



The Jupiter Cooling Advantage

JUPITER’s Module Ceiling helps you keep your cool on hot days. Each of the four systems guarantees the perfect room temperature in the summer.

Circulating cold water, which for example passes through a heat pump, cools the ceiling or walls of your house or office. This keeps the environment

pleasantly cool. And the best thing of all is your energy costs will be extremely low!



7 GOOD REASONS TO CHOOSE JUPITER MODULE CEILINGS

1. Made-to-measure systems for drywall construction and plastered interior finishing.
2. Extremely low energy costs.
3. Absolutely silent! No humming noises!
4. Large-area cooling of ceilings and walls.
5. Complete systems instead of individual components.
6. Pleasant conditions – like in the shade of a large tree.
7. 10-year guarantee.

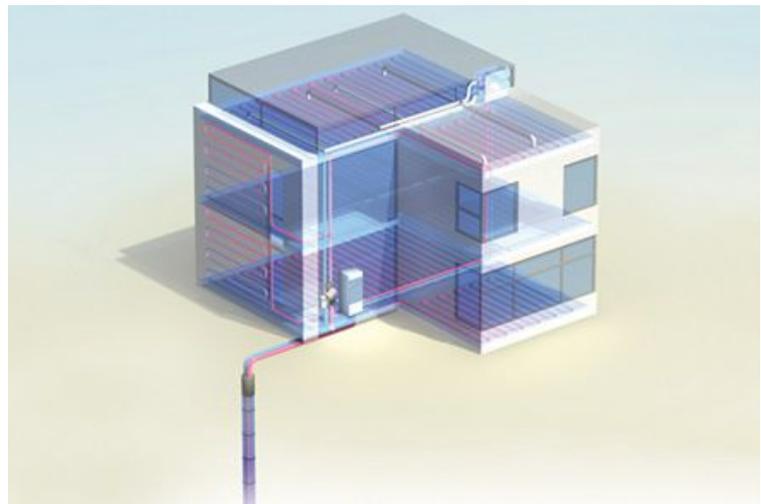




The Jupiter Energy Advantage

Ideal solution for cooling in low-energy buildings

Free cooling is a term generally used when low external temperatures are used for cooling purposes in buildings. The JUPITER free cooling concept is based on a ground coupled heat exchanger combined with a radiant heating and cooling system. A ground coupled heat exchanger can for example be horizontal collectors, vertical boreholes or energy cages. A radiant system means that the floors, ceilings or walls have embedded pipes in which water is circulated for heating and cooling of the building. Underfloor heating and cooling is the most well know example of a radiant system.



A radiant system combined with a ground coupled heat exchanger is highly energy efficient and has several advantages. In the summer period, the ground coupled heat exchanger provides cooling temperatures that are lower compared to the outside air. The radiant system operates with large surfaces, which means it can utilize the temperatures from the ground directly for cooling purposes. The result is that free cooling can be provided with only cost being the electricity required for running the circulation pumps in the brine and water systems. No heat pump is required.

In the heating season the system is operated using a heat pump. As the ground temperature



during winter is higher compared to the outside air temperature, the result is improved heat pump efficiency (COP) compared to an air based heat pump. In addition, the radiant emitter a system (underfloor heating) operates at moderate water temperatures in large surfaces which further improves the heat pump COP.

The need for cooling in buildings

Today, there is a high focus on saving energy and utilising renewable energy sources in buildings. The energy demand for space heating is reduced by increased insulation and tightness of buildings.

However, increased insulation and tightness also increase the cooling demand. The building becomes more sensitive to solar radiation through windows and becomes less able to remove heat in the summer. More extreme weather conditions further contributes to the cooling needs and together with an even more increased consumer awareness of having the right indoor climate, the need for cooling also in residential buildings will become a requirement. Optimal architectural design and shading will help to reduce the cooling need, but simulations and practical experience show that such measures alone will not eliminate the cooling need. Space cooling is needed, not only in the summer, but also in prolonged periods during spring and autumn when the low angel of the sun gives high solar radiation through windows. In order to meet the energy frame requirements of the building regulations, space cooling can be provided by utilising renewable energy sources such as ground heat exchangers for cooling purposes in conjunction with a radiant system with embedded pipes in the floor, wall or ceiling.

Cooling needs will differ between rooms and are highly influenced by direct solar radiation. Rooms with larger window areas and facing the south will generally have higher cooling requirements. In periods with high cooling loads, active cooling is normally required during both day and night time.



Independence of the energy situation

Ground energy or Geothermy (Greek: geo = earth; thermy = heat) is the heat stored in the accessible part of the earth crust. Geothermy describes both, dealing with thermal energy and its utilization from a technical point of view and the scientific investigation of the thermal situation of the earth.

