

Heat Pumps



ecoGEO

2017-2018

Presentation



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RRSS

NEW HEADQUARTERS



Production increase 300%
Built surface 13.500 m2



INNOVATION

Continuous improvement philosophy

R&D

Unique technology

ecology

Committed to the renewable energies

HUMAN CAPITAL

Importance of people

INTERNATIONAL IMPACT

Installations in 48 countries



Why pay for something that is a gift of nature?

Although it may be hard to believe, we come across an infinite number of different forms of energy every day. Just like there is technology to take advantage of solar energy or the kinetic energy of the wind, there are also machines which can use the temperature of the earth or the air in our favour. This is where heat pumps come into play. These machines, designed to generate heat, DHW and even cooling, use a power supply that is clean, renewable and free that it is right under our feet and in the air that surrounds us.

PRODUCT RANGE

OUR PRODUCTS

HOW DOES AN ecoGEO HEAT PUMP WORK?

COLLECTION AND EMISSION SYSTEMS

HOLISTIC ecoGEO CONTROL SYSTEM

GSHP PRODUCTS

ASHP PRODUCTS

ENERGY MANAGERS

SOME REFERENCES AROUND THE WORLD

P05

P06-P07

P08-P09

P10-P11

P12-P13

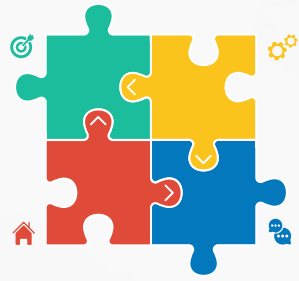
P14-P19

P20-P23

P24-P25

P26



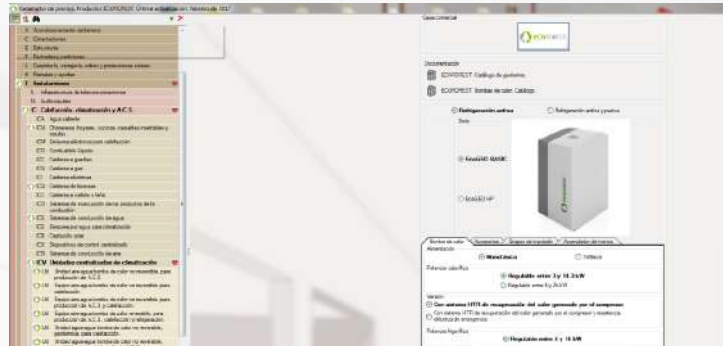


Complete range of solutions

Configuration adaptation



Prescription



Prescription

For the right selection of the Ecoforest products in each project, the different heat pumps and biomass products have been added to the CYPE ingenieros Price generator and in Construnario. CYPE MEP will be soon also available.

Divulgation

From Ecoforest we have a technical and academic character, what makes us try to spread our own experience and let the world know about the progress obtained in R&D from our laboratories and in collaborations such as Energylab.

Custom training

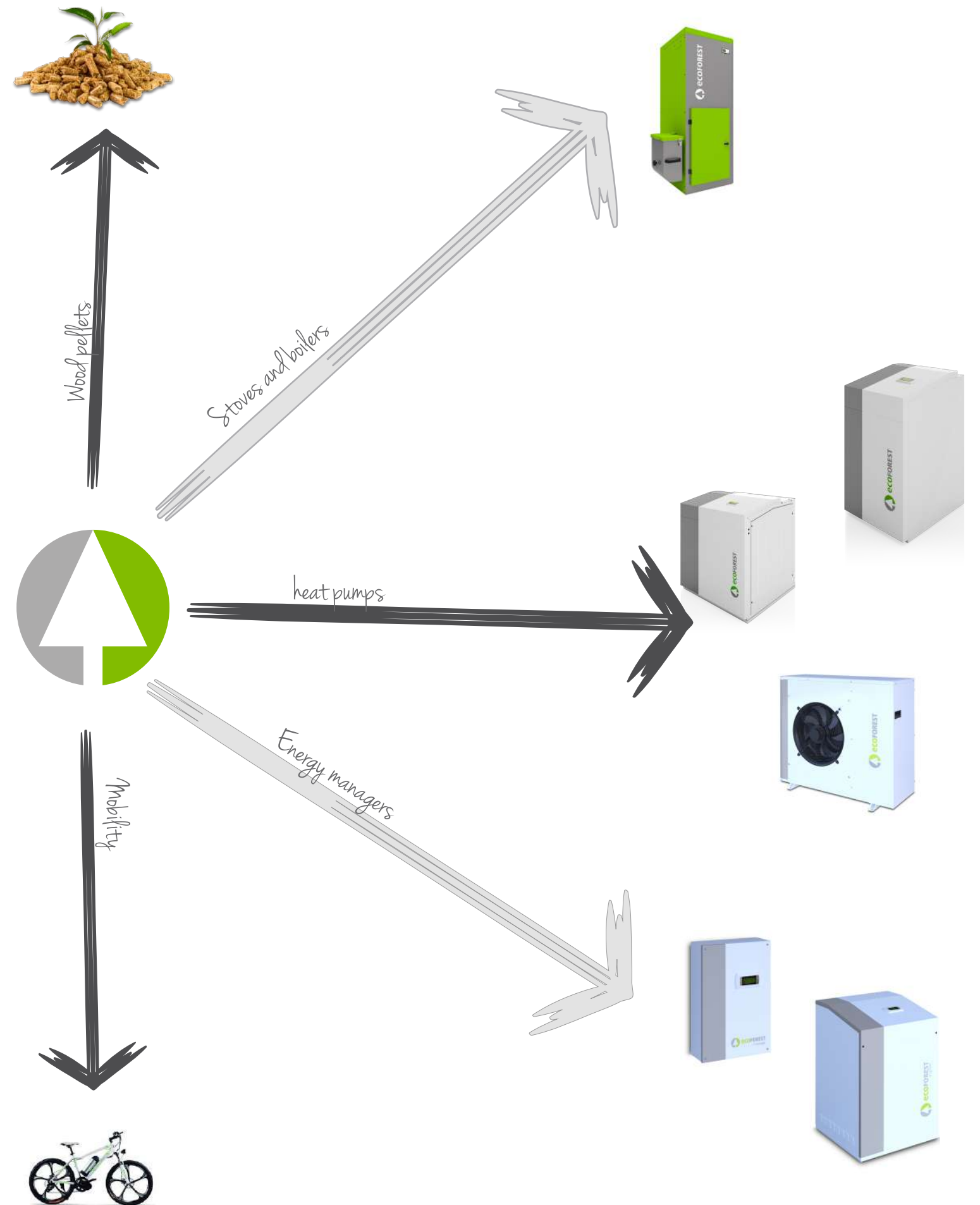
The quality of our products is a principle, but so it is the formation and knowledge of professionals. That is the reason why we organize courses periodically, so the knowledge regarding our products can become efficient installation and satisfied customers.

Counseling

The Ecoforest technical team is made out of engineers who can support you in those projects requiring particular or complex solutions. The study generator is available in our website.

Engineering

Every Ecoforest heat pump is subjected to exhaustive quality tests, starting on the design/development period and ending in the last station of the production line.



Energy that is clean, unlimited and constant



ecoGEO Basic & ecoGEO Compact

Modules 1, 2, 3 and 4 (both Basic and Compact) have several control strategies to provide DHW and heating
 *With no reverse cycle, it is possible to slightly chill the dwelling while the compressor remains switched off.
 **It is possible to reverse the cooling circuit by means of a 4-way valve to provide low cooling temperatures.

- Module 1**
 DHW
 Heating
- Module 2**
 DHW
 Heating
 Passive cooling*
- Module 3**
 DHW
 Heating
 Active cooling**
- Module 4**
 DHW
 Heating
 Passive cooling*
 Active cooling**



ecoGEO HP

Models HP1 and HP3 have different control strategies to provide DHW and heating.
 *With no reverse cycle it is possible to manage the primary and secondary circuits to cover cooling + heating demands. Check the simultaneous production scheme.
 **By means of a 4-way valve, they provide reverse cycle active cooling.
 ***It is possible to manage an external heat exchanger to cover the passive cooling demands. During this function, the compressor will remain switched off.

- HP 1**
 DHW
 Heating
 Passive cooling***
 Active cooling*
- HP 3**
 DHW
 Heating
 Passive cooling***
 Active cooling**



ecoGEO + AU12

Basic and Compact models are compatible with air units for an air-water configuration.
 *Management of temperatures. From 4 heating zones to 3.
 **Only compatible with modules 2 or 4.

- Models 2: Heating + DHW.
- Models 4: Heating&Cooling + DHW.



ecoAIR

This model has diverse control strategies to provide DHW, heating and cooling.
 *Pool management.
 **By means of a 4-way valve, they provide reverse cycle active cooling.



e-manager

























Energy manager compatible with the ecoGEO and ecoAIR range to take advantage of the photovoltaic energy collection. By establishing communication with the heat pump it is possible to adapt the thermal production with the maximum efficiency.



e-system

Energy manager compatible with the ecoGEO and ecoAIR range to take advantage of the photovoltaic energy collection. By establishing communication with the heat pump it is possible to adapt the thermal production with the maximum efficiency (and storing electricity in batteries if necessary).

