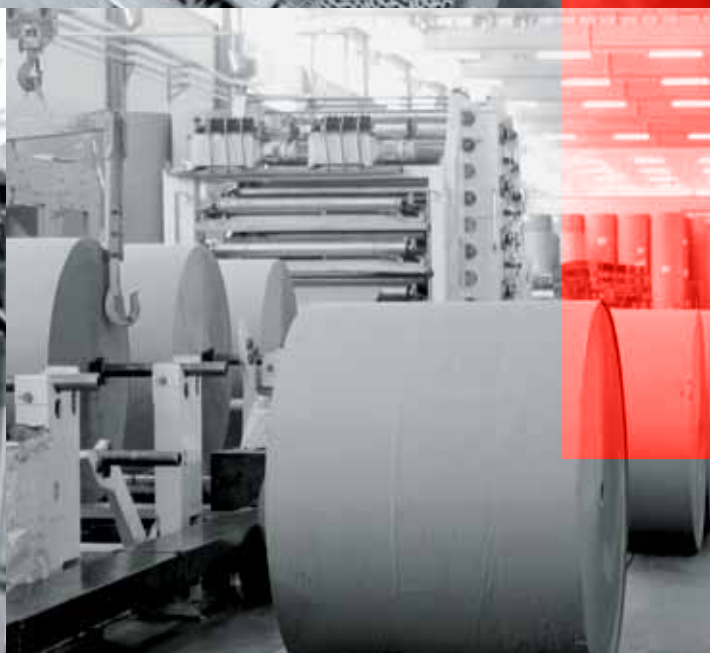
AB
COGENERATION WORLD

ECOMAX®

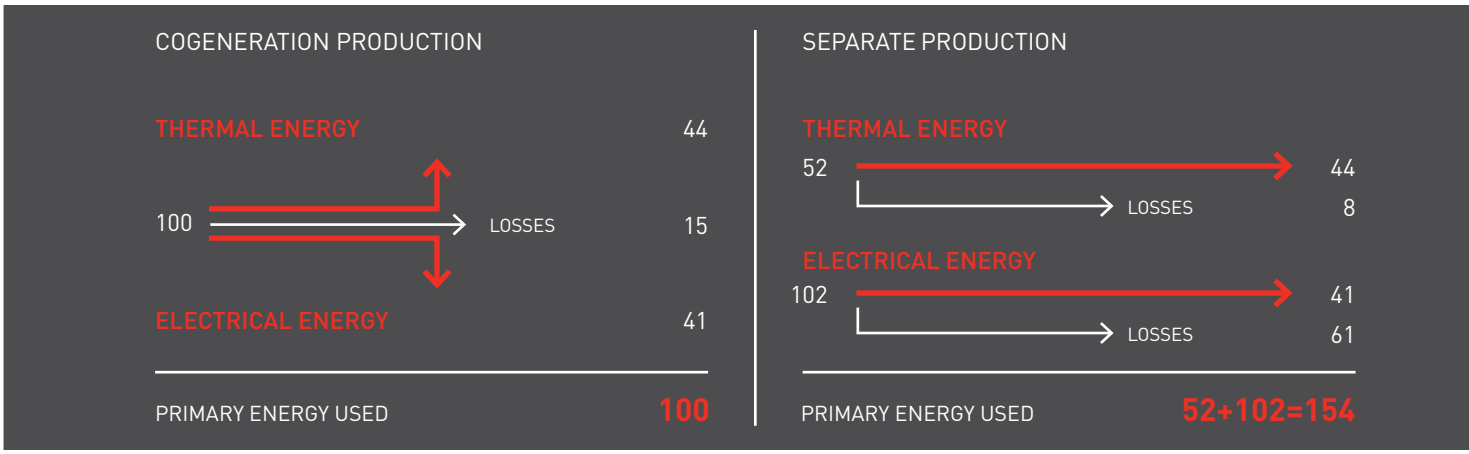
Cogeneration World

TABLE OF CONTENTS



COGENERATION: A STRATEGIC CHOICE

Cogeneration has shown itself to be an ideal choice for the simultaneous production of electrical and thermal energy in multiple industrial, commercial and agricultural sectors, in particular those which are "energivorous" and require continuous, significant heat production and the need of considerable amounts of electrical energy. In fact, cogeneration consists of the simultaneous production of electrical and thermal energy using a single source and within a single integrated system. It allows the achievement of important results in energy efficiency, with the advantage of being able to manage the production of two energy vectors in a continuous, reliable and safe way. Cogeneration is the best choice to achieve, within a reasonable time, the advantages in the reduction of the energy cost while containing the emissions of CO_2. This explains why it is fully a part of the sustainable energy policy. The range of **ECOMAX®** modular packaging systems proposed by AB confirms and highlights the advantages of cogeneration in terms of energy efficiency and sustainability.



ECOMAX®

THE MOST RECOGNIZED MODULAR PACKAGE SOLUTION IN THE WORLD

THE ADVANTAGES

- LIMITED BUILDING PERMISSION NEEDED
- CAN BE MOVED
- REDUCTION ON COSTS, RISKS AND TIMES DURING INSTALLATION AND START-UP
- SIMPLICITY OF CONNECTION TO EXISTING SYSTEMS

Video Ecomax®

The solution of distributed generation in a modular package which has brought innovation to the entire world. Compact, versatile and modular for increased energy performance.
ECOMAX® is an idea conceived and developed entirely by AB, evolved in the range and types of applications (5 product lines) which has become the main technological and commercial point of reference in modern cogeneration.

THE AB **CHOICES** WHICH MAKE THE DIFFERENCE

EFFICIENCY AND RELIABILITY

Those who choose cogeneration require their own plant to ensure a high level of performance over time. In order to offer technology which is dependable, in addition to optimum operational performance, AB applies specific solutions and innovations to its **ECOMAX®** plants to improve their working capacity. Technical choices are able to prevent operational problems and machine stops, reducing the need for maintenance.

CONVENIENCE AND SAFETY

ECOMAX® is the engineering solution which has brought unmatched levels of practicality to the cogeneration sector. Not only is the module compact, drastically reducing the footprint compared to other types of plants, but all the component parts are contained within a technological lay-out which is functional and accessible to maintenance activities. Equally important is the attention AB has dedicated to safety: **ECOMAX®** integrates the most reliable devices in its products for safe operation of the plant in all conditions of use.

VERSATILITY AND RATIONALITY

The great versatility of **ECOMAX**® meets the specific expectations and needs of the specific operational situation, so that it can truly be defined as a "tailor-made cogeneration plant". The design and engineering of the offering is the result of the commitment, of the multidisciplinary AB team, to take the needs of the customer into account, organizing the elements of the module to achieve the ideal plant configuration.

COMMAND AND CONTROL

To achieve a precise, complete and continuous control of the plant, in all of its operational and performance parameters, the AB engineering team has provided an integrated system, easily manageable even remotely through an IT platform, which allows monitoring of each sensitive element of the operation. All components of the command and control system are installed by AB technicians and are integral parts of the qualitative excellence which differentiate the **ECOMAX**® solution in the marketplace. The command panels, located in an air-conditioned room within the module, ensure a convenient and immediate interface with service personnel. This can also be carried out by remote control.


AB

Video Facility Tour

ECOMAX® ORIGINS

ENGINEERING OF THE OFFER
Technical - economical feasibility plan

DESIGN
Electrical engineering | Mechanical engineering | Process engineering | Assistance during the design authorization phase

PRODUCTION
36,000 mq surface areas, of which 25,000 mq are covered | Automated warehouse | Water-based paint technology with oven curing | Standardization of the processes

INSTALLATION
Hydraulic, mechanical and electrical connections with existing customer systems | Reduced installation and commissioning times at the worksite

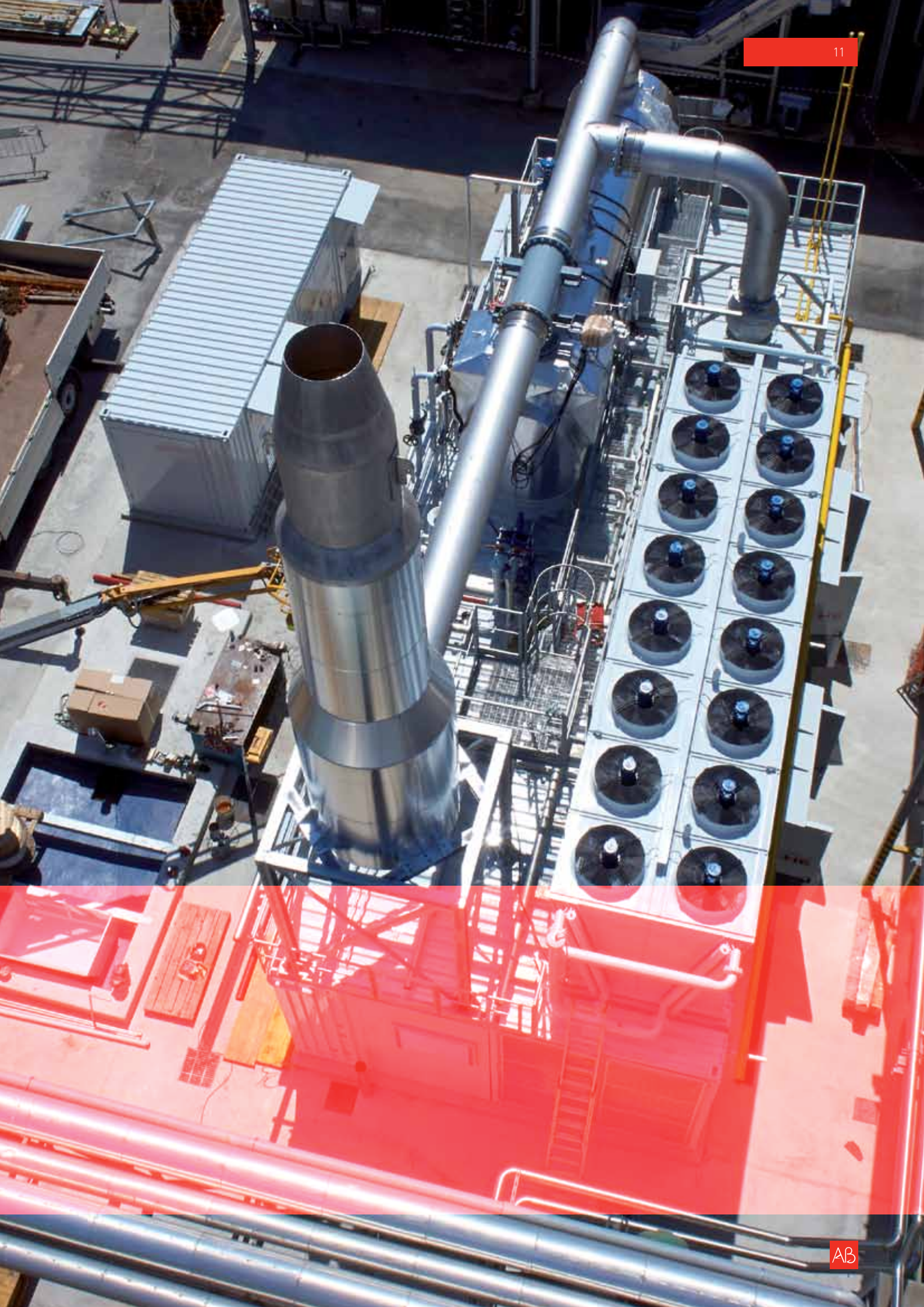
MANAGEMENT SOFTWARE
Choice of service structure | Monitoring of operating conditions | Monitoring plant performance | Remote connection by the telephone network

SERVICE
200 staff | Capillary coverage of the territory | 24 hour availability, 365 days a year | AB Service Competence Centre

THE **DESIGN**

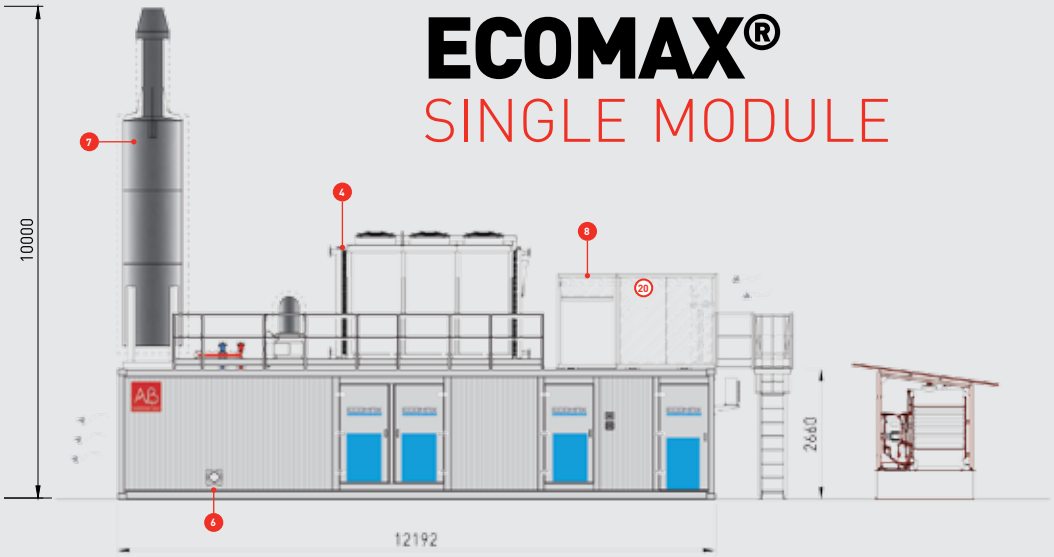
ECOMAX® plants are designed in the engineering hub, the "jewel in the crown" of AB, and the most important "think tank" for cogeneration in the world.