The geothermal gradient, which is the difference in temperature between the core of the planet and its surface, drives a continuous conduction of thermal energy in the form of heat from the core to the surface.

Ground energy, stored up to 400 m depth, cannot only be used as source of energy for radiant heating and water heating but also as an energy source for radiant cooling with very low operating costs. Ground energy can be used in all types of buildings from single-family houses to large office and industrial buildings. When a ground system is operating it hardly requires any running costs and has a long operating period. Though the investment costs for a ground energy system are slightly higher than for conventional boilers and cooling aggregates the amortization period is shorter due to the low operating costs.

Ground energy as energy source in combination with radiant emitter systems is the all-in-one solution with respect to the combination of heating and cooling. Such systems are more efficient and easier to install than two separate systems for heating and cooling. In addition, the radiant emitter systems benefit from the exergy principle in the form of reduction of the operating temperatures for heating and high operating temperatures for cooling.

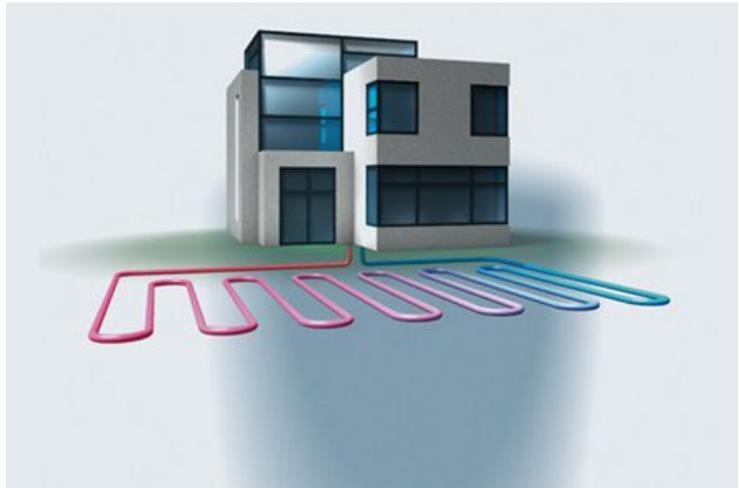
Thus the heat pump can work with a higher efficiency (operating factor) which reduces the power consumption and hence the operating costs accordingly.



JUPITER Horizontal collectors for ground energy

Ideal solution for single family homes and smaller industrial buildings

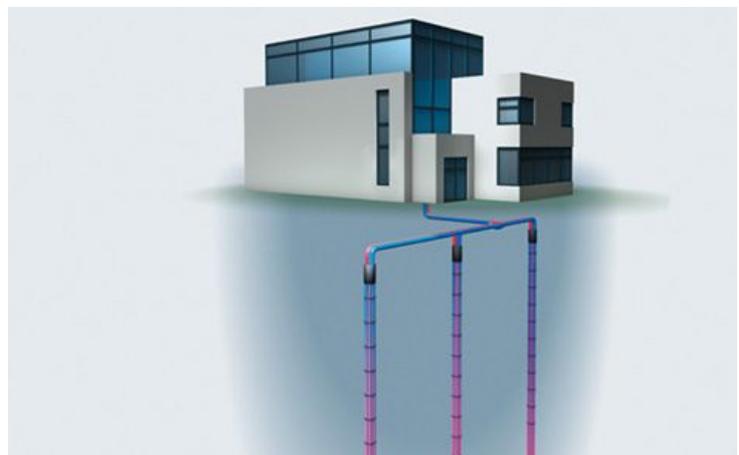
JUPITER Horizontal collectors are ground heat exchangers which are installed in the upper two meter of the ground soil. In most cases they are used in one or two family houses as well as small industrial applications. The important benefit of the horizontal collectors is the low investment with a relatively high seasonal performance factor. The horizontal collector is the variant with the lowest costs involved compared to all other ground energy systems.



JUPITER Vertical collectors for ground energy

Solution for all kind of ground soils and space saving

The JUPITER Vertical collector is the most popular ground energy system. It can be installed in all kind of ground soils and is the most space-saving system. The available heat in the soil combined with a heat pump will be lifted up to a usable temperature level for heating and domestic hot water preparation. Vertical collectors can





