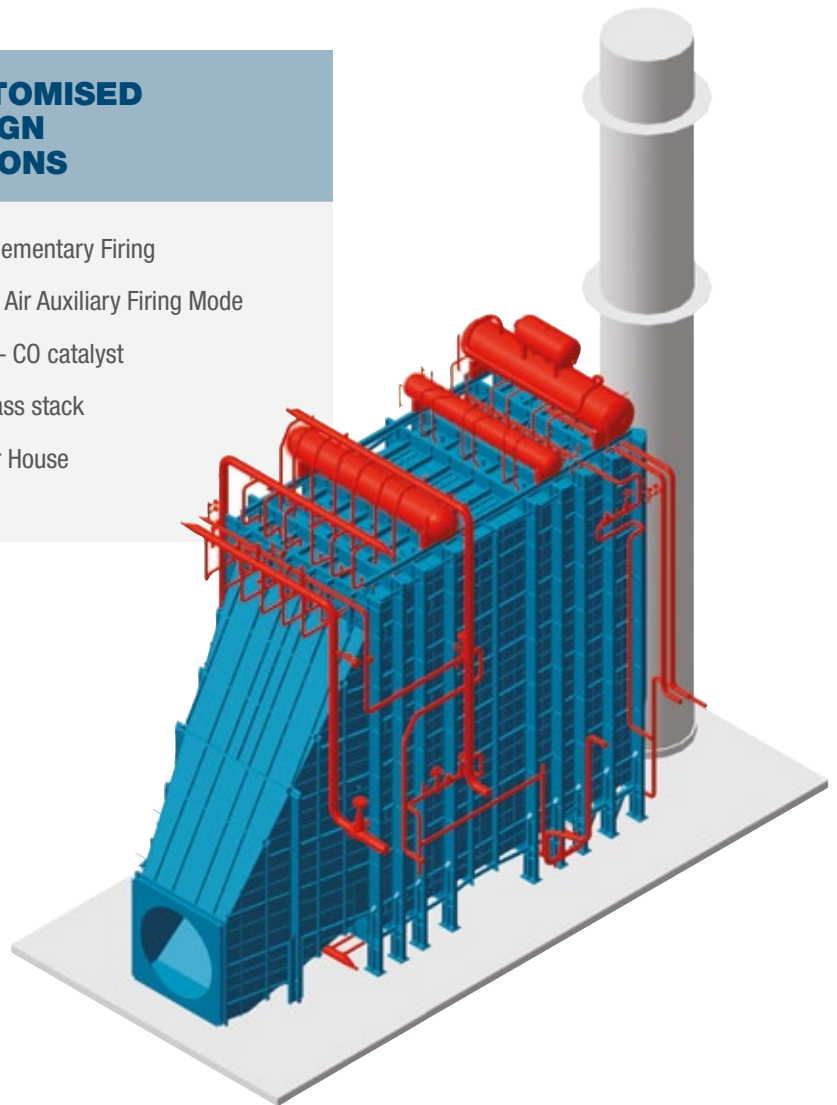
Heavy Cycling, Fast Start-Ups,  
Operational Flexibility

### Constructability:

Flexible Solutions of Harps,  
Modules or “C-Type” Sections

### Arrangement:

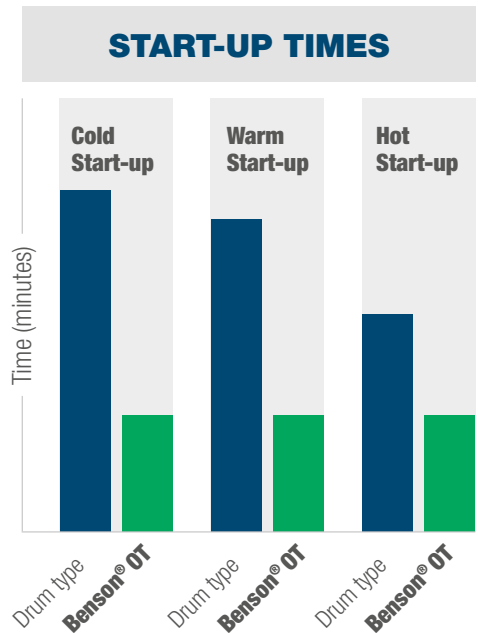
Fully Drainable, Spiral-Finned Efficient  
Heating Surface,  
Top Supported, Cold Casing