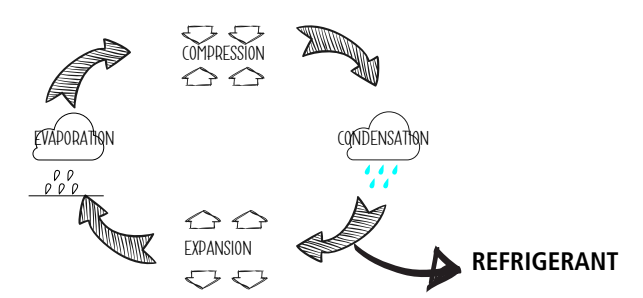
SYMBOLGY

-  Product compatible with energy managers.
-  DHW separate management. Recirculation control.
-  Heating and cooling available product.
-  Heating and cooling available product.
-  Management of 3 or 4 different heating groups, 3 or 4 different temperatures. Management of 5 groups in High Power heat pumps.
-  Product with WiFi.
-  Product with WiFi.
-  Scroll compressor, higher durability, efficiency and lower noise than rotary compressors.
-  HTR technology. DHW up to 70°C without electrical heater.
-  HTR technology. DHW up to 70°C without electrical heater.
-  Ideal for passive and low energy buildings.
-  100% hydraulic installation.
-  100% hydraulic installation.
-  Inverter Copeland Scroll. It adapts to the real needs of the installation.
-  New.
-  New.
-  Pool heating program with power management.
-  Coming soon.
-  ErP labelled product.
-  ErP labelled product.
-  EVI Technology. Enhanced Vapour Injection.
-  Product or system with unique Ecoforest technology.
-  Product or system with unique Ecoforest technology.
-  Product with Ecoforest defrost technology.

How does an ecoGEO heat pump work?

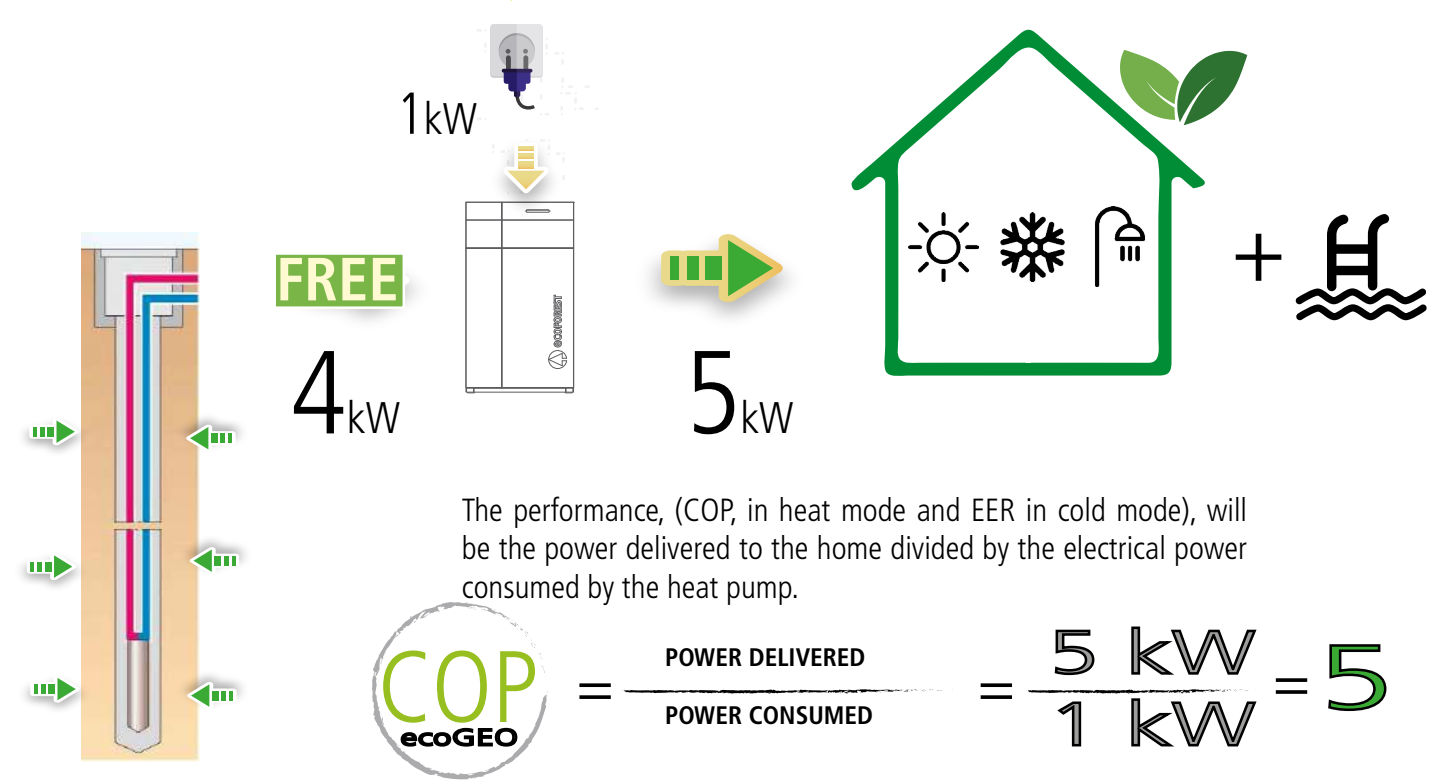
Applying Thermodynamics

The system is based on the simple cycle described below,

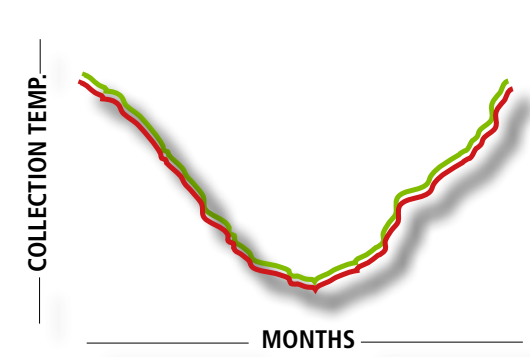
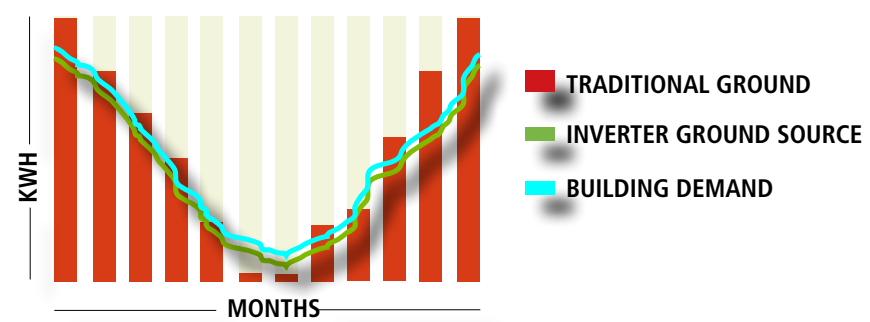


but, **why is it so efficient?**

The reason is because a high percentage of the energy delivered to the home, between 70% and 80% approximately, comes from the collection circuit. The rest of the required energy comes from the compressor. On this component, Ecoforest applies a series of



One of the reasons for the use of inverter heat pumps



explanation...
The difference between adaptation between the building demand and the power given from the heat pump, helps the inverter heat pumps to have lower collection temperatures, what would mean working with higher efficiencies, since the temperature difference is lower.

Why choose ecoGEO heat pump?

- ECONOMIC SAVINGS** (Piggy bank icon)
- LOCAL RESOURCE** (Globe icon)
- HOLISTIC SYSTEM** (Brain icon)
- LOWER CO2 EMISSIONS** (CO2 icon with downward arrow)
- MINIMAL MAINTENANCE** (Technician icon)
- NO FLAMES OR SMOKES** (Flame icon with slash)
- NO VISUAL IMPACT** (Eye icon with slash)
- LESS NOISE** (Speaker icon with slash)

SAVINGS. Ecoforest heat pumps substantially increase savings, not only because they are highly efficient day after day and reduce CO2 emissions, but because of ecoGEO technology and control strategies. Ecoforest heat pump installation is simple, compact and economic, an improvement over other heat pumps on the market because the user can forego certain components that would be essential in the installation of a traditional heat pump.

The following comparison matches with a dwelling with a thermal demand of 10 heating kW in London. According to the type of heating device, fuel and efficiency, the consumption may vary meaningfully. Ecoforest is the most ecological and economic solution.

