Surface electric heating from GREEN2HEAT

Use

Experience the comfort of electric underfloor heating! Imagine entering your home in the morning, and your feet are gently welcomed by pleasant warmth as you enjoy your first coffee of the day. With our high-quality and efficient surface heating system from GREEN2HEAT, this imagination becomes a reality!

Floor

Conductive surface heating strips with breathable protective film.

Wall / Ceiling

Waterproof heating strips for use in drywall construction/wet rooms. Breathable and compatible with wall plaster and tile adhesive.

Our system is suitable for both floor and wall installation, allowing targeted surface heating in various rooms of your house. Thanks to the electric operating mode, the heat conversion takes place directly at the point of use with minimal energy losses. This ensures not only a comfortable indoor climate but also an efficient use of your resources.

The installation of our electric underfloor heating is simple and can be realized with almost all types of flooring. You don't need additional radiators, which saves valuable space in your home. Moreover, our surface heating system is highly adaptable due to flexible installation options and can be customized to suit your individual needs.

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Whether you're renovating, building a new house, or simply wanting to enjoy the benefits of underfloor heating, GREEN2HEAT is your best choice! Experience the difference and treat yourself to the comfort of electric underfloor heating today. Contact us for more information or request a non-binding quote.

Power / Efficiency

The efficiency of an electric underfloor heating system operated with direct current depends on various factors. These include the type of heating surface, insulation, and temperature control.

In principle, the efficiency of electric heaters is nearly 100 percent, as all the electrical energy used is converted into heat. However, in practice, conversion losses may occur. These losses could be attributed, for example, to the way heat is transferred to the floor or the insulation of the floor.

When the electric underfloor heating operates on direct current, certain electrical losses can be minimized, potentially improving efficiency. Direct current is more efficient than alternating current as there are no alternating current losses.

Temperature control is also crucial for efficiency. An efficient control system ensures that the heating operates only when warmth is needed, enhancing overall efficiency.

To enhance the efficiency of an electric underfloor heating system, it is important to use high-quality products tailored to individual needs and to carry out the installation professionally.

Operating Temperatures

The surface temperature of the heating fleece is limited to a maximum of 35°C.

To adhere to the parameter mentioned above, all spaces must be heated simultaneously, and the system must be operated professionally. It is crucial to control the room air temperature (measured with a thermometer), not the floor temperature.

It should be noted that the floor temperature in an underfloor heating system reacts to changes in outside temperatures with a certain delay. This is due to the fact that heat is distributed over a larger mass in the screed, which takes some time to heat up or cool down.
Therefore, it is important to turn on the heating in a timely manner to achieve the desired room temperature. Maintaining a constant surface temperature is also crucial to ensure uniform heat perception.

By observing these guidelines, the heating system operates efficiently and contributes to a pleasant living climate.

Floor structure, two types of installations

Regular floor structure

- Floor finish
- Screed
- Green2Heat
  - Separation Layer (PE-Film)
  - Electrode Layer
  - Heating Fleece

  } Heating Fleece (detailed structure)
- Thermal insulation
- Moisture barrier
- Concrete

The reduced thickness of the heating fleece allows for energy-efficient heat transfer without requiring additional space. This is particularly advantageous when a heating system without radiators is desired, or when there are limitations on the overall construction height. Radiant heat penetrates deeply into the screed, gradually and evenly warming it. This contributes to temperature stability in the room and enhances the control cycle.

Second Option: Heating Fleece Installed Floating ON the Screed (directly under the floor finish):

Alternatively, the heating fleece can also be installed above the screed.

- Floor finish
  (this can simply be laid over the Green2Heat heating fleece)
- Green2Heat
  - Separation Layer (PE-Film)
  - Electrode Layer
  - Heating Fleece

  } Heating Fleece (detailed structure)
- Impact sound insulation
- Screed
- Thermal insulation
- Moisture barrier
- Floor slab

