



Specialist heating and ventilation systems proposal

e:nergycarbon

Efficient low carbon heating systems



# Energy Carbon Ltd - background

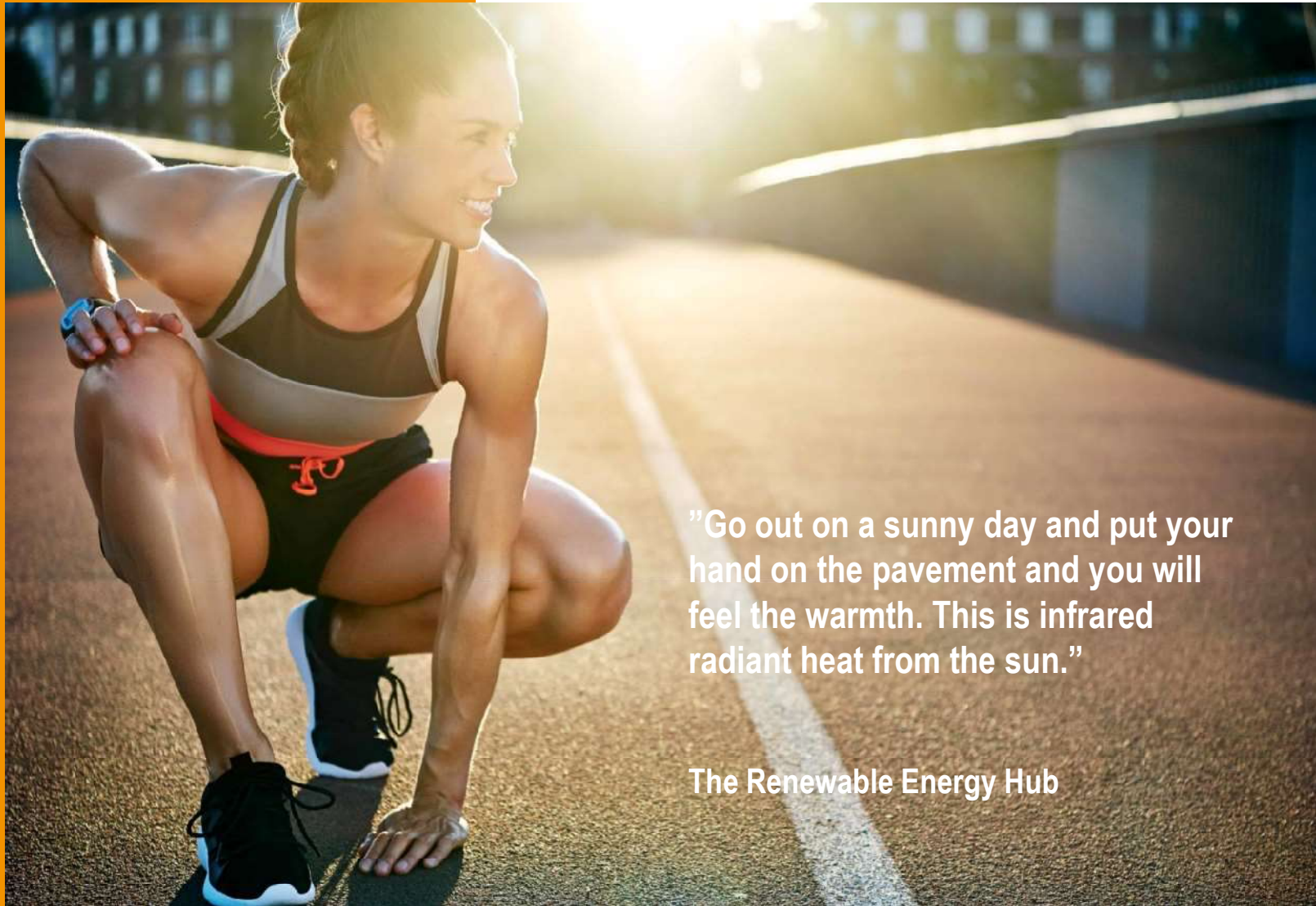
Energy Carbon are the sole distributor operating in the UK on behalf of MFH Systems GMBH who are one of East Germany's leading heating and ventilation manufacturers and installers since 1968.

Working in conjunction with MFH, we are able to provide the back up and technical resources of this well respected German company. Though our distribution agreement we can offer full technical support and warranties as well as a joined-up product range that has been tried and tested.





