

Ground source

ecoGEO+ Basic & Compact

Inverter water-to-water heat pumps

A complete range for domestic installations with compact units that use the most advanced technology to guarantee the best comfort.



ecoGEO+ HP

Inverter water-to-water heat pumps

A complete range for installations that require greater thermal power, incorporating units that use the most advanced technology to guarantee the best comfort.

Ground source

How does ground source energy work?





The ground source heat pump extracts energy from the ground or water for heating, cooling and domestic hot water production. The ground source heat pump uses the thermodynamic cycle to provide these different services, for heating it extracts heat from the ground or water and introduces this heat into the building, and for cooling it extracts heat from the building and transports it to the ground or water source.

Ground source heat pumps are also known as water-to-water heat pumps because they extract heat from the ground or a water source through a water circuit and transfer this energy to the building also

through a water circuit. Ground source systems have no visual or acoustic impact. Ground source installations require a higher initial investment than air source systems, due to the work associated with the collection circuit.

On the other hand, ground source heat pumps have better efficiency than air source heat pumps. This allows for higher energy savings, making ground-source heat pumps more cost-effective in the long run.

Types of collection systems

			
Vertical closed loop	Horizontal closed loop	Open loop	Other
These collectors consist of boreholes buried at depths generally between 80m and 150m.	Horizontal heat exchangers are buried pipes in trenches of 1-2 m deep.	This system consists of an open circuit of water collected from the water table. It allows the heat pump to extract energy after passing through an exchanger.	Ground source baskets, thermoactive piles, round-source pillars...

Ecoforest ground source heat pumps ecoGEO+ can be paired to any type of collection system thanks to their control strategies that adapt their operation to the characteristics of each type of source.



■ Ground source

ecoGEO+ Basic & Compact PRO

Inverter water-to-water heat pumps with natural refrigerant R290



- Inverter technology and natural refrigerant R290 (GWP: 3).
- Power ranges: 1-6 kW.
- Natural refrigerant in ecoGEO PRO models with DHW production temperatures of up to 75°C.
- Heating, active cooling, passive cooling, DHW and swimming pool production.
- Control of external auxiliary equipment (gas boilers, heating elements, etc.).
- Integrated energy meters and Internet connection through the ecoSMART easynet.
- Integrated photovoltaic combination.
- Single-phase (230V) or three-phase (400V) power supply.

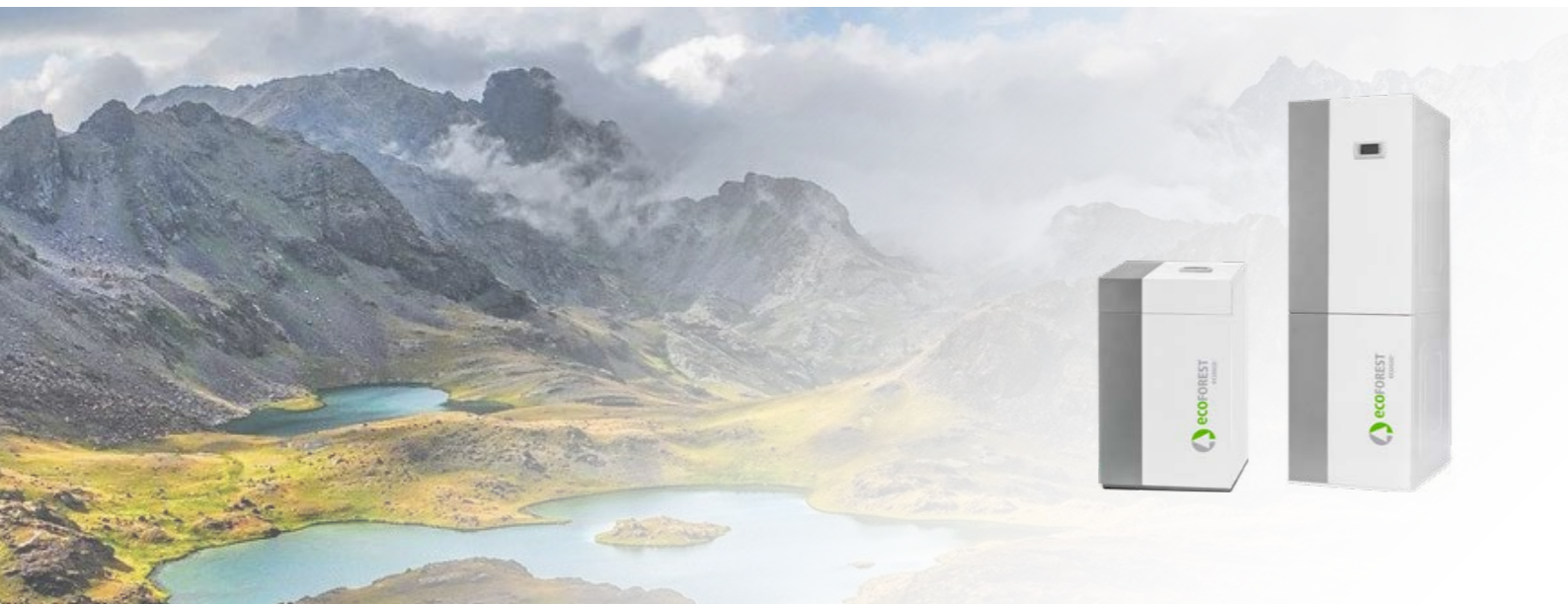
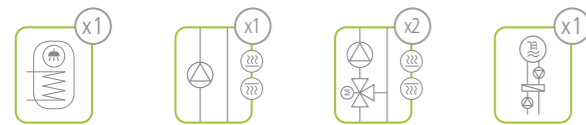
Services



