Innovation and Quality

ICI Powering Evolution

ICI
POWERING EVOLUTION

Summary

WE ARE

energy

ICI has a long history that was created and developed around a work culture, shared values, goals and suctions.

We believe that companies can reach a point where they can produce better and consume less to achieve emission neutrality by 2050.

This is a challenge that is far from trivial.

It requires skill and initiative, but above all conviction.
We believe in this future, we devote our energies towards visualising it, achieving it, and we also believe that this change will only become real if we do it together.

With our innovative solutions for energy production and exchange, we are already part of this change and we are ready to offer our support to companies that are embarking on their energy evolution journey. We are ready to give them the boost they need.

OUR PASSION FOR

research

We offer turnkey solutions for the integration of complex systems, ensuring a smooth process from installation to maintenance. Thanks to our experience, we can turn energy into a reliable and sustainable resource towards your success.

International partnerships between research centres and industry

In the global context of scientific research and technological development, international partnerships between research centres and industry are a key driver of innovation. Through such partnerships, we have been opening up new horizons for scientific discovery, enabling its practical application for the commercialisation of advanced technologies.

Examples of such partnerships are European research projects involving research centres and industries from a number of countries and sectors.
The experience and know-how gained within these energy and environmentally focused projects is now available within ICI Powering Evolution.

FLEXnCONFU project

The FLEXnCONFU project has developed innovative, viable and replicable power-to-X-power solutions to be integrated into existing and new power plants by converting electricity into hydrogen or ammonia, which are in turn reused locally in the same power plant room to meet varying demand.

MACBETH project

Catalytic membrane reactors combine the two processes of chemical reaction and membrane-based product separation in a single step. The aim of the international MACBETH consortium is to ascertain the industrial applicability of this technology through the long-term operation of demonstration systems for the production of hydrogen from biogas, at a technology maturity level of 7.

THE CUSTOMER SATISFACTION
IS A MARK OF THE COMPANY'S

progress

ICI Powering Evolution has a strong quality culture, based around continual improvement resulting in obtaining system and product certifications such as **ISO 9001** certification, **CE** marks, construction according to directives on gas equipment and pressurised tanks, and by several national certifications on the export to Countries that require specific mechanical and hydraulic tests, such as the **ASME** - American Society for Mechanical Engineers - certificates.
ICI Powering Evolution's corporate policy complements these certifications with further goals aimed at respecting environmental impacts and the health and safety of workers. This on-going philosophy of improvement has allowed ICI Powering Evolution to obtain environmental certification according to the ISO 14001 standard and the certification on the health and safety of workers as per standard BS OHSAS 18001 (Occupational Health and Safety Assessment Series). ICI Powering Evolution believes that meeting customer needs is essential for the company's continual progress.

CERTIFIED INNOVATION

The awarded certifications are an acknowledgement of our commitment to continual improvement proving the creation, application and maintenance of a production, management and organisation system compliant with international regulations introduced to improve and standardise the internal processes as well as to enhance the effectiveness of the service to customers, thus increasing their satisfaction.

ISO 9001 QUALITY CERTIFICATION

ISO 45001 ENVIRONMENTAL CERTIFICATION

ISO 14001 ENVIRONMENTAL CERTIFICATION

70 YEARS OF

innovation

35.000 m² production area

Precision cutting:
plasma laser technology

Steel plates are taken from storage and positioned for plasma laser cutting with specific settings to suit various applications, both vertical and inclined. We handle plates up to 12x3 m, with precision and safety guaranteed.
Our design and nesting system optimises the use of materials to ensure efficiency and sustainability.

Precision rolling:
bending and preparation of materials

The plates for the boiler body are curved using a high-precision rolling machine.
Thicknesses from 6 mm to 32 mm are selected on the basis of the specific application. The rolling process ensures precision curvature even for large plates. Each plate is inspected and treated to ensure high quality and structural integrity to provide superior durability and strength for industrial applications.

