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■ consulting ● design ► distribution of electrical systems

YOUR PRIVATE OASIS

The greenACTIVEhome

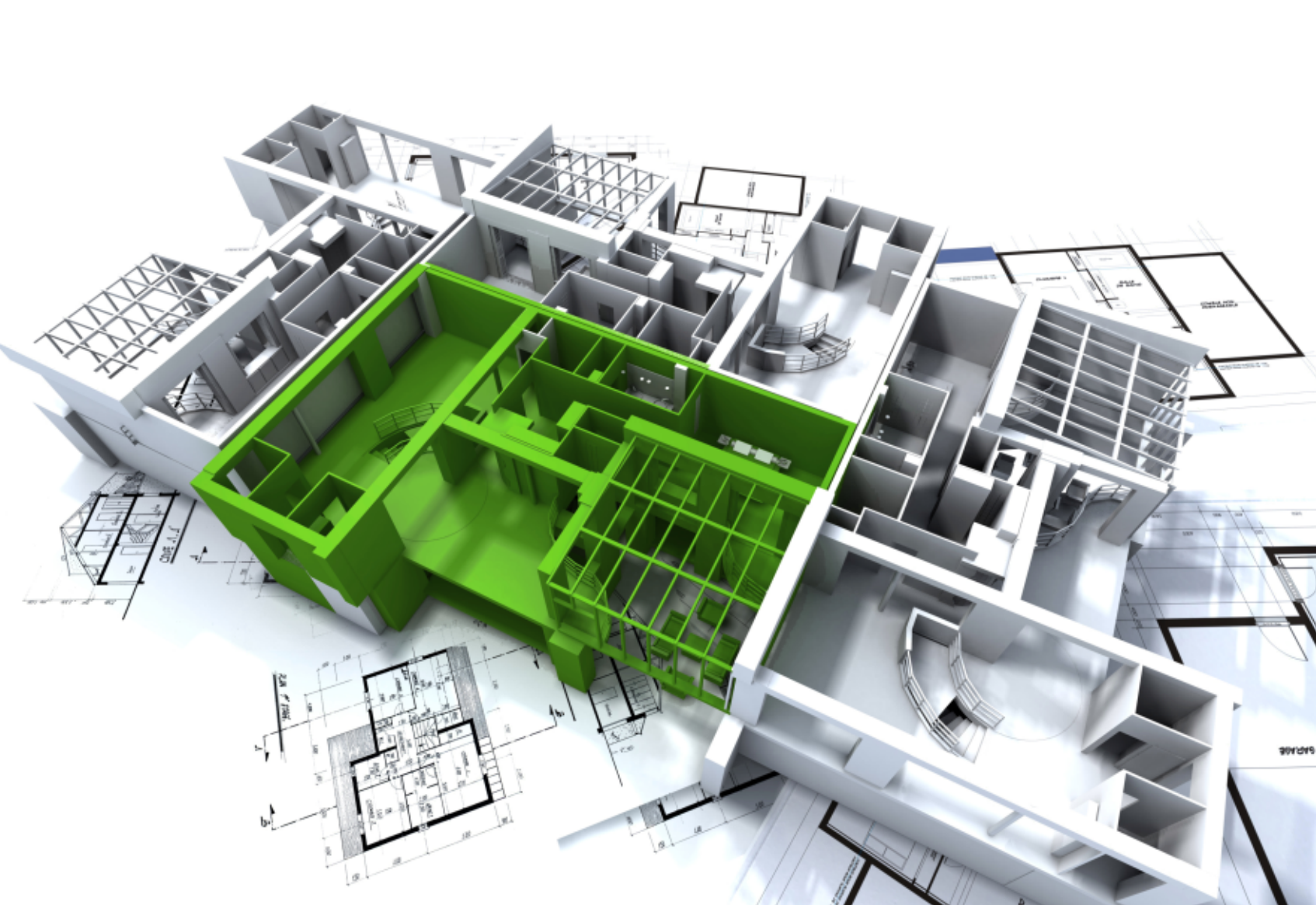


The greenACTIVEhome - Your private oasis

As our largest source of energy, the sun delivers around $1.1 \cdot 10^{18}$ kWh of solar energy, to the earth's surface. Approximately 10.000 times more than the world's primary energy demand. This radiant energy can be collected and converted into direct current electricity. Especially with regard to steadily increasing costs of energy and constantly rising requirements for environmental protection, new ways of environmentally friendly living become more and more important.