CONSUMPTION(kW)	EFFICIENCY(%)	HEATING DEVICE
11	90	GAS BOILER
9,5	107	CONDENSING BOILER
11,5	85	OIL BOILER
2	500	ECOGEO

LOCAL RESOURCE. Heat pumps take most of the energy they need from their surrounding environment. Although they still have to be connected to the mains, they do not need to be supplied with any type of fuel, increasing user convenience and comfort. Likewise, they do not generate flames or smoke and provide a comprehensive heating system with little or no visual impact.

MINIMAL MAINTENANCE. The technology used by Ecoforest heat pumps is the same as a normal refrigerator, providing them with long lifespan and minimal maintenance requirements.

MINIMAL NOISE. Heat pump technology and insulation reduce noise levels to those of a common household appliance. Between 35 and 46 dB.

SAFETY. No combustion means no flames or smoke. In addition, the ecoGEO heat pump is totally monitored by the software, security shutdowns take place in the event of machine or external anomalies.

MINIMAL VISUAL IMPACT. None of the components in the geothermal configuration are visible. In the aerothermal or hybrid configuration, the air unit can be hidden appropriately to reduce the impact.


HOLISTIC SYSTEM. Ecoforest programming allows an integral management of the entire installation from the control screen. Ecoforest control allows user-friendly configuration of the entire system.


Simple, compact installations

Collection

The primary circuit of an ecoGEO heat pump can use some of the following solutions. Each one has its benefits and features.

- Vertical collection**
 It is made through a borehole and a plastic pipe which creates a closed loop and takes advantages of the soil stable temperatures. It has positive heating and cooling properties.



- Horizontal collection**
 In this case the closed loop is horizontal and at low depth. It has positive heating properties.



- Ground water collection**
 This solution can be made in those cases in which there exists a constant water flow and the water can be collected in one point and returned to the flow in a different point.


- energy blades or slinky**
 By using these systems it is possible to take advantage of rivers, lakes, or any other water accumulation of flowing water.


- Ground source screens or structures**
 It takes advantage of the underground part of the buildings. It is useful because it is more economic and it saves more space than other collection systems.


- Geothermal piles**
 A different solution, but still using the underground structure of buildings.


- Ground source baskets or helix**
 Pipes are attached to structures which keep them distributed in the above mentioned shapes. They are buried at depths between 3 and 6 meters. Saves space in comparison with the horizontal collection.

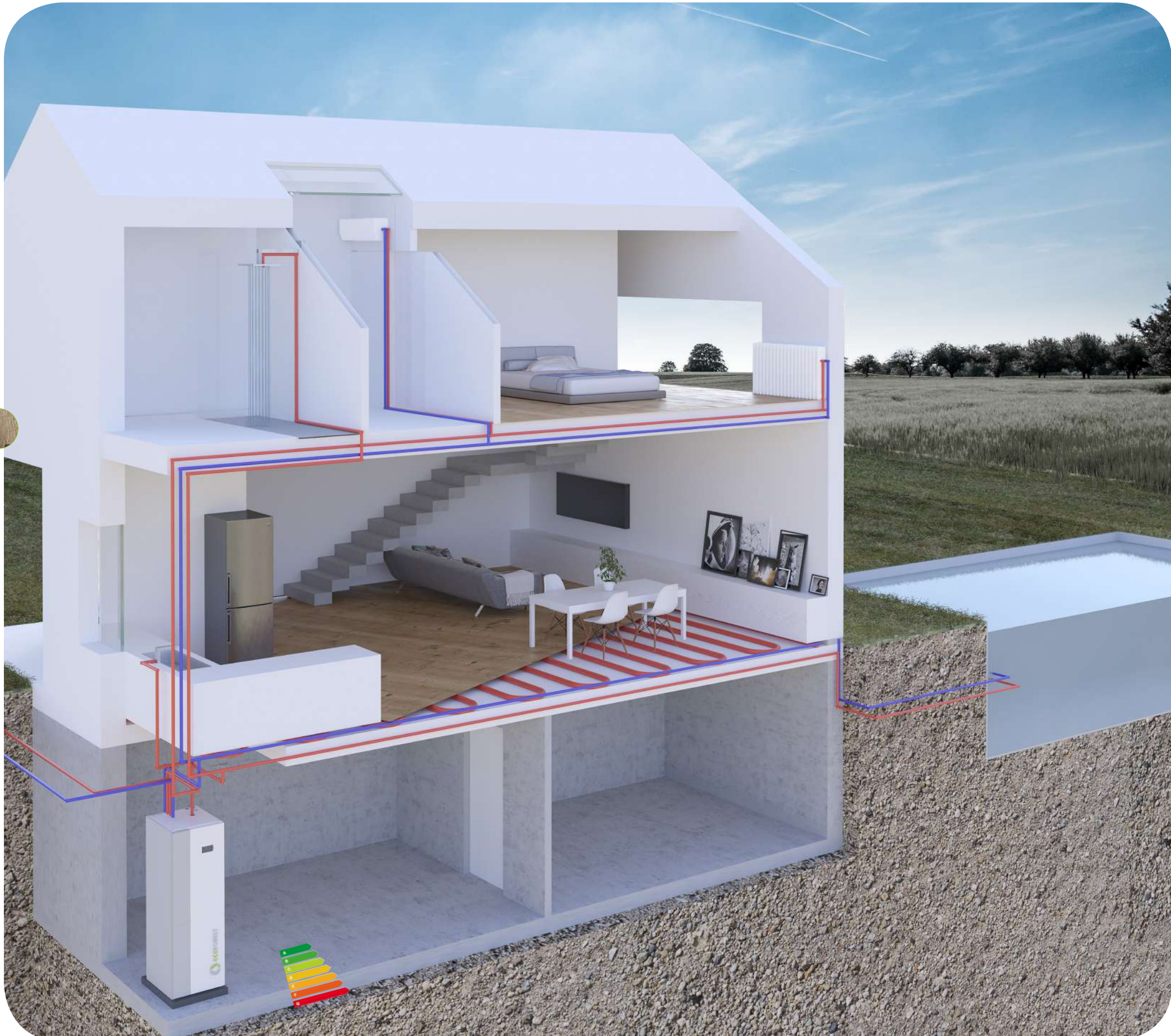

- Process water heat recovery**
 Many industries or businesses waste energy in the form of fluids which may have a high value.


- Greywater heat recovery**
 Greywater can also act as energy source as long as their flow stays stable along their working period.


- DCL dynamic collection systems**
 This ground source probe incorporates a tubular beam in its interior, what is connected directly to the input and output of the heat pump. A small pump moves water inside of this tubular beam to exchange energy with the soil. This is why the DCL probe provides higher heating and cooling efficiencies with lower depths.



Air Units
 Ideal for air source and hybrid configuration (air+ground -water).

Emission

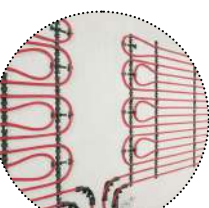
The emission systems contribute in a direct manner on the efficiency of any heating generation system and it is possible to say that together with the heat pump, the right emission system provides higher savings and comfort.




Underfloor heating
 This system provides the most similar curve to the ideal profile curve. It can run with temperatures around 35°C for heating and around 15°C for cooling, which is a great value for passive cooling.




Wall heating
 This system runs with temperatures around 35°C for heating and around 15°C for cooling, which is a great value for passive cooling.




Ceiling heating
 This system is more useful in those cases in which cooling is the most prevalent service.



Low temperature radiators
 This system allows an intermediate heat distribution between the 3 previous mentioned systems and fancoils.



Fancoils
 Temperatures around 45°C for heating and ideal for cooling with temperatures around 7°C. This system has the lower buffer and hence higher speed than the first mentioned 3 systems.



Unique!

Ecoforest heat pumps stand out from the competition due to their holistic control management system and physical characteristics that provide performance levels acknowledged by several laboratories throughout Europe.

outdoor temperature control

Possibility to operate according to the outdoor temperature. The possibility to switch between WINTER/SUMMER modes manually or automatically. The option of switching between the HEAT/COLD operating modes automatically by reading the accumulated outdoor temperature (this setting can be changed). The option of generating HEAT and/or COLD in both summer and winter, thanks to the

control

The operating ranges have been optimised (operation map) to reach more operating conditions in different installations.

metering

The heat pumps are equipped with energy and performance meters for: instantaneous, daily, monthly and annual periods

simplicity

The wide modulation range makes possible to avoid having to install the typical buffer storage tanks in most facilities.

defrost

Our defrost technology makes us unique, since it does not need electrical heaters. An additional exchanger is enough to carry out heat exchange with the circuit of choice -the heating circuit, swimming pool circuit or DHW. This operating mode carries out defrost with a minimal effect on the comfort temperature of the service used to contribute the energy.

adaptation

The ecoGEO control adapts to the ideal conditions of the comfort zone, thereby enabling a rational use of the energy consumed. It provides the building with what it needs at all times. SEE CHART 1.

modulation

Ecoforest can provide a wide range of products to cover from 3 kW to 600 kW. In each model, the range of modulation can reach up to 25%, a differential fact. SEE CHART 2.

software

Another significant advantage of the ecoGEO heat pumps by Ecoforest is that their software is designed to be user-friendly. This enables quick and easy start-ups since the customer does not need tedious technical explanations.

information

The possibility of viewing all the operation and performance information is an important advantage. All the data of the refrigeration circuit, hydraulics or component status, etc. can be viewed on the screen.

management

Control of 4 outlet groups (3 shunts groups and 1 direct) in domestic ecoGEO installations and up to 30 groups in high-power units. Control over the pool. Control over zone and modulating valves. Control of heaters. Depending on the installation.

hybridisation

The use of this technique for collection and thermal production becomes more and more interesting every day. ecoGEO software can be used to manage both. See Page 28.