A special facility where a team of over 120 engineers work in an interdisciplinary environment to produce solutions of excellence, personalized to the needs of the end customer. They determine and plan every aspect of plant construction: hydraulic, electrical, mechanical and process, developing a specific work protocol planned in the methods, in the timelines for implementation and in the results which will represent the guideline for to the production departments.

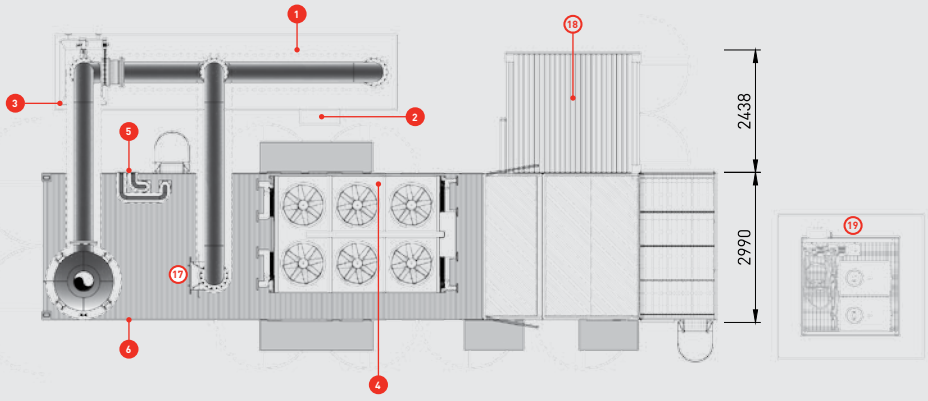


THE **LAYOUT**

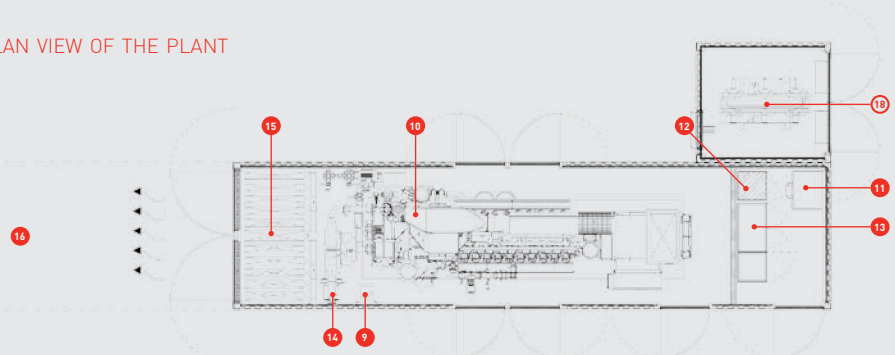
ECOMAX®
SINGLE MODULE



PLAN VIEW



INTERNAL PLAN VIEW OF THE PLANT



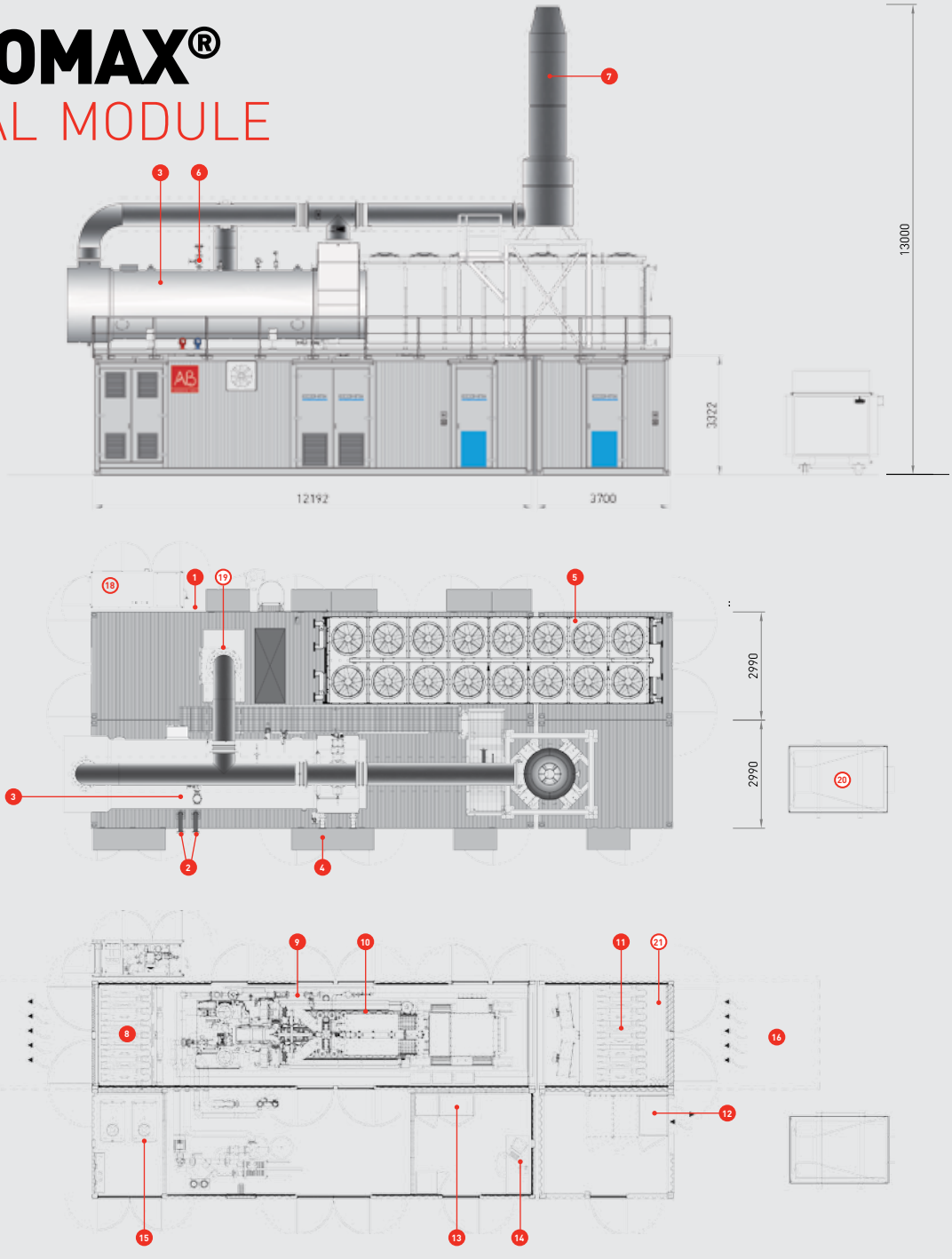
EQUIPMENT

1. Exhaust gas heat exchanger
2. Steam connection
3. Feed water system
4. Dry-cooler HT+LT
5. Hot water connection
6. Natural gas connection
7. Silencer + stack
8. Air input
9. Internal oil system 150 lt
10. Engine
11. SCADA control system
12. Generator circuit breaker
13. Electrical control panel
14. Natural gas train
15. Air outlet
16. Free area for engine extraction

OPTIONS

17. Catalyst
18. Step up transformer with housing container
19. Oil skid
20. Air pre-heating system

ECOMAX®
DUAL MODULE



EQUIPMENT

1. Natural gas connection
2. Hot water connection
3. Exhaust gas heat exchanger
4. Feed water system
5. Dry-cooler HT+LT
6. Steam connection
7. Silencer + stack
8. Air outlet
9. Natural gas train
10. Engine
11. Air inlet
12. Surge arrester
13. Electrical control panel
14. SCADA control system
15. Oil skid
16. Free area for generator extraction
17. Free area for engine extraction

OPTIONS

18. Natural gas compressor
19. Catalyst
20. Step up transformer
21. Air pre-heating system


_1


_2


_3


_4


_5


_6


_7


_8

THE **PRODUCTION**

Following the work plans developed by the engineers, all phases of the **ECOMAX®** production cycle are planned at the AB facility in Orzinuovi.

_1 As a function of the production plant, the **AUTOMATED WAREHOUSE** guarantees increased efficiency of the industrialized process: it supplies the components necessary for the implementation of the various orders.

_2 The phases of bending, cutting and welding of the external structure of the module occur thanks to **ROBOTIC LINES** able to guarantee precision and speed of execution.

_3 The semi-finished products from the robotic lines are then assembled giving shape to the manufactured product which will later receive the mechanical, hydraulic and electrical components of the plant.

_4 Each plant is **PRE-ASSEMBLED IN THE FACTORY.** This permits verification that all elements of the plant correspond exactly to the design expectations, reducing installation times to a minimum.

_5 Once construction of the external packaging is complete, the module is ready for the **WASHING AND PAINTING** phases.

_6 **THE ENDOTHERMIC ENGINE** is located inside the module. The ECOMAX® preparations are completed with **THE REALIZATION OF THE ELECTRICAL, MECHANICAL AND HYDRAULIC PART.**

_7 **ECOMAX®** is designed to guarantee full accessibility to the functional phases of preparation and maintenance. Even the **ELECTRICAL PANELS** are designed and realized by AB.

_8 **ECOMAX®** is ready to be **SHIPPED AND INSTALLED** on the site of the customer production unit. In the Control Room, the monitoring and control of the plants installed by AB around the world is carried out, followed by our Service.

IN-BUILDING SOLUTIONS

The **ECOMAX®** solutions may even be configured for installations within buildings through integrations with site installations or with the implementation of a completely new technological lay-out. AB has the skills and solutions dedicated to tailor-made installations inside buildings without the need of the module.
The design and realization of these plants makes evident the engineering know-how of AB in determining the optimum configurations and dimension. Skills to which is add the professionalism in managing the installation phase, even in the most complex conditions.


J 620 GS
AB

Cogeneration
World

ECOMAX® includes solutions for distributed generation in modular packaging structured in five production lines, enabling AB to offer the most complete range, with the most features in the cogeneration market on a global level.
AB aims to be the point of reference where cogeneration is the winning solution to the growing demand for energy efficiency, with a constant focus on environmental sustainability.
All product lines which form the **ECOMAX®** range confirm the basic principles of the product conceived and developed by AB, with specific characteristics relative to the sector of application.