Foxing: hot plastic deformation for maximum strength

The body of a boiler, designed to withstand high pressures, requires an advanced processing technique called the Fox process. This technique plastically deforms the large thicknesses of a heat exchange cylinder, by creating precision undulations. The controlled application of heat increases mechanical strength and improves the distribution of internal stresses to ensure optimal durability and safety even under extreme conditions.

Precision welding:
skilled labour and automated processes

We use advanced welding processes to assemble the machined parts. Thanks to our specialised workforce and industrialised processes using customised equipment, we are able to guarantee precision and standardisation. We use submerged-arc welding (SAW), MAG wire robot welding and MIG INOX robot welding. These automated processes guarantee high quality and uniformity, which are essential for the complex industrial applications of our boilers.

Welding controls:
safety and reliability guaranteed

Each stage of the work requires careful and accurate control. We are the only manufacturers in the sector to have equipment and personnel to perform welding quality checks using:
- **X-rays**
- **ultrasound, including phased array testing**
- **penetrating liquid**

These methods ensure that every weld meets the highest standards of safety and reliability.

Complete system Technical support and consultancy

The international success is the result of high quality standards. ICI Powering Evolution has obtained international product quality certifications that allow it to produce and distribute its boilers all over the world with top quality and safety features as required by the relevant specific regulations.

COMMERCIAL AREA

We have a presence in countries all around the world, with headquarters and representative offices in **Russia, Kazakhstan, Romania, Great Britain, USA, Chile, Ukraine** with products certified according to the specific local trade and technical regulations.

ITALY
Headquarters

CHILE
Representative offices

U.S.A.
Representative offices

GREAT BRITAIN
Commercial subsidiary

RUSSIA
Commercial subsidiary

ROMANIA
Commercial subsidiary

KAZAKHSTAN
Commercial subsidiary

UKRAINE
Representative offices

ACTIVITIES AND SERVICES

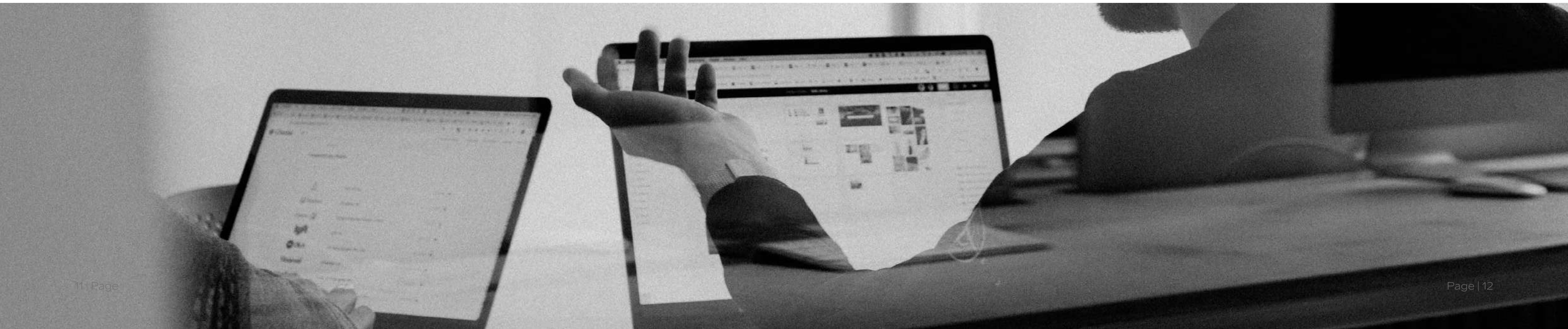
Relying on a single partner for the implementation of a system offers a number of key advantages that can contribute to the overall success of the project. From coordination to process optimisation, increased accountability and quality control to time and cost savings, this strategy can deliver better results in terms of efficiency, quality and customer satisfaction.