But not only ecological aspects are reasons in favor of our greenACTIVEhome. We offer our customers unique solutions for self-sufficient living. The greenACTIVEhome is the consistent implementation of an off-grid home, independent from public electricity supply.

Individually designed according to specific climatical conditions, the house can be located where ever you prefer to live. A luxury villa on an island in the see, a weekend house in the back country, or a holiday resort in the desert - the greenACTIVEhome is your private oasis.



Individual solutions

The MECO ELECTRIC greenACTIVEhome is an off-grid self-sufficient house, which can be designed and built according to your personal specifications. Individual sizes, designs and floor-plans can easily be realized.

The greenACTIVEhome is powered by a high-performance photovoltaic system, installed on the roof or besides the building and our unique wind power station. These systems are powerful enough to ensure the functionality of all components of the building services under any circumstances. All components are optimally attuned to each other and work accurately and reliably. Only the most energy-efficient and powerful components available on the market are applied.

Natural challenges are closely linked to the specific weather and climatic conditions. The states of the Near and Middle East for example show temperatures of 50°C during daytime in summer month. This fact places great demands on the cooling system. Misty weather conditions, dust and sandstorms influence the output of the photovoltaic system. Therefore sufficient sized storages are required to guarantee the supply of electricity and cooling.



The greenACTIVEhome

The MECO ELECTRIC greenACTIVEhome is an off-grid self-sufficient house. Off-grid means that no public grid is necessary. Self-sufficiency signifies that the house produces the entire required energy on its own. The house consists of a high-performance photovoltaic system, a wind power station, a small-scale sewage treatment plant, as well as our unique cooling system.

Electricity and cooling supply for nighttime is assured by a high-performance battery system and a long-term water storage tank. The water storage is an important component of our radiant cooling system and is designed to provide hot and cold water for at least two days. During nighttime only a small circulation pump is required to ensure cooling for the entire building.

All components like batteries, circulation pumps, air-handling unit, heat pump and inverters are located in the technical room. The storage tank is placed beneath it. Therefore the technical room can be seen as the heart of the greenACTIVEhome.

The technical room - Heart of the building

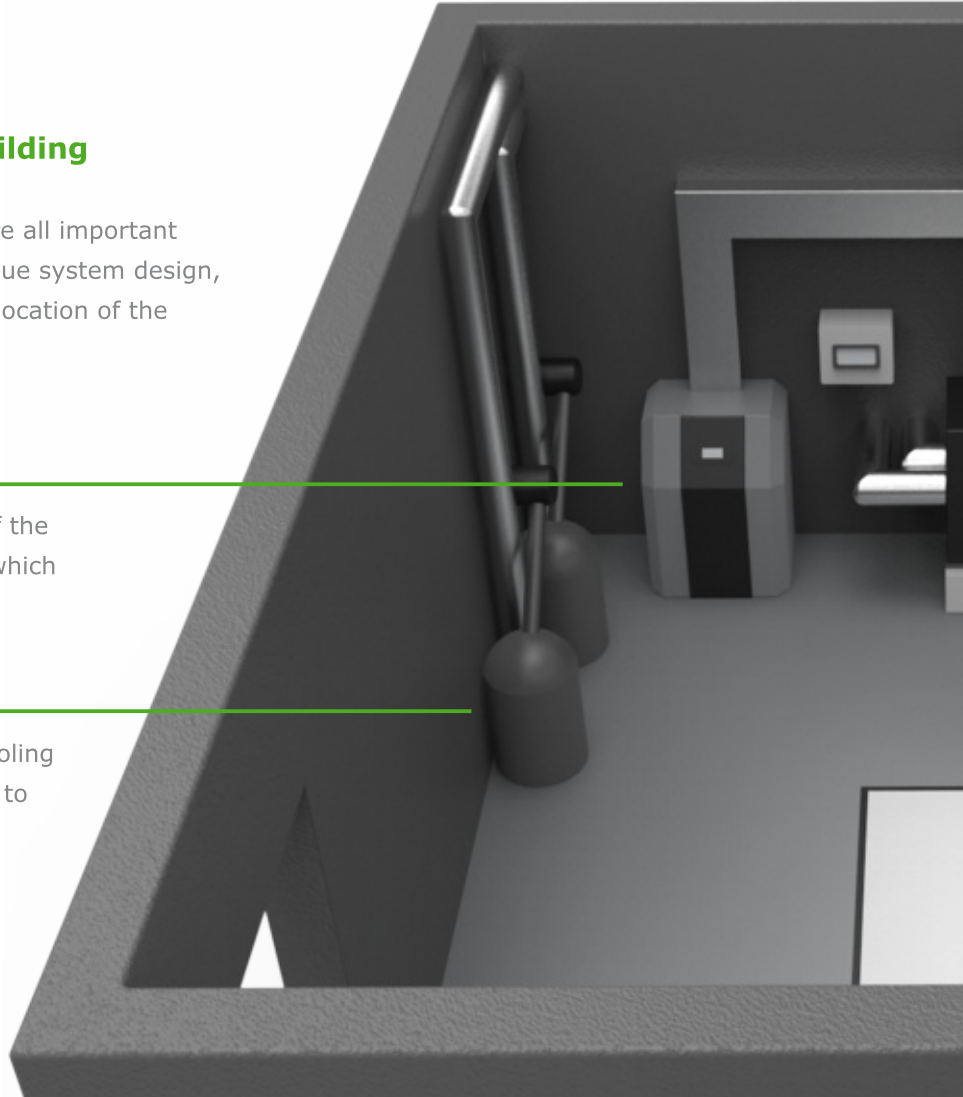
The technical room is the place in the house where all important system components are installed. Due to the unique system design, the required space is particularly small. Size and location of the technical room can be chosen individually.