ECOMAX® NATURAL GAS

ECOMAX® BIOGAS

ECOMAX® GREENHOUSE

ECOMAX® BIOGAS LINEA ROSSA

ECOMAX® LANDFILL GAS

ECOMAX® SPECIAL GAS

NATURAL GAS

SECTORS

MANUFACTURING
- Foodstuffs
- Beverages
- Paper
- Ceramics and stone
- Chemical
- Pharmaceuticals
- Milk and cheese products
- Metallurgical
- Plastic
- Textiles

COMMERCIAL
- Data processing centres
- Shopping centres
- Hospitals/Hotels
- District heating
- District cooling

GREENHOUSES
- Fruits and vegetables
- Floriculture

BIOGAS

SECTORS
- Agriculture
- Landfills/OFMSW
- Agro-industrial waste
- WWT (waste water treatment)

SPECIAL GASES

SECTORS
- Oil extraction and production (APG)
- Coal mining

ECOMAX®
NATURAL GAS

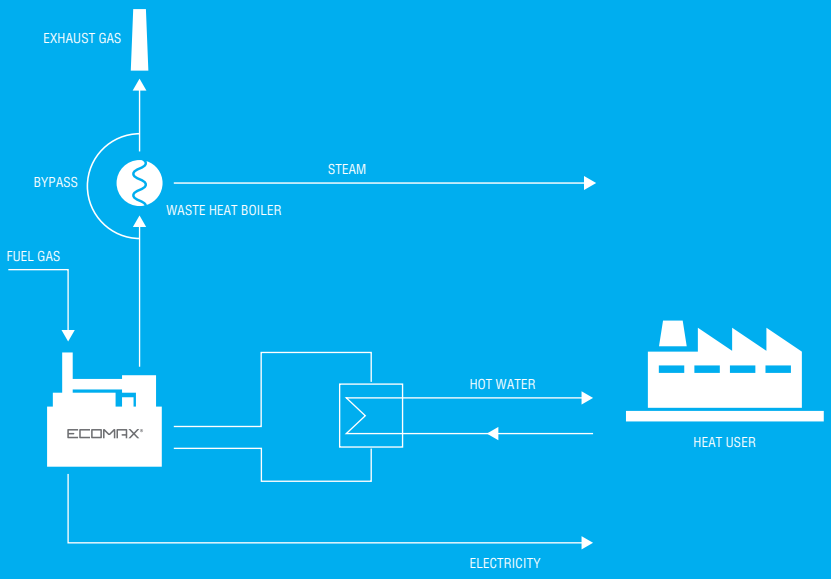
Fields Of Application
ECOMAX® Natural gas

The most competitive and tested solutions to meet the cogeneration needs of multiple industrial and commercial sectors.

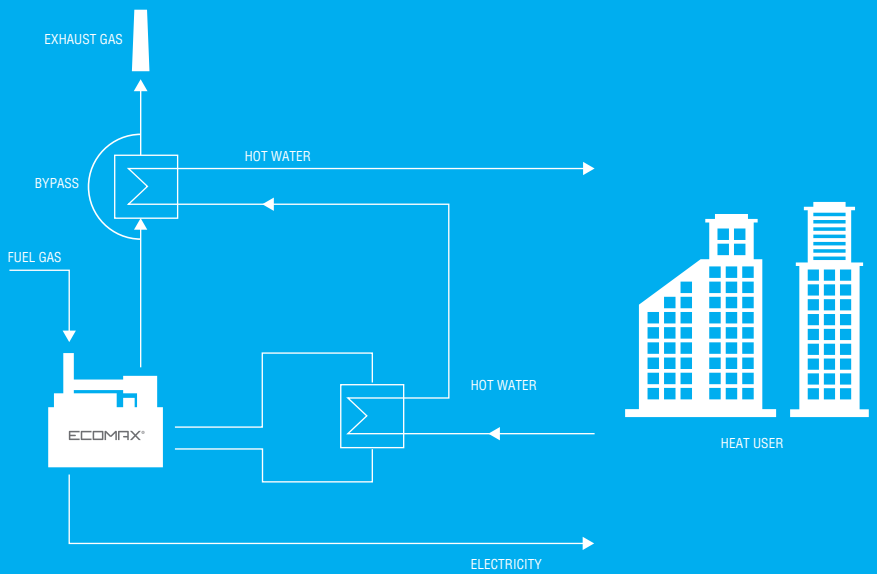
Cogeneration represents a real and concrete lever for growth, an opportunity for different industrial and commercial sectors in the competitive world market of today. With the ECOMAX® Natural gas line, AB makes available, to the industrial and commercial sector, cogeneration plants powered by methane gas, able to unite structural compactness and versatility with high energy performance. With the advice of AB specialists, it is possible to identify the size and features most suitable for a plant based on the energy needs of the company and its existing technology.

The Range
ECOMAX® Natural gas

Manufacturing



Commercial



ECOMAX® 3

Electric output	**kW**	**294**
Energy input	**kW**	**781**
Available heat recovery:		
Engine block - as hot H_2O	kW	214
Exhaust - as hot H_2O	kW	193
Total heat recovery as hot H_2O	**kW**	**407**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**176**
Steam flow (with economiser)	kg/h	264
or		
Thermal oil output at 180°C to 200°C	kW	131
Electrical efficiency	%	37,6
Thermal efficiency (as hot H_2O)	%	52,1
TOTAL EFFICIENCY	%	**89,8**

ECOMAX® 6

Electric output	**kW**	**637**
Energy input	**kW**	**1.601**
Available heat recovery:		
Engine block - as hot H_2O	kW	404
Exhaust - as hot H_2O	kW	341
Total heat recovery as hot H_2O	**kW**	**745**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**302**
Steam flow (with economiser)	kg/h	453
or		
Thermal oil output at 180°C to 200°C	kW	214
Electrical efficiency	%	39,8
Thermal efficiency (as hot H_2O)	%	46,5
TOTAL EFFICIENCY	%	**86,3**

ECOMAX® 8

Electric output	**kW**	**851**
Energy input	**kW**	**2.140**
Available heat recovery:		
Engine block - as hot H_2O	kW	515
Exhaust - as hot H_2O	kW	490
Total heat recovery as hot H_2O	**kW**	**1005**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**441**
Steam flow (with economiser)	kg/h	663
or		
Thermal oil output at 180°C to 200°C	kW	322
Electrical efficiency	%	39,8
Thermal efficiency (as hot H_2O)	%	41,6
TOTAL EFFICIENCY	%	**81,4**

ECOMAX® 9

Electric output	**kW**	**889**
Energy input	**kW**	**2.141**
Available heat recovery:		
Engine block - as hot H_2O	kW	575
Exhaust - as hot H_2O	kW	426
Total heat recovery as hot H_2O	**kW**	**1001**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**331**
Steam flow (with economiser)	kg/h	498
or		
Thermal oil output at 180°C to 200°C	kW	215
Electrical efficiency	%	41,5
Thermal efficiency (as hot H_2O)	%	46,8
TOTAL EFFICIENCY	%	**88,3**

ECOMAX® 10

Electric output	**kW**	**1.067**
Energy input	**kW**	**2.657**
Available heat recovery:		
Engine block - as hot H_2O	kW	689
Exhaust - as hot H_2O	kW	579
Total heat recovery as hot H_2O	**kW**	**1.268**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**515**
Steam flow (with economiser)	kg/h	774
or		
Thermal oil output at 180°C to 200°C	kW	368
Electrical efficiency	%	40,2
Thermal efficiency (as hot H_2O)	%	47,7
TOTAL EFFICIENCY	%	**87,9**

ECOMAX® 12

Electric output	**kW**	**1.189**
Energy input	**kW**	**2.855**
Available heat recovery:		
Engine block - as hot H_2O	kW	767
Exhaust - as hot H_2O	kW	527
Total heat recovery as hot H_2O	**kW**	**1.294**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**442**
Steam flow (with economiser)	kg/h	664
or		
Thermal oil output at 180°C to 200°C	kW	287
Electrical efficiency	%	41,6
Thermal efficiency (as hot H_2O)	%	45,3
TOTAL EFFICIENCY	%	**87,0**

ECOMAX® 14

Electric output	**kW**	**1.487**
Energy input	**kW**	**3.569**
Available heat recovery:		
Engine block - as hot H_2O	kW	957
Exhaust - as hot H_2O	kW	660
Total heat recovery as hot H_2O	**kW**	**1.617**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**552**
Steam flow (with economiser)	kg/h	830
or		
Thermal oil output at 180°C to 200°C	kW	358
Electrical efficiency	%	41,7
Thermal efficiency (as hot H_2O)	%	45,3
TOTAL EFFICIENCY	%	**87,0**

ECOMAX® 20

Electric output	**kW**	**2.004**
Energy input	**kW**	**4.544**
Available heat recovery:		
Engine block - as hot H_2O	kW	1.031
Exhaust - as hot H_2O	kW	923
Total heat recovery as hot H_2O	**kW**	**1.954**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**774**
Steam flow (with economiser)	kg/h	1.164
or		
Thermal oil output at 180°C to 200°C	kW	504
Electrical efficiency	%	44,1
Thermal efficiency (as hot H_2O)	%	43,0
TOTAL EFFICIENCY	%	**87,1**

ECOMAX® 27

Electric output	**kW**	**2.679**
Energy input	**kW**	**6.059**
Available heat recovery:		
Engine block - as hot H_2O	kW	1.366
Exhaust - as hot H_2O	kW	1.231
Total heat recovery as hot H_2O	**kW**	**2.597**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**1.032**
Steam flow (with economiser)	kg/h	1.552
or		
Thermal oil output at 180°C to 200°C	kW	672
Electrical efficiency	%	44,2
Thermal efficiency (as hot H_2O)	%	42,9
TOTAL EFFICIENCY	%	**87,1**

ECOMAX® 33

Electric output	**kW**	**3.356**
Energy input	**kW**	**7.574**
Available heat recovery:		
Engine block - as hot H_2O	kW	1.703
Exhaust - as hot H_2O	kW	1.539
Total heat recovery as hot H_2O	**kW**	**3.242**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**1.290**
Steam flow (with economiser)	kg/h	1.940
or		
Thermal oil output at 180°C to 200°C	kW	841
Electrical efficiency	%	44,3
Thermal efficiency (as hot H_2O)	%	42,8
TOTAL EFFICIENCY	%	**87,1**

ECOMAX® 44

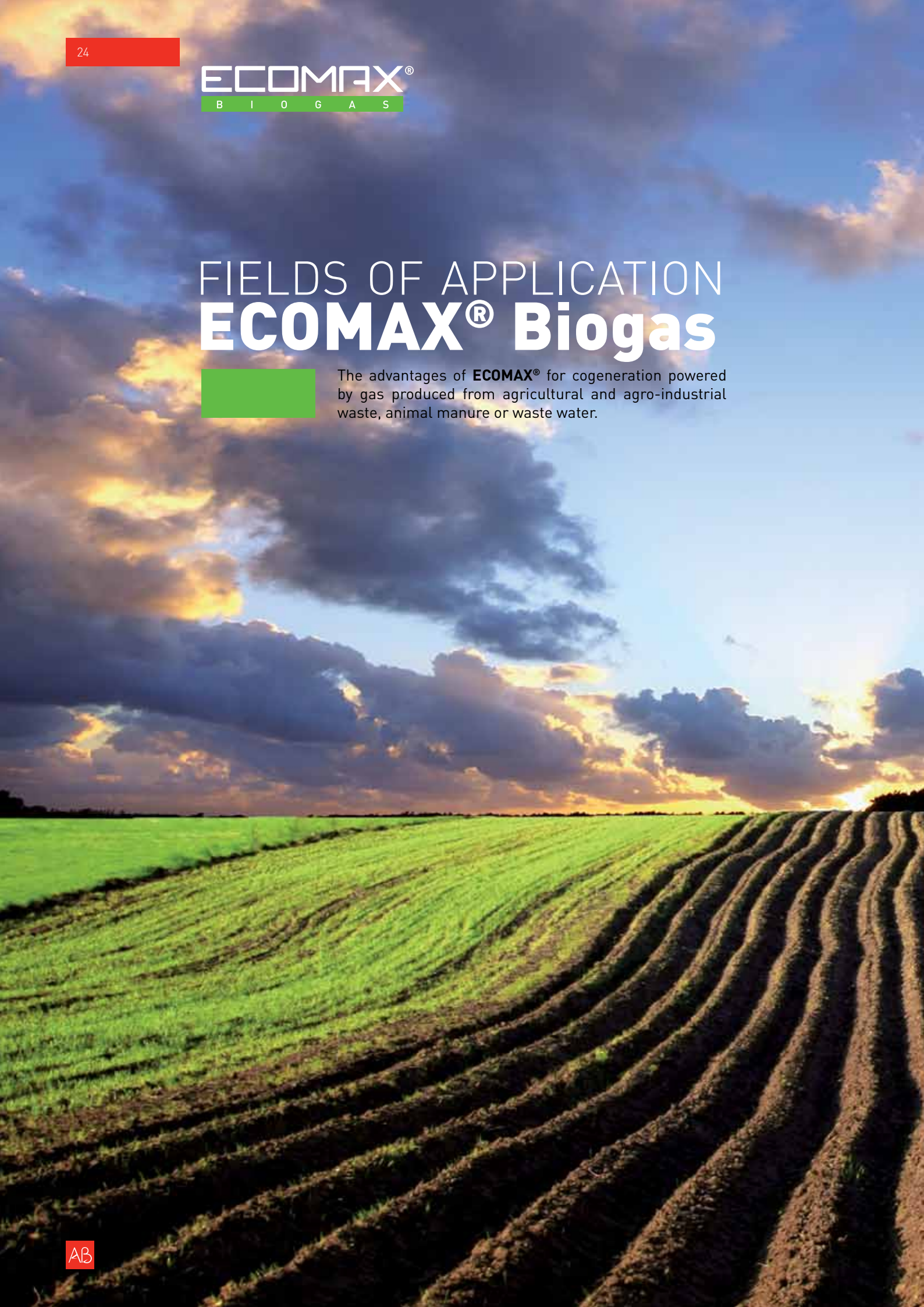
Electric output	**kW**	**4.401**
Energy input	**kW**	**9.739**
Available heat recovery:		
Engine block - as hot H_2O	kW	1.798
Exhaust - as hot H_2O	kW	1.790
Total heat recovery as hot H_2O	**kW**	**3.588**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**1.471**
Steam flow (with economiser)	kg/h	2.208
or		
Thermal oil output at 180°C to 200°C	kW	932
Electrical efficiency	%	45,2
Thermal efficiency (as hot H_2O)	%	36,8
TOTAL EFFICIENCY	%	**82,0**