The future of heating **is here**



"Go out on a sunny day and put your hand on the pavement and you will feel the warmth. This is infrared radiant heat from the sun."

The Renewable Energy Hub



# Welcome to E:ENERGY CARBON



SAP10 is coming  
and if you're building to  
'Future Homes Standard'  
then our system is the only  
Direct electrical system that  
ticks all of the boxes and is  
truly Future Proof

- » Simple, safe, efficient and good for you and for our planet.
- » Installed into the ceiling either behind the plasterboard or skimmed into the ceiling.
- » Space freed up for better placement of furniture
- » No need for plant room or pipe work
- » Can also be fitted into walls and floors.
- » Cut holes and fixings for spot lights, fire alarms, and it carries on working away happily with zero. maintenance for years to come.

## OUR SYSTEMS HAVE THE FOLLOWING BENEFITS

### **FIT AND FORGET**

With no ongoing burden on maintenance due to failure and a design life of 50+ years. This indicates that under normal operation replacement would not be necessary until well after the 2050 climate action target

### **GOOD COMFORT AND SAFETY**

Occupants should feel comfortably warm at all times without creating stale air and dust circulation. No hot surfaces and a balanced even coverage throughout all areas.

### **LOW ENERGY**

Providing maximum warmth with minimal energy cost and carbon footprint

### **ZONE CONTROLLABLE**

Enabling user friendly monitoring and adjustment in each area remotely and/or autonomously using occupancy controls to maximise energy efficiency

### **LOW CO2 IMPACT**

Good credentials as our FLEECE product is manufactured from recycled materials and comes with a 'Cradle to Grave' calculation of just 36kgs for the whole project

### **UTILISE THERMAL MASS**

Far Infrared heats objects rather than air. Floors, desks, furniture, worktops all offer good thermal mass that gently capture heat and release slowly back into the room during the off cycle.

# Testing proof and research

It is widely recognised that a good quality infrared heating system can deliver up to **60% energy savings\*** over a conventional electrical system. This is partly due to the fast reaction times but also to the 'feel' of the comfort level experienced by the occupants. The biggest saving is experienced by the nature of directly heating objects and occupants rather than through warming the air around them. This allows for greater air circulation around a room without heat loss which, in turn aids air quality. In practice the user experience shows that heating can be run 2 degrees lower than it's convection counterpart and every 1 degree is equal to an additional 6% energy saving. Smart controls allowing areas to switch on/off and warm up fast as areas are unoccupied also account for large savings.

In September 2010 Katholieke Universiteit Leuven in Belgium conducted a detailed survey of Far Infrared heating using different house types and drawing data from over 30 different studies over a 30 year time period. This report may be viewed at [summ\\_report\\_study\\_kul\\_rad\\_heat.pdf\(ducoterra.com\)](http://summ_report_study_kul_rad_heat.pdf(ducoterra.com))

KATHOLIEKE UNIVERSITEIT  
**LEUVEN**

In October 2020 we commissioned the Building Services Research and Information Association (BSRIA) to undertake thorough testing of our Far infrared heating product, FLEECE and DRYTEC. We were looking to quantify maximum surface temps, reaction times, speed of response and spread. Results of this test are summarised on the graphic on the next page and showed good results

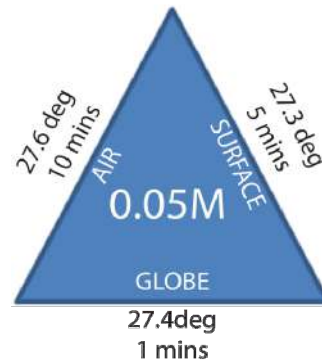
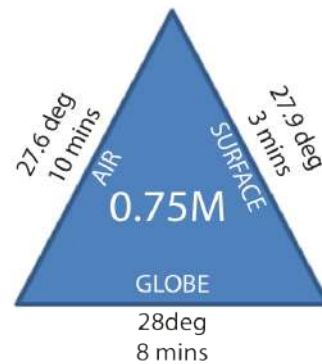
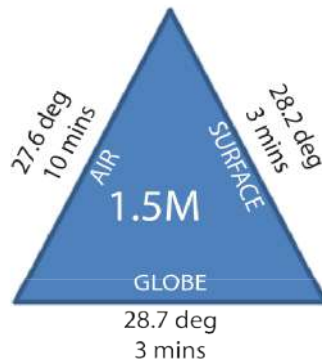
**BSRIA**

The German manufacturer commissioned testing with the University of Dresden conducted over a 2 year period running side-by-side with an air source heat pump and a gas boiler in a lived in, 170m2 family home with a 40w heat loss. This showed that overall savings per year could be achieved when compared to heat pumps and gas boilers. Graphic shown on the next page.