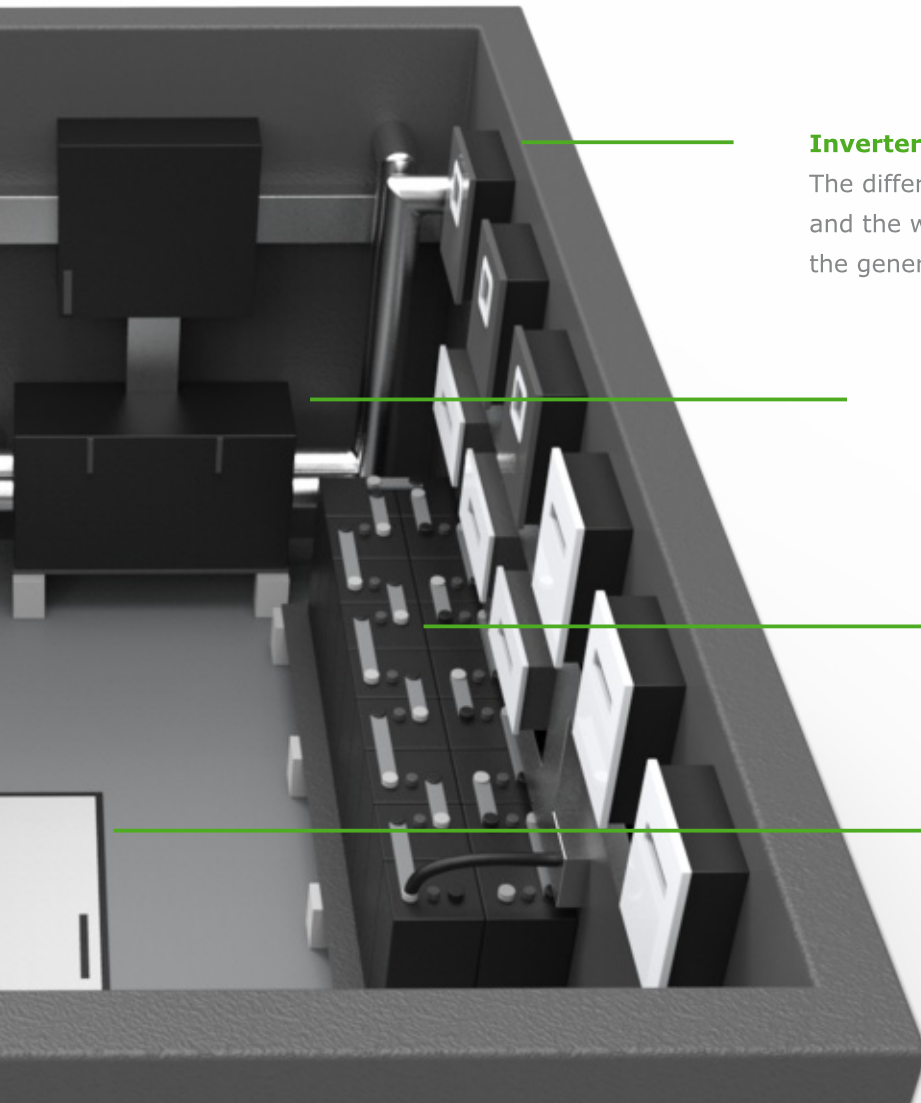
Heat pump

The water-to-water heat pump is part of the cooling system. It produces cold water which is the coolant for the system.