Unique!

simultaneity

Some installations require simultaneous production of COLD+HEAT. The high power ecoGEO range can provide this thanks to probe, valve and circulator pump control that can be used to generate the specific energy at any time and distribute excess energy to the collection circuit.

design

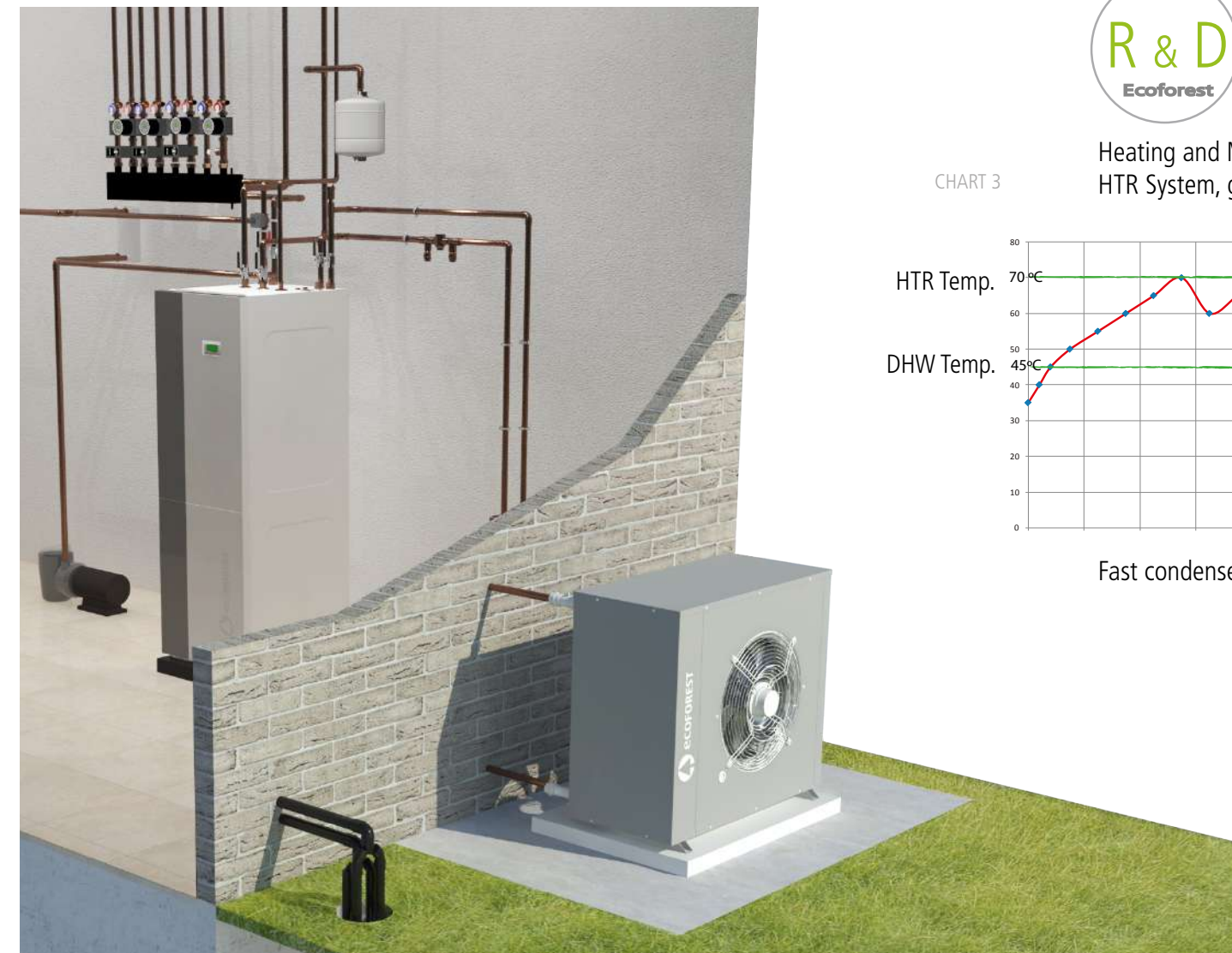
The option of placing intakes at the top or rear of the equipment (domestic product range). Condensate drain pans. A hydraulic system that is easy to access (domestic and HP product range). The option of using the desuperheater in the domestic product range. HTR system. Improved acoustic insulation. Large pipe diameter, lower load losses. Electrical cards that are easy to connect. The domestic product range is completely equipped with circulator pumps, expansion vessels, etc.

DHW management

Control of DHW recirculation. Simultaneous production of: COLD and HEAT. The compact model includes a 3/4" intake for recirculation. Generation of up to 70°C with the heat pump, without electrical heaters and with HTR technology. SEE CHART 3. HTR: High Temperature Recovery. Increase in overall performance of the system by using more thermal energy with the same compressor consumption.

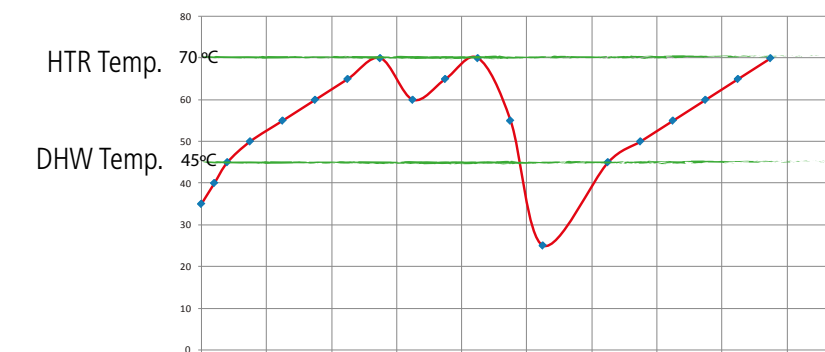
cascade

In HP range, several heat pumps placed in "parallel" can be managed by the Supervisor; contrary to other cascade controls, the Supervisor distributes the number of hours of operation and the point of maximum efficiency. In other words, a given amount of power is provided by several pumps running at their highest COP point, instead of a single heat pump. The domestic product range can use 3 heat pumps in cascade without a supervisor.



Heating and Maintenance with the Ecoforest HTR System, generating heat or cold

CHART 3



Fast condenser driven heating

CHART 1

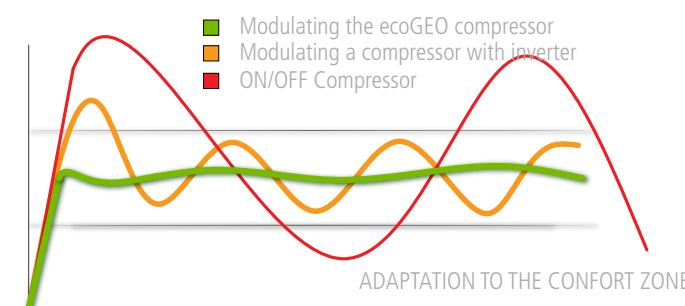
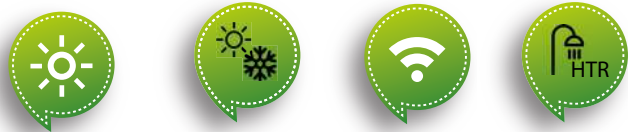


CHART 2

CONDITIONS	B0/W35																	
ecoGEO 1-8	[Bar chart showing power range 0-8 kW]																	
ecoGEO 3-12	[Bar chart showing power range 0-12 kW]																	
ecoGEO 5-22	[Bar chart showing power range 0-22 kW]																	
ecoGEO 12-40	[Bar chart showing power range 0-40 kW]																	
ecoGEO 15-70	[Bar chart showing power range 0-70 kW]																	
ecoGEO 25-100	[Bar chart showing power range 0-100 kW]																	
POWER	kW	0	5	10	20	25	30	35	40	45	50	55	60	70	80	90	100	110

ecoGEO Basic & ecoGEO Compact

Ground source water-water heat pump for heating, cooling, DHW and pool depending on the model and operating scheme. Easy installation and handling. Powerful control which allows to work always in the maximum efficiency range. Possible to connect up to 3 units in cascade and to work with different emission systems by configuring different curves. Also possible to install a hybrid ground + air collection (page 21).



Dimensions (he x wi x de):
1060x600x710mm in Basic models
1800x600x710mm in Compact models



Built-in DHW 165 l Tank with corrugated flexible coil.