Emissions systems



Installation management



■ Ground source

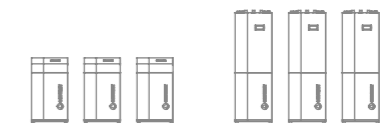
Features



Models



Cascade



ecoGEO+ PRO, the only one with natural refrigerant

ecoGEO+ PRO heat pump is the only ground source heat pump in the world that uses propane (R290) as refrigerant and can be installed indoors without restrictions. This is possible due to the low refrigerant charge of these units.

Ecoforest's philosophy of technological innovation for a sustainable world translates into a unique product ideal for the renovation of existing systems that can guarantee the same thermal performance but with the typical efficiency of ground source.

The use of propane as a refrigerant makes it possible to achieve exceptional performance and hot water temperatures above 75°C, while using a natural refrigerant.



■ Ground source

ecoGEO+ Basic & Compact

Inverter water-to-water heat pumps



- Technologie Inverter y compresor Scroll.
- Rango de potencias: 1-9 kW / 3-12 kW / 5-22 kW.
- HTR technology for DHW production up to 70°C and simultaneous production of several services.
- Heating, active cooling, passive cooling, DHW and swimming pool production.
- DHW recirculation control.
- Integrated energy meters and Internet connection through the ecoSMART easynet.
- Control of external auxiliary equipment (gas boilers, heating elements, etc.).
- Integrated photovoltaic combination.
- Single-phase (230V) or three-phase (400V) power supply.