1. Analysis of actual requirements
2. Support in choosing the most efficient system according to performance requirements
3. System inspections and surveys
4. Designing the best energy-efficient solution
5. Component sizing and supply
6. Fitting, installation and testing
7. Supervision of system execution
8. System certification

ADVANTAGES

Achieving targets is paramount to the success and sustainability of a company. Relying on qualified partners makes it possible to achieve short- and long-term benefits within the required performance levels and results.

1. Single point of contact
2. Maximum energy efficiency
3. Sustained performance
4. Extending the life of components over time
5. Guaranteed payback
6. Reduced fuel consumption and guaranteed performance
7. Reduced installation time with minimal system downtime



Our SERVICES

SERVICE LEVEL AGREEMENT

A Service Level Agreement **(S.L.A.)** is a formal contract defined and tailored to the customer's specific needs, and includes services for power plant room maintenance as well as technical support. Specifically, these are different activities (including scheduled maintenance, remote monitoring of machine operation, warranty extension) organised into packages on different 'levels', defined according to service availability, response time, guaranteed quality and so on.

What advantages does it offer the customer?

This new service proposal allows the customer to enjoy comprehensive support from dedicated and competent technical staff. Moreover, by entering into contracts with the manufacturer, certain basic elements such as extended machine warranties and personalised remote technical support are made available.

An interesting new proposal

Working in the industrial boiler industry, we know the importance of safe and reliable performance for our customers' business. Clearly, the first step in ensuring the performance of machinery over time is to protect end-user plants with maintenance contracts, but we have recently developed a proposal that goes beyond these simple activities, representing a significant step towards more efficient and customised management: the Service Level Agreement.

SUPPORT SERVICES

With new Support Services that are specific to different types of generators and their impact on productivity, ICI Powering Evolution customers can maintain the high efficiency status of their thermal power plants.

Activities

Support service activities are grouped into 4 categories:

0 Level
Web Access Pack

1 Level
Basic Support

2 Level
Advanced Support

3 Level
Advanced Support Plus

Each level of contract corresponds to specific conditions:

- Service level
- Activities included in the activities description table
- Rates and conditions in the economic section