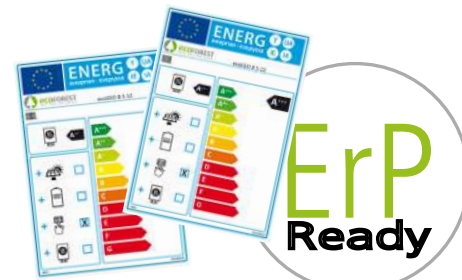


Technical characteristics

- Power:** 1 - 9 / 3- 12/5- 22 kW
- COP:** 4.6 / 4.9
- Refrigerant:** R410A
- Power supply:** 230V and 400V (only 5-22 kW)- 50Hz- 60 Hz
- Weight:** 185-193 Kg
- Noise level:** 35 to 46 dB
- Applications:** Heating, DHW, Active and passive cooling
- Energy labelling with Control:** A+++

Features

- First European manufacturer with Copeland Inverter technology.
- Copeland Scroll Compressor.
- Electronic expansion valve
- Variable speed, high-efficiency circulator pumps.
- Alfal Laval asymmetrical plate heat exchangers.
- pCOOEM+ Carel Control.
- Active cooling by reverse cycle.
- Passive cooling completely integrated.
- 3-way valve for heat/DHW generation.
- DHW production via a closed circuit (Patented HTR technology).
- Self developed software and control strategies.
- Built-in compressor noise insulation kit.
- Internet connection via a client server with website.
- Built-in electric, thermal, COP/EER and SPF energy meters.
- Integrated pressure sensors in the brine and heating circuits.
- Soft start.



ecoGEO HP

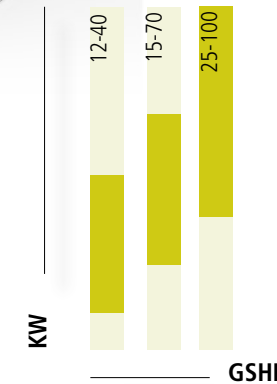
Ground source water-water heat pump for heating, cooling, DHW and pool depending on the model and operating scheme. Easy installation and handling. Powerful control which allows to work always in the maximum efficiency range. Possible to connect up to 6 units in cascade and to work with different emission systems by configuring different curves.



Dimensions (he x wi x de):
1000x950x900mm



NEW
Improving
dB



Technical characteristics

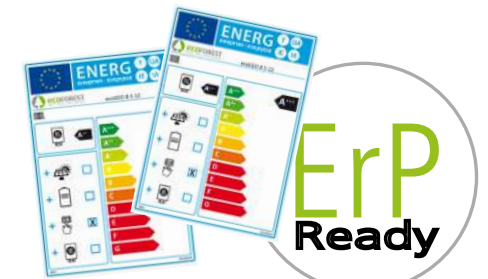
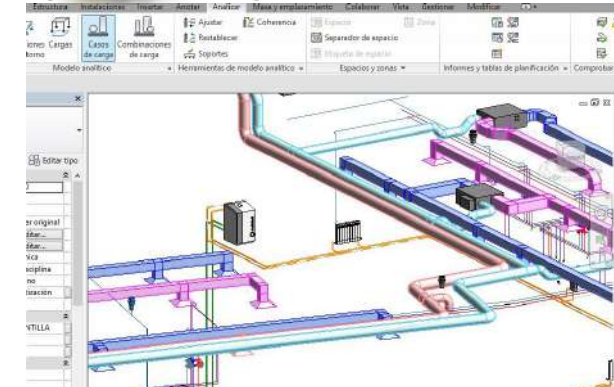
- Power:** 12- 40 / 15- 70 / 25- 100 kW
- COP:** 4.76 / 4.6 / 4.5
- Refrigerant:** R410A
- Power supply:** 400V - 50Hz - 3/N/PE
- Weight:** 280- 320- 350 Kg
- Noise level:** 46 dB
- Applications:** Heating, DHW, Active cooling

Features

- Inverter Technology with Scroll Compressor.
- Electronic expansion valve
- Alfal Laval plate heat exchangers.
- Reverse cycle active cooling.
- Control PC05+.
- Self developed software and control strategies.
- Possibility to manage up to 5 outlet units.
- Internet connection via a client server with website.
- Built-in electric, thermal, COP/EER and SPF energy meters.
- The option of connecting up to 6 units in cascade.
- Integrated pressure sensors and flow meters in the



BIM Models available in BIM



GROUND SOURCE

In February 2018 will be available the 3-Phase version of the ecoGEO 3-12 kW

In February 2018 will be available the ecoGEO 1-9 kW

Ideal for efficient buildings.



GROUND SOURCE

Applications of the ecoGEO Domestic product range

Single Zone Scheme



The scheme that is most frequently implemented because of its simplicity and the little space it requires. Depending on the module, this configuration can supply heating, passive cooling, active cooling and domestic hot water. This only requires the following probes: external probe, DHW probe and an activation signal.

In BASIC models, the domestic hot water storage tank has to be installed separately. The DHW probe is already wired in COMPACT models.



Variant Scheme

An attractive scheme for installations that work at the same outlet temperature. Valves are installed per zone to distribute the installation in as many zones as necessary.



Dual Zone Scheme



This scheme is ideal for installations that require two different outlet temperatures, either because there are 2 different types of emission systems or 2 areas with different uses. Depending on the module, this configuration can supply heating, passive cooling, active cooling and domestic hot water. This only requires the following probes: external probe, DHW probe and an activation signal to manage each zone.

In BASIC models, the domestic hot water storage tank has to be installed separately. This scheme can be expanded to a version with up to 4 zones, 3 shunt groups and 1 direct (See the scheme). The DHW probe is already wired in COMPACT models.

4 Temperatures and Pool Heating



A very compact scheme that uses only a few square metres of technical room to cover a very complete and simple installation, avoiding the need to install valves, buffer storage tanks, etc. Depending on the module, this configuration can supply heating, passive cooling, active cooling and domestic hot water. This only requires the following probes: external probe, DHW probe, pool activation signal and an activation signal to manage each zone.

In BASIC models, the domestic hot water storage tank has to be installed separately. The DHW probe is already wired in COMPACT

Applications of the ecoGEO High Power Range

Basic



This scheme covers high thermal demands, while simplifying both the hydraulic part and management. Module 1 covers the heating, pool heating and domestic hot water demand. This only requires the following probes: external probe, DHW probe and a heat activation signal.

It should be noted that a proper external hydraulic design will enable the system to generate active cooling (see the diagram below) and passive cooling, which would be external but managed from the ecoGEO control. Control of up to 5 different outlet temperatures.

Simultaneous

A high energy performance scheme that produces cooling and heating (without REVERSE cycle) simultaneously with the same consumption required to generate heating, which can reach a SPF of 7 or 8, depending on the design specifications. This only requires the following probes: external probe, DHW probe (if required by the installation) and one or more heating activation signals.

It should be noted that a proper hydraulic design can cover passive cooling requirements; this would be external but managed from the ecoGEO control. Control of up to 5 different outlet temperatures.



HP Cascade

A typical scheme that requires power over 100 kW. Up to 6 ecoGEO HP units can be managed with the Supervisor (external control) in parallel. The Supervisor is in charge of optimising the operation of the block so it always runs at the maximum point of efficiency and distributes the work load among the ecoGEOs of the block.

Note that a DHW tank can also be managed from the heat pump. -Control of up to 5 outlet units for each ecoGEO HP (4 mixed units and 1 direct unit).



Cascade&Simultaneous

GROUND SOURCE



Cascade

Scheme which allows to build installations with thermal powers higher than 22 kW and with heat pumps including pumps, expansion vessels, etc... The modulation range is an advantage, because it is possible to reach up to 66 kW from a lower power of 5 kW, what means a modulation range of 95%.

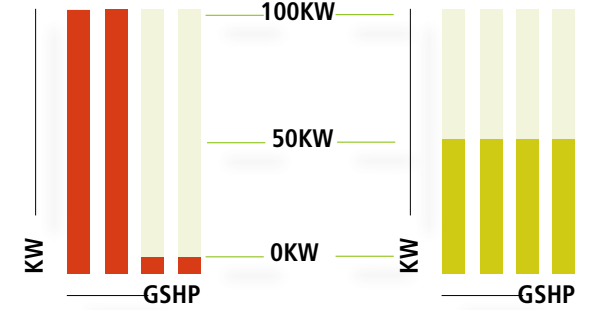


Supervisor

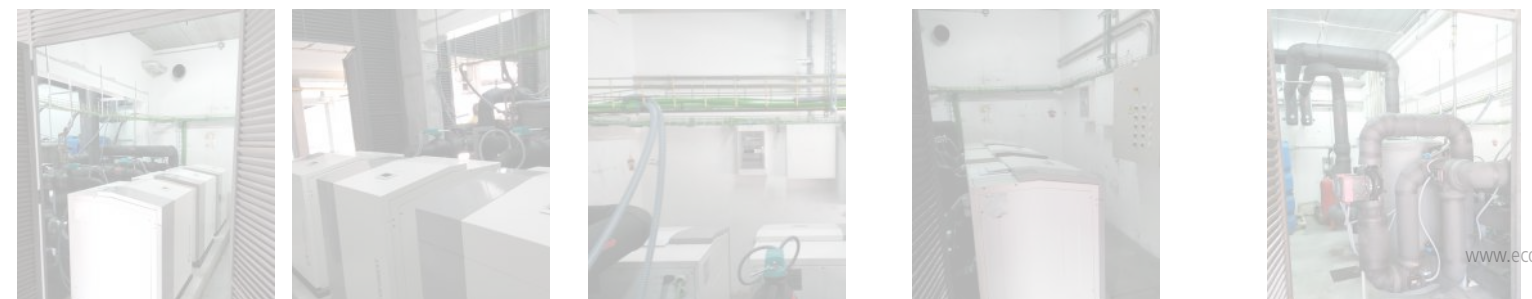
Technical specifications



External control to drive 2 or more ecoGEO HP in cascade with the most efficient strategies of the market. It distributes the number of working hours of the heat pumps equitably and it seeks the highest efficiency range of the installation. In the image below you may find an example of a traditional cascade installation compared to the Ecoforest cascade strategies (to the right).