Services



Emissions systems



Installation management



■ Ground source

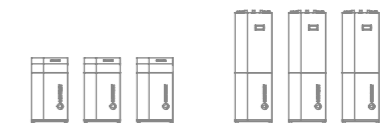
Features



Models



Cascade



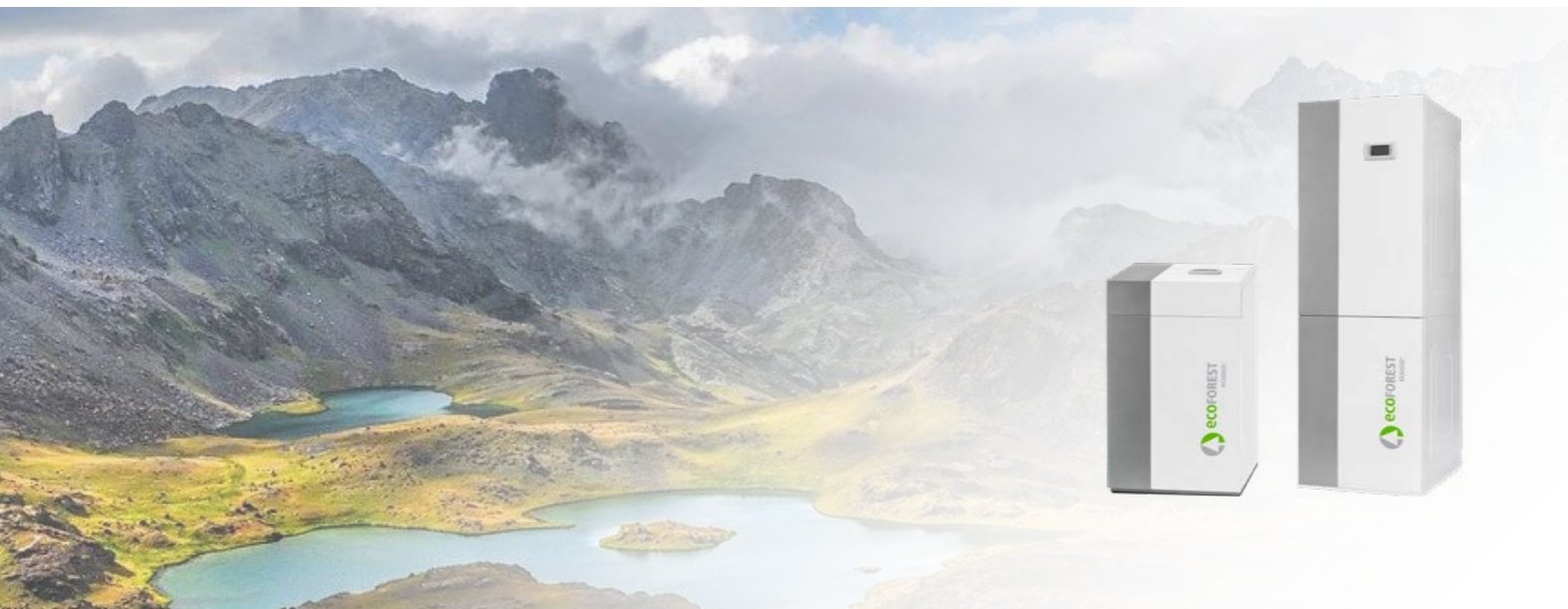
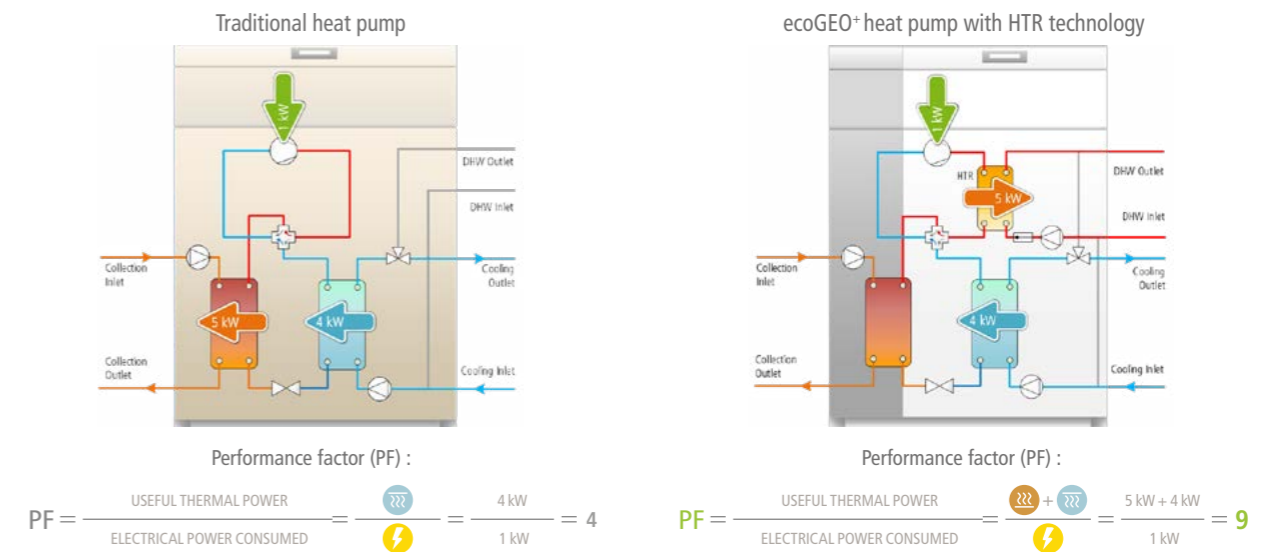
HTR, heat recovery for the best performance