Circulation pumps

The circulation pumps are part of the cooling system. They distribute the chilled water to the radiant cooling mats.





Inverters

The different inverters are part of the photovoltaic system and the wind power station. They are used to transform the generated direct-current into alternating-current.

Air-handling-unit

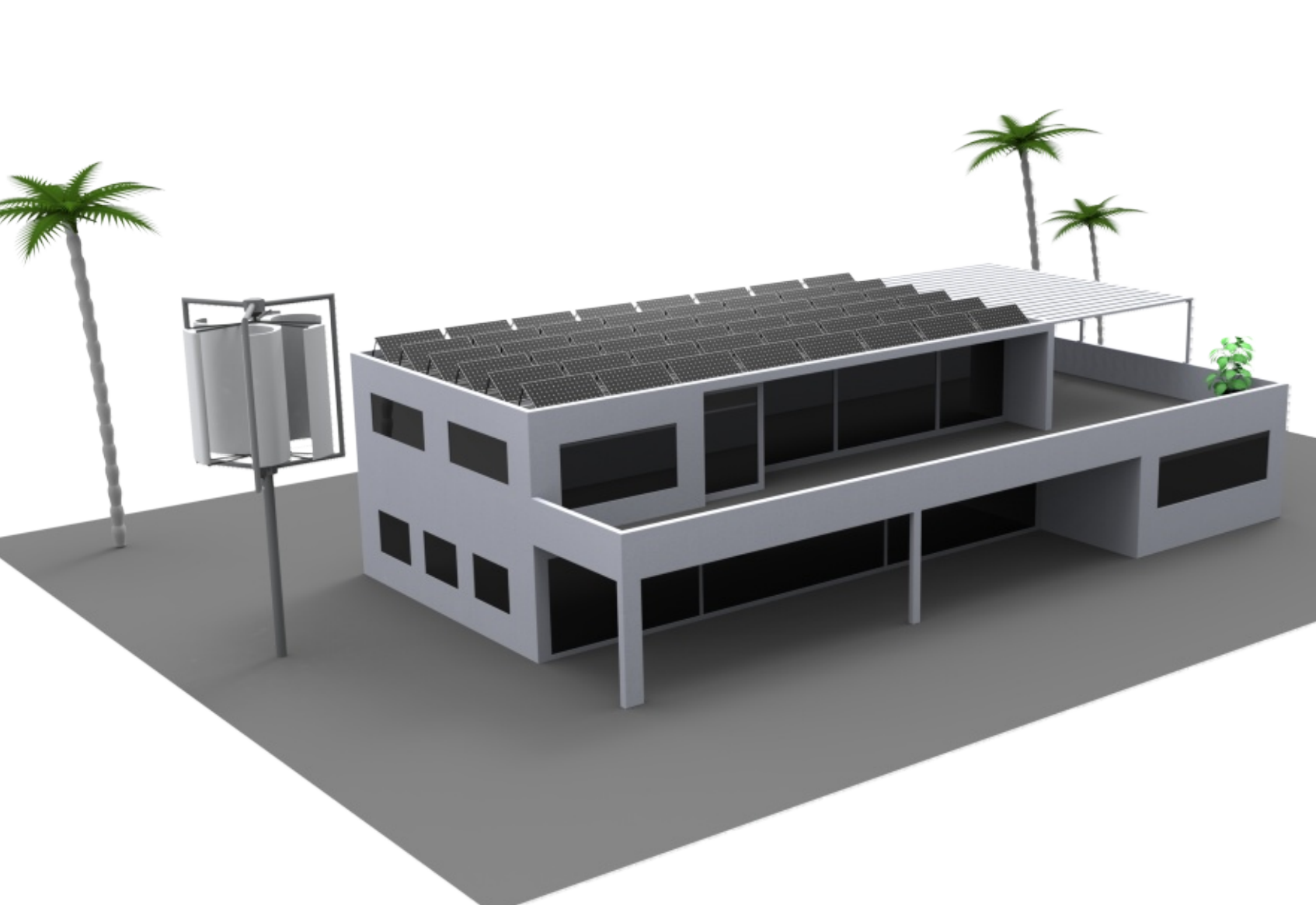
The air-handling-unit is part of the cooling system. It controls the relative humidity and the CO₂ content of the room air.