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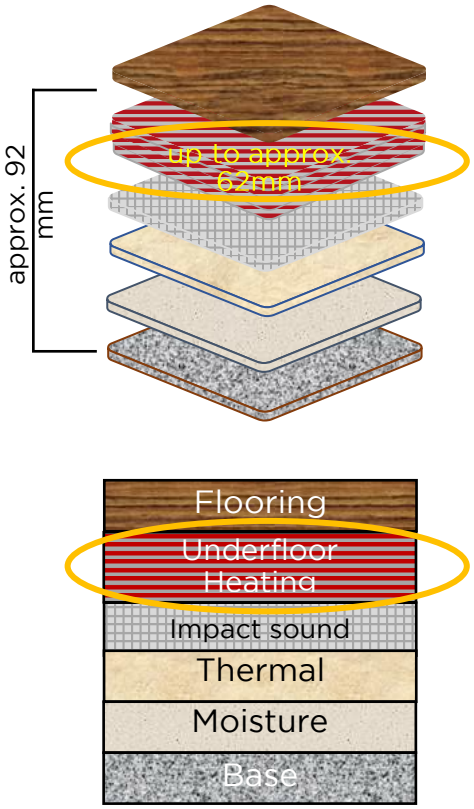
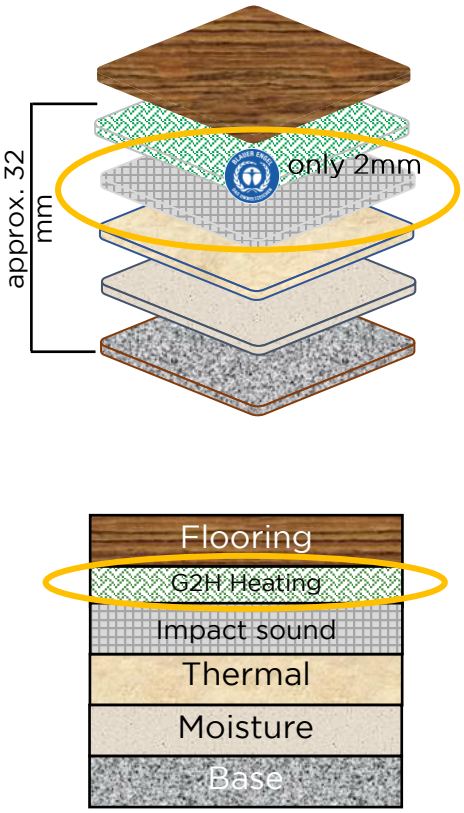
Comparison

Conventional Floor Structure



The conventional floor construction, including the underfloor heating, has a thickness of 92mm. The heating elements alone are 62mm thick and consist of a variety of components

green2heat ®



The conductive, durable heating fleece, with a thickness of 2mm, a density of 100 kg/m^3, and a heat output of up to 100-140W, is manufactured through a patented process and is composed of 100% recycled polyester. It is ideal for the temperature control of floors, walls, and ceilings."

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Instalation

Installing the fleece is a craftsmanship process that requires care, precision, and patience. Here are the basic steps for installing the heating fleece:

Substrate Preparation: Ensure that the substrate is clean, leveled, dry, and free from dust and dirt. Repair any cracks or irregularities and use a primer if necessary.

Moisture Barrier & Insulation: Lay the moisture barrier and the desired thermal insulation.

Calculation and Layout: To achieve the necessary heat output in each room, calculate in advance how many linear meters of heating fleece are required. In a second step, consider how to distribute the corresponding linear meters in the room (for rooms with exterior walls and windows, it is advisable to place the heating fleece along these areas). Establish a layout to ensure that the heating fleece is evenly arranged in terms of heat distribution.

Cutting: Cut the fleece to the correct size and shape using scissors or a similar tool. Please note that both electrodes (right & left) are always required for operation, which is why cutting in width should only be done up to the electrode!

Connections to electrodes: Lay the electrical connection cables and connect the heating fleece. Use the foil connectors we provide and press them directly onto the electrode (carefully remove the foil above). CAUTION! Then use adhesive tape to seal the connector and foil securely!

Adhering the heating fleece: The heating fleece must be tightly attached to the underneath layer using adhesive tape.

Testing: Once all previous installation steps have been executed, the functioning of the fleece shall be tested before applying the next layer.

*The heating fleece can be installed either beneath the screed (in new constructions) or above the screed (in renovations).

Operating Concept

Wireless Sensor Technology

Capture of External Influencing Factors and Consideration of Weather Forecasts Calculation of Optimal Heating Strategy.

DASHBOAD

Live overview of energy consumption, temperature trends, humidity, and more. User management and alert system

CLOUD-PLATTFORM

Ubiquitous access and administration via a cloud solution. Automated backups. Measurement data via HTC6LoRa

Individual Room Control

Individual room control system suitable for complex requirements. Introduction to intelligent building management.

Experience maximum comfort and energy efficiency with our advanced control system for electric underfloor heating!

With our innovative solution, we not only capture external influences but we consider precise weather forecasts. This results in an optimal heating strategy that provides cosiness saves energy.

Through a user-friendly cloud solution, you have access to the system anytime, anywhere, allowing you to conveniently administer it. Thanks to automated backups, you don't need to worry about data loss.

Our live overview keeps you informed about your energy consumption, temperature trends, humidity, and much more. You can customize and manage the system according to your needs, including user management and an alert system.

For complex requirements, we offer a single-room control system that you can adapt flexibly. Additionally, our system provides an entry point into smart building management.

Benefit from our expertise and use our advanced control system for your electric underfloor heating – ensuring the highest comfort and energy efficiency in your home.