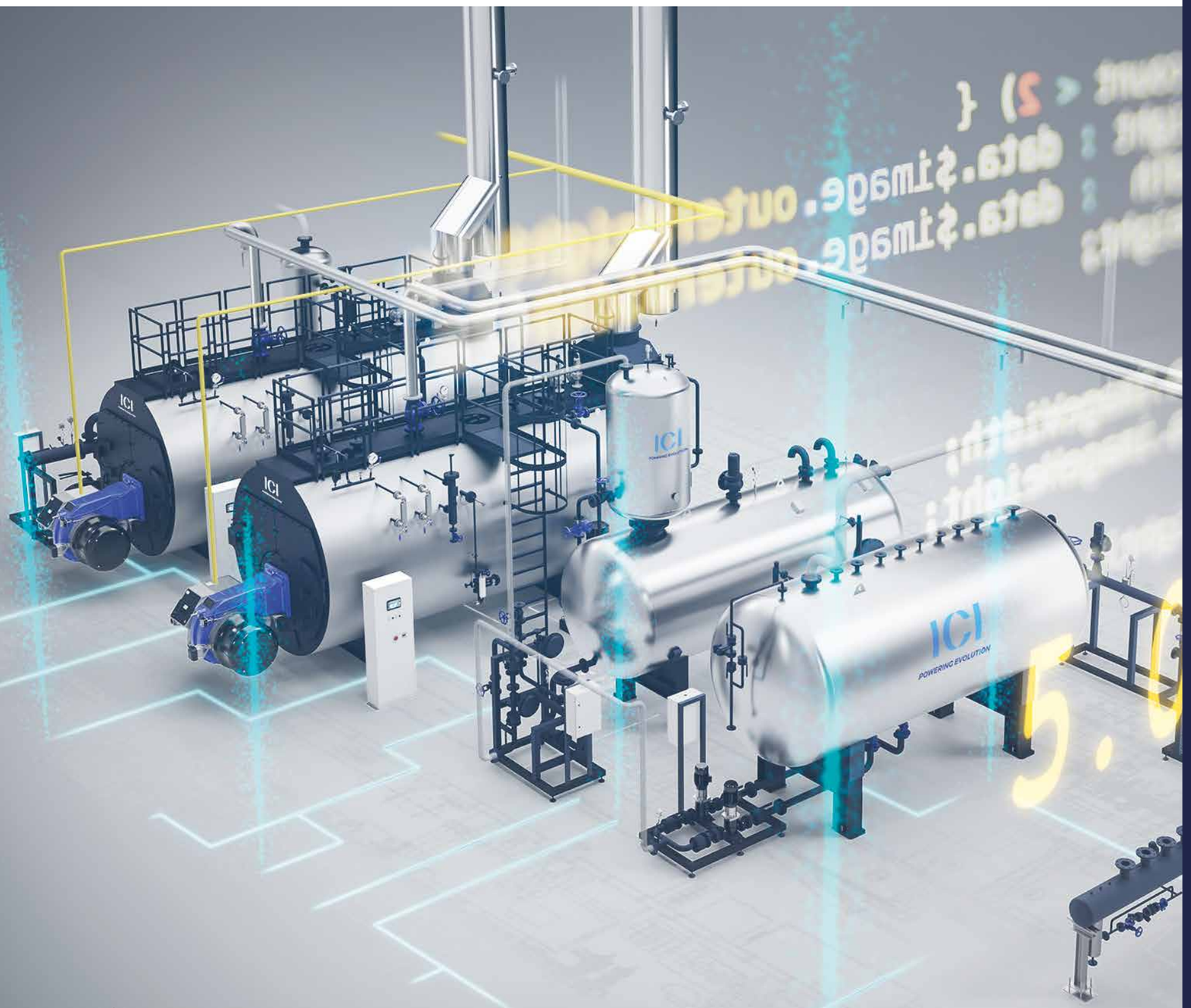
	LVL 0	LVL 1	LVL 2	LVL 3
	WEB ACCESS PACK	BASIC SUPPORT	ADVANCED SUPPORT	ADVANCED SUPPORT PLUS
Staff Training		✓	✓	✓
Scheduled maintenance		✓	✓	✓
Consumable maintenance material		✓	✓	✓
Warranty extension		✓	✓	✓
Newsletter		✓	✓	✓
Software updating	✓	✓	✓	✓
Data monitoring	✓	✓	✓	✓
Customised synoptic diagram	✓	✓	✓	✓
Product use support		✓	✓	✓
Customised spare parts Kit		✓	✓	✓
Account review	✓	✓	✓	✓
Availability			✓	
Availability plus				✓
Guaranteed technical intervention				on request*

*contact the relevant sales representative

Our SYSTEMS

REMOTE MANAGEMENT WITH ETERM

With our advanced remote management system, the heating plant can be connected to the production system, remotely controlled and monitored continuously 24 hours a day. This allows for a perfect alignment of the required thermal load and early detection of any inefficiencies and anomalies.



BENEFITS

Easy installation::
- Guided selection of necessary components
- Typical personalised wiring diagrams
- Remote configuration by ICI specialised technicians

Optimisation of heat generation system::
- Burner modulation
- Progressive temperature
- Hourly programming
- Remote modification of settings depending on weather
- Cascade control
- Integrated management of adjustment and distribution circuits

Better service to the final user:
- Control and adjustment of the flow temperature
- Alarm signalling to solve malfunctions before breakdown occurs
- Possibility of consumption reduction

Speed and easy management:
- System manageable from any device equipped with browser (computer, tablet, smartphone)
- Possibility to remotely change settings
- Possibility to understand the nature of the intervention required

Minimisation of unexpected events:
- It avoids the need to physically go the heating plant room
- It eliminates unexpected events due to handling to perform the operation

Heating plant room

Turnkey design and construction of complete heating plant rooms. Starting with a preliminary study of requirements, we are able to propose the best solution in terms of efficiency and compliance with atmospheric emissions. The heating plant room is completed with SKIDs in order to facilitate installation and achieve the lowest possible system downtime while still guaranteeing the required performance. The project is certified and tested and maintained over time with specially designed service packages to ensure efficiency performance over the years.