 **TECHNISCHE  
UNIVERSITÄT  
DRESDEN**



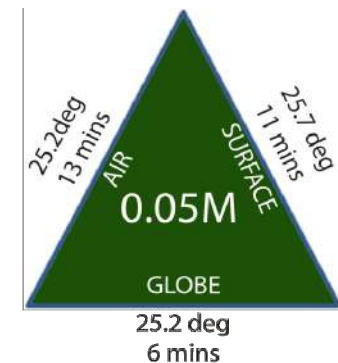
## Product test result analysis showing reaction times and temperature relationships between types of sensor



**FLEECE**  
Max. surface temp. 41.5°



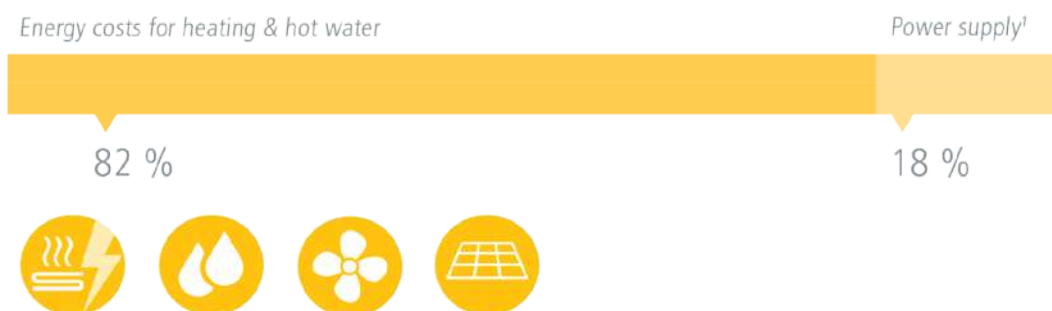
**DRYTEC**  
Max. surface temp. 44.4°



Testing carried out October 2020

## » COMPARISON OF OPERATING COSTS

### **ELECTRIC SURFACE HEATING 627.71 € / YEAR\***



### **GAS CONDENSING BOILER 783.96 € / YEAR\*\***



### **AIR-TO-WATER HEAT PUMP 826.30 € / YEAR\*\*\***



### **Basis of calculation**

\* Electricity costs 0.261 €/kWh

\*\* Gas costs 0.057 €/kWh

\*\*\* Electricity costs 0.20 €/kWh (separate electricity meter)

<sup>1</sup> Ventilation & circulation lines, pumps (heating, circulation)

<sup>2</sup> Electricity meter (electric surface heating) / Gas connection (gas condensing boiler)

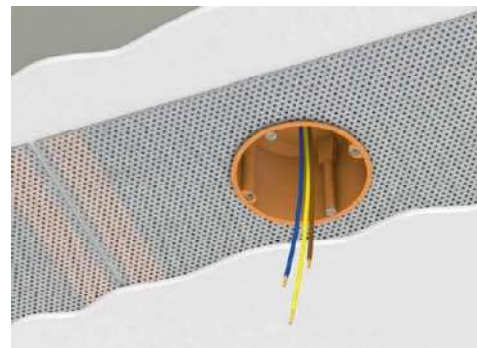


## A brief overview of the product

Energy Carbon provides an effective, low energy, low carbon footprint, infrared heating solution. It is a proven product manufactured in Germany and takes the form of a heating 'fleece' that simply fits into the ceiling or walls, either behind the plasterboard or simply skimmed into the final plaster coat. The product can also be installed under self levelling compound in the floor or under floating floors such as laminates.

Our product is easy to install, using existing trades thereby reducing costs and time spent with specialist trades. It sits invisibly within the fabric of the building and gives an even, comfortable warmth that is zone controllable using smart control systems.

