THE ECOMAX® GREENHOUSE SOLUTION BRINGS SAVINGS,
EFFICIENCY AND SUSTAINABILITY TO GREENHOUSES.

AB GPN GREENHOUSE POWER NETHERLANDS a Company of Gruppo AB

AB, THE GLOBAL REFERENCE FOR COGENERATION, HAS ENGINEERED THE ECOMAX® GREENHOUSE (GH) SOLUTION: A NEW REVOLUTIONARY STEP IN ENERGY EFFICIENCY.

THE ECOMAX® GH SOLUTION IS A UNIQUE BREAKTHROUGH FOR GROWERS, DEVELOPERS AND INVESTORS WHO ARE LOOKING FOR A RELIABLE COGENERATION SYSTEM FOR THEIR GREENHOUSE. WE'VE BEEN WORKING FOR THE LAST TWENTY YEARS SIDE BY SIDE WITH GROWERS AND ALL THE STAKEHOLDERS IN THE GREENHOUSE INDUSTRY. THIS INCOMPARABLE EXPERIENCE ENABLES US TO DEEPLY UNDERSTAND THE GREENHOUSE NEEDS TO IMPROVE OPERATIONS, QUALITY AND PRODUCTIVITY.

THE ECOMAX® GREENHOUSE IS THE PERFECT SOLUTION FOR YOUR GREENHOUSE TO SUPPLY HEAT, ELECTRICITY AND CO_2.

AB PRESENTS GPN: A STRONG-ROOTED COMPANY.

BRINGING THE BEST OF TWO WORLDS TOGETHER

THE DUTCH EXPERIENCE IN THE GREENHOUSE SECTOR COMBINED WITH THE COMPETENCIES OF AB, WORLD LEADER IN THE COGENERATION SECTOR.

AB AT A GLANCE

- 30 YEARS OF EXPERIENCE
- 900 INSTALLED PLANTS (1.300 MWE)
- 36,000 SQ M OF PRODUCTION FACILITIES
- PEAKS OF 98% PLANT OPERATION TIME
- >500 EMPLOYEES
- >190 FIELD SERVICE TECHNICIANS

Greenhouse Power Netherlands (GPN) is a company of the AB Group.

AB cogeneration systems improve energy efficiency for clients in the industrial sector through natural gas applications (Coca Cola, Nestlé, Pfizer, Ferrero, Kraft etc.), biogas applications (more than 700 farms, landfills and industries such as Cargill and Inalca, turning waste into biogas), and associated gas applications.

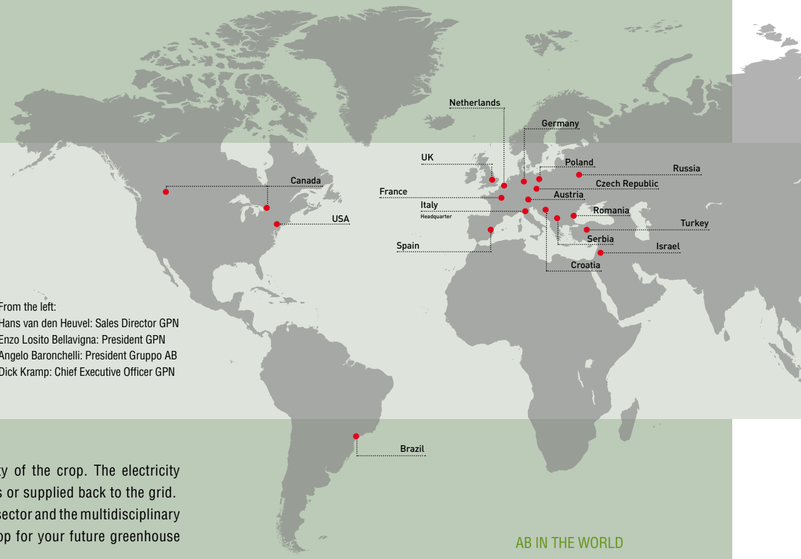
AB CHP solutions offer the features of high efficiency, modularity, compactness and easy transport: all details that fully satisfy the energy requirements of the different types of cogeneration applications worldwide.