All data are based on engine versions with NOx - emissions level at 250 mg/Nm3 (5% O_2) and Methane Number (MN) 94

ECOMAX®
BIOGAS

FIELDS OF APPLICATION
ECOMAX® Biogas

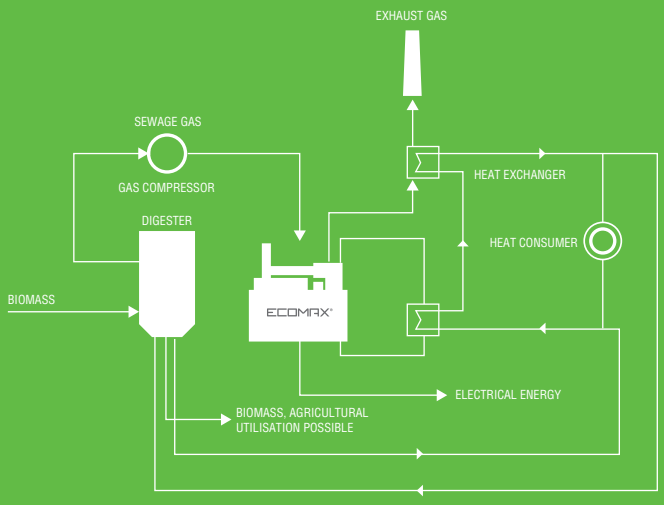
The advantages of **ECOMAX®** for cogeneration powered by gas produced from agricultural and agro-industrial waste, animal manure or waste water.

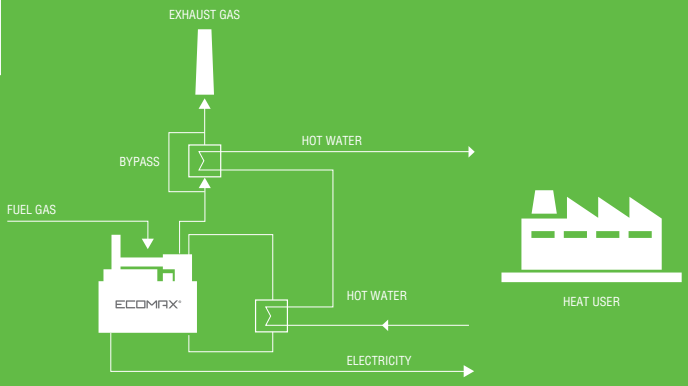


Cogeneration using biogas constitutes a very interesting performance opportunity for both agricultural/livestock businesses and public/private companies pointing to the production and exploitation of biogas with a view to high energy efficiency and environmental sustainability Through cogeneration using biogas, electrical and thermal energy is produced using agricultural / livestock or industrial waste, or organic fraction of municipal solid waste, or even waste water. AB offers its expertise from over 600 plants realized using technologies and solutions which represent the heart of the entire system: the transformation of biogas into energy, ensuring the highest levels of performance within the context of total reliability. The **ECOMAX® BIOGAS LINE** is the point of reference for all businesses wishing to take advantage of this opportunity, thanks to a modular range starting from 62 kW plants up to those of 1500 kW.

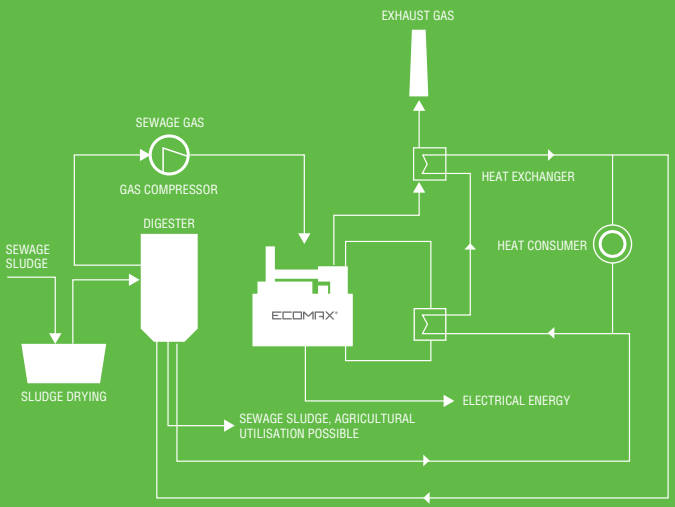
THE RANGE
ECOMAX® Biogas

Agricultural and livestock biogas





Biogas from agro-industrial waste



Biogas from Waste Water Treatment (WWT)

ECOMAX® 3 Biogas

Electric output	**kW**	**330**
Energy input	**kW**	**851**
Available heat recovery:		
Engine block	kW	162
Exhaust cooled to 200°C	kW	174
Total heat recovery as hot H_2O	**kW**	**336**
Electrical efficiency	%	38,8
Thermal efficiency	%	39,5
TOTAL EFFICIENCY	**%**	**78,3**

ECOMAX® 5 Biogas

Electric output	**kW**	**527**
Energy input	**kW**	**1.268**
Available heat recovery:		
Engine block	kW	317
Exhaust cooled to 200°C	kW	212
Total heat recovery as hot H_2O	**kW**	**527**
Electrical efficiency	%	41,6
Thermal efficiency	%	41,6
TOTAL EFFICIENCY	**%**	**83,1**

ECOMAX® 6 Biogas

Electric output	**kW**	**637**
Energy input	**kW**	**1.565**
Available heat recovery:		
Engine block t	kW	377
Exhaust cooled to 200°C	kW	286
Total heat recovery as hot H_2O	**kW**	**663**
Electrical efficiency	%	40,7
Thermal efficiency	%	42,4
TOTAL EFFICIENCY	**%**	**83,1**

ECOMAX® 7 Biogas

Electric output	**kW**	**703**
Energy input	**kW**	**1.690**
Available heat recovery:		
Engine block	kW	421
Exhaust cooled to 200°C	kW	283
Total heat recovery as hot H_2O	**kW**	**704**
Electrical efficiency	%	41,6
Thermal efficiency	%	41,7
TOTAL EFFICIENCY	**%**	**83,3**

ECOMAX® 8 Biogas

Electric output	**kW**	**851**
Energy input	**kW**	**2.076**
Available heat recovery:		
Engine block	kW	502
Exhaust cooled to 200°C	kW	380
Total heat recovery as hot H_2O	**kW**	**882**
Electrical efficiency	%	41,0
Thermal efficiency	%	42,5
TOTAL EFFICIENCY	**%**	**83,5**

ECOMAX® 9 Biogas

Electric output	**kW**	**889**
Energy input	**kW**	**2.105**
Available heat recovery:		
Engine block	kW	533
Exhaust cooled to 200°C	kW	322
Total heat recovery as hot H_2O	**kW**	**855**
Electrical efficiency	%	42,2
Thermal efficiency	%	40,6
TOTAL EFFICIENCY	**%**	**82,9**

ECOMAX® 10 Biogas (999)

Electric output	**kW**	**999**
Energy input	**kW**	**2.454**
Available heat recovery:		
Engine block	kW	608
Exhaust cooled to 200°C	kW	443
Total heat recovery as hot H_2O	**kW**	**1.051**
Electrical efficiency	%	40,7
Thermal efficiency	%	42,8
TOTAL EFFICIENCY	**%**	**83,5**

ECOMAX® 10 Biogas

Electric output	**kW**	**1.067**
Energy input	**kW**	**2.608**
Available heat recovery:		
Engine block	kW	654
Exhaust cooled to 200°C	kW	458
Total heat recovery as hot H_2O	**kW**	**1.112**
Electrical efficiency	%	40,9
Thermal efficiency	%	42,6
TOTAL EFFICIENCY	**%**	**83,6**

ECOMAX® 12 Biogas

Electric output	**kW**	**1.189**
Energy input	**kW**	**2.806**
Available heat recovery:		
Engine block	kW	709
Exhaust cooled to 200°C	kW	430
Total heat recovery as hot H_2O	**kW**	**1.139**
Electrical efficiency	%	42,4
Thermal efficiency	%	40,6
TOTAL EFFICIENCY	**%**	**83,0**

ECOMAX® 14 Biogas

Electric output	**kW**	**1.487**
Energy input	**kW**	**3.508**
Available heat recovery:		
Engine block	kW	887
Exhaust cooled to 200°C	kW	537
Total heat recovery as hot H_2O	**kW**	**1.424**
Electrical efficiency	%	42,4
Thermal efficiency	%	40,6
TOTAL EFFICIENCY	**%**	**83,0**

