

Heat Recovery Steam Generators

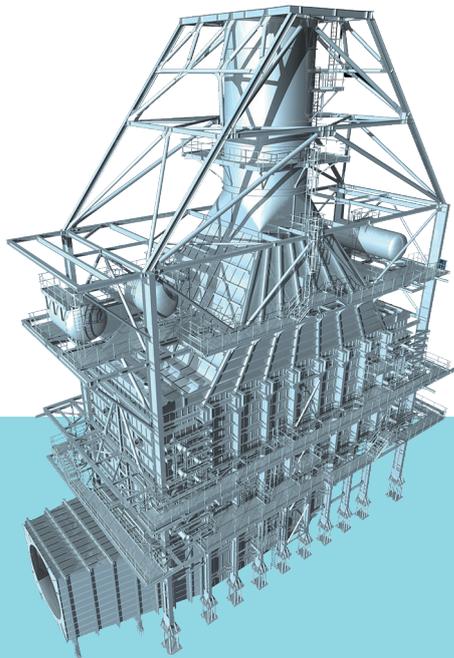


The Power to Change the World

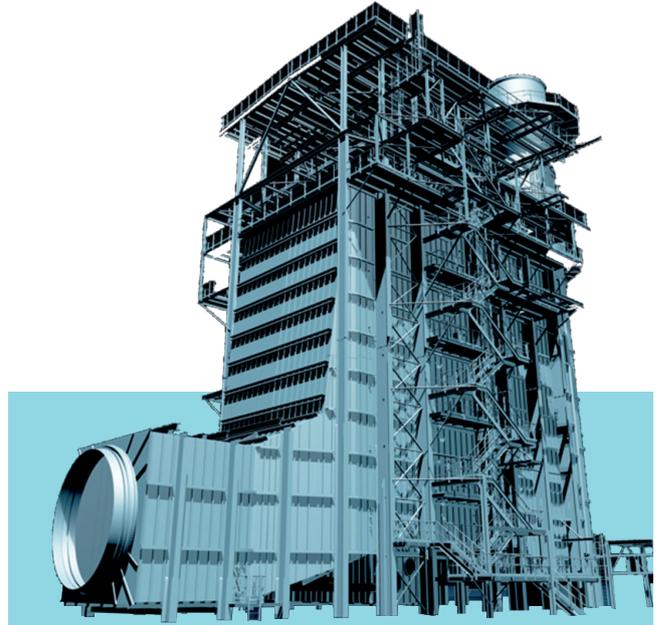


Designs that meet your needs

Both horizontal and vertical HRSG technologies are designed for cycling operation, providing optimal performance during frequent start-ups and shut-downs.



Vertical Technology



Horizontal Technology

Vertical Once Through Boilers

- Innovative solutions developed by John Cockerill experts and engineers
- Increased Combined Cycle Power Plant Efficiency
- HP drum replaced by small diameter separator, if any, allowing fast start-up (more power revenues)
- High cycling operation
- Less heat loss through blowdown
- Compact footprint even with Selective Catalytic Reduction (SCR) and CO Catalysts
- Better accessibility & lower maintenance costs
- Extensive savings on erection time, resources and costs (thousands of hours)
- Available in dry running mode (no by-pass stack), behind GT lower than 100 MW



DNV-certified boilers for Floating Liquidified Natural Gas applications (FLNG)

Project Flexibility & Expertise

Wide-Ranging Applications

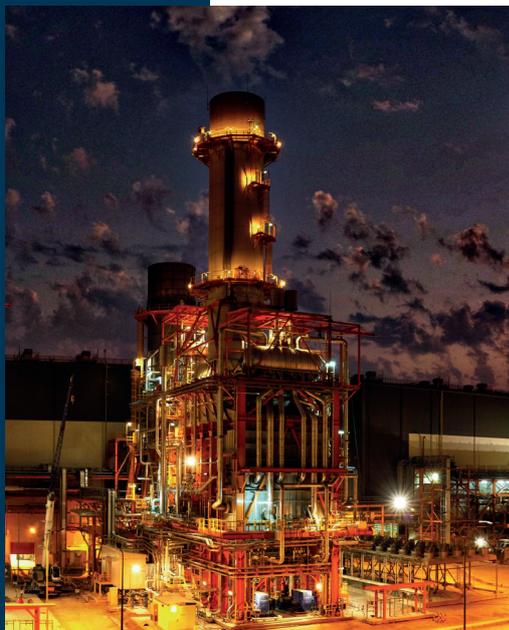
- Combined cycle and cogeneration plants
- Installed behind gas turbines from 25 MW to 500+ MW ISO of all brands: Ansaldo, GE, MHPS, Siemens
- Base load and heavy cycling modes of operation
- Repowerings, add-ons, greenfield and brownfield projects



Hamitabat, Turkey

Versatile Designs

- Vertical or horizontal HRSGs
- Natural or assisted circulation
- Once Through Boilers
- Condensing Boilers
- FLNG and industrial applications
- Single, dual, triple pressure with or without reheat
- Natural gas, refinery gas, light, heavy, and crude oil
- Certified to ASME, EN, PED, CE marking
- GOST-R, GOST-U, DNV
- Respect to local regulations & customer requirements
- ISO 9001, ISO 14001