The AB/GPN greenhouse solution is based on a natural gas driven engine which delivers heat and CO_2 to the greenhouse to increase quality and productivity of the crop. The electricity produced can be used inside the greenhouse to power the grow lights or supplied back to the grid.

With more than 20 years of experience in the greenhouse cogeneration sector and the multidisciplinary organization and technical know-how of AB, GPN is the one stop shop for your future greenhouse cogeneration projects.

For GPN it's more than selling an engine: we are selling a total integrated greenhouse cogeneration solution with the highest quality standards. From green field engineering to a full maintenance contract for a complete solution.

From the left:
Hans van den Heuvel: Sales Director GPN
Enzo Losito Bellavigna: President GPN
Angelo Baronchelli: President Gruppo AB
Dick Kramp: Chief Executive Officer GPN



AB IN THE WORLD

THIS IS WHERE AB SOLUTIONS ARE DESIGNED AND PRODUCED: ALL UNDER ONE ROOF.

THE AB HEADQUARTERS IN ORZINUOVI, ONE OF THE MOST IMPORTANT COGENERATION PRODUCTION FACILITIES WORLDWIDE, IS SET UP TO ENGINEER AND MANUFACTURE COGENERATION SOLUTIONS WITH THE HIGHEST QUALITY STANDARDS.

Within a multidisciplinary framework, AB has all the in-house experience to design, manufacture, install and maintain the cogeneration plants.
We are able to guarantee excellent system performance for the entire life cycle. Furthermore AB has one of the largest engine and spare part stock worldwide, to guarantee prompt supplies and services.

ENGINEERING
Technical-economic feasibility plan

DESIGN
Electrical engineering | Mechanical engineering
Process engineering | Order management team
Support during the project authorization stage

PRODUCTION
36,000 sq m surface area | Automatic warehouse
Oven water-painting technology
Process standardization

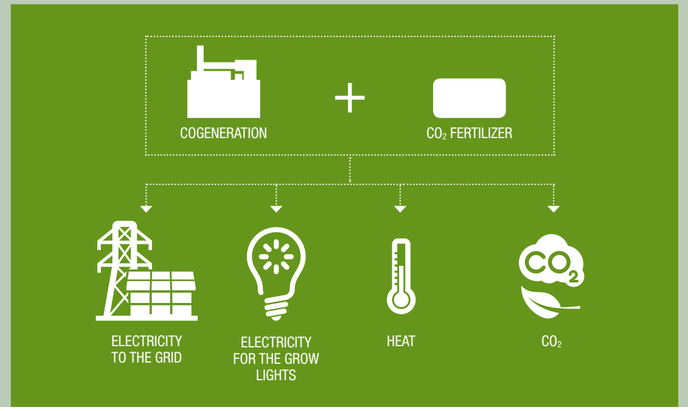
INSTALLATION
Hydraulic, mechanical and electrical interfacing with client's existing situation | Fast installation and worksite start-up

MONITORING SYSTEM
Choice of service set-ups | Monitoring of operating conditions | Monitoring of plant profitability
Remote customer care

SERVICE
>190 field service technicians
Extensive area coverage | 24 hours - 365 days
AB Service Competence Center

CHP: THE BEST EFFICIENCY CHOICE FOR GROWERS.