ECOMAX® Biogas Linea Rossa

ECOMAX® 0,6

Electric output	**kW 62**
Total heat recovery as hot H_2O	**kW 72**

ECOMAX® 1,3

Electric output	**kW 124**
Total heat recovery as hot H_2O	**kW 150**

ECOMAX® 2

Electric output	**kW 190**
Total heat recovery as hot H_2O	**kW 209**

ECOMAX® 1

Electric output	**kW 100**
Total heat recovery as hot H_2O	**kW 102**

ECOMAX® 1,5

Electric output	**kW 150**
Total heat recovery as hot H_2O	**kW 168**

ECOMAX® 2,5

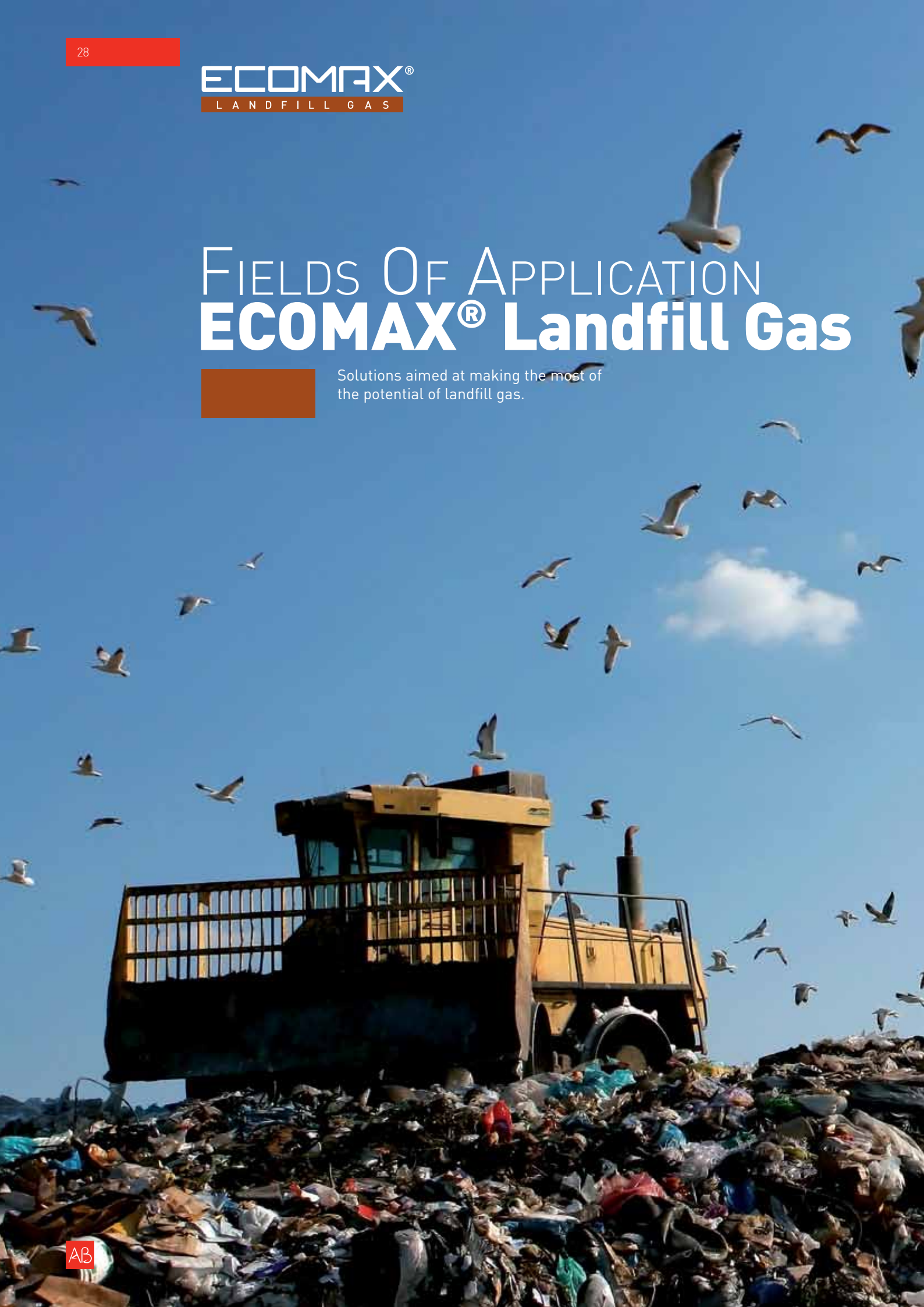
Electric output	**kW 249**
Total heat recovery as hot H_2O	**kW 282**

All data are based on engine versions with NOx - emissions level at 450 mg/Nm3 (5% O_2)

ECOMAX®
LANDFILL GAS

Fields Of Application
ECOMAX® Landfill Gas

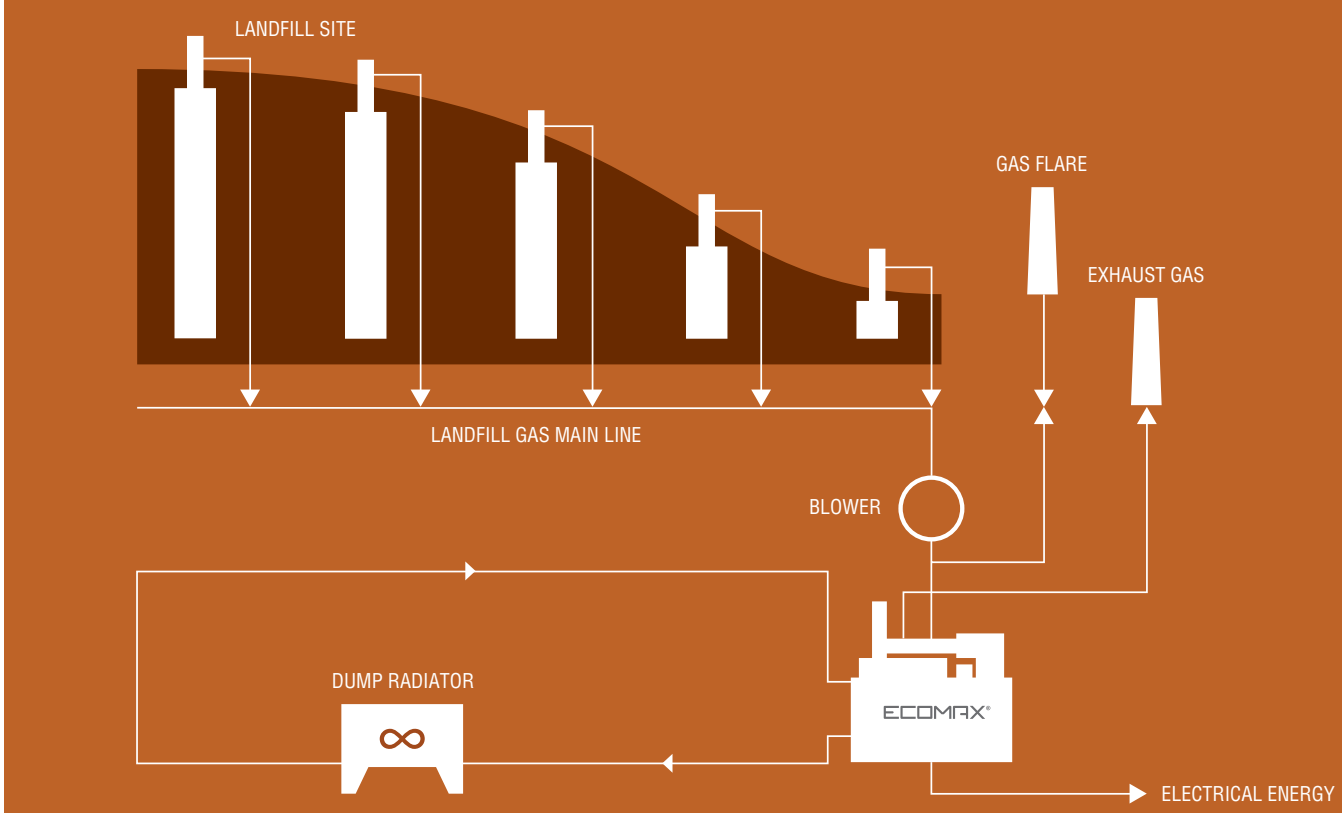
Solutions aimed at making the most of the potential of landfill gas.



AB

With an average calorific power output of between 3.5 and 5.0 kWh/Nm3, landfill gas constitutes a good fuel source for endothermic engines and may therefore be used to efficiently power cogeneration plants. Over the average lifetime of a landfill site, a million tonnes of waste may produce from 1.7 to 2.5 million m3 of methane.With the **ECOMAX® LANDFILL GAS LINE**, AB offers the best technological solutions for transforming the controlled storage of waste into a convenient means to create energy.

THE RANGE
ECOMAX® Landfill Gas



ECOMAX® 3 Landfill Gas

Electric output	**kW**	**330**
Energy input	**kW**	**851**
Available heat recovery:		
Engine block	kW	162
Exhaust cooled to 200°C	kW	174
Total heat recovery as hot H_2O	**kW**	**336**
Electrical efficiency	%	38,8
Thermal efficiency	%	39,5
TOTAL EFFICIENCY	**%**	**78,3**

ECOMAX® 5 Landfill Gas

Electric output	**kW**	**527**
Energy input	**kW**	**1.268**
Available heat recovery:		
Engine block	kW	317
Exhaust cooled to 200°C	kW	212
Total heat recovery as hot H_2O	**kW**	**527**
Electrical efficiency	%	41,6
Thermal efficiency	%	41,6
TOTAL EFFICIENCY	**%**	**83,1**

ECOMAX® 6 Landfill Gas

Electric output	**kW**	**637**
Energy input	**kW**	**1.565**
Available heat recovery:		
Engine block	kW	377
Exhaust cooled to 200°C	kW	286
Total heat recovery as hot H_2O	**kW**	**663**
Electrical efficiency	%	40,7
Thermal efficiency	%	42,4
TOTAL EFFICIENCY	**%**	**83,1**

ECOMAX® 7 Landfill Gas

Electric output	**kW**	**703**
Energy input	**kW**	**1.690**
Available heat recovery:		
Engine block	kW	421
Exhaust cooled to 200°C	kW	283
Total heat recovery as hot H_2O	**kW**	**704**
Electrical efficiency	%	41,6
Thermal efficiency	%	41,7
TOTAL EFFICIENCY	**%**	**83,3**

ECOMAX® 8 Landfill Gas

Electric output	**kW**	**851**
Energy input	**kW**	**2.076**
Available heat recovery:		
Engine block	kW	502
Exhaust cooled to 200°C	kW	380
Total heat recovery as hot H_2O	**kW**	**882**
Electrical efficiency	%	41,0
Thermal efficiency	%	42,5
TOTAL EFFICIENCY	**%**	**83,5**

ECOMAX® 9 Landfill Gas

Electric output	**kW**	**889**
Energy input	**kW**	**2.105**
Available heat recovery:		
Engine block	kW	533
Exhaust cooled to 200°C	kW	322
Total heat recovery as hot H_2O	**kW**	**855**
Electrical efficiency	%	42,2
Thermal efficiency	%	40,6
TOTAL EFFICIENCY	**%**	**82,9**

ECOMAX® 10 Landfill Gas

Electric output	**kW**	**999**
Energy input	**kW**	**2.454**
Available heat recovery:		
Engine block	kW	608
Exhaust cooled to 200°C	kW	443
Total heat recovery as hot H_2O	**kW**	**1.051**
Electrical efficiency	%	40,7
Thermal efficiency	%	42,8
TOTAL EFFICIENCY	**%**	**83,5**

ECOMAX® 10 Landfill Gas

Electric output	**kW**	**1.067**
Energy input	**kW**	**2.608**
Available heat recovery:		
Engine block	kW	654
Exhaust cooled to 200°C	kW	458
Total heat recovery as hot H_2O	**kW**	**1.112**
Electrical efficiency	%	40,9
Thermal efficiency	%	42,6
TOTAL EFFICIENCY	**%**	**83,6**

ECOMAX® 12 Landfill Gas

Electric output	**kW**	**1.189**
Energy input	**kW**	**2.806**
Available heat recovery:		
Engine block	kW	709
Exhaust cooled to 200°C	kW	430
Total heat recovery as hot H_2O	**kW**	**1.139**
Electrical efficiency	%	42,4
Thermal efficiency	%	40,6
TOTAL EFFICIENCY	**%**	**83,0**

ECOMAX® 14 Landfill Gas

Electric output	**kW**	**1.487**
Energy input	**kW**	**3.508**
Available heat recovery:		
Engine block	kW	887
Exhaust cooled to 200°C	kW	537
Total heat recovery as hot H_2O	**kW**	**1.424**
Electrical efficiency	%	42,4
Thermal efficiency	%	40,6
TOTAL EFFICIENCY	**%**	**83,0**

All data are based on engine versions with
NOx - emissions level at 450 mg/Nm3 (5% 02)

ECOMAX®
GREENHOUSE

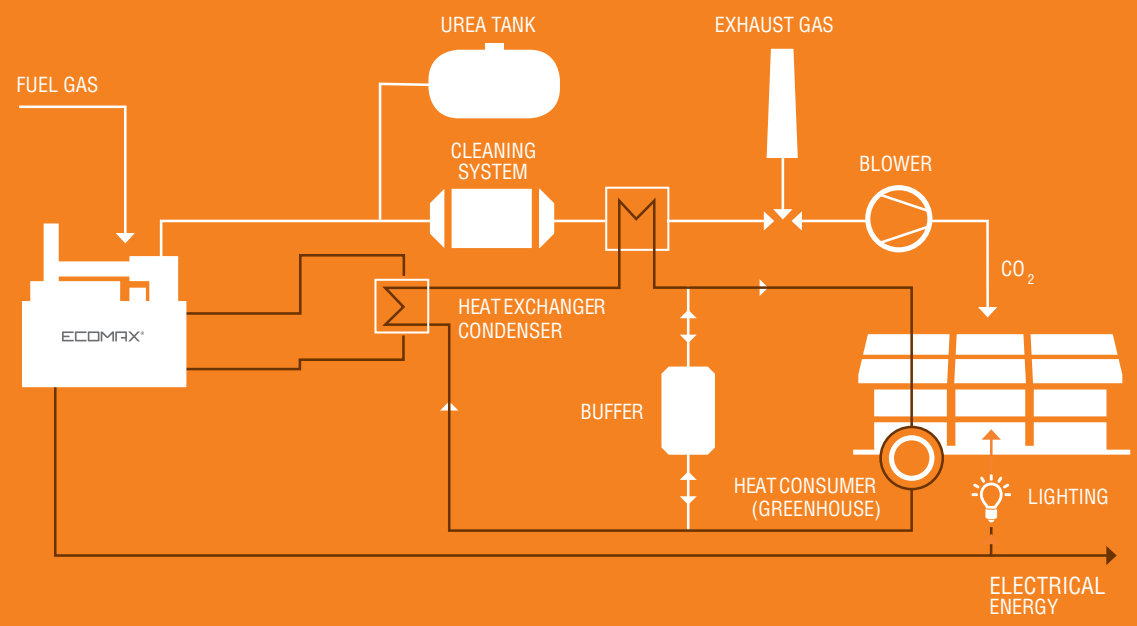
Fields Of Application
ECOMAX® Greenhouse

Cogeneration plants dedicated to greenhouse applications.