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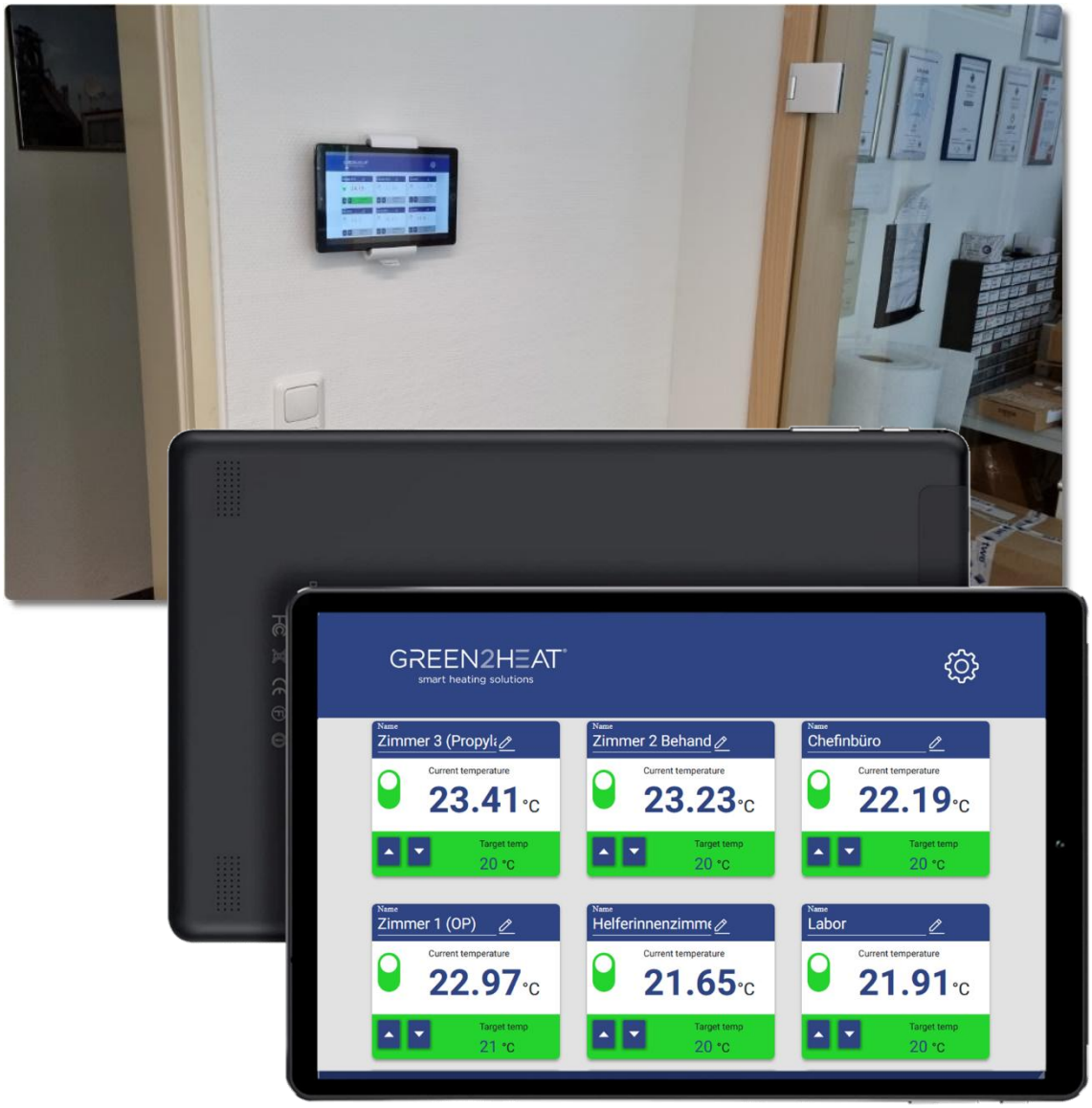
Various control options

We offer three types of control:

1. ***Centralized control***
   This type of control supplies all heating zones through a direct current unique power supply and independently maintains the set temperatures. This control can manage up to 16 differentiated heating zones and be operated locally via WLAN (a device can connect, e.g., a control panel):

   The available functions are:
   a. Viewing the Temperature in every room
   b. Adjusting the target temperature in the respective room/heating zone
   c. Turning the heating on/off in the respective room

Here is an image of a control panel (tablet) that can optionally be delivered with a wall mount.