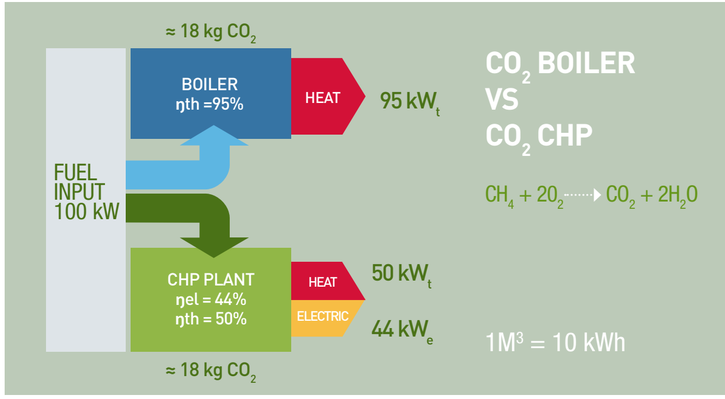
AB CHP PLANTS DELIVER THE HIGHEST ENERGY EFFICIENCY PERFECTLY INTEGRATED IN THE GREENHOUSE.



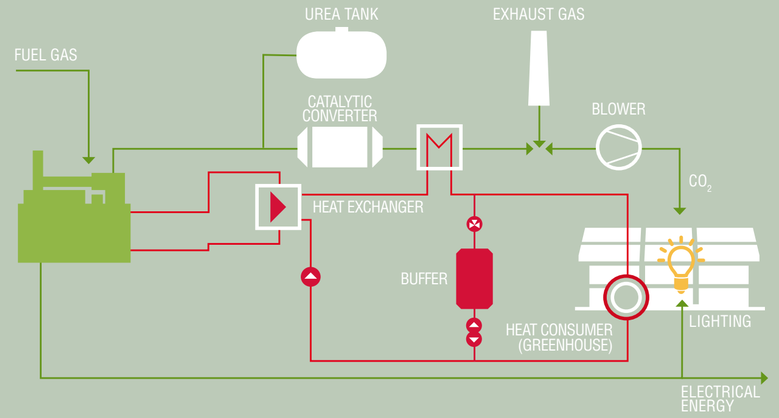
Cogeneration is based on the simultaneous production of electricity and recoverable heat, starting from a single source (both fossil and renewable), within a single integrated system. The main advantage compared to traditional separate-process energy production is that the heat is reused, while it normally remains unused and is released into the atmosphere.

Cogeneration saves up to 30% of primary energy and ensures objective, measurable and quantifiable benefits.

In the world of greenhouse, energy saving is a key factor in providing companies with a competitive edge. Cogeneration plants for greenhouses are designed and built by AB, for the production of electricity, thermal energy and CO_2, all at the same time.

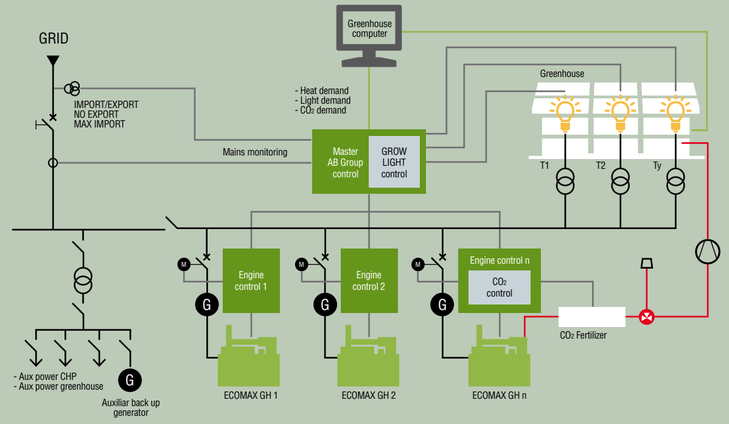


ECOMAX® GH: THE PERFECT SOLUTION FOR YOUR GREENHOUSE.



For any type of cultivation, from flowers to potted plants and vegetables, AB is able to supply a 'turnkey' solution serving specific client requirements, with energy efficiency results that are always at highest performance levels, creating a healthy return on investment. The electricity can be sold to the grid or used to power grow lights. High and low temperature water produced by the gas engine is supplied to the heating system of the greenhouse. By the use of a so-called CO_2 exhaust gas cleaning system, the exhaust gases are purified to supply clean CO_2 to the greenhouse and increase crop productivity. Cogeneration represents both a business opportunity and a long-term strategy for companies involved in the greenhouse sector, always in perspective of high energy performance and eco-sustainability.