AB

Cogeneration plants achieve a considerable level of efficiency in greenhouse applications and also constitute a highly flexible source of electric energy. The **ECOMAX® GREENHOUSE** cogeneration plants ensure the simultaneous production of electrical energy, thermal energy and CO_2. The electricity may be used for illumination or sent to the power network. The heat from the production of hot water, at a high or low temperature, used for the heating and air-conditioning of the green house. CO_2 is an excellent fertilizer. Because of this, the **ECOMAX® GREENHOUSE** range is seen as the overall solution for greenhouse efficiency.

THE RANGE
ECOMAX® Greenhouse



ECOMAX® 10 GH

Energy input	**kW**	**2.592**
Electric output	**kW**	**1.067**
Mechanical output	**kW**	**1.095**
Heat recovery:		
Engine + boiler for flue gases recovery*	kW	1.218
Heat exchanger**	kW	120
2° stage intercooler	kW	85
TOTAL HEAT RECOVERY	**kW**	**1.423**

*Exhaust gases cooled to120°C
**Exhaust gases cooled to 50°C

ECOMAX® 12 GH

Energy input	**kW**	**2.768**
Electric output	**kW**	**1.189**
Mechanical output	**kW**	**1.222**
Heat recovery:		
Engine + boiler for flue gases recovery*	kW	1.204
Heat exchanger**	kW	130
2° stage intercooler	kW	102
TOTAL HEAT RECOVERY	**kW**	**1.436**

*Exhaust gases cooled to120°C
**Exhaust gases cooled to 50°C

ECOMAX® 14 GH

Energy input	**kW**	**3.460**
Electric output	**kW**	**1.487**
Mechanical output	**kW**	**1.527**
Heat recovery:		
Engine + boiler for flue gases recovery*	kW	1.504
Heat exchanger**	kW	160
2° stage intercooler	kW	128
TOTAL HEAT RECOVERY	**kW**	**1.792**

*Exhaust gases cooled to120°C
**Exhaust gases cooled to 50°C

ECOMAX® 20 GH

Energy input	**kW**	**4.477**
Electric output	**kW**	**2.004**
Mechanical output	**kW**	**2.058**
Heat recovery:		
Engine + boiler for flue gases recovery*	kW	1.920
Heat exchanger**	kW	220
2° stage intercooler	kW	144
TOTAL HEAT RECOVERY	**kW**	**2.284**

*Exhaust gases cooled to120°C
**Exhaust gases cooled to 50°C

ECOMAX® 27 GH

Energy input	**kW**	**5.970**
Electric output	**kW**	**2.679**
Mechanical output	**kW**	**2.745**
Heat recovery:		
Engine + boiler for flue gases recovery*	kW	2.562
Heat exchanger**	kW	304
2° stage intercooler	kW	191
TOTAL HEAT RECOVERY	**kW**	**3.057**

*Exhaust gases cooled to120°C
**Exhaust gases cooled to 50°C

ECOMAX® 30 GH

Energy input	**kW**	**6.957**
Electric output	**kW**	**3.047**
Mechanical output	**kW**	**3.119**
Heat recovery:		
Engine + boiler for flue gases recovery*	kW	3.058
Heat exchanger**	kW	345
2° stage intercooler	kW	185
TOTAL HEAT RECOVERY	**kW**	**3.588**

*Exhaust gases cooled to120°C
**Exhaust gases cooled to 50°C

ECOMAX® 33 GH

Energy input	**kW**	**7.462**
Electric output	**kW**	**3.356**
Mechanical output	**kW**	**3.356**
Heat recovery:		
Engine + boiler for flue gases recovery*	kW	3.210
Heat exchanger**	kW	381
2° stage intercooler	kW	232
TOTAL HEAT RECOVERY	**kW**	**3.823**

*Exhaust gases cooled to120°C
**Exhaust gases cooled to 50°C

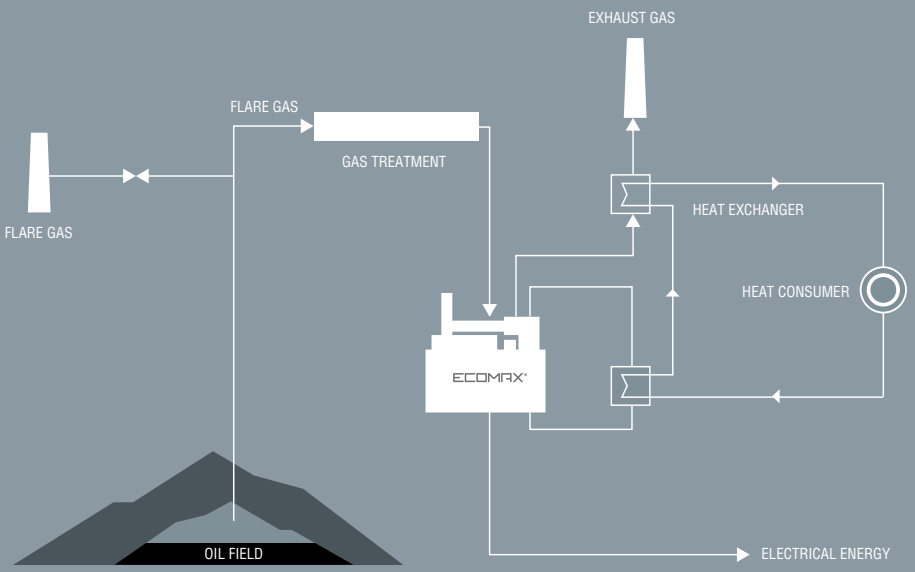
ECOMAX®
SPECIAL GAS

Fields Of Application
ECOMAX® Special Gas

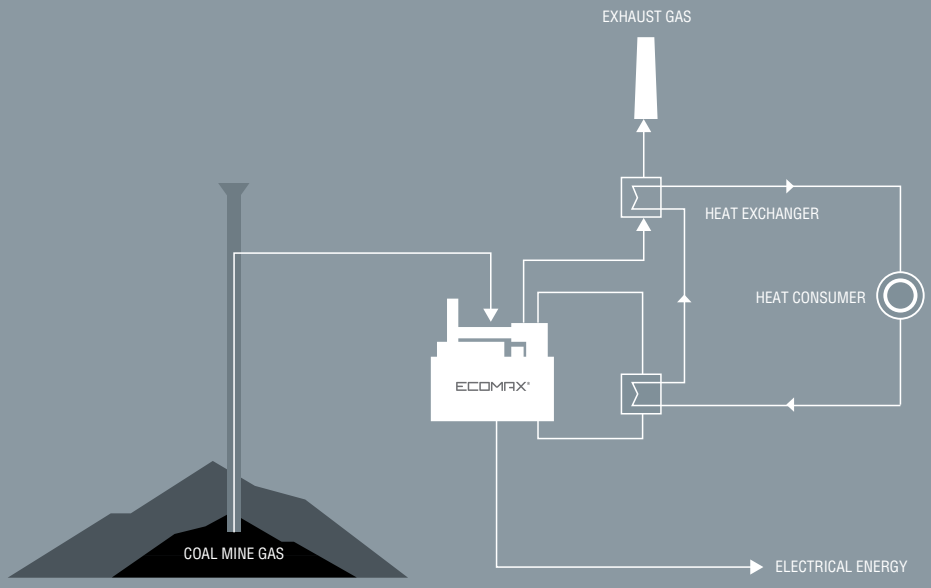
The point of reference for plants which use gas recovered during oil extraction or from processes using coal.

The **ECOMAX® Special Gas** line is the point of reference for plants which exploit gas recovered during oil extraction (APG, Associated Petroleum Gas) or from processes using coal. Oil wells are characterized by the natural presence of gases, methane in particular, which are in a liquid state when mixed with petroleum, becoming gaseous when approaching the surface. APG represents a problem during the extraction of petroleum and also for the environment, because escapes under pressure may saturate the area surrounding the point of extraction. To eliminate the gas, it is often burned off by torch, but it can also present a great opportunity if controlled and managed, particularly its exploitation for the fuelling of cogeneration plants. The electrical energy produced through cogeneration may be used for the needs of the extraction sites, in particular for the pumping stations, while any excess electricity produced may be ceded to the power network. Methane gas even develops during the extraction of mineral carbon, which for reasons of safety and for the economic opportunity created can be advantageously used through cogeneration.

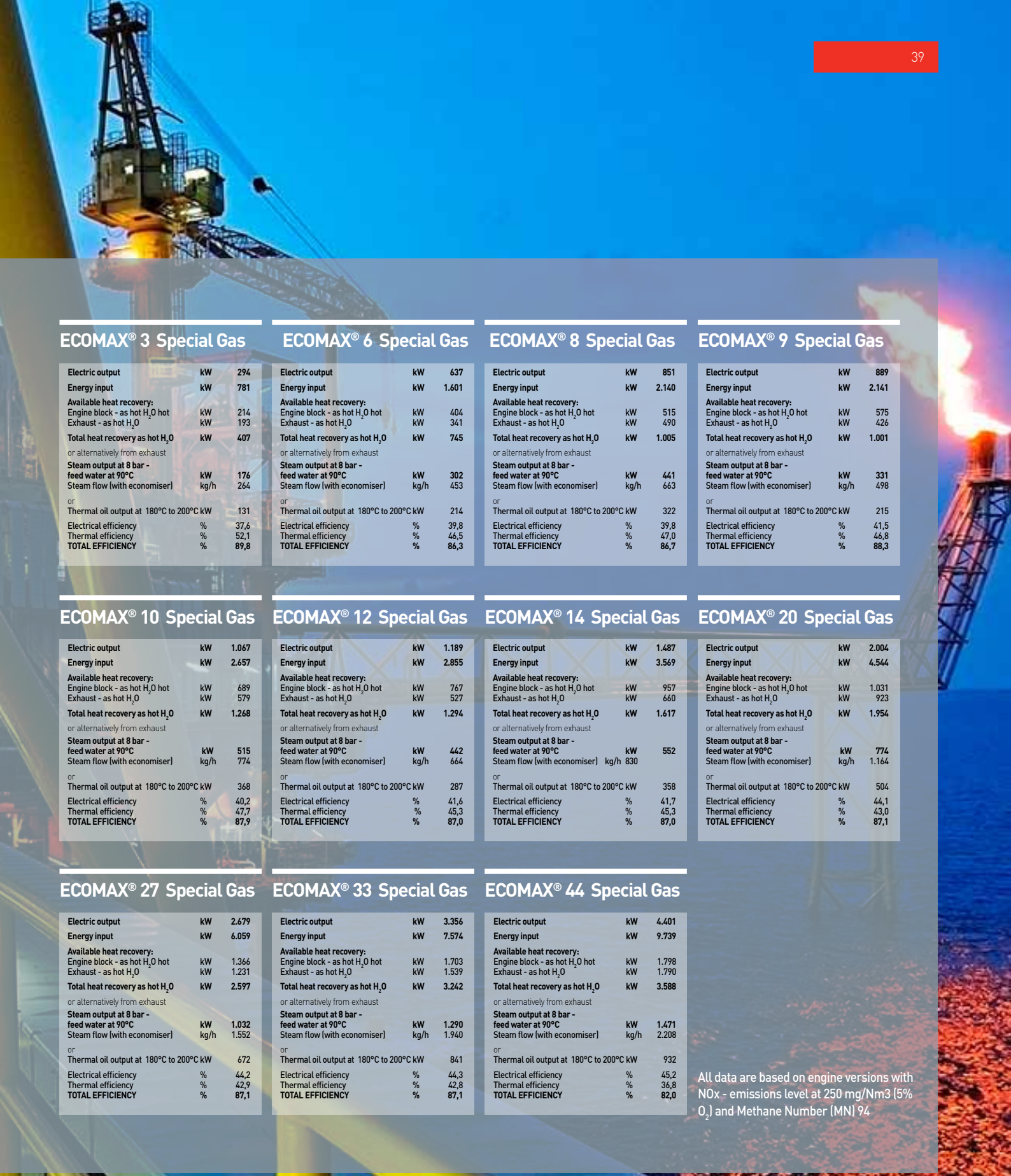
THE RANGE
ECOMAX® Special gas



APG (Associated Petroleum Gas)