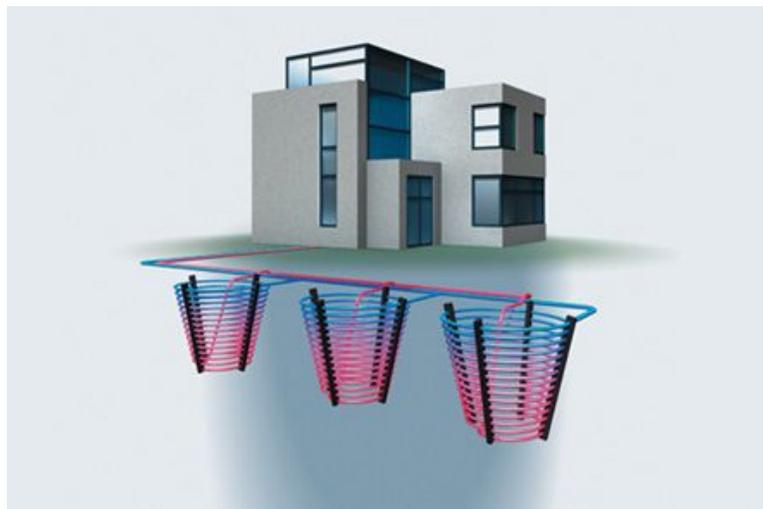
also be used for passive (free) and active cooling in summer. This is one of the main benefits compared to other ground energy systems.

But the vertical collector is the ground energy solution with the highest investment costs. Nevertheless the benefits and investment costs have to be balanced. The application field extends from ordinary single family homes up to industrial applications and office buildings.

JUPITER Energy cage for ground energy

Whenever the space for a horizontal collector is not available

The JUPITER Energy cage is a special design of the horizontal collectors. Energy cages are used when deep drillings or deep foundations are not possible for reasons of water law conditions or for hydrological reasons, or when the available space is too small. The energy cage is an economically and energetically very effective alternative for the usage of ground energy. The JUPITER Energy cage is the ideal solution for single family homes or multi storey buildings as well as small business and industrial offices.





Why is ground energy eco-friendly?

Economical

Regionally usable, independent of external suppliers and changes in currency exchange rates. Ground energy increases the industrial competitiveness and as a result has a positive effect on the regional development and employment

Renewable and environmentally friendly

Ground energy is available endlessly, 24 hours a day for heating and cooling.

Any usage of ground energy reduces the emissions of greenhouse gas.

Safe, controllable and versatile

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Ground energy is technically mature and has been used for heating and cooling for more than 50 years.

Applicable in combination with other energy sources

High performance

A response to all energy demands such as heating, cooling, hot waters and energy storage.

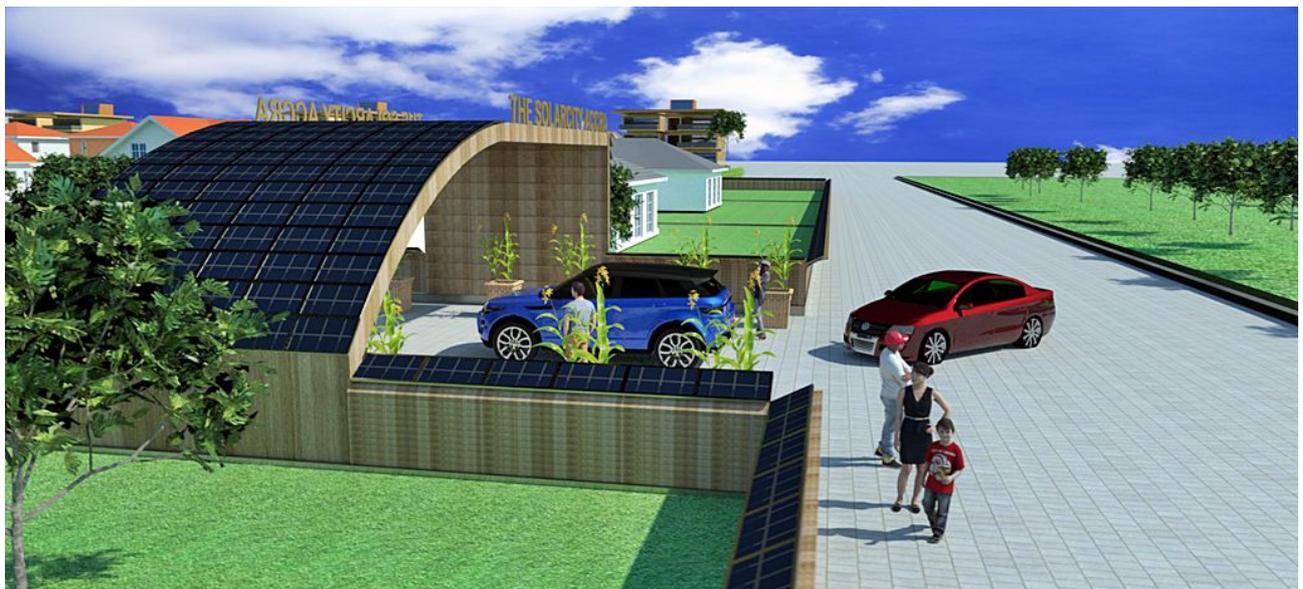
Ground Energy is the only sustainable Energy source which can cover basic loads.





PROJECT. Sustainable Living Concepts

Subproject: Low Energy Private Buildings





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