A SIMPLE AND EFFICIENT CONTROL TOPOLOGY FOR YOUR GREENHOUSE.



A UNIQUE COGENERATION CONCEPT FOR GREENHOUSES.

FOR NEWLY BUILT AND EXISTING GREENHOUSES, THROUGHOUT THE WORLD.

ECOMAX® GREENHOUSE (GH): THE MODULAR SOLUTION ADVANTAGES

- → TOP-QUALITY PRODUCTS, MADE ENTIRELY IN-HOUSE
- → OUTDOOR & INDOOR SOLUTIONS
- → NO BUILDING PERMITS
- → MAJOR REDUCTION OF ON-SITE ASSEMBLY
- → EASY RELOCATION AND SCALABILITY
- → EASY CONTROL AND INTERCONNECTION WITH EXISTING SYSTEMS
- → SHORTER DELIVERY TIME
- → EASY IMPORT PROCEDURES

With many years of experience in the greenhouse industry, GPN presents cogeneration solutions with the same positive features that have made AB modular plants so successful. The ECOMAX® GH modular package solution combines characteristics such as versatility, modularity and compactness with high energy efficiency performance.

Thanks to its great flexibility, Ecomax® can be run at different speeds from 100% of rated power to 50% of plant potential, in order to optimize the produced energy carriers. Vertical scalability enables coverage of the entire power range. Horizontal scalability, guaranteed by a multiple module solution, especially suited to large plants, enables production to be sustained in reduced load conditions or during scheduled production stoppages.

Both an outdoor and an indoor modular solution are available to cater for each specific design requirement and, in particular, to facilitate interconnection with existing plant systems.

AB is the ideal partner for 'turnkey' construction of your cogeneration plant, from design to servicing. AB is the perfect one stop for the entire life cycle of your plant.

A REVOLUTIONARY TECHNOLOGICAL CONCEPT: STANDARDIZED, MODULAR BUILT AND PROVEN.

CO_2 fertilization

An exhaust gas cleaning system is used to purify the exhaust gas produced by the engine to supply clean CO_2 for fertilization of the crop in the greenhouse.
By the use of exhaust gas heat exchangers, the heat is extracted from the exhaust gas to heat the greenhouse. The cooled exhaust gas, which is purified to clean CO_2, is blown into the CO_2 system of the greenhouse, where it acts as a 'fertilizer' and increases substantial plant growth and quality. An exhaust gas guarding and measuring system is installed to monitor the quality of the CO_2 that is fed into the greenhouse.

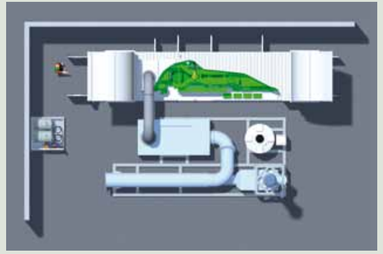
Main switch gear and control panels

We supply your CHP solution including switch gear and control panels.
The Ecomax® management system controls and monitors the greenhouse solution. All relevant information on power, temperature and possible faults is presented clearly on a touch screen. The software automatically reports any faults to our troubleshooting service, which operates around the clock, so that we can take action immediately. In many cases, we can also solve problems from a distance.

Grow light control

To secure smooth operation in both grid parallel and island operation we deliver the so called 'grow light computer'. The grow light computer is integrated in the Ecomax® management system which controls and monitors the grow light installation in the greenhouse with high flexibility for the grower thanks to the use of open and useful control software in which light strategies can be very easily changed as required. The grow light control will be programmed to growers' specific needs with optimal flexibility.