Coal mines



ECOMAX® 3 Special Gas

Electric output	**kW**	**294**
Energy input	**kW**	**781**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	214
Exhaust - as hot H_2O	kW	193
Total heat recovery as hot H_2O	**kW**	**407**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**176**
Steam flow (with economiser)	kg/h	264
or		
Thermal oil output at 180°C to 200°C	kW	131
Electrical efficiency	%	37,6
Thermal efficiency	%	52,1
TOTAL EFFICIENCY	**%**	**89,8**

ECOMAX® 6 Special Gas

Electric output	**kW**	**637**
Energy input	**kW**	**1.601**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	404
Exhaust - as hot H_2O	kW	341
Total heat recovery as hot H_2O	**kW**	**745**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**302**
Steam flow (with economiser)	kg/h	453
or		
Thermal oil output at 180°C to 200°C	kW	214
Electrical efficiency	%	39,8
Thermal efficiency	%	46,5
TOTAL EFFICIENCY	**%**	**86,3**

ECOMAX® 8 Special Gas

Electric output	**kW**	**851**
Energy input	**kW**	**2.140**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	515
Exhaust - as hot H_2O	kW	490
Total heat recovery as hot H_2O	**kW**	**1.005**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**441**
Steam flow (with economiser)	kg/h	663
or		
Thermal oil output at 180°C to 200°C	kW	322
Electrical efficiency	%	39,8
Thermal efficiency	%	47,0
TOTAL EFFICIENCY	**%**	**86,7**

ECOMAX® 9 Special Gas

Electric output	**kW**	**889**
Energy input	**kW**	**2.141**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	575
Exhaust - as hot H_2O	kW	426
Total heat recovery as hot H_2O	**kW**	**1.001**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**331**
Steam flow (with economiser)	kg/h	498
or		
Thermal oil output at 180°C to 200°C	kW	215
Electrical efficiency	%	41,5
Thermal efficiency	%	46,8
TOTAL EFFICIENCY	**%**	**88,3**

ECOMAX® 10 Special Gas

Electric output	**kW**	**1.067**
Energy input	**kW**	**2.657**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	689
Exhaust - as hot H_2O	kW	579
Total heat recovery as hot H_2O	**kW**	**1.268**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**515**
Steam flow (with economiser)	kg/h	774
or		
Thermal oil output at 180°C to 200°C	kW	368
Electrical efficiency	%	40,2
Thermal efficiency	%	47,7
TOTAL EFFICIENCY	**%**	**87,9**

ECOMAX® 12 Special Gas

Electric output	**kW**	**1.189**
Energy input	**kW**	**2.855**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	767
Exhaust - as hot H_2O	kW	527
Total heat recovery as hot H_2O	**kW**	**1.294**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**442**
Steam flow (with economiser)	kg/h	664
or		
Thermal oil output at 180°C to 200°C	kW	287
Electrical efficiency	%	41,6
Thermal efficiency	%	45,3
TOTAL EFFICIENCY	**%**	**87,0**

ECOMAX® 14 Special Gas

Electric output	**kW**	**1.487**
Energy input	**kW**	**3.569**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	957
Exhaust - as hot H_2O	kW	660
Total heat recovery as hot H_2O	**kW**	**1.617**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**552**
Steam flow (with economiser)	kg/h	830
or		
Thermal oil output at 180°C to 200°C	kW	358
Electrical efficiency	%	41,7
Thermal efficiency	%	45,3
TOTAL EFFICIENCY	**%**	**87,0**

ECOMAX® 20 Special Gas

Electric output	**kW**	**2.004**
Energy input	**kW**	**4.544**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	1.031
Exhaust - as hot H_2O	kW	923
Total heat recovery as hot H_2O	**kW**	**1.954**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**774**
Steam flow (with economiser)	kg/h	1.164
or		
Thermal oil output at 180°C to 200°C	kW	504
Electrical efficiency	%	44,1
Thermal efficiency	%	43,0
TOTAL EFFICIENCY	**%**	**87,1**

ECOMAX® 27 Special Gas

Electric output	**kW**	**2.679**
Energy input	**kW**	**6.059**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	1.366
Exhaust - as hot H_2O	kW	1.231
Total heat recovery as hot H_2O	**kW**	**2.597**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**1.032**
Steam flow (with economiser)	kg/h	1.552
or		
Thermal oil output at 180°C to 200°C	kW	672
Electrical efficiency	%	44,2
Thermal efficiency	%	42,9
TOTAL EFFICIENCY	**%**	**87,1**

ECOMAX® 33 Special Gas

Electric output	**kW**	**3.356**
Energy input	**kW**	**7.574**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	1.703
Exhaust - as hot H_2O	kW	1.539
Total heat recovery as hot H_2O	**kW**	**3.242**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**1.290**
Steam flow (with economiser)	kg/h	1.940
or		
Thermal oil output at 180°C to 200°C	kW	841
Electrical efficiency	%	44,3
Thermal efficiency	%	42,8
TOTAL EFFICIENCY	**%**	**87,1**

ECOMAX® 44 Special Gas

Electric output	**kW**	**4.401**
Energy input	**kW**	**9.739**
Available heat recovery:		
Engine block - as hot H_2O hot	kW	1.798
Exhaust - as hot H_2O	kW	1.790
Total heat recovery as hot H_2O	**kW**	**3.588**
or alternatively from exhaust		
Steam output at 8 bar - feed water at 90°C	**kW**	**1.471**
Steam flow (with economiser)	kg/h	2.208
or		
Thermal oil output at 180°C to 200°C	kW	932
Electrical efficiency	%	45,2
Thermal efficiency	%	36,8
TOTAL EFFICIENCY	**%**	**82,0**

All data are based on engine versions with NOx - emissions level at 250 mg/Nm3 (5% O_2) and Methane Number (MN) 94

+750

PLANTS SUPPORTED

+800

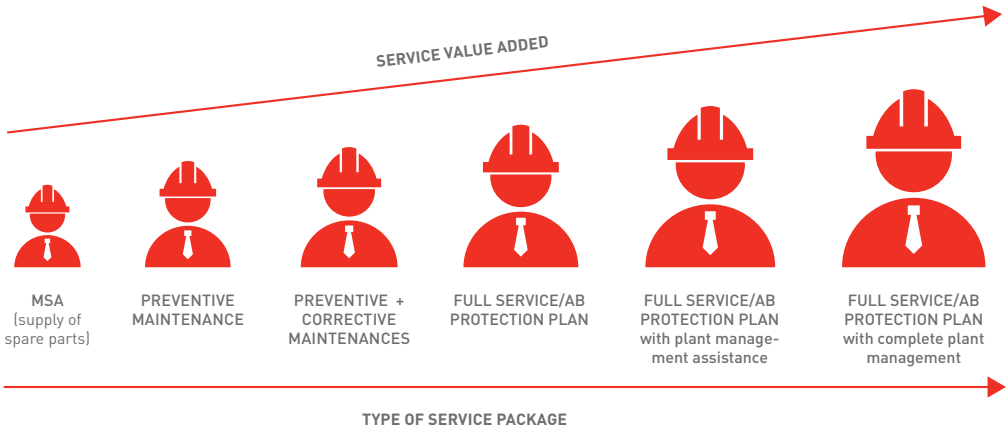
PLANTS MONITORED

+200

SPECIALIZED TECHNICIANS

THE **SERVICE**

With over 200 specialized technicians around the world, AB Service is completely dedicated to the assistance and maintenance of AB installations.
Over 90% of plants installed have a "Full Service" 24 hour assistance, 365 days a year, which provides remote monitoring of the plant and original replacement parts. The benefits to our customers are: machine stoppages reduced to a minimum, excellent performance and maximum reliability.
A strategic choice which gives certainty in payback on the investment.

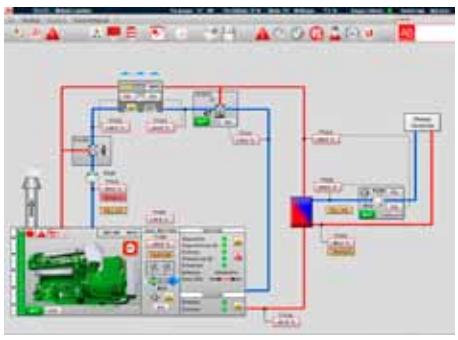


THE AB **MONITORING SYSTEM**: SUPERVISION AND CONTROL

The supervision and monitoring system constitutes a "centralized point" of plant management for the customer, not only for cogeneration plant but also for the production processes closely associated to the plant.
In fact, the remote monitoring systems allow the user to:

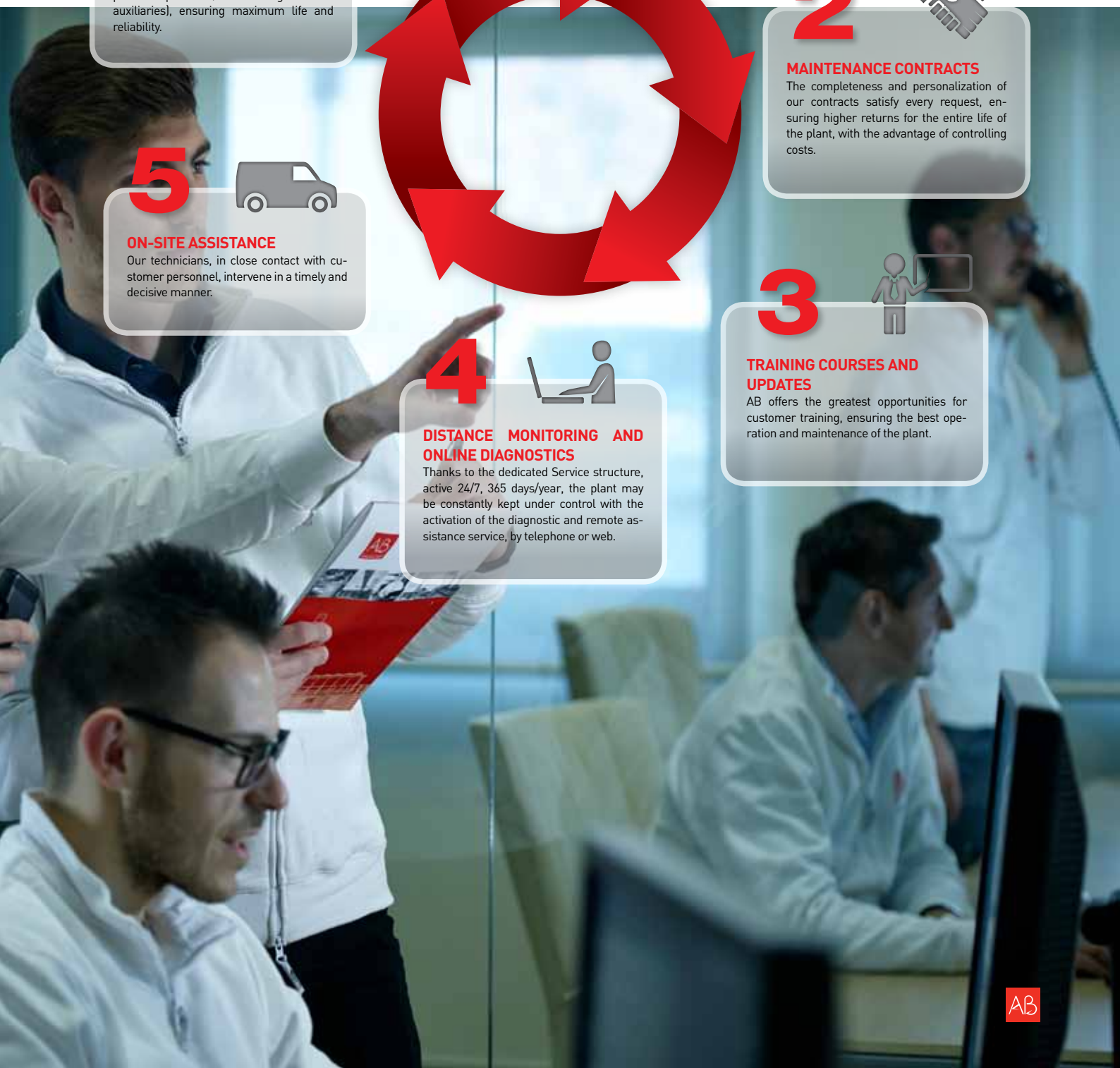
- choose the best operating set-up
- verify the operating conditions
- determine the daily profitability of the plant.
- remote connection accessible by Internet, both fixed and mobile

The monitoring system also constitutes an interface which is always active, allowing AB Service, on the basis of assistance agreements established with the customer, to manage and regulate the plant remotely, ensuring an even more reliable and efficient monitoring and emergency intervention service.