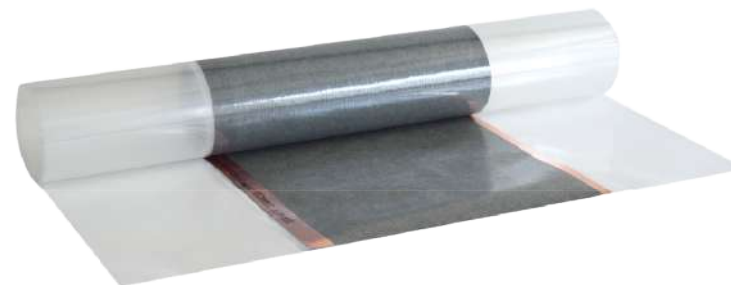
This system has been tried and tested over a 6 year period with 100,000 linear metres fitted to date. It has CE approval, is TUV tested and has and continues to undergo stringent testing including a 2 year study conducted by Dresden University where it was proven to be far more economical than other solutions.



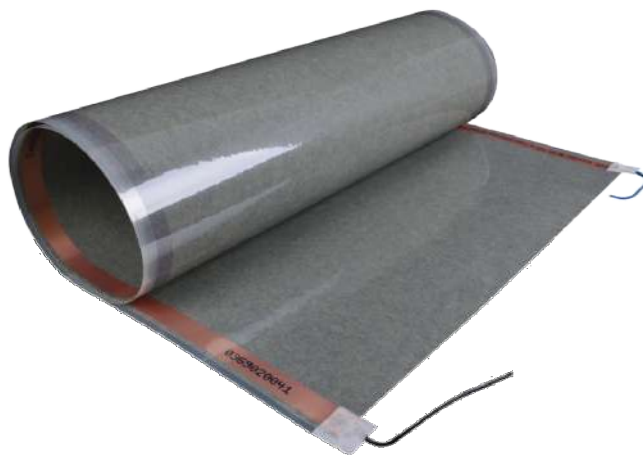
# Products



FLEECE for ceilings, walls and floors— installed behind wet plaster or self levelling compound. Available in 60w, 110w and 220w per m2



DRYTEC for ceilings— installed between ceiling joists. Available in 112.5w per m2



PET for floors— installed underneath floating surfaces such as laminates. Available in 115w



The Energy Carbon, self learning, zone control thermostat. Wifi enabled and app controlled from phones or tablets

# Benefits at a glance



97% efficient



High heat output and fast heat up



Zone controllable



Easy installation with dry lining or plaster



Cut holes up to 70mm for lighting etc.



Planet protecting low 'Whole Life Carbon'



Safe low voltage



Patented manufacturing process



Smart device compatible



Low energy - out performs all others



Moisture protection



Healthy heat



Perforated for better adhesion



## E-ENERGY CARBON

- » Our product is ultra light and ultra thin at just 0.4mm, becoming part of the fabric of the building.
- » Amalgamated nano carbon fibres that are as used as conductors to convert electricity into heat at 97% efficiency. Thousands of them in an extremely small space.
- » Safe, easy to use and maintenance free.
- » A real, viable alternative to heat pumps and wet systems – providing a direct electrical heating solution that fulfills the requirements of the Future Homes Standard.
- » As the heat comes safely from the ceiling, walls and floors there is no need to have chunky, hot radiators
- » Infrared heat is proven to reduce damp and, as there is very little convection, reducing dust as well.

## E-ENERGY CARBON

- » The system provides very fast warm up times and directional heat up to 3.5m, warming items such as furniture, worktops and the floors gently and safely to become heat synchs which in turn act in place of radiators that warm the air in the home.
- » Unlike all other foils, E-ENERGY CARBON FLEECE does **not** consist of individual layers, but is homogeneously melted in a patented manufacturing process. This eliminates the possibility of long-term defects caused by the detachment of individual layers.
- » 6 years and 100,000 metres sold with no reported failures - our product is designed to last

## Transformers

- The main transformers chosen for the product is the 3.2kw PRO TT allowing centralised supply with up to 10 zones per unit