ECOMAX®
GREENHOUSE



1. **ECOMAX® :** containerized engine + gas train + acoustic enclosure, all in one
2. **Control panel:** used to control and manage the total solution
3. **Exhaust gas purifier:** for the production of clean CO_2
4. **Urea tank:** storage of urea for use in the exhaust gas cleaning system
5. **Urea injection:** injector of urea into the exhaust gasses in order to reduce the NOx content in the exhaust gases
6. **Exhaust gas cooler:** this is used to cool exhaust gasses in order to recover thermal energy
7. **Exhaust gas condenser:** this is used to cool exhaust gasses in order to recover thermal energy bringing the exhaust gas temperature to a value which is suitable for CO_2 fertilization in the greenhouse
8. **Filter:** to reduce particles from the exhaust gas before being blown into the greenhouse
9. **Ventilation ducts:** for ventilation and combustion air
10. **Exhaust gas cleaning system control and guarding panel:** to control, manage and guard the exhaust cleaning system
11. **Oil skid:** for storage of waste and fresh lubrication oil
12. **Exhaust gas stack:** for the release of exhaust gas when not used in the greenhouse
13. **CO_2 valve:** this is the point where the clean CO_2 is taken for delivery to the greenhouse when needed

TAILOR MADE CHP FOR YOUR GREENHOUSE

THE 'TURNKEY' ECOMAX® GH CAN BE ADAPTED TO YOUR NEEDS. A COMPLETE RANGE OF SOLUTIONS TO SERVE CLIENT ENERGY DEMANDS, AIMING TO EXPLOIT THE ADVANTAGES OF COGENERATION APPLIED TO GREENHOUSE OPERATIONS.

HOW AB COMPETENCES WILL ASSURE THE BEST IN CLASS SOLUTION.

- → IMMEDIATE KNOWLEDGE AND UNDERSTANDING OF THE GREENHOUSE OPERATIONS AND THEIR NEEDS
- → ABILITY TO OFFER DIFFERENT SCOPE FOR GREENHOUSE ENERGY SOLUTIONS INDOORS AND OUTDOORS
- → ABILITY TO PROVIDE UPFRONT ENGINEERING AND MARKET EXPERTISE
- → SIZING TOOL TO DEFINE THE COGENERATION NEED FOR A GREENHOUSE BASED ON HEAT, CO_2 AND GROW LIGHT DEMAND
- → FEASIBILITY STUDIES, LIFE CYCLE COSTING AND R.O.I. ANALYSIS
- → LAYOUT DRAWINGS FOR INDOOR AND OUTDOOR SOLUTIONS
- → ELECTRICAL ENGINEERING, DESIGN OF MEDIUM - AND LOW VOLTAGE SYSTEMS FOR GRID PARALLEL AND ISLAND OPERATION
- → MECHANICAL ENGINEERING HEAT INTEGRATION INTO THE GREENHOUSE TO REACH THE HIGHEST POSSIBLE SYSTEM EFFICIENCY
- → BALANCE OF PLANT CONTROLS AND AUTOMATION
- → CO_2 CONTROL AND INTEGRATION
- → GROW LIGHT CONTROL AND INTEGRATION
- → SUPPORT ON PROJECT PLANNING, DESIGN AND EXECUTION