Besmaya III, Iraq

Tailor-Made Solutions

- Supplemental firing with up-front or interstage burners
- Deaerator feedwater tanks and subsystems
- Selective Catalytic Reduction (SCR) and CO catalysts
- Boiler housings
- Auxiliaries (dosing, sampling, and nitrogen systems)
- Sootblowers
- Fresh-air firing for special applications
- Bypass diverter damper

Turnkey HRSG Solutions

Field Experience

- Global sourcing options
- Local content optimizing
- Transport and logistics worldwide
- Local manufacturing when required
- Experienced on-site Technical Field Associates work closely with installation team for optimized site assembly
- Full range of commissioning and performance testing
- Quick and easy access to project design team for trouble shooting and installation support

Hamitabat, Kırklareli, Turkey



Global After-Sales Support

Wide range of technical services and advice to modernize, repair or overhaul boilers of all power ratings and from all boiler manufacturers.

Technical Expertise

- Inspections and condition assessments
- HRSG Dry Ice Cleaning
- Remaining Life Time Assessments (RLTA)
- Boiler Stress Evaluator
- Qualified supervision to follow implementation of revamp work or on turnkey basis solution
- Trainings: maintenance and inspections, process, water chemistry, life time extensions

Revamping & Repair

- Re-engineering of any existing design from any boiler manufacturer
- Pressure parts improvements on recurrent failures, including retubing and heat exchanger replacement
- Engineering and installation of specific equipment on any boiler in operation, e.g. adding SCR, burners, a lift, sootblowers

Engineering Services

- New performances calculation with GT upgrades
- Seismic design, piping behavior analysis
- Cycling capability analyses and upgrades

Spare Parts



Easy Construction, Durable Performance

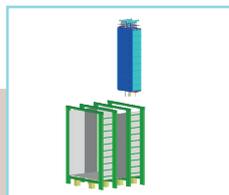
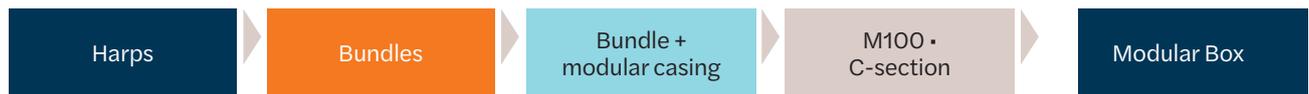


John Cockerill Energy modular designs (shop fabrication maximized as per customer needs), such as the M100, help to minimize field labor construction works and meet challenging deadlines



Modules for a vertical HRSG

Heat exchangers level of pre-fabrication can be increased by the use of:



Large HRSGs applications

Small HRSGs applications

Customer-Oriented Solutions

Reliable - Experienced - Trusted

- Professional relationship with customers
- HRSGs designed, engineered and supplied to meet specific client needs or site requirement, such as specific thermal performances, sound and/or emissions requirements, special certifications, limited footprints, seismic areas, innovative solutions, ...
- Skilled Engineers, Project Managers*, Supply Managers, Technical Field Advisors ...
- Highly-responsive, customer-oriented from Sales Teams up to Warranty Teams
- Efficient, accurate project planning using advanced scheduling tools
- Rigorous Quality Management, in-house, on-site, and throughout the supply chain (using tracking system)
- Systematic Return on Experience (REX) for continuous improvement on products & services



*John Cockerill Project Managers are credentialed Project Management Professionals (PMPs®) certified with the Project Management Institute (PMI).

Trust the John Cockerill teams to provide the best customer service while addressing every project need.

Specialized Manufacturing Workshop

Through our specialized workshop in Mexico, our customers benefit from the skills of top level experts in manufacturing and maintenance of boiler parts, in particular pressurized parts.

- Enhanced shop assembly of pressure parts, casing, and structural steel
- Shop assembly may comprise full casing assembly including bellow seals, structural steel frame
- Single-wide HRSG shop assembly may also include drums, large-bore piping and valves



John Cockerill HRSGs around the globe



 Horizontal Technology
 Vertical Technology

- Over 700 John Cockerill HRSGs installed worldwide
- Proactive, dedicated Account Managers in all regions worldwide
- Addressing contract-specific needs: engineering, consortium, turnkey, sourcing, special equipment
- Financing solutions: world-class banks, Export Credit Agencies



Towards a more Sustainable World

John Cockerill's expertise in steam production dates back to 1817. Its know-how as a designer and supplier of heat recovery boilers is recognized worldwide in the market of power generation.

Resolutely turned towards the future, entrepreneurship is key at John Cockerill and our moto is **responding to the needs of our times** by developing innovative solutions to encourage access to energy, **reducing emissions** and help you produce **sustainably**.

Discover our other specialities in power generation:



Cooling Systems



Solar & Thermal Storage



Integrated Renewable Solutions

John Cockerill Energy Worldwide

Belgium – France – Spain – Saudi Arabia – Indonesia – South Korea – Brazil – Canada – USA

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