Battery system

The battery system stores the energy produced by the pv-system and the wind power station. Its capacity can be designed individually.

Floor hatch

Beneath the floor hatch the water storage is located. It stores hot and cold water to provide domestic hot water, as well as cold water for the cooling system.



Power generation

The greenACTIVEhome is powered by a high-performance photovoltaic system and a small-scale wind power station. The photovoltaic system can be placed on the roof, besides the building or on track-racks. The performance, amount and orientation of the panels is calculated and designed according to specific geographical characteristics, such as solar radiation and weather conditions. Detailed individual load calculations are mandatory to assure the security of supply under any possible circumstances. Electricity for nighttime is provided by a high-performance battery system. The size and capacity of this system is designed to guarantee the supply for at least two days without sunshine. This safety stock is further increased by our unique small-scale wind power station. With a performance of 2.5kW, 5.0kW or 7.5kW, the wind power station is our second source for electricity generation.

The key features are:

- Generate renewable energy yourself and use it immediately
- Security of supply for a at least two days without sunshine
- No additional grid or diesel-generator required



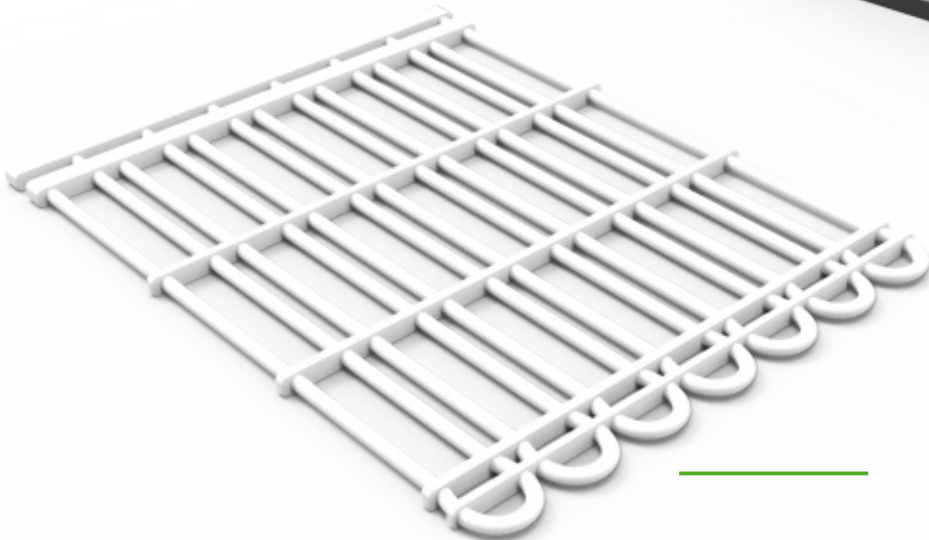
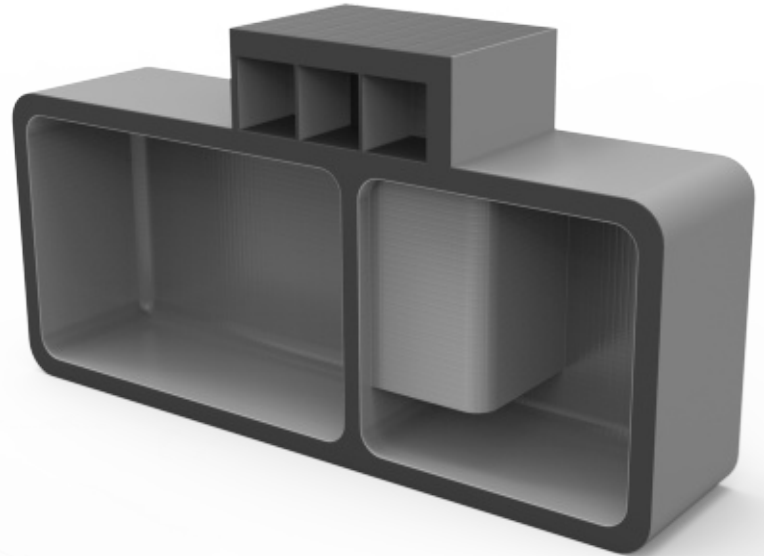
Radiant cooling system

In contrast to conventional split unit which directly cool down the room air, radiation emits its energy when it hits objects. Everybody knows the difference between sitting in the shadow or sitting in direct sunlight. The air temperature is in both cases the same, but the felt temperature is totally different. We are using this phenomenon in our cooling system. Chilled water circulates through cooling mats which are plastered directly onto the raw ceiling and on the walls. The result is a very large cooling surface which guarantees a constant and even temperature profile of the room. On the way through the capillary cooling mats the cold water emits its cooling energy and absorbs the heat of the room. Furthermore an air-handling unit is used to control the the relative humidity and the CO₂ content of the room air in order to prevent condensation.