ECOMAX®
GREENHOUSE

ECOMAX 10 GH

Electric Power kW 1.063
Rec. Thermal Power kW 1.401

ECOMAX 11 GH

Electric Power kW 1.130
Rec. Thermal Power kW 1.355

ECOMAX 11 HE GH

Electric Power kW 1.189
Rec. Thermal Power kW 1.416

ECOMAX 14 GH

Electric Power kW 1.413
Rec. Thermal Power kW 1.691

ECOMAX 14 HE GH

Electric Power kW 1.487
Rec. Thermal Power kW 1.770

ECOMAX 20 GH

Electric Power kW 2.000
Rec. Thermal Power kW 2.292

ECOMAX 27 GH

Electric Power kW 2.679
Rec. Thermal Power kW 2.959

ECOMAX 30 GH

Electric Power kW 3.044
Rec. Thermal Power kW 3.601

ECOMAX 33 GH

Electric Power kW 3.352
Rec. Thermal Power kW 3.699

ECOMAX 44 GH

Electric Power kW 4.401
Rec. Thermal Power kW 4.561

ECOMAX® GH

		ECOMAX® 10 GH	ECOMAX® 11 GH	ECOMAX® 11 HE GH	ECOMAX® 14 GH	ECOMAX® 14 HE GH	ECOMAX® 20 GH	ECOMAX® 27 GH	ECOMAX® 30 GH	ECOMAX® 33 GH	ECOMAX® 44 GH
ENERGY INPUT	kW	2.065	2.636	2.768	3.295	3.460	4.476	5.969	6.957	7.461	9.450
Electrical Output	kW	1.063	1.130	1.189	1.413	1.487	2.000	2.679	3.044	3.352	4.401
MECHANICAL OUTPUT	kW	1.095	1.161	1.222	1.451	1.527	2.058	2.745	3.119	3.431	4.491
Recoverable Heat											
Engine + Exhaust Gas Heat Exchanger	kW	1.200	1.145	1.188	1.430	1.485	1.928	2.486	3.067	3.113	3.771
Condenser	kW	126	126	133	157	166	229	306	350	382	477
Intercooler Second Stage	kW	75	84	95	104	119	135	167	184	204	313
TOTAL RECOVERABLE HEAT	kW	1.401	1.355	1.416	1.691	1.770	2.292	2.959	3.601	3.699	4.561

THE MAINTENANCE EXPERIENCE OF MORE THAN 900 PLANTS WORLDWIDE AT YOUR DISPOSAL.

AB SERVICE EFFICIENCY AND EXTENSIVE PRESENCE ENSURE RECORD RESULTS TO GROWERS: PEAKS OF 98% CHP PLANT AVAILABILITY.

Do AB and GPN represent an effective partner for growers and builders? Yes, a partner that considers the relationship between product quality and top performance inseparable. Confirmed over the years.
The quality of the service is strategic for determining the certainty of return on investments. In fact its profitability is represented by the number of plant operating hours, which in the case of AB plants is on average over 95%, with peaks of 98%.

AB SERVICE: A REFERENCE POINT, A HOST OF ADVANTAGES

- Service 24 hours a day, 365 days a year
- Immediate response to reduce periods of inactivity
- 24/7 remote monitoring for optimal plant operation both from the local branch and from the 'Competence Center' in Italy
- Local availability of original spare parts
- Planned management of activity suspensions for maintenance
- Customized service agreements
- Better operating cost predictability

AB SERVICE

REPAIRS, UPGRADES AND OVERHAULS
Our specialists are skilled in giving plants new life before and after 60,000 hours of operation, including upgrades to the most advanced technological levels.

MAINTENANCE AGREEMENTS
We offer complete and customised agreements to satisfy every need and ensure high plant efficiency for its entire lifetime with the added advantage of cost control.

ORIGINAL SPARE PARTS
AB Service uses only original spare parts for all the plant components (from the engine to the auxiliaries) ensuring maximum life and reliability.

INSTALLATION
The AB specialists assure qualified plant installation and startup in compliance with the requirements.

ON-SITE SERVICE
Our technicians operate promptly and decisively in close contact with the customer's staff.

REMOTE MONITORING AND ONLINE DIAGNOSTICS
Thanks to the dedicated service structure, the plant can constantly be kept under control with activation of diagnostics and remote monitoring both via telephone and the Web.

TRAINING AND REFRESHER COURSES
AB offers the best opportunities for customer training ensuring the best plant operation and maintenance.

T +31 (0)88 62 50000
F +31 (0)88 62 50001

Honderland 305
2776 LV Maasdijk
Netherlands

gpn@gruppoab.com
T +39 030 9400100
www.gruppoab.com