The HTR (High Temperature Recovery) system consists of a heat recovery unit that recovers the thermal energy discharged by the compressor at high temperature when the unit is producing heating or cooling.

achieving considerably higher efficiencies than conventional heat pumps, as the production of hot water is done "for free" by recovering the high temperature at the compressor discharge.

Through this heat recovery it is possible to produce domestic hot water up to 70°C. This unique technology also allows the simultaneous production of DHW and heating or DHW and cooling,

This, together with their Inverter technology and Ecoforest control strategies, makes the ecoGEO+ Basic & Compact units the most efficient ground source heat pumps on the market.



■ Ground source

ecoGEO+ HP

Inverter water-to-water heat pumps



- Inverter technology and Scroll compressor.
- Power ranges: 12-40 kW / 15-70 kW / 25-100 kW.
- Heating, active cooling, passive cooling, DHW and swimming pool production.
- DHW recirculation control.
- Integrated photovoltaic combination.
- Simultaneous production of heating and cooling.
- Combination of collection sources with the ecoSMART e-source.
- Integrated energy meters and Internet connection through the ecoSMART easynet.
- Control of external auxiliary equipment (gas boilers, heating elements, etc.).
- Three-phase (400V) power supply.

Services



Emissions systems



Installation management



■ Ground source

Features



Models



Cascade



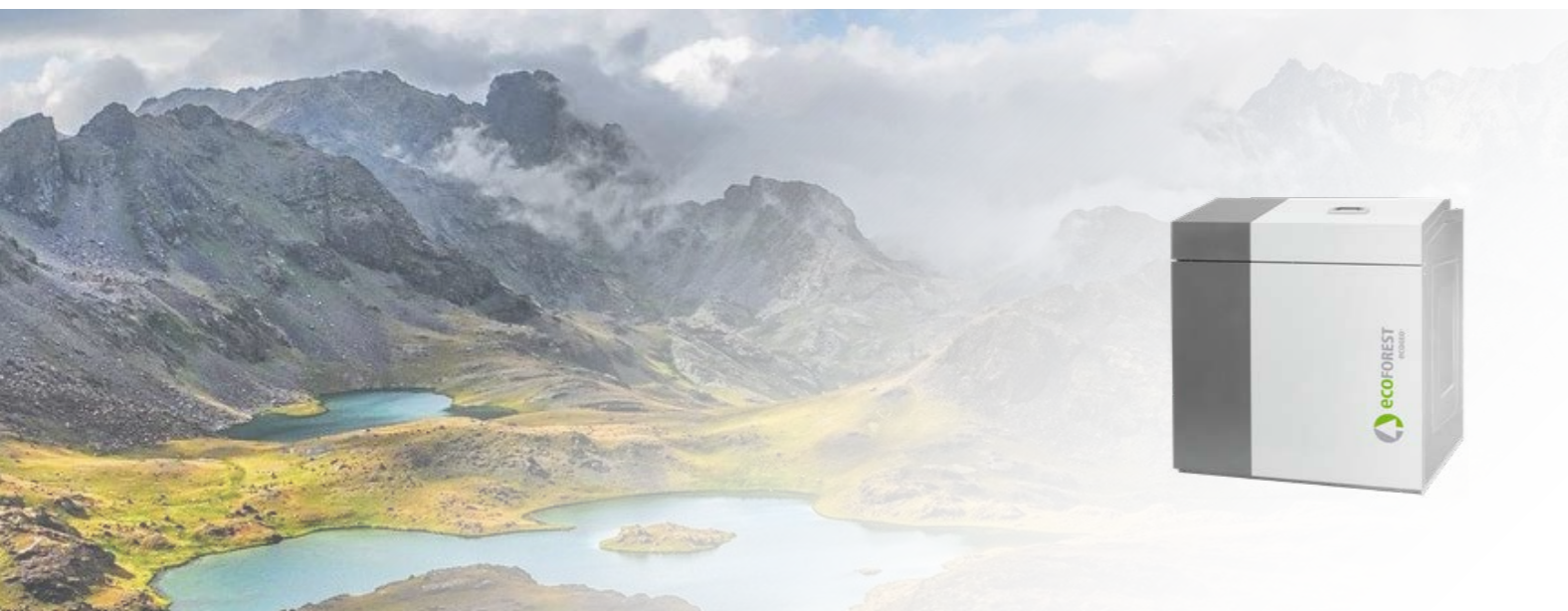
Simultaneous cooling and heating, the solution for high demands