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2. ***Centralized control in combination with Innovative AI-controlled cloud control***

   This type of control supplies all heating zones through one or more direct current power supplies and independently maintains the set temperatures. It can manage up to 16 heating zones and be operated locally via WLAN (a device can connect, e.g., a control panel). Similar to the functions described in point 1, it offers numerous additional cloud-based possibilities. Here are some additional ***functions***:

   a. Access via any internet-enabled device through our app (Apple or Android) or also via the browser from a PC/laptop, etc. Note that for security reasons, the access to your local control device is NOT established directly from the internet but through our cloud service. The local control device then retrieves your new settings from the cloud service in near-real-time via an IoT network (Internet of Things).

   b. You can view floor temperature, room temperature, humidity, and your power consumption (also as statistics) for each room.

   c. Set one or more timer controls for each individual room, e.g., set night temperature, or automatically lower the temperature during the day when no one is at home, and raise it shortly before you return.

   d. Combination with radio-based sensors such as "outdoor sensors," "door/window contacts" (window open = heating off, window closed = heating on). No need for cable laying, as the sensors are battery-operated (batteries last several years).

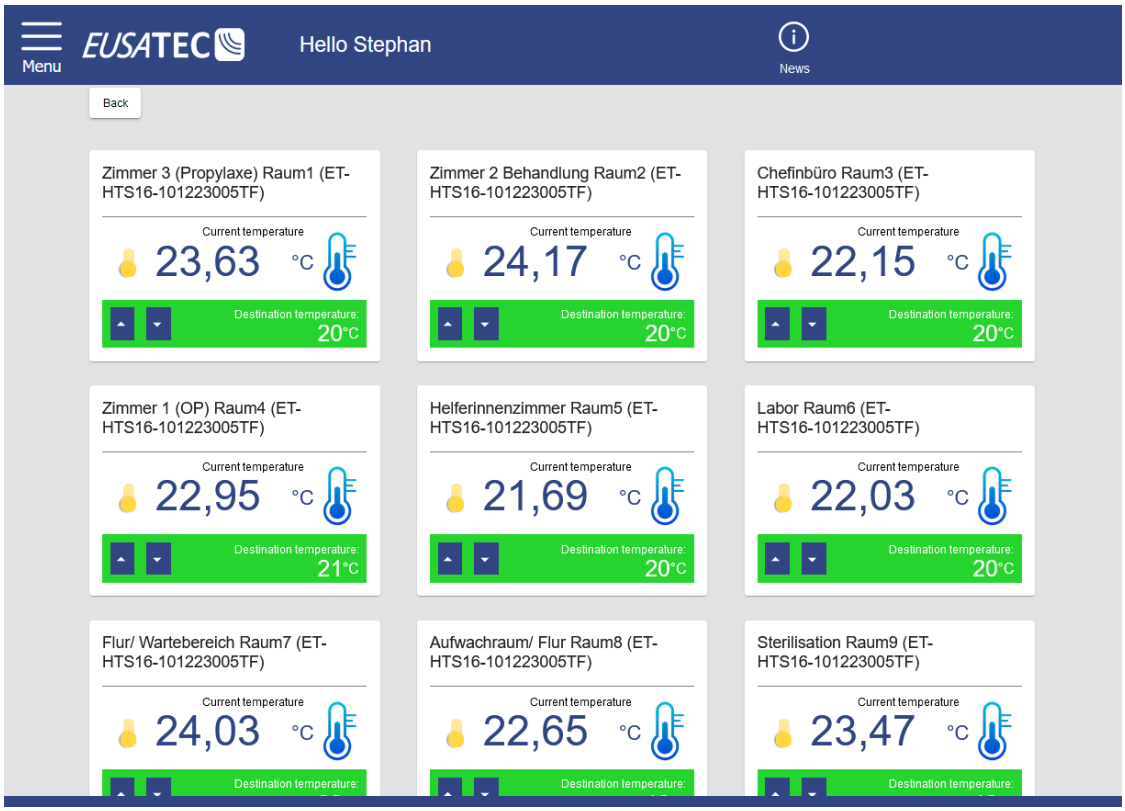
   e. Alarms are also possible, e.g., terrace door open, smoke detection in the attic... you will automatically receive an email, the app will give a warning, or you will be informed automatically by phone.