### **E-ENERGY CARBON Power supply PRO TT**

Power supply PRO TT 2.400 W: 550 x 300 x 140 mm (LxBxH), Art.-Nr. 2 03 591

Power supply PRO TT 3.200 W: 550 x 300 x 140 mm (LxBxH), Art.-Nr. 2 03 592



Ready in case



Room thermostat WiFi connectable

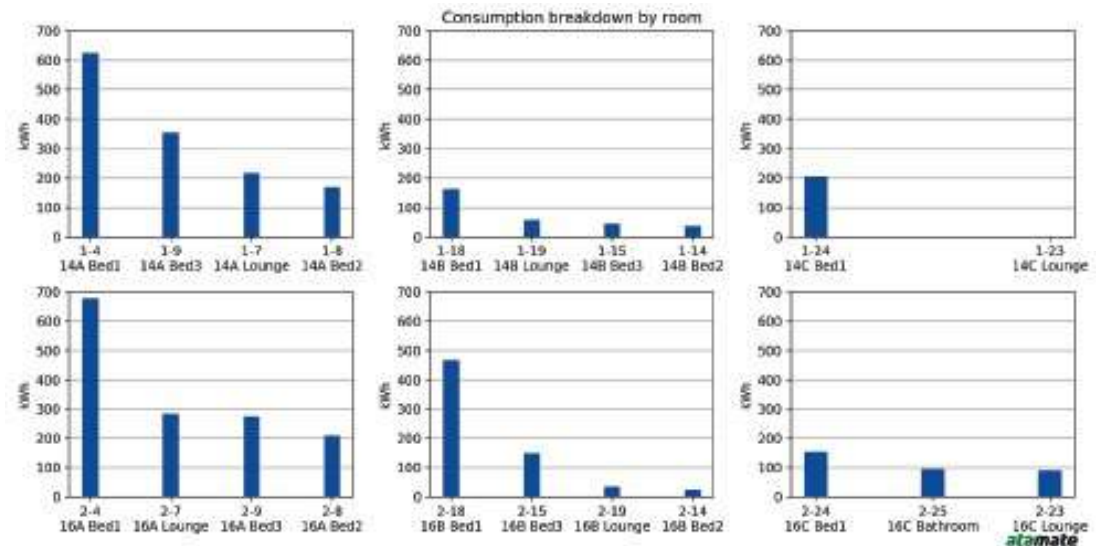


Intuitive connection electronics



## Recommended control system

- The Energy Carbon heating system is extremely responsive and compatible with most smart systems available today. As smart technology improves in this area our system is 'plug and play' and will adapt making it effectively future proof.
- Today's smart controllers range from simply being able to monitor and adjust the heating remotely right through to measuring CO<sub>2</sub> levels in a room to ascertain the occupancy of motionless occupants and adjust ventilation and heating control accordingly and report on potential concerns before they exist.
- As well as our own simple AI, self learning system we recommend the Genius system easy control and to maximise energy efficiency