1 Steam boiler
2 Combustion system
3 Deaerator
4 Condensate collection and recovery tank
5 Plant room management control panel
6 Steam header
7 PIPING
8 Chimney
9 SKID hot water production technology
10 Energy measurement systems

SKID

Integrated system designed as a standalone unit, preassembled and pre-tested at the factory before shipment in order to offer a finished product, guaranteed and simple to install. The system is designed so that all system components are appropriately dimensioned, allocated in one volume and interconnected. The customer can thus rely on a spot-on design and a guaranteed system, which only needs to be connected to utilities.

1 Steam boiler
2 Combustion system
3 Deaerator
4 Plant room management control panel
5 SKID water treatment
6 Energy measurement systems

STEAM systems

Productivity: up to 30,000 kg/h
Power: up to 21,000 kW
Pressure: up to 28 bar
Performance: up to 98% (can be increased to 107%)

Exemption from conduction: up to 72 h
Control and regulation: PLC, System synoptic diagram on ETERM portal, Remote operation data on SCADA, Connectivity and data logging, Operation and monitoring charts, Remote control by specialised personnel

Available certificates: CE, ASME, EAC

- **Traditional fuels:** Methane, LPG, Light oil, Naphtha
- **Clean fuels:** Biogas, Biomethane, Biodiesel (green solutions)
- **NOx emissions to atmosphere:** up to 30 mg/Nm^3
- Hybrid and Full Electric Systems
- **H_2 mixture compatibility:** up to 100%
- **Modulation range:** up to 1:10
- Certification and compliance with local regulations

generation

SYSTEMS

Steam boilers built in fire tube, three-pass or reverse-flame types. The offer includes equipment for the production of instantaneous, low and high pressure steam. All boilers can be combined with the global security systems (GSS) allowing them to be operated unmanned (up to 72 hours, i.e. arrangement 3). The steam generation rates are between 50 and 32,000 kg/h.