The thermal needs of industrial, commercial, agricultural, etc. buildings present different energy demands than those corresponding to domestic demands. Depending on the type of use and the services that the building has to provide, these can vary enormously.

It is common that in certain types of buildings, such as hotels, sports halls, spas, centres, agricultural facilities, etc., it is necessary to satisfy heating and cooling needs simultaneously almost all year round. It is in this type of application where a total heat recovery installation (simultaneous production) becomes an ideal solution, and Ecoforest has therefore developed an exclusive technology for the management of this type of installation.

The ecoGEO+ HP heat pumps can manage this type of installation. Thanks to Ecoforest's control strategies and their great modulation capacity, they can modulate their power to adapt it to the most important thermal demand at any given time and use their collection as a source of energy or as a dissipation system in a modulated way to achieve the correct thermal balance in each operating condition.

This makes this solution the simplest, most efficient and economical for this type of installation in which greater efficiency means greater savings and the guarantee of correct operation is critical.



Ecoforest Ground source solutions

ecoGEO+ Basic and Compact

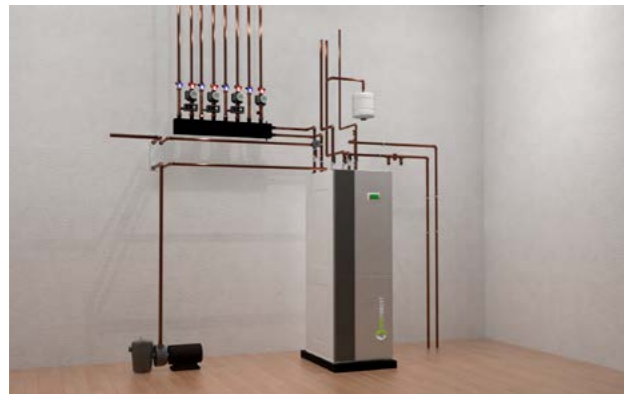
Simplicity and versatility

ecoGEO+ Basic units can be installed with an external hot water tank, so the size can be chosen according to the needs of each installation. The circulation pumps, expansion valves, safety valves and the three-way DHW valve are integrated in the unit, making the installation very simple and compact.

This diagram corresponds to an installation in which the required services are domestic hot water and heating/cooling in a single circuit. As the heat pump includes the circulation pumps inbuilt, it is not necessary to add a buffer tank and no additional hydraulic elements are required.



The most compact all-in-one system



The ecoGEO+ Compact units incorporate a 165 litre stainless steel hot water tank.

This compact design allows the user to meet the needs of DHW, heating, cooling and pool heating. A four-zone heating/cooling installation, which would be very complex with other heat pumps, is very simple and easy to install, as it is possible to avoid installing a buffer tank thanks to the high modulation capacity of the ecoGEO+ heat pumps. In addition, the heat pump also manages the heating of the swimming pool.

The smart cascade

The ecoGEO+ Basic and ecoGEO+ Compact heat pumps can be installed in a cascade of up to 3 units in parallel, reaching a total modulating capacity between 5 kW and 66 kW in a single installation. This does not require any additional control devices, the cascade management is integrated in the control strategies developed by Ecoforest.