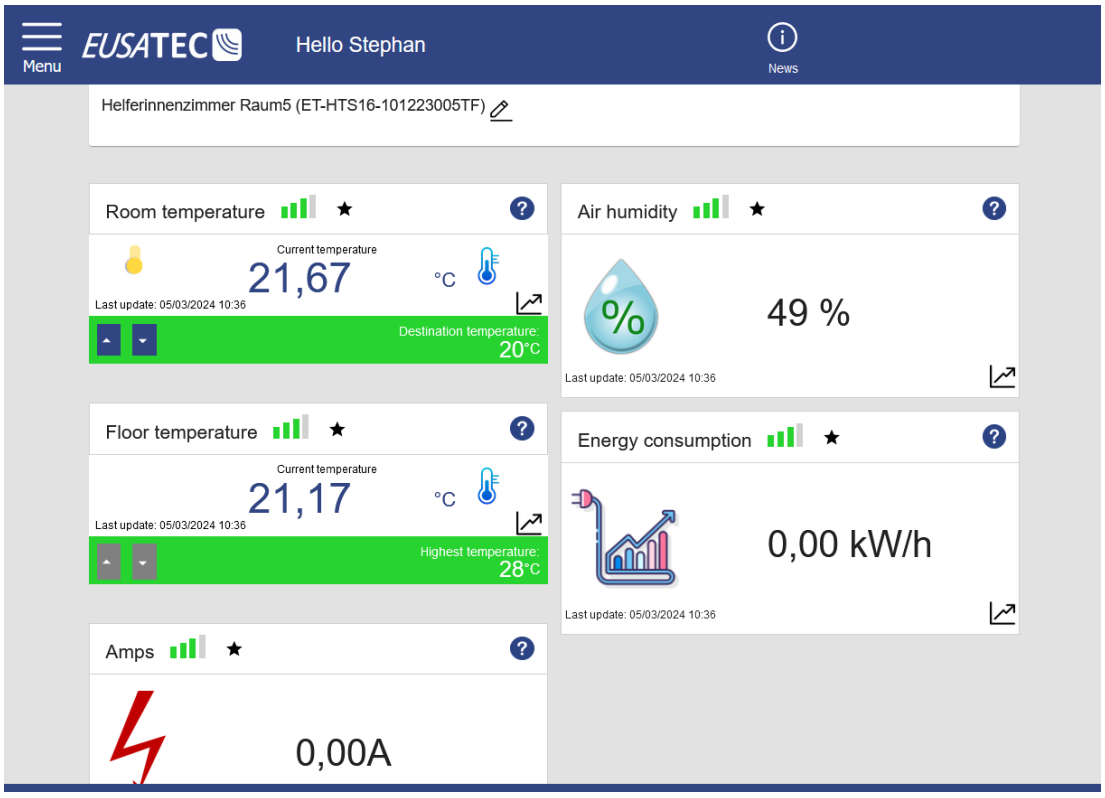
   f. User groups creation to, for example, control separately multiple apartments (total of 16 rooms/heating zones). Each group can only operate and view the assigned zones.

   g. Each group can view its own power consumption (heating costs).

   h. Combination with "Photovoltaic" system, meaning the Green2Heat heating system communicates with your photovoltaic system and adjusts the heating system as efficiently as possible based on the potentially available self-produced electricity.

Here are a few screenshots of the cloud service:





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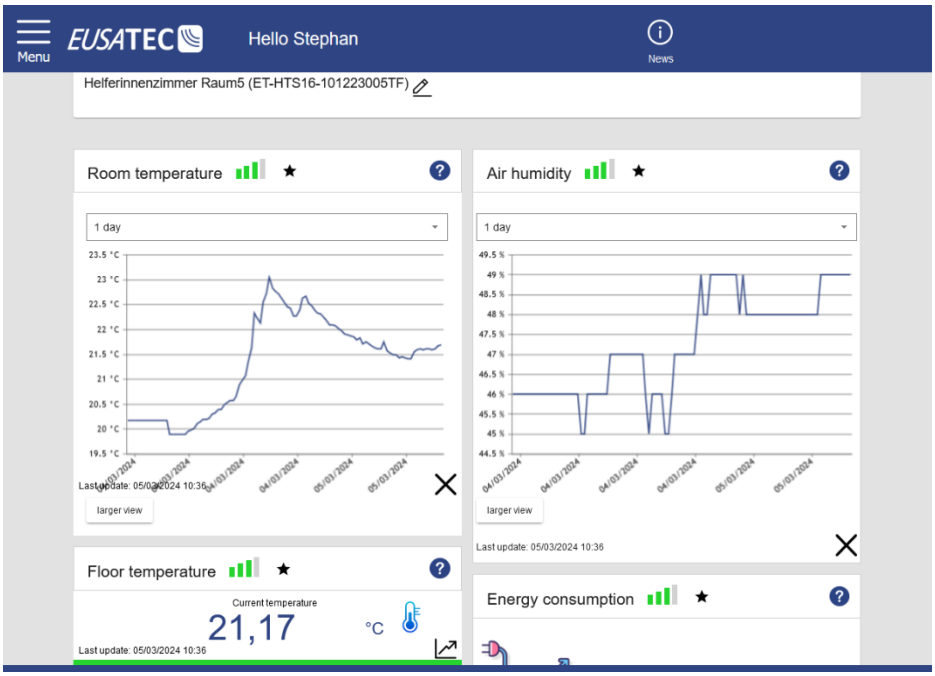