ECOVAPOR

STEAM PRODUCTION: 1000 ÷ 3000 kg/h

NOMINAL POWER: 681 ÷ 2035 kW

DESIGN PRESSURE: 12 bar

EFFICIENCY: > 95,0%

MODULATION: 1 ÷ 8

GX

STEAM PRODUCTION: 1700 ÷ 32000 kg/h

NOMINAL POWER: 1163 ÷ 17442 kW

DESIGN PRESSURE: 12 o 15 bar *

BASIC EFFICIENCY: 90,0% o 95,5%

BNX

STEAM PRODUCTION: 100 ÷ 3000 kg/h

NOMINAL POWER: 69,8 ÷ 2035 kW

DESIGN PRESSURE: 0,98

EFFICIENCY: > 91,0%

BBNX

STEAM PRODUCTION: 100 ÷ 3000 kg/h

NOMINAL POWER: 69,8 ÷ 2035 kW

DESIGN PRESSURE: 0,5 bar

EFFICIENCY: > 91,0%

TReVAPOR

STEAM PRODUCTION: 1200 ÷ 6500 kg/h

NOMINAL POWER: 818 ÷ 4770 kW

DESIGN PRESSURE: 12 bar

BASIC EFFICIENCY: 90,5% o 95,5%

SIXEN

STEAM PRODUCTION: 350 ÷ 5000 kg/h

NOMINAL POWER: 238 ÷ 3407 kW

DESIGN PRESSURE: 12 o 15 bar

BASIC EFFICIENCY: 90,0% o 95%

FX-N

STEAM PRODUCTION: 50 ÷ 300 kg/h

NOMINAL POWER: 31,7 ÷ 209,2 kW

DESIGN PRESSURE: 5 bar

EFFICIENCY: > 91,0%

FLASH

STEAM PRODUCTION: 20,3 ÷ 244,2 kg/h

NOMINAL POWER: 15 ÷ 180 kW

DESIGN PRESSURE: 4,5 bar

*higher pressures on request

plant

COMPONENTS

Components and accessories to build and complete heating plant rooms for steam generation.
They are designed and manufactured on SKID for easy installation.

VRC-V

Condensate collection tank made of AISI 316 L steel

CAPACITY: 200 ÷ 5000 l
MAX. OPERATING T°: 90 °C
EXECUTION: vertical

DEG

Atmospheric deaerator for pre heating and deaerating the feed water of steam boilers

CAPACITY: 500 ÷ 40,000 lt
PRESSURE: ATM
EXECUTION: horizontal
MATERIAL: STEEL Carbon/AISI 304

BDV

Tank for collecting and treating blowdowns

CAPACITY: 500 ÷ 2000 lt
PRESSURE: 12 bar
EXECUTION: vertical

VEX

Steam accumulator

CAPACITY: 5,000 ÷ 30,000 lt
PRESSURE: 5 ÷ 12 bar
EXECUTION: horizontal

DEG-P

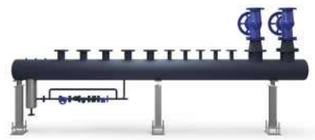
Atmospheric deaerator for pre heating and deaerating the feed water of steam boilers

CAPACITY: 500 ÷ 40,000 lt
PRESSURE: 0.5 bar
EXECUTION: horizontal
MATERIAL: STEEL Carbon/AISI 304

ADD

Feed water treatment plant using resins, complete with chemical dosing station

MAX. FLOW RATE: 1.6 ÷ 20 m³/h
CAN BE COMBINED TO BOILERS: from 100 ÷ 10,000 kg/h
EXECUTION: single column/double column



COV

Project-designed steam distribution header

EXECUTION: horizontal
SUPPLIED WITH:
- supporting legs
- insulation
- condensate recovery system

72 H EXEMPTION SYSTEM

Designed to ensure operation without a conductor for up to a maximum of 72 hours

SUPERHEATED
water system

Power: up to 17,000 kW
Pressure: up to 22 bar
Performance: up to 91% (can be increased to 98%)

Exemption from conduction: up to 72 h
Control and regulation: PLC, System synoptic diagram on ETERM portal, Remote operation data on SCADA, Connectivity and data logging, Operation and monitoring charts, Remote control by specialised personnel

Available certificates: CE, ASME, EAC

- **Traditional fuels:** Methane, LPG, Light oil, Naphtha
- **Clean fuels:** Biogas, Biomethane, Biodiesel
- **NOx emissions to atmosphere:** up to 30 mg/Nm³
- Hybrid and Full Electric Systems
- **H_2 mixture compatibility:** up to 100%
- **Modulation range:** up to 1:10
- Certification and compliance with local regulations

generation

SYSTEMS

Fire tube superheated water generators manufactured as either three-pass or reverse flame type suitable for processes where the operating temperature requirements are above 110°C. All boilers can be combined with the global security systems (GSS) allowing them to be operated unmanned (up to 72 hours, i.e. arrangement 3). The power generation rates for these superheated water boilers are between 200 and 17,000 kW.

ASGX EN

NOMINAL POWER: 3,000 ÷ 17,000 kW

DESIGN PRESSURE: 12 ÷ 22 bar

BASIC EFFICIENCY: 90% ÷ 98%

ASX

NOMINAL POWER: 233 ÷ 3,488 kW

DESIGN PRESSURE: 5 ÷ 12 bar

BASIC efficiency: 90% ÷ 98%

plant

COMPONENTS

Components and accessories to build and complete heating plant rooms for superheated water generation. They are designed and manufactured on SKID for easy installation.