Needs in the moment specified in the graphs, 200kW.

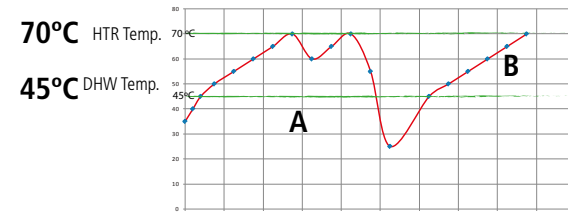


GROUND SOURCE

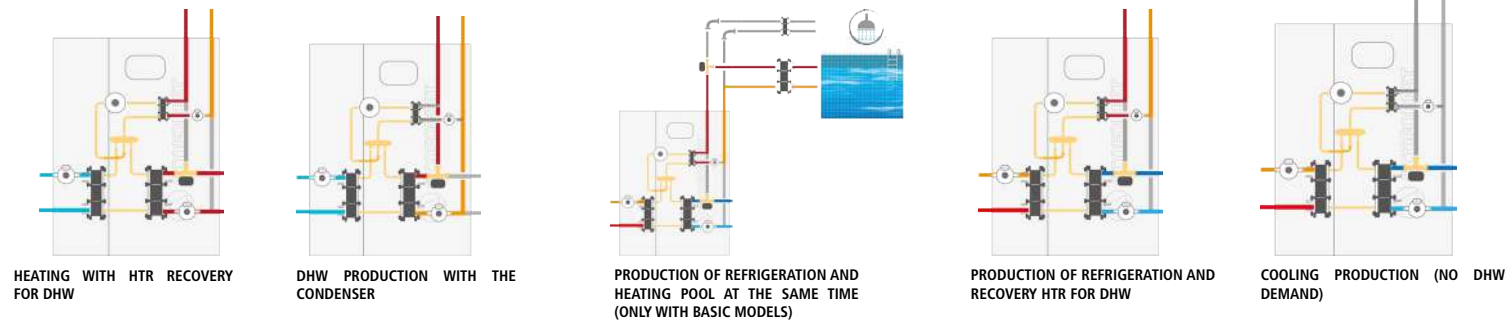
Efficiency improvement



With the ecoGEO domestic heat pump range it is possible to provide partial heat recovery with the models which incorporate HTR (High Temperature Recovery). Models 3 or 4 incorporate this function as standard. In the graph you may find an example of how this function Works.

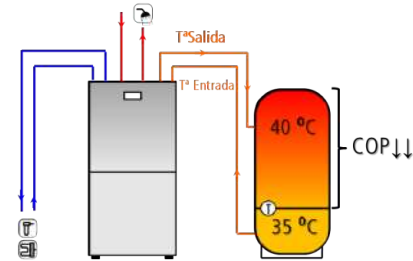


A- In this area and starting with a cold tank or with a peak of consumption, the heat pump increases the temperature fast with the condenser until reaching the DHW set point, for example 45°C.
 B- This is the HTR area of the graph. This means that while covering heating or cooling demands (modules 3 or 4), the heat pump will recover part of the discharge power of the compressor up to the HTR temperature with a maximum of 70°C. With the Basic models it is possible to heat

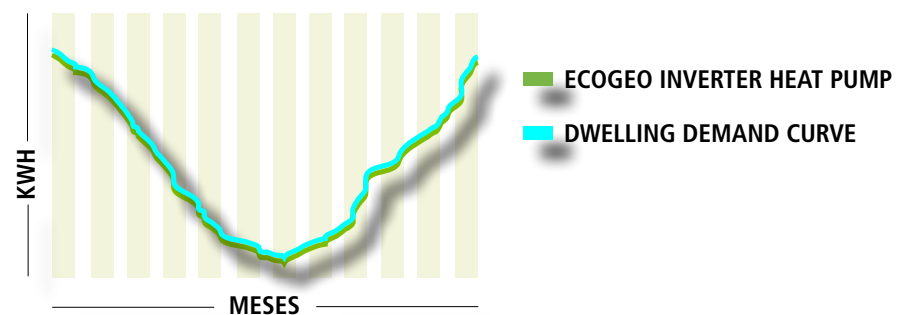


Cascade management is integrated in the Domestic range and it needs the Supervisor in the HP range. It allows the system to reach higher power and modulation ranges up to a 95%. Besides, it is possible to reach the unique advantages commented on page 17.

In the traditional ON/OFF heat pumps, the SPF lowers significantly because the heat pump is not able to adapt to the demand variations and the output temperature of the heat pump needs to be higher. Not possible to fix an output temperature (the higher the input temperature, the higher the output temperature):
 *Lower efficiency (máximum COP only in the lower part of the tank)
 *It is needed to install a buffer tank and at least an additional shunt group, what increases the cost and complexity of the installation.
 *Besides, the buffer tank means a loss of efficiency along the year, since it no matter how insulated it is, it exchanges energy with the environment.



The perfect coordination of compressor, valves and pumps is able to provide the power required by the dwelling as shown in the graph below.



Unique characteristics

GROUND SOURCE



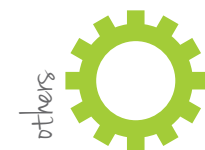
The Ecoforest ecoGEO heat pumps count with thermal, electrical and energy counters. It is also possible to read these counters in a daily, monthly or yearly periods and also the seasonal efficiencies in each time slot. You may read instantaneous parameters such as power, EER and COP.



The Ecoforest ecoGEO heat pumps are able to manage the output temperature of up to 5 groups in the HP models and 4 groups in the Domestic range thanks to the use of 0-10V mixing groups, which provide an accurate regulation.



The power regulation is a characteristic which allows, for example:
 Selecting a different power per service, avoiding unnecessary consumption, noises, buffer, etc...
 Vary the power in case the dwelling gets extended
 Adjust and adapt the power to reality in each moment



Lower noise thanks to the compressor type and the fact that most of the time, the heat pump will run in médium loads.
 Combination with e-manager and e-system.
 Update through USB



The best technology to reach ECD prices





Aerothermo AU12



Advantages of an unique collection system, hybrid collection

- *Exclusive control from the heat pump. The brine circulates for each circuit or combination of them depending on the most efficient configuration (ground, air or ground + air).
- *Higher efficiency than traditional air source installations.
- *Lower investment than traditional ground source installations.
- *It is possible to produce passive cooling.

Technical characteristics

- Maximum consumption:** 180 W
- Power supply:** 230V- 50Hz-60 Hz
- Weight:** 85 kg
- Noise level:** 42 to -65 dB
- Applications:** Aerothermal or Hybrid Brine

Features

- Compatible with domestic ecoGEO heat pumps.
- Built-in hybrid operation, optional combination with ground source boreholes.
- Patented defrost system that reduces the number and time needed for defrost.
- Axial Ziehl-Abbeg fan with the highest efficiency and most silent operation in the market.
- Fan speed control.
- Exclusively hydraulic installation.
- Main installation components in the internal unit, thereby longer lifespan.
- Special protections for operation in the most extreme conditions.
- Flexible placement of the aerothermal unit.
- Operation up to -10°C.

ecoGEO defrost

ONLY IN MODULES 2 AND 4



Applications with Aerothermal Unit

1 Aerothermal Unit



This scheme reduces the number and/or depth of the boreholes (town/city centers) and is useful if the available surface is not enough for horizontal collection circuits.