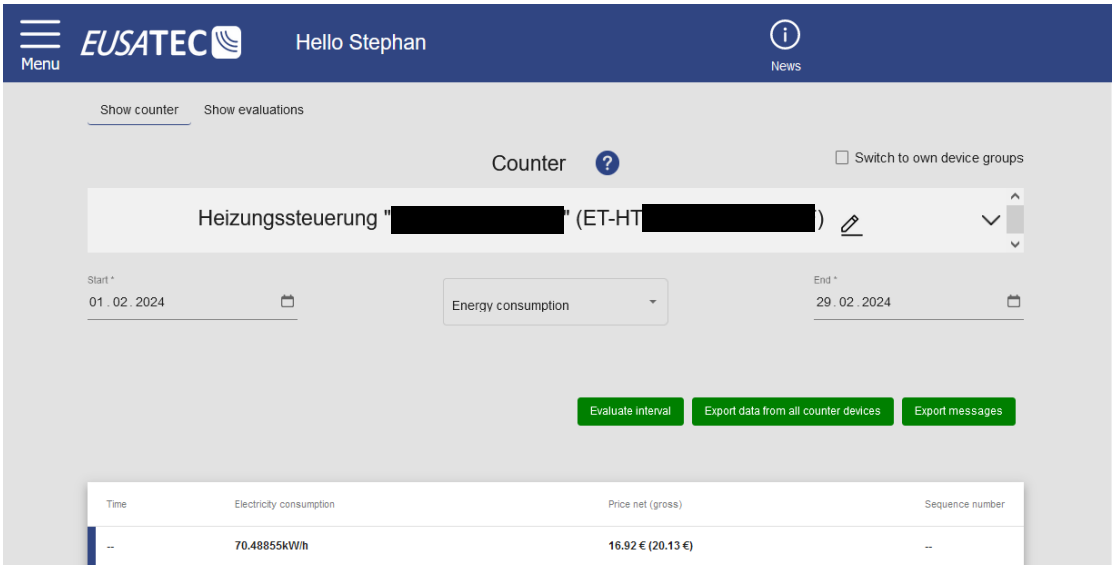

3. ***Purely cloud-based heating control***
The heating control is located in the cloud, requiring a separate direct current power supply for each room/heating zone. In this setup, the respective room sensor sends measurement data (room/floor temperature, humidity) directly to the cloud service. The heating control in the cloud then manages the respective power supplies in each room.
Functions:
   a. Similar to point 2.
   b. however, unlike solutions 1 and 2, energy consumption will be approximately 5-10% higher here, as each individual power supply unit has conversion losses.

Consult with one of our partners; together with them, you will find the optimal solution for your needs.

Maintenance

Heating Fleece: The heating fleece requires very little maintenance. It is recommended to conduct a test using the testing device annually or biennially to check full functionality.

Control: Components related to the control system are virtually maintenance-free.

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Technical Data

Maximum Heating power area/ running meter	100-140Watt/m² or 55-77 Watt/ running meter
Dimensions of Heating Mat (Roll)	Length: 40m Width: 0,60m Thickness: 2 mm
Max. Length per Heating Mat (recommended):	10 m
Voltage	48V DC
Integrated Voltage Supply	Integrated Electrodes on the Right and Left in the Fleece
Weight	353 g/m +-10%
Heating Foil Material	Polyester Fleece with Metal Fibers
Min. Operating Temperature	+ 5°C
Max. Operating Temperature	+ 60°C
Surface Temperature in Operation	max. + 35°C (Standard Room Temperature: 21°C) (Performance Limit of Fleece: Max. Temperature 60°C)
Storage	Dry, Protected from Moisture

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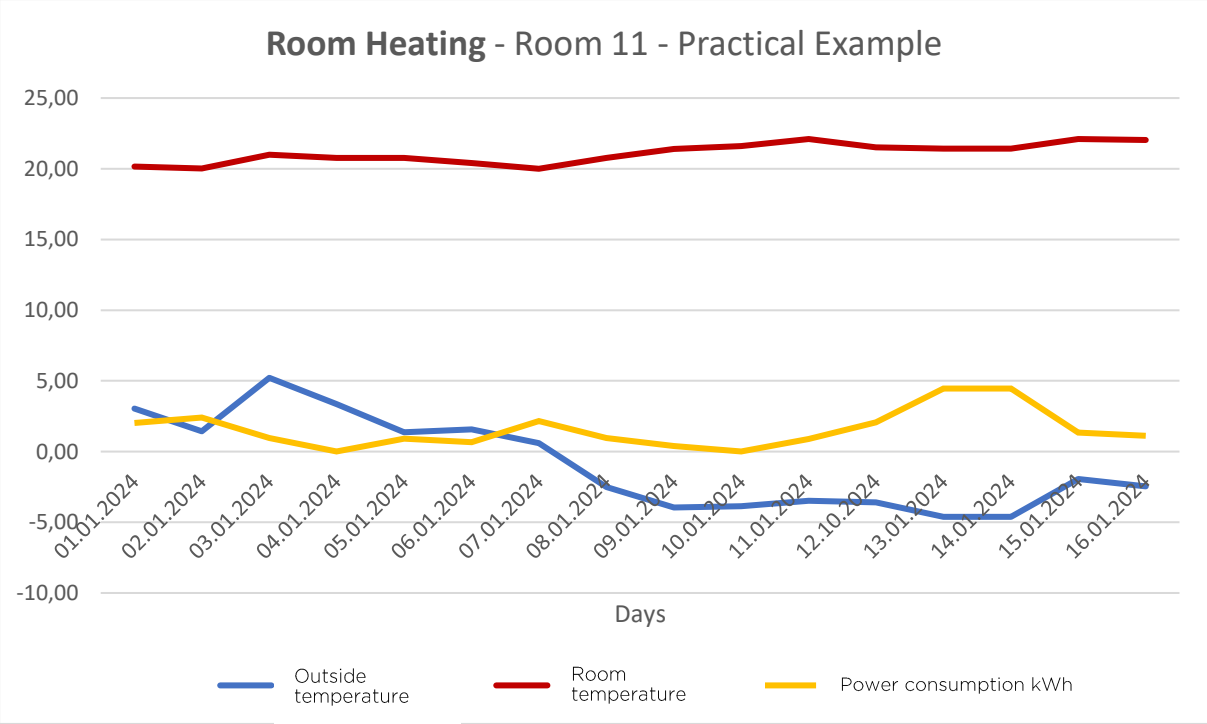
Practical Example - Heating Performance