These control strategies for cascade installations have a number of advantages, as the system accurately tracks the operating hours of each unit in the cascade to prolong its lifetime, and prioritises its operation at half load to optimise its performance at all times. In addition, the management capacity is multiplied by the number of units in the cascade, resulting in installations capable of meeting any demand.



ecoGEO+ HP

The ideal solution for a classic installation

The ecoGEO+ HP heat pumps enable more efficient and simpler installations for industrial applications. This is also applicable to residential buildings with high thermal needs, as their ability to manage up to 5 heating/cooling zones, the integrated cycle inversion and the possibility of installing a DHW tank according to the needs of each building, make these units capable of adapting to any type of demand.

They also use Inverter technology, with modulation ranges of up to 80%. This makes it possible to considerably reduce the volume of buffer tanks required, or even eliminate them altogether.



Cascade and simultaneous production

The ecoGEO+ HP heat pumps can be installed in cascades of up to 6 units in parallel, this management capacity is possible thanks to the use of the ecoSMART Supervisor, which allows an equal distribution of the operating hours of each unit in the cascade, optimising the life and efficiency of the system by seeking partial load operation of all the heat pumps.

In addition, these heat pumps can manage heat recovery installations, simultaneous production of heating and cooling, with unique performance thanks to the exclusive control strategies developed by Ecoforest.

These two features make the ecoGEO+ HP ideal for installations where heating and cooling needs often occur simultaneously and represent a significant thermal power. In addition, the management capacity of the ecoGEO+ HP heat pumps is multiplied by the number of units in the cascade, making this system more complete in terms of control of the installation and its elements.



PV ready heat pumps

Unique combination with photovoltaic installation

The ecoGEO+ and ecoAIR+ heat pumps incorporate hybridization management with electricity generation systems from renewable energy sources, which reduces electricity consumption while optimising the operation of the heat pump in a unique way.

This patented technology optimises the available resources in order to achieve self-consumption. In the event of excess electricity production, the heat pump is activated and modulates its power to consume only the excess electricity, achieving a "zero" balance between production and consumption.

This PV ready combination with our heat pumps is compatible with all types of installations and systems.

This is only possible thanks to Ecoforest's advanced control strategies and the performance and modulation capacity of the ecoGEO+ and ecoAIR+ heat pumps.

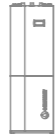
Compatible models



ecoAIR+



ecoGEO+ Basic



ecoGEO+ Compact



ecoGEO+ HP

How does it work?

The heat pump is connected to an energy meter that provides a reading of the electrical balance between the grid and the house.

In the event that the injection reading corresponds to sufficient electrical power to start the system, the heat pump will activate a "surplus mode" by which it will modify the setpoints of the main Services of the installation to store thermal energy thanks to this free and renewable electrical energy that would be injected into the grid if it were not consumed through this functionality.

This excess power is variable and can change over time, which is why the high modulation capacity of the ecoGEO+ and ecoAIR+ heat pumps is so important. The heat pump will adapt its consumption to consume only the excess energy available at any given time.

Once there is no more excess energy available, the heat pump will return to its normal operating mode, and will have stored as much energy as possible in the form of thermal energy for the different services. In this way, the services can be supplied at a later date without the heat pump having to be switched on, thus saving a large part of the electricity consumption from the grid.

	DHW	Heating	Cooling	Pool
Normal operating mode	45 °C	35 °C	15 °C	26 °C
Excess operating mode	60 °C	55 °C	7 °C	32 °C

The functionalities



- Unique technology: European patent
- Surplus management: storage of surplus renewable electricity as thermal energy
- Tariff control: priority for the operation of the heat pump during off-peak electricity price periods
- Power limitation: modulation of the power consumed by the heat pump in order not to exceed a maximum contracted power
- Combination of ecoGEO+ and ecoAIR+ heat pumps with renewable electricity generation systems
- Compatible with production systems: photovoltaic, wind, hydroelectric, etc.
- System to reduce or eliminate electric batteries for energy storage

ecoSMART e-system, a compact solution for homes

The ecoSMART e-system is a unit designed for use in domestic installations to obtain more compact and efficient systems.