VEA

Expansion vessel for superheated water

DESIGN PRESSURE: 5 or 12 bar
EXECUTION: vertical

RETURN T° CONTROL SYSTEM

System for maintaining the temperature difference Δ° between supply and return

ENERGY SAVER

System to increase the efficiency of the plant designed to handle partial or total flow

72 H EXEMPTION SYSTEM

Designed to ensure operation without a conductor for up to a maximum of 72 hours

HOT
water systems

Power: up to 20,000 kW
Pressure: up to 16 bar
Performance: up to 99%

Control and regulation: PLC, System synoptic diagram on ETERM portal, Remote operation data on SCADA, Connectivity and data logging, Operation and monitoring charts, Remote control by specialised personnel

Available certificates: CE, ASME, EAC

- **Traditional fuels:** Methane, LPG, Light oil, Naphtha
- **Clean fuels:** Biogas, Biomethane, Biodiesel
- **NOx emissions to atmosphere:** up to 30 mg/Nm^3

- ZERO Emission Systems
- Hybrid and Full Electric Systems
- **H_2 mixture compatibility:** up to 100%

- **Modulation range:** up to 1:10

- Certification and compliance with local regulations

generation

SYSTEMS

Steel boilers with high water content, efficient solutions that meet any heating requirements depending on the type of building and the level of energy certification required.

REX - REX F

NOMINAL POWER:
70 - 3,500 kW

DESIGN PRESSURE:
5 ÷ 16 bar

BASIC EFFICIENCY:
92% or 95%

GREENOX.E

NOMINAL POWER:
420 - 3,000 kW

DESIGN PRESSURE:
5 ÷ 10 bar

BASIC EFFICIENCY:
95%

TNX - TNX EN

NOMINAL POWER:
3,000 - 20,000 kW

DESIGN PRESSURE:
6 ÷ 16 bar

BASIC EFFICIENCY:
92%

TNOX - TNOX EN

NOMINAL POWER:
2,500 - 25,000 kW

DESIGN PRESSURE:
6 ÷ 16 bar

BASIC EFFICIENCY:
93%

TNOX.e - TNOX.e EN

NOMINAL POWER:
2,500 - 17,000 kW

DESIGN PRESSURE:
6 ÷ 16 bar

BASIC EFFICIENCY:
95%

plant

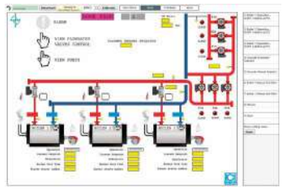
COMPONENTS

Components and accessories to build and complete heating plant rooms for superheated water generation. They are designed and manufactured on SKID for easy installation.

RETURN T° CONTROL SYSTEM

System for maintaining the temperature difference Δ° between supply and return

ETERM PANEL



MODBUS INTERFACE

BAX

Condensing heat recovery unit built from AISI 316 Ti stainless steel, which must be located after the boiler (running exclusively on natural gas or LPG) flue gas outlet

THERMAL
oil system

Power: 116 ÷ 9,302 kW
Pressure: 10 bar
Performance: up to 95%

Control and regulation: PLC, System synoptic diagram on ETERM portal, Remote operation data on SCADA, Connectivity and data logging, Operation and monitoring charts, Remote control by specialised personnel

Available certificates: CE, ASME, EAC

- **Traditional fuels:** Methane, LPG, Light oil, Naphtha
- **Clean fuels:** Biogas, Biomethane, Biodiesel
- **NOx emissions to atmosphere:** up to 30 mg/Nm^3

- **H_2 mixture compatibility:** up to 100%

- Certification and compliance with local regulations

generation

SYSTEMS

Thermal oil heat generators are manufactured in the three flue gas passes type, with low thermal loads and high oil velocities to eliminate the risk of oil cracking. Suitable for operation with hot thermal oil, our range includes generators designed at a design pressure of 10 bar, with a nominal power of between 100 and 9000 kW, all characterised by very high construction standards, in accordance with the strictest reference standards.