System advantages:

- Highest energy efficiency, savings of 40 - 70%
- Not emitting bacterias or germs
- Even temperature distribution, absolutely silent and invisible
- Suitable for all room sizes, from residential up to industrial projects

Central water storage



Radiant cooling mat

Central water storage

The cooling system is a closed loop. A water-to-water heat pump produces hot and cold water. Both are stored in the storage tank. The cold water is the coolant for our radiant cooling system. The hot water can be used to produce domestical hot water by means of a heat exchanger. Therefore the storage tank has two different compartments. The tank is made of GRP (glass fibre reinforced plastic) and PU foam and shows the highest possible insulation values. All technically necessary components are already integrated. It includes a heat exchanger, a network compatible control unit, additional equipment like pumps and a blending station, as well as a complete storage connection unit. The capacity of the tank is calculated to guarantee the cooling function for at least two days without sunshine.

Radiant cooling mats

The capillary cooling mats are plastered directly onto the entire raw ceiling and on the walls. Due to the slim design and special material specifics, a plaster layer of 1.0 - 1.5mm is enough. All kinds of available plasters are suitable for this purpose. Floor distributors split the central cold water inlet. Each room has its own thermostat. In that way we can guarantee a constant and comfortable temperature profile of every single room.

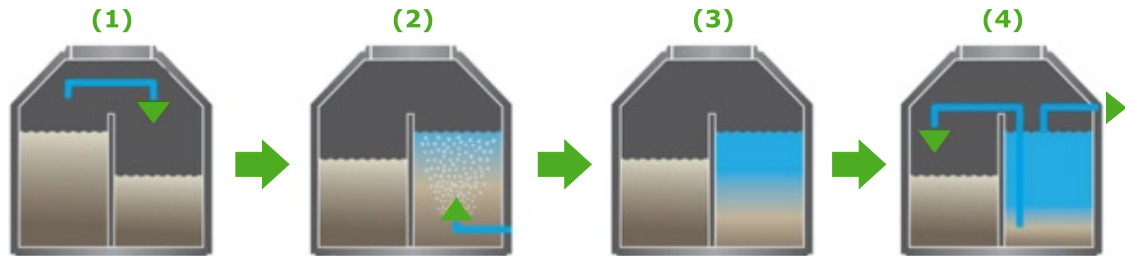
Sewage treatment plant



System advantages:

- Single or multi container versions from 4 up to 200 persons
- All certifications according to EN 12566-3, CE-approved
- Easy and quick installation, thanks to pre-mounted technical equipment
- Very energy-efficient - only 300kW/h per year

Sewage treatment plant



(1) The wastewater is initially fed into a sludge tank where solid constituents are removed. From here the wastewater is gradually led into the SBR tank.

(2) The actual biological treatment process takes place in the SBR tank. Short aeration and rest phases alternate and the activated sludge with its millions of micro-organisms can treat the water thoroughly.

(3) During a 90-minute rest phase, the activated sludge settles on the bottom of the tank and a clear water zone forms in the upper part of the SBR tank.

(4) The separated clear water is led from the SBR tank to the receiving water (sea, river or lake) or into a percolation system. The remaining sludge is returned to the first chamber of the tank and the process can start again.



Ecological aspects

The MECO ELECTRIC greenACTIVEhome offers you the possibility to live your life independent from public electricity supply. With our unique combination of environmentally friendly energy generation, cooling and water treatment, a sustainable lifestyle becomes reality. As the entire building is powered by photovoltaics and wind energy, fossile fuels like oil and gas are no longer necessary. Consequently the building emits no CO₂ at all. Over 90% of the sewage water can be reused after the cleaning process. The result is almost 100% germ and bacteria free water, which is suitable for watering your garden.

Health aspects

Everybody knows the inconvenient side effects of split units. They are loud, they are uncomfortable due to the high convection and the very cold and dry air that is emitted. Furthermore split units are often a source for bacteria and germs which can cause diseases. Using water as coolant for our cooling system, all the mentioned inconveniences can be totally ruled out. That is why radiant cooling and heating systems are used in hospital projects for many years.

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