Attached is a depiction of a 20-square-meter room with windows and an exterior wall within an existing building. The insulation of the building is rated from poor to best case. The entire property comprises 250 square meters of heated surface. The below diagram illustrates the following values:

- Room temperature (°C)
- Outside temperature
- Heating power consumption (kWh)



Compared to traditional heating systems, our product allows you to save up to 20 percent in energy without compromising your thermal comfort. This is achieved through radiant heat, known for its particularly cozy and pleasant feel. Let yourself be convinced by the efficiency and comfort that our product provides!

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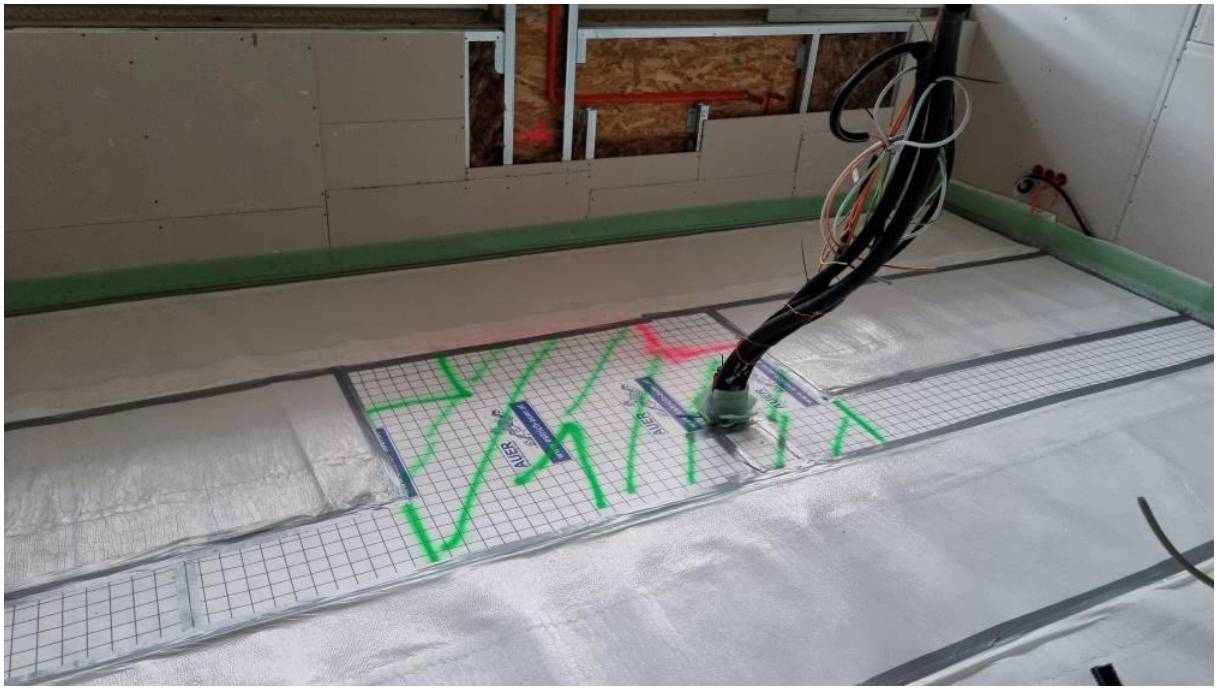
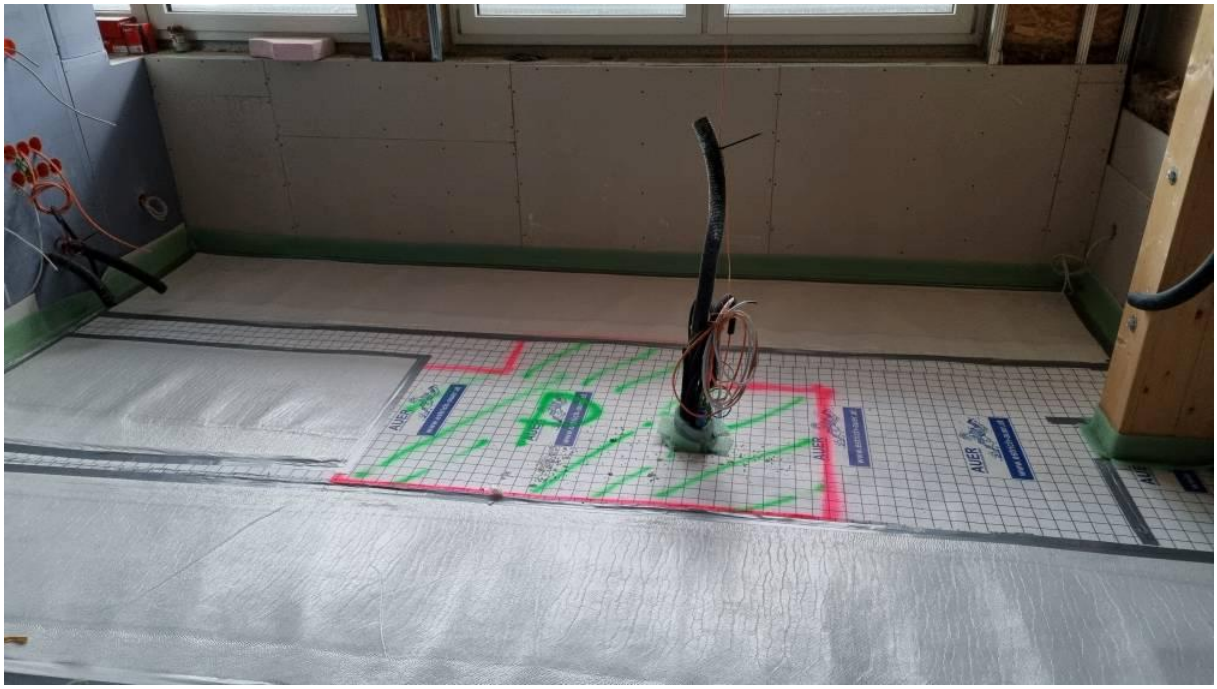
Practicale Example – Installation