OPX

NOMINAL POWER: 116 ÷ 9302 kW

DESIGN PRESSURE: 10 bar

BASIC EFFICIENCY: > 86,0% o 95%

plant

COMPONENTS

Components and accessories to build and complete heating plant rooms for heat generation. They are designed and manufactured on SKID for easy installation.

VEO

Thermal oil expansion vessel

DESIGN PRESSURE: 5 bar

EXECUTION: horizontal

STORAGE TANK

PMX

Standby thermal oil pumping

HEAT RECOVERY
Boilers

Productivity: up to 6,000 kg/h
Pressure: up to 30 bar

Exemption from conduction: Up to 72 h
Control and regulation: PLC, System synoptic diagram on ETERM portal, Remote operation data on SCADA, Connectivity and Data Logging, Operation and monitoring charts, Remote control by specialised personnel

Available certificates: CE, ASME, EAC

- **Traditional fuels:** Methane gas, LPG
- **Clean fuels:** Biogas, Biomethane
- Certification and compliance with local regulations

generation

SYSTEMS

Range of products and accessories dedicated to heat recovery. Solutions characterised by production flexibility, capable of satisfying any market requirement, regulatory constraint or installation criticality.

GXC - Steam combination unit

STEAM PRODUCTION: 50 ÷ 6000 kg/h

DESIGN PRESSURE: 1 ÷ 30 bar

WHB - Steam

STEAM PRODUCTION: 50 ÷ 6000 kg/h

DESIGN PRESSURE: 1 ÷ 30 bar

WHS - Superheated water

WHC - Hot water

DESIGN PRESSURE: 5 ÷ 16 bar

NOMINAL POWER: up to 8,000 kW

WHO - Thermal oil

DESIGN PRESSURE: 10 bar

NOMINAL POWER: 116 ÷ 9,300 kW

CONDENSATION systems

Power: up to 7,000 kW
Pressure: up to 10 bar

Control and regulation: PLC, System synoptic diagram on ETERM portal, Remote operation data on SCADA, Connectivity and data logging, Operation and monitoring charts, Remote control by specialised personnel

Available certificates: CE, ASME, EAC

- **Traditional fuels:** Methane gas, LPG
- Certification and compliance with local regulations

generation

SYSTEMS

Range of products and accessories dedicated to heat recovery. Solutions characterised by production flexibility, capable of satisfying any market requirement, regulatory constraint or installation criticality.

MONOLITE GT

NOMINAL POWER: 180 ÷ 850 kW

DESIGN PRESSURE: 5 ÷ 6 bar

BASIC EFFICIENCY: >107%

GREENOX BT COND

NOMINAL POWER: 1,000 ÷ 3,000 kW

DESIGN PRESSURE: 5 ÷ 10 bar

BASIC EFFICIENCY: >107%

TNOX BT COND

NOMINAL POWER: 3,000 ÷ 7,000 kW

DESIGN PRESSURE: 5 ÷ 10 bar

BASIC EFFICIENCY: >107%

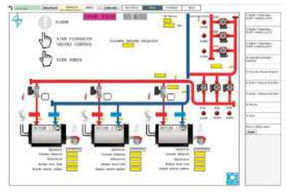
plant

COMPONENTS

Components and accessories to build and complete heating plant rooms for steam generation. They are designed and manufactured on SKID for easy installation.

CONDENSATE NEUTRALISER

ETERM PANEL



MODBUS INTERFACE

POWERING EVOLUTION

ICI CALDAIE S.p.A.

Via G. Pascoli, 38
37059 Campagnola di Zevio
(Verona) - Italia

icicaldaie.com

T. +39 045 8738511
P.IVA e C.F. 00227490232