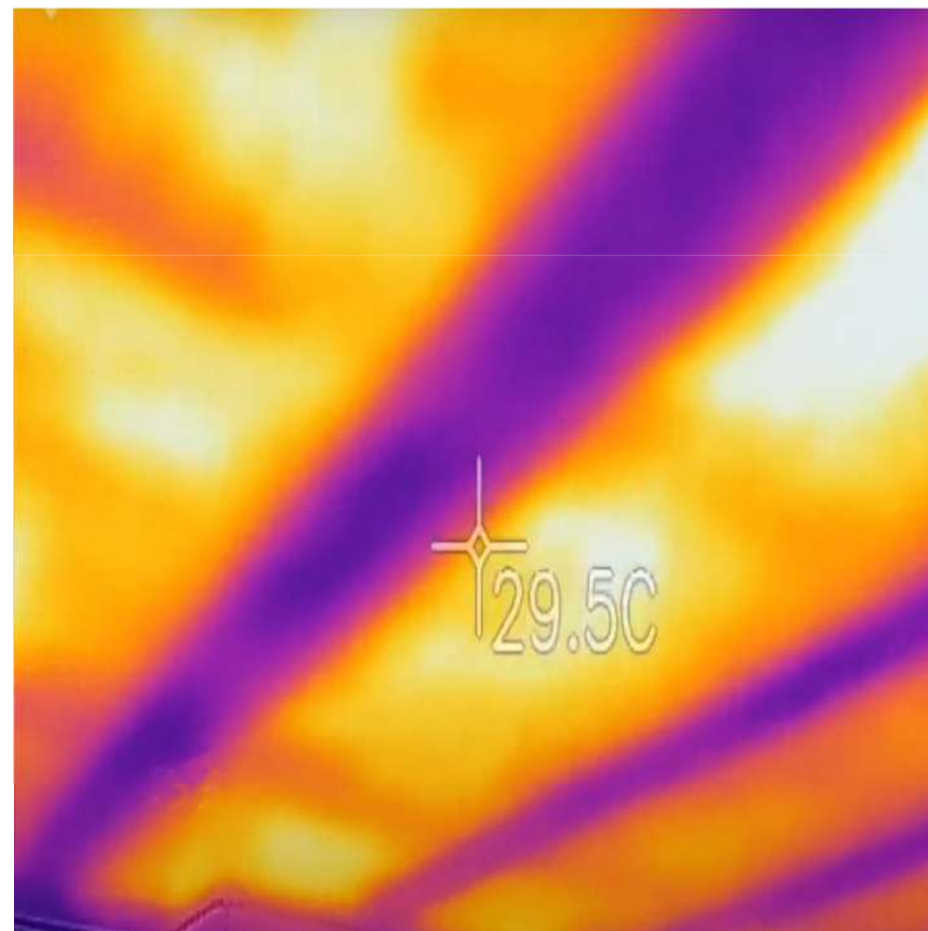


## What is Radiant heat?

Typically our buildings have been heated with radiators which transfer heat into a room primarily by convection. This draws cold air from the floor, pulls it across the heat source where it warms and then rises to the ceiling, cools and returns to the floor to begin the cycle again. To feel the benefit, this circuit needs to repeat until the air mass is warmed which can be a slow and expensive process, dragging dust and dirt along with it. Open the door and the warm air escapes to start the process over again.

Our system uses infrared radiant heat instead. A far more natural source of warmth and one that bypasses the air and warms objects and people in a room. This provides a fast heat response and we feel far more comfortable more quickly. The objects in turn warm and release their own form of heat similar to the sun warming the sand on a beach.

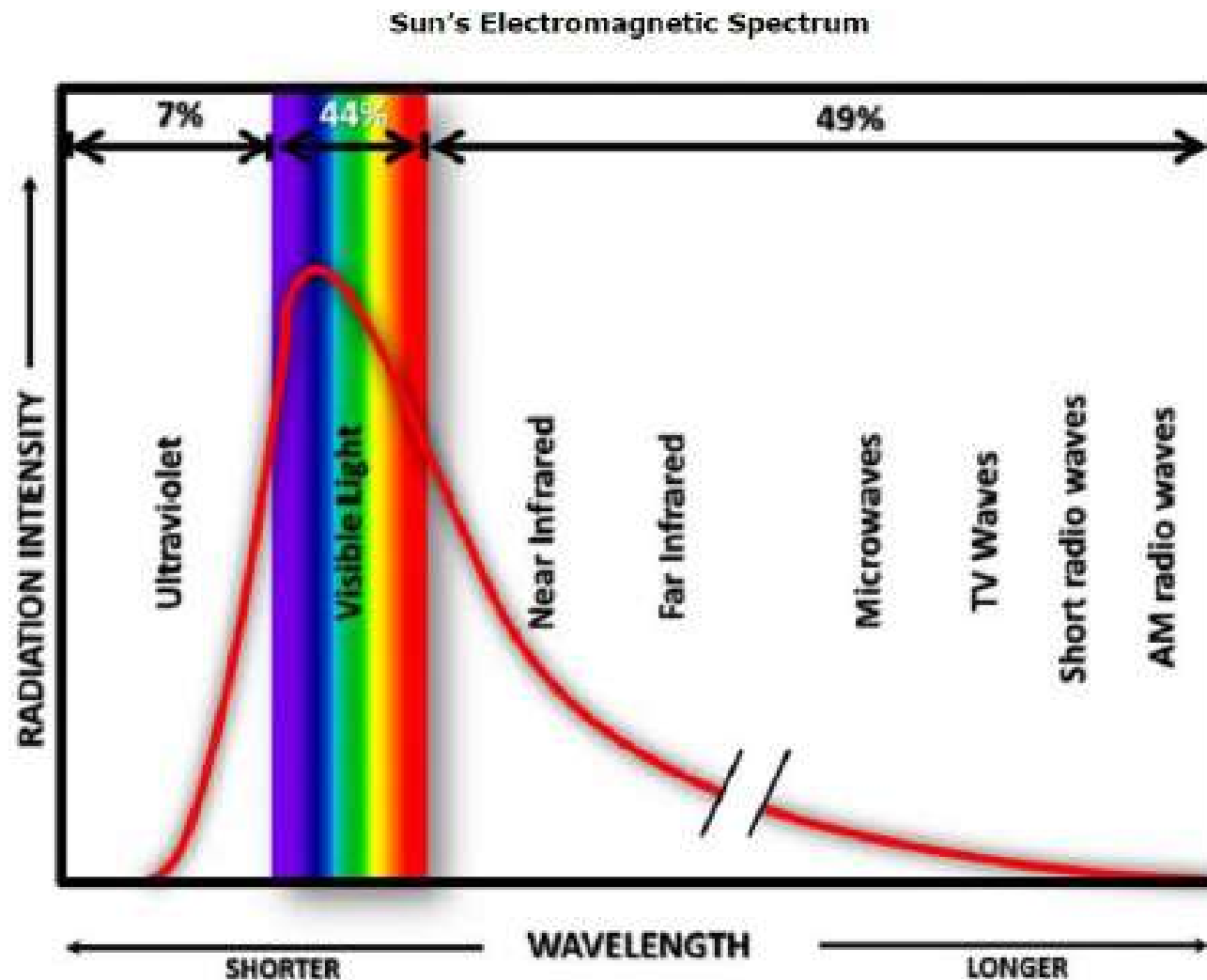
As our system is electric it also reacts very quickly. No other form of heating reacts so fast.