This unit includes a photovoltaic inverter, the e-manager and a number of electric batteries to be chosen according to needs, so that all the components of the photovoltaic installation are already included and do not need to be installed.

The e-system is compatible with single-phase domestic installations of less than 5 kW of renewable electricity production and can be connected to up to two lines of photovoltaic panels. It is compatible with all types of photovoltaic panels.

The storage capacity is modular and selectable. The e-system can integrate from 0 to 5 electric batteries of 2.4 kWh each, reaching a maximum storage capacity of 12 kWh, which is more than enough for domestic applications and consumption in individual homes.

These functionalities make it possible to reduce the energy bill by managing the surplus of renewable energy, controlling the electricity tariff and regulating the power consumed by the installation.



Combination of heat sources

Control of high-power systems: ecoSMART e-source

Combination of up to 3 different heat sources



The ecoSMART e-source manager is an electronic device specifically designed for ecoGEO+ HP heat pumps. It allows hybrid installations combining up to three different sources simultaneously: ground source, air source, phreatic and solar sources.

The ecoSMART e-source searches constantly for the single most efficient source or mix of energy sources. For the first time, the ecoGEO+ HP heat pumps can work with external air-source units.

This combination reduces the cost of brine systems and results in more versatile and efficient installations. Furthermore, the ecoSMART e-source allows the system to work without stopping and even manages sequential defrostings in case of relying on several air units.

This device is characterised by its great versatility: its capacity to vary the percentage to be provided by each energy source results in a highly flexible installation for any budget.

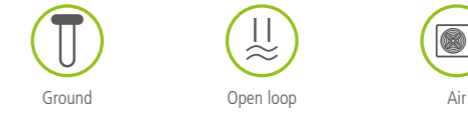


- Hybrid installations with the ecoGEO+ HP heat pumps (high power) mixing several sources: ground source, air source, phreatic and solar sources.
- Defrosting of air units without any compressor (large efficiency improvements) and without the need to inverse the cycle (no waiting times).
- Seamless operation: gradual defrosting with several air units.
- Great flexibility: adaptability to any budget varying the percentage to be provided by each energy source.

Combination of heat sources

Control of multiple dwellings: ecoSMART e-source community

Combination of up to 3 different heat sources



The ecoSMART e-source community allows the management of energy systems in newly-built community buildings or for replacing old boilers. With this device, Ecoforest enables the installation of a common source system with a single heat pump per house for individual production.

This innovative device offers great advantages as an adaptative collection system suitable for ground source systems relying on

boreholes or air source systems with air units. These features offer a higher performance and a longer lifespan, increase individual efficiency and comfort, and enable the management of multiple services (DHW, heating and cooling) through a system tailored to each installation needs.



- Multi-service: DHW management, heating and cooling.
- Use of the HTR technology for DHW production up to 70°C and for the provision of simultaneous services (heating and cooling).
- Flexible collection systems (air unit or boreholes).
- Integrated energy meters, independent consumption for each household or common for the whole building.
- Increase of individual efficiency and comfort.
- Unique defrosting with dedicated air source heat pump, which reduces defrosting time and improves seasonal performance. Individual heat pumps do not defrost.

Reference installations

Finner camp in Donegal

Location	Donegal (Ireland)
Type of installation	Air source
Type of building	Military barracks
Model	5x ecoAIR EVI 4-20 KW
Power	100 KW
Services	DHW, Heating and Cooling



Residential building in Alphen



Location	Alphen (Netherlands)
Type of installation	Air source and common collection
Type of building	Residential building
Model	89x ecoGEO C3 1-9 KW HTR EH
Power	801 KW
Services	DHW, Heating and Cooling

Housing development in Madrid

Location	Boadilla del Monte (Spain)
Type of installation	Ground source
Type of building	Single houses
Model	312x ecoGEO C 1-9 KW HTR EH
Power	2.808 KW
Services	DHW, Heating and Cooling



Single house with photovoltaic hybridisation



Location	Leutkirch (Alemania)
Type of installation	Ground source
Type of building	Single house
Model	ecoGEO C4 T 3-12 KW HTR EH
Power	12 KW
Services	DHW, Heating and Cooling