Remotable AB SCADA (System control and data acquisition) System

AB Plant Status online monitoring



1 COMMISSIONING

AB specialists ensure qualified plant installation and start-up which conform to requirements.

2 MAINTENANCE CONTRACTS

The completeness and personalization of our contracts satisfy every request, ensuring higher returns for the entire life of the plant, with the advantage of controlling costs.

3 TRAINING COURSES AND UPDATES

AB offers the greatest opportunities for customer training, ensuring the best operation and maintenance of the plant.

4 DISTANCE MONITORING AND ONLINE DIAGNOSTICS

Thanks to the dedicated Service structure, active 24/7, 365 days/year, the plant may be constantly kept under control with the activation of the diagnostic and remote assistance service, by telephone or web.

5 ON-SITE ASSISTANCE

Our technicians, in close contact with customer personnel, intervene in a timely and decisive manner.

6 ORIGINAL PARTS

The Service uses only original parts for all plant components (from the engine to the auxiliaries), ensuring maximum life and reliability.

7 REPAIR, UPGRADE AND OVERHAUL

Our specialists know how to give new life to the plants before and after 60,000 hours of operation, including upgrades of the most advanced technical levels.

AB IS THE **WORLD'S FOREMOST AUTHORITY** SPECIALIZED IN COGENERATION PLANTS.

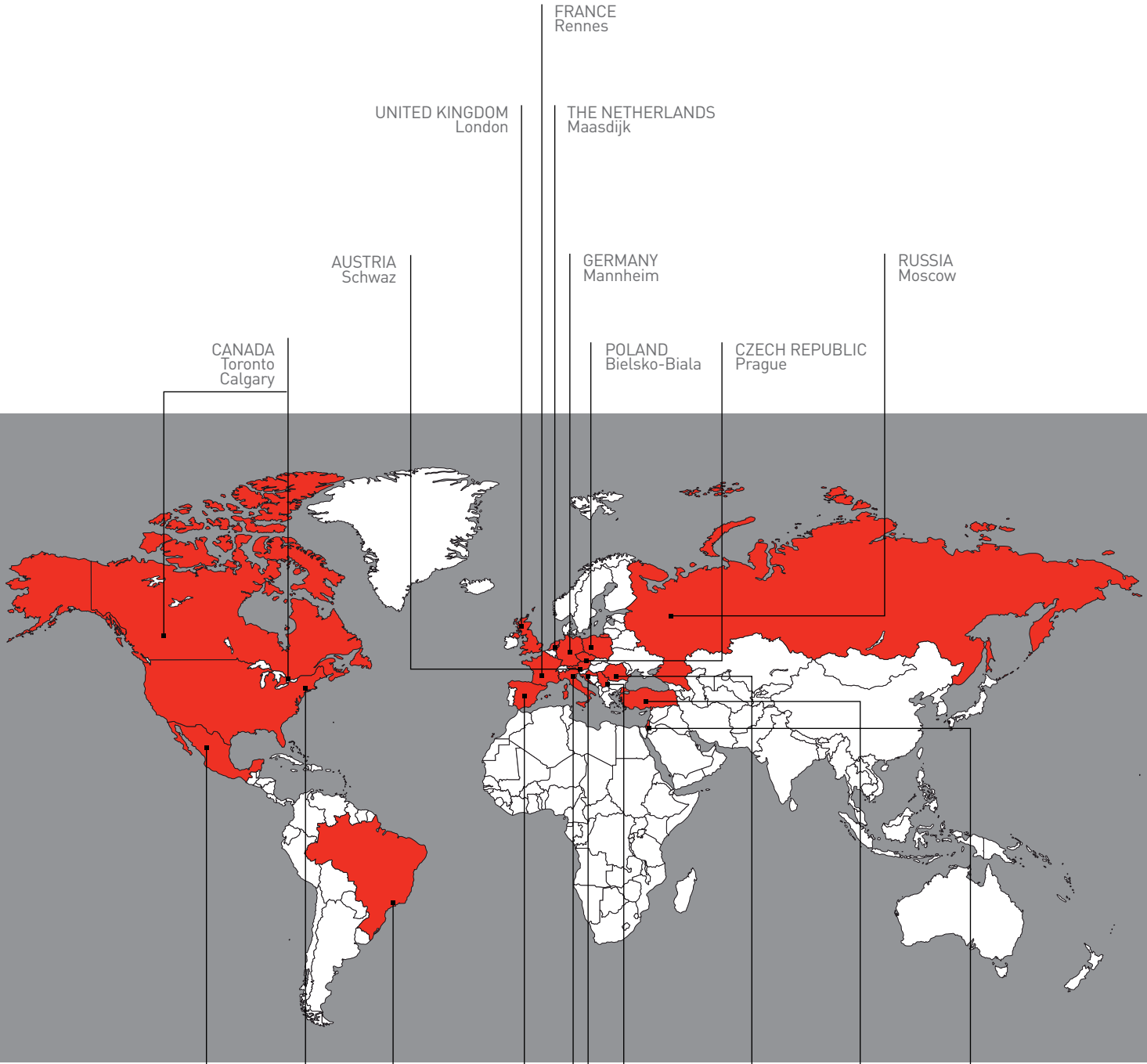
Since 1981, AB has been at the side of companies seeking to improve their own competitiveness, saving energy and limiting environmental emissions. We create a relationship with our customers and partners based on frankness and trust: we produce, install and manage the plants as if they were ours.

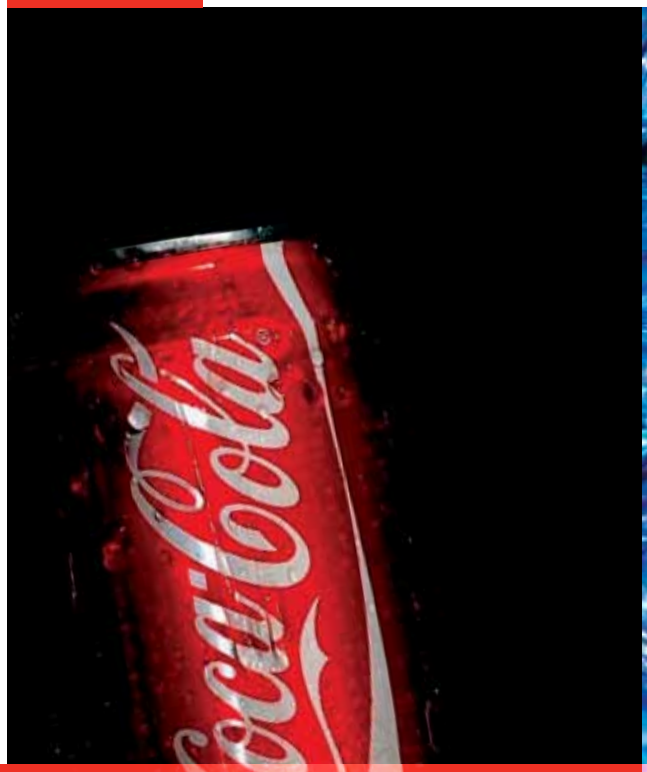
Over 30 years of work, we have developed a know-how and a production capacity without equal on a world-wide level, which ensure the excellence of the plants, the maximum quality of both the installation and after-sales service.

Because AB is the only manufacturer, with an industrial process, able to internally manage the entire production cycle of the cogeneration plant.

AB pursues the highest degree of innovation with determination, gathering knowledge, experience and technologies, in order to respond with advanced solutions to a primary need of mankind: energy. Contributing to the creation of a better future in the direction of an eco-sustainable system.

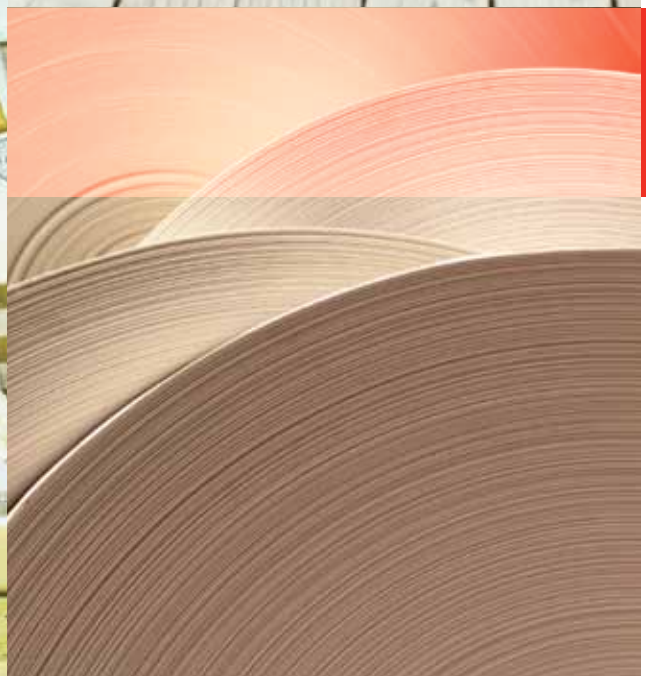
The principal production and engineering research activities are concentrated in a modern industrial hub with its head offices in Orzinuovi (BS) Italy, spread over about 40,000 mq of connected buildings, where the production facility, engineering offices, service centre and management are located.


FRANCE
Rennes
UNITED KINGDOM
London
THE NETHERLANDS
Maasdijk
AUSTRIA
Schwaz
GERMANY
Mannheim
RUSSIA
Moscow
CANADA
Toronto
Calgary
POLAND
Bielsko-Biala
CZECH REPUBLIC
Prague
MEXICO
Mexico City
SERBIA
New Belgrade
ROMANIA
Bucharest
USA
New Jersey
CROATIA
Rijeka
TURKEY
Istanbul
ISRAEL
Yokneam
BRASIL
San Paolo
SPAIN
Barcellona
ITALIA
Head Office
Orzinuovi



THE **EXPERIENCES**

Our customers choose us because we guarantee them maximum competitiveness thanks to the best solutions for cogeneration.



Over 700 customers around the world have chosen AB, among which are:

AMADORI
GRUPPO BENETTON
BNL
BUITONI
CARGILL
COCA-COLA
COELSANUS
CONSERVE ITALIA
DUCATI
EDF
ERIDANIA
ESSELUNGA
FERRERO
GALBANI
GARDA PLAST
GRANAROLO
GRUPPO CREMONINI
HERA-COMM
IDEAL STANDARD
ITALDENIM
KRAFT
GRUPPO LACTALIS
LATTERIA SORESINA
LILLY
LINDT
GRUPPO MAPEI
MAGNA

MARTINI&ROSSI
MENZ&GASSER
MUKKI LATTE – CENTRALE DEL LATTE DI FIRENZE
NESTLE'
NOVARTIS
OROGEL
PERONI
PERUGINA
PETROM
PFIZER
PASTIFICIO GAROFALO
PASTIFICIO LA MOLISANA
PASTIFICIO RUMMO
PIZZOLI
SPUMADOR
WIENERBERGER

WEB CHANNEL

COGENERATION CHANNEL

The first and only web channel entirely dedicated to COGENERATION and all its applications.

- Case histories and best practices from around the world
- More than 400 online videos
- 12 thematic sections

www.cogenerationchannel.com

BIOGAS CHANNEL

The first and only web channel entirely dedicated to BIOGAS and all its applications.

- Visitors from 168 countries on 5 continents.
- More than 600 online videos
- 16 thematic sections

www.biogaschannel.com

NOTE

COGENERATION WORLD

AB ENERGY SPA
Via Caduti del Lavoro, 13
25034 Orzinuovi (BS) - Italy
T +39 030 9400100
F +39 030 9400126
www.gruppoab.com