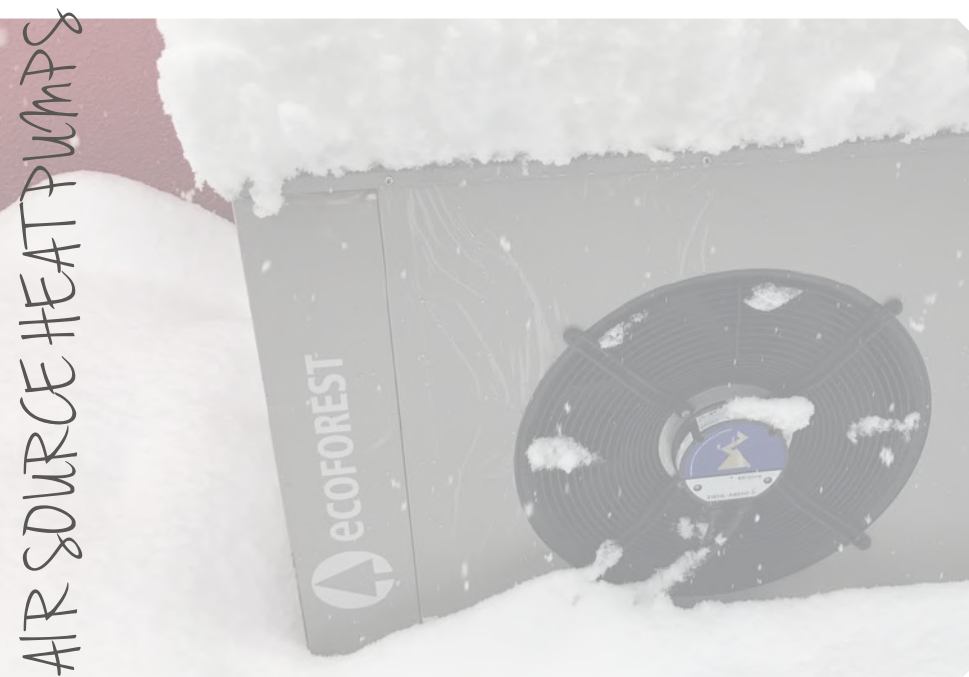
Scheme with a heat pump that has an aerothermal configuration, an attractive option for locations with fair weather, where it is not possible to use boreholes due to prohibitive cost or type of terrain or because the area is protected by legislation, etc. This configuration avoids the need to install refrigerant connections between the aerothermal installation and the heat pump, which simplifies the necessary testing in installations with refrigerant (direct expansion).

Hybrid



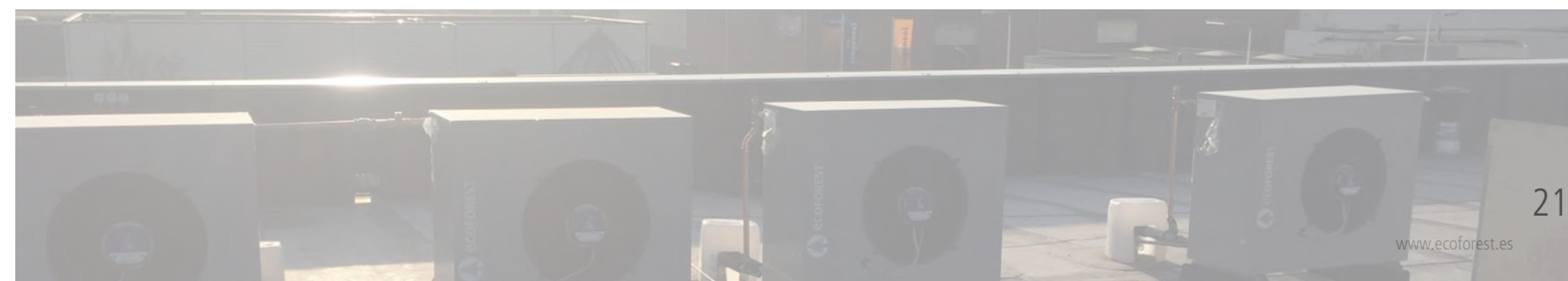
This scheme provides higher collection circuits to combine with ecoGEO 5-22 models in situations where the weather conditions require it. Check price list.

2 Aerothermal



AIR SOURCE HEAT PUMPS

AIR SOURCE HEAT PUMPS



ecoAIR air to water monobloc heat pump

NEW

Air to water air source heat pump providing heating, cooling, DHW and pool heating, depending on the model and the installation scheme. Easy installation and handling. Powerful control which allows the heat pump to work always in the maximum efficiency point and the possibility to use several shunt groups with different heating curves.



ecoAIR monobloc

Dimensions (he x wi x de):
969x1140x430mm

Technical characteristics

- Power:** 3- 12 kW
- COP:** 4,8
- Refrigerant:** R410A
- Power supply:** 230V y 400V _ 50Hz- 60 Hz
- Weight:** 125 Kg
- Dimensions:** 969x1140x430mm(he x wi x de)
- Noise Level:** 35 a 46 dB
- Applications:** Heating & Cooling and DHW
- Energy labelling with Control:** A+++

Features

- First European manufacturer with Copeland Inverter technology.
- Copeland Scroll Compressor.
- Electronic expansion valve
- Variable speed, high-efficiency circulator pumps.
- Alfal Laval asymmetrical plate heat exchangers.
- pCOEM+ Carel Control.
- Active cooling by reverse cycle.
- Self developed software and control strategies.
- Built-in compressor noise insulation kit.
- Internet connection via a client server with website.
- Built-in electric, thermal, COP/EER and SPF energy meters.
- Integrated pressure sensors in the brine and heating circuits.
- Soft start.



ecoAIR + HKSEH

High added value scheme in which only a few space is needed and with a completely hydraulic installation. Ideal scheme for an installation where the kind of building is a one family house and where heating, cooling and DHW exist. It is also possible to cover the thermal demands of a pool.



AIR SOURCE HEAT PUMPS

eni FT

The ecoAIR heat pumps count with EVI system in their cooling circuits. With EVI it is possible to reach extraordinary temperature levels when comparing them with other technologies. The EVI Scroll compressor is developed especially for heat pumps and it is a compressor model which stands out because it has an intermediate step in its cycle, what maximizes its performance.

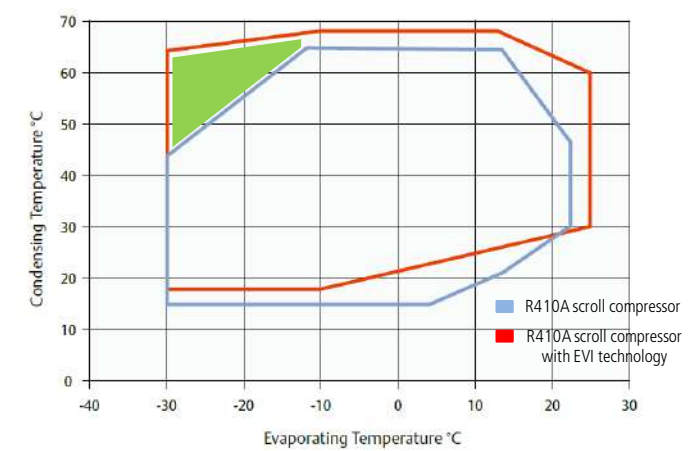
The modern EVI technology reinjects vaporized refrigerant in the compressor in an efficient way, what allows reaching higher temperatures. This vaporized refrigerant injection allows heating water 10°C higher with the same compressor output. EVI technology improves meaningfully the cooling circuit and also provides higher efficiency heating.

EVI technology advantages:

1. Improvement of the capacity and the output temperature
2. Improvement of the seasonal performance
3. Higher utilization of the heat capacity of the system

However, the main advantage is obtained when combining it with air source heat pumps since the compressor map is wider, what can be translated into high output temperatures even at low outside air temperatures.

The main feature of the ecoAIR is that this vaporized refrigerant injection comes from a flash tank, which simplifies reversing the cycle and avoids complex situations as the ones existing nowadays in the market.



AIR SOURCE HEAT PUMPS

HKSEH Hidrokit



Same logics, configuration and readings as the ecoGEO models.