Below you will find some pictures of Green2Heat heating fleece installations during the construction phase





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Practicale Example – Electrical Power Connection

For the heating fleece system, the crucial factor for the main electrical connection is not the overall power (total area) but rather the largest heated room.

Building Types	Heating Capacity[1]	Area (GFA)[2]	Total Heating Capacity	Current Strength	Current Strength[3]
				Direct Current	Alternating Current
	Watt/m2	m2	Watt	Ampere	Ampere
Existing, very poor insulated buildings	70	30	2'100	52.50	10.00
Existing, poorly insulated buildings	50	30	1'500	37.50	7.00
New Constructions	35	30	1'050	26.25	5.00
Passive Houses	25	30	750	18.75	3.60

[1]The heating capacity depends on the building standard, which the building owner must be aware of or clarify. Influencing factors include: windows, facade insulation, roof insulation, thermal bridges, etc.

[2]The largest heated room in the project is significant. Additionally, the thermal storage capacity of the ground also has a considerable impact on the system's operating times.

[3]It is possible to distribute the load of the current at the main connection for power supplies with 3 phases, meaning amperes of alternating current divided by three.

The power supply, which converts either 230V to 48V for individual rooms or for central supply, determines how much the current connection is loaded. The sizing of a power supply is determined by the required power of the largest room.

Further information

Photovoltaics

A combination of photovoltaics and an electric underfloor heating system with direct current offers numerous advantages:

1. Efficient use of renewable energy: with a photovoltaic system, you generate your own electricity, which can be directly utilized for the electric underfloor heating. This maximizes the benefits of your renewable energy source and reduces your carbon footprint.
2. Low operating costs: by using direct current with underfloor heating, you can further reduce your energy expenses. Direct current incurs fewer losses compared to alternating current, leading to higher efficiency and lower operating costs.
3. Independence from energy providers: with photovoltaics and electric underfloor heating, you become less reliant on external energy providers. You can produce your own electricity and use it as a heat source without depending on the power grid.
4. By consuming self-generated solar power and utilizing an efficient underfloor heating system with direct current, the operational lifespan can be positively influenced, potentially extending it beyond the standard 15 years.

Overall, the combination of photovoltaics and an electric underfloor heating system (direct current) provides a sustainable and future-proof solution for your home. This solution is not only cost-effective and environmentally friendly but also offers comfort and flexibility.