# Benson® Once-Through HRSGs

AC Boilers Designed and Manufactured the first 3 commercially-operating Benson Once-Through HRSGs in the world

Where extreme demand fluctuations are the norm, Benson Once Through HP Evaporators allow for enhanced dynamic characteristics, flexibility and faster start-ups making them suitable for Advanced Combined Cycle Power Plants operating at the highest steam pressure and temperature



**Hamm Uentrop**  
Trianel (GERMANY)  
2 HRSG behind  
2 x 250 MW GT

# Vertical Gas Flow HRSGs

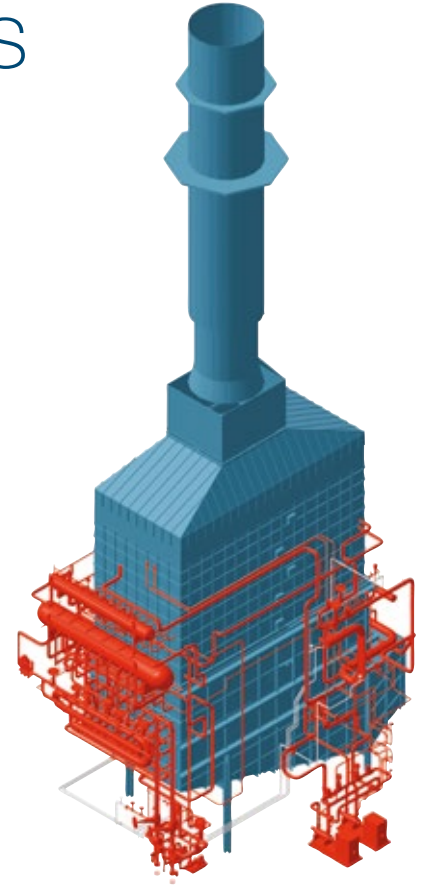
In Brownfield projects with space constraints, or downstream of Crude-oil-firing GTs, Vertical HRSGs can be the best option at hand

## SPECIFIC FEATURES INCLUDE

- Multiple Pressure Levels, with or without Reheat
- Natural or Assisted Circulation
- Operational Flexibility
- Modular Design for Shop-Assembled tube bundles
- Horizontal tube bundles with Spiral-Finned, Efficient Heating Surfaces
- Top Supported
- Cold or Hot Casing

Tailored solutions  
for Utility Boiler Repowering

Cleanable heating surfaces  
optimized for operation downstream  
Crude Oil Firing GTs



### Torrevaldaliga South Combined Cycle

Tirreno Power (Italy) ITALY  
3 HRSG behind  
3 x 250 MW GT



# WASTE-TO-ENERGY BOILERS



AC Boilers has a long standing history in the supply of Waste-to-Energy boilers including grate fired boilers for municipal solid wastes and for a variety of biomass fuels

AC Boilers is the OEM of the largest Italian Waste-to-Energy plant based on three units each with a nominal capacity of 900 t/day of municipal solid wastes

AC Boilers offers wide range of design solutions for large capacity units:

- Multi-Pass Boiler design
- Grate fired
- MSW, RDF, bagasse, wood-chips and other biomass fuels
- Customized design for each fuel type meeting the low emission requirements
- Furnace with vertical flue gas passes
- Inconel lined furnace options for MSW firing
- Convective pass with SH and Economize

# SERVICE

Sofinter Group offers a full range of OEM boiler services, spanning from full Reha-bilitations to Spare parts procurement

## Regulations & Environment

### Emission

- Low Emission Burners
- In-Furnace Emission Reduction Systems

## Operation

### Flexibility

- Fuel Conversions & Multi-Fuel Applications
- Flexible Load & Cycling Mode Adjustments

### Availability

- Pressure Part Replacement
- Material Change

### Efficiency

- Combustion Optimization
- Efficiency Improvement

### Performance

- Restoration to Design Output
- Steam Flow Increase, Boiler Up-Grade

## Maintenance

### Reliability

- OEM Spare Part Manufacturing
- Spare Part Supply Management

### Intervention

- Failure Analysis & Improvement Studies
- Material & Design Modifications

### Improvement

- Inspection, Diagnostics & Expertise
- Outage Planning, Repairs, Supervision

## Lifecycle

### Status Extension

- Equipment Condition Analysis
- Remaining Lifetime Assessment
- Full Rehabilitation Projects

### Experience & Expertise

- Supervision of Erection, Commissioning & Start-Up
- Operator Training



# SOFINTER GROUP

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