

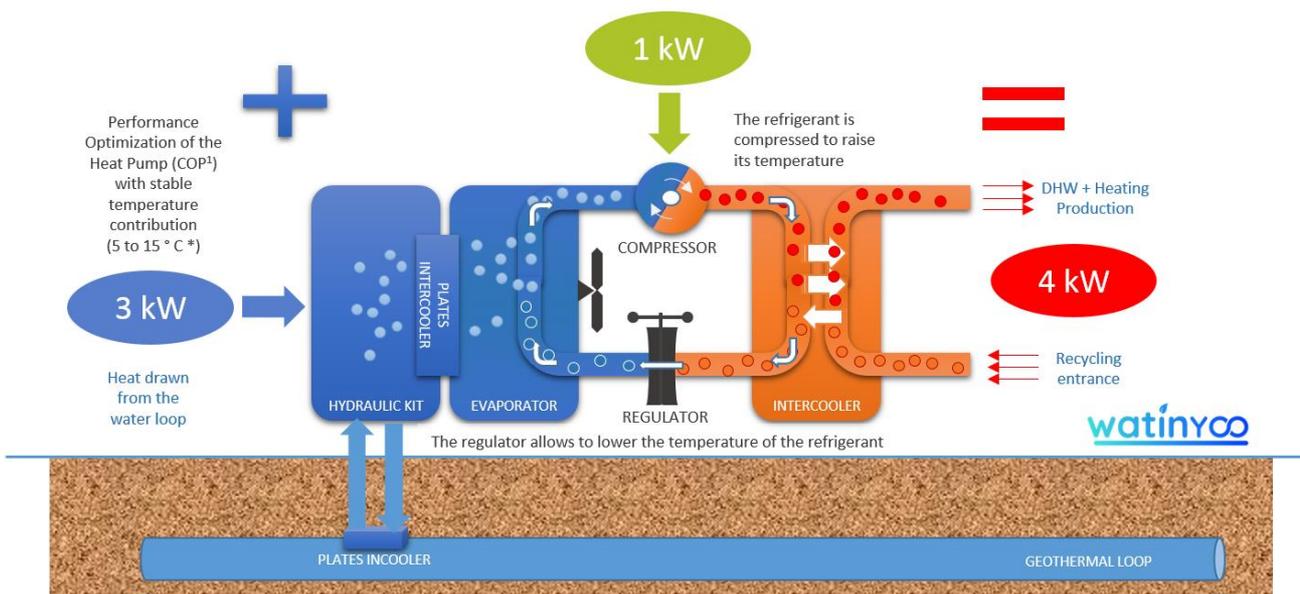
## WATER-WATER HEAT PUMP ON GEOTHERMIC WATER LOOP

The system operates from water-water heat pumps associated with geothermal energy. This technology uses thermal energy naturally present in water and transforms it into heat

### How a water-water heat pump works ?

Calories contained in the water loop are exchanged (using high performance plate heat exchanger) with the refrigerant hydraulic circuit of the Heat Pump. By playing on the phase changes (liquid/gaseous) of the fluid, the heat pump produces heat or cold. This thermal energy is then sent to the central circuit of DHW (Domestic Hot Water) or heating (connection to a hydraulic heating circuit, a heated floor, a swimming pool, etc..).

Note: Like other PACs, the water-to-water heat pump works reversibly. In summer, the water of the loop allows you to refresh effectively.



\* Data corresponding to the average climatic conditions encountered in Europe

$$\text{Coefficient of Performance (COP}^1\text{)} = \frac{\text{Heat Supplied}}{\text{Electrical Energy consumption}}$$

# HEATING, DHW , COOLING AND ENERGY SAVING

## What is the interest of the geothermal water loop?

The water contained in the loop is used as a heat transfer fluid. Containing no additives, there is no pollution hazards.

This system is less expensive than groundwater drilling or a conventional geothermal probe which, moreover, does not offer the energy storage and exchange capacity of a loop (a loop of 1000 linear meter represents a capacity of 1.16 MegaWatt-hour).

The water exchanged in the hydraulic kit returns to the loop. This operation in closed circuit, allows to reject nothing in the environment.

The energy contained in the loop is naturally regenerated by heat exchange with the surrounding soil. In the heat demand phase, we will cool the soil by drawing the calories it contains. In the cooling phase, the excess calories contained in the loop will be dissipated in the soil.



## Performance and Compatibility

The coefficient of performance of a heat pump (COP) is evaluated according to the final energy restored and the electrical energy consumed by its operation.

By using the natural temperature of the soil (via the water loop), the system offers a stable temperature all year long (unlike PAC Air-Air whose heat source varies with the seasons).

The heat drawn from the ground (between 5 and 15 ° C in a temperate zone) corresponds to the optimal operating range of the heat pumps. The water-water heat pump on a geothermal loop provides maximum performance all year long.

In addition, the water/water heat pumps are adaptable to an existing installation (eg a gas or oil boiler). By bringing already hot water, they will contribute to lowering the primary energy required for the operation of the heating system and thus improve the COP.



Depending on the installations and the optimization gain recorded, a COP of 7 to 8 can be envisaged (compared to 4.5 for the best current air/air heat pumps).

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