NEW

manager



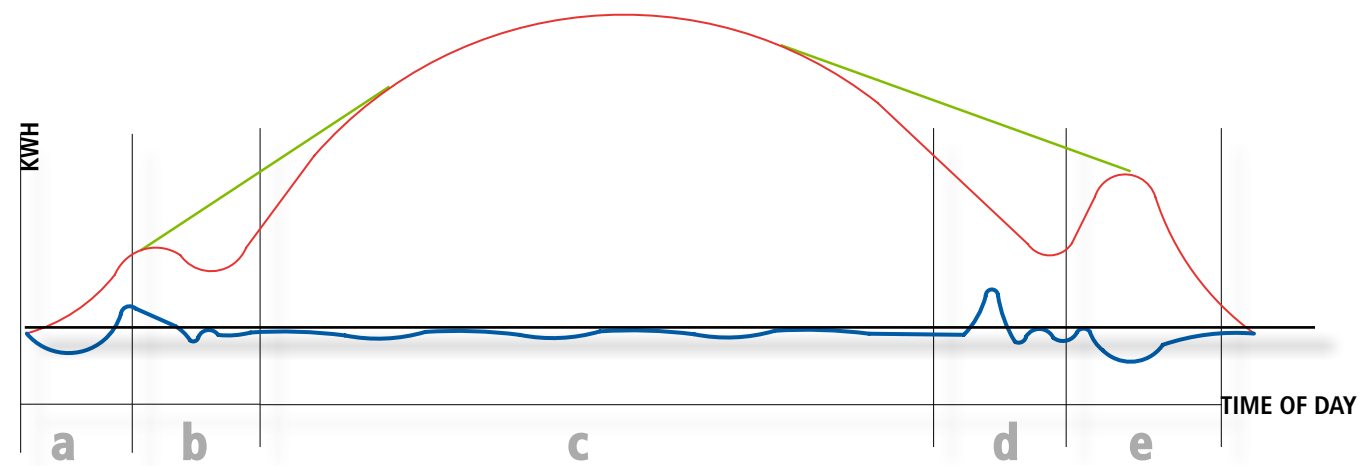
Technical characteristics

Power supply: 230V a 50-60 Hz
Communication via : Modbus serie RS485
Dimensions : 550x400x150 mm (alto x ancho x fondo)

Features

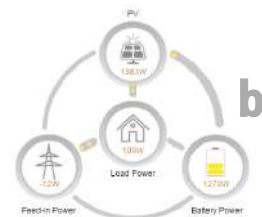
Hybrid inverter with 2 MPPT inputs, 5 kW and 48 V 50A battery load regulation.
 1 LiFePo4, 2,4kWh (48V 50A) battery module. BMS loading system.
 5 230V 8A relay inputs.
 Emergency UPS output.

Operation Graph



A: Low photovoltaic production and low batteries. Power consumed from the grid.
B: Battery load. Part of the produced energy is used directly to load the batteries.
C: Surplus regulation, Zero Energy Balance. All the produced energy is used to store heating or cooling, while almost exchanging no energy with the grid.
D: Injection. Non-critical loads.
E: Consumption is higher than production. The installation takes energy from the batteries and from the grid.

■ PRODUCED IN PANELS
 ■ CONVERTED INTO AC BY THE INVERSOR
 ■ INJECTED/CONSUMED BY THE GRID.



system

characteristics

Power supply: 230V a 50-60 Hz
Communication via: Modbus serie RS485
Dimensions: 1060 x720x710xmm(alto x ancho x fondo)

Features

Hybrid inverter with 2 MPPT inputs, 5 kW and 48 V 50A battery load regulation.
 1 LiFePo4, 2,4kWh (48V 50A) battery module. BMS loading system.
 5 230V 8A relay inputs.
 Emergency UPS output.

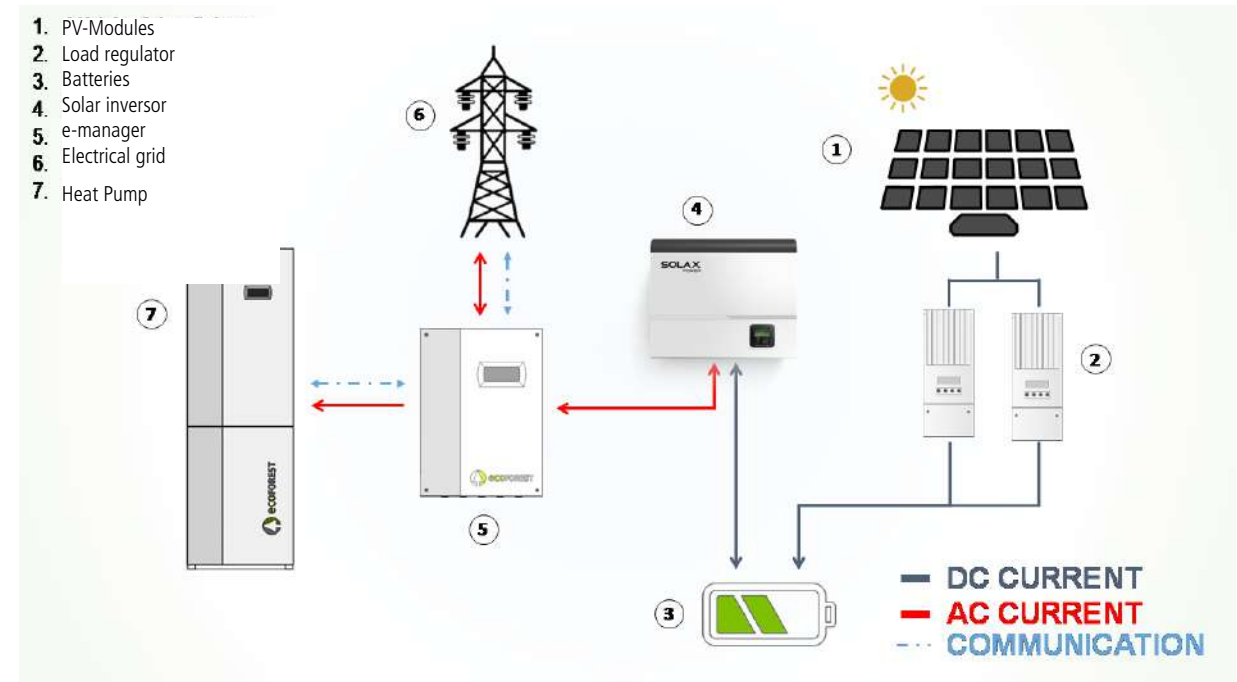


Display and control

Battery module

Battery tray

Interior view



ENERGY MANAGERS

ENERGY MANAGERS

Some references around the world



1 pcs. HP1 25-100
Power: 105 kW
EEUU

FIREKEEPERS CASINO IN MICHIGAN
This is a reference when talking about savings. The collection circuit is made through thermal + photovoltaic panels. The installation was designed in such a way, that the input temperature of the heat pump is 20°C while producing DHW preheating at 45°C, what provides seasonal performances of 700%. Date: 2015.



1 ud. C2 3-12 EH
Potencia: 12 kW
CHILE

IN COYHAIQUE, CHILE
This installation guarantees confort and savings in a kindergarten with consumption and contamination issues due to an old gas boiler. One ecoGEO C2 3-12kW running together with an AU12 air unit and 5 ground source baskets.

This installation is providing high efficiencies even if the outside temperature these days was -20°C.



3 Pcs. HP1 25-100
Power: 300 kW
SCOTLAND

In Scotland, three ecoGEO HP1 25-100 kW heat pumps have been installed in order to provide heating and cooling to a farm. This 300 kW installation is a clear example of how heat pumps may be used to service multiple different locations.

2 Pcs. HP1 15-70
Power: 200 kW
SOUTH AFRICA

Future installation for an industrial building and its offices.
Heat Pump: ecoGEO HP
Use: Heating, cooling and DHW
Date: Predicted for 2018



1 pcs. B1 5-22 EH
Power: 22 kW
UK

A clear example of INTEGRATION in an installation where historical heritage is a maxim. In this case, St. Andrews Church takes benefit from ground source energy.
Location: Oxford, England
Use: Heating Buffer with 1 group managed from the ecoGEO heat pump
Heat pump: ecoGEO B1 5-22 kW EH
Date: 2017

2 pcs. HP3 25-100
Power: 200 kW
NORWAY



2 units of HP3 25-100 for the production of HVAC in a Powerhouse building, that is to say, a building that with surplus of energy.

3 Pcs. B 5-22
Power: 66kW
THE NETHERLANDS



Installation of 3 ecoGEO B4 5-22 in cascade working with 6 AU12 air units in a residential building.
Date: 2017

6 Pcs. HP3 25-100
Power: 600 kW
Cyprus



Priming Dormitory student residence in Cyprus.
This installation achieves a MODULATION OF 96% SINCE EACH HEAT PUMP MODULATES FROM 25 to 100 kW (in UNE EN14511 conditions). The great ground water collection allows higher efficiencies than expected.
This installation also counts with a solar thermal installation, what, together with the above mentioned installation supplies 1200 students with heating, cooling and DHW. There exists an ongoing twin Project.

3 pcs. B 5-22
Power: 66 kW
SWITZERLAND



Scheme of 3 pumps in cascade 5-22, with a geothermal configuration, reaching a maximum power of 66 kW and modulating the set up to 90%.

3 pcs. HP3
Power: 270 kW
SPAIN



The Project counts on 270 kW thermal power to allow this installation to be the MOST IMPORTANT INSTALLATION IN GALICIA, where the mean power for company and administrative buildings is around 125 kW. Ground source power is a clean and renewable energy coming from the thermal conditions of the ground.
The collection is done through 24 boreholes 140 meters deep. This system allows to transform the ground heat into heating or cooling and duct it through a fluid (brine). The installation is made out of 3 heat pumps which feed a circuit of 53 Fan coils which distribute heating or cooling into the installation.



1 pcs. C4 3-12
Power: 12 kW
NEW ZELAND

In OUR ANTIPODES it is possible to find an ecoGEO C4 3-12 installed together with an AU12 air unit in a one family house.
Use: Heating, cooling and DHW
Date: 2017



More information available at:
www.ecoforest.es



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