Thermal image taken of E:nergy Carbon fleece installed into the ceiling

- » Infrared radiant heat warms objects gently and not the air mass resulting in quicker comfort levels, more controllability, lower running costs and no need for hot radiators

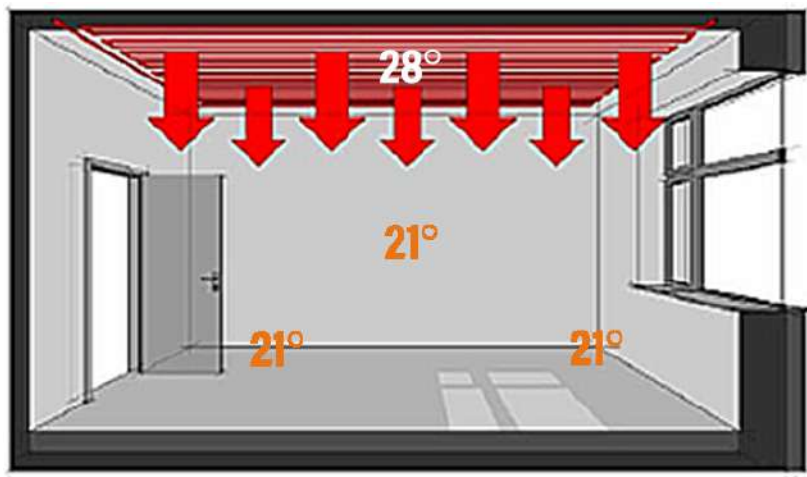
## Infrared radiant heat— part of the sunlight



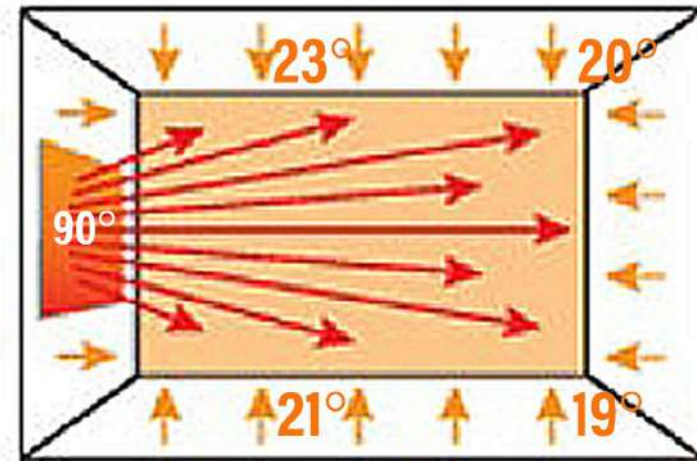


## Energy Carbon Fleece vs Panel heating systems

Low temperature – large surface area



High temperature – small surface area



- » Both heating systems work with a high proportion of radiant heat
- » The aim of both is to evenly heat the rooms ambient areas
- » 1° of heat variance is equivalent to 6% energy saving
- » Comfort = uniform heat distribution

## Installation in a new facility or retrofitted into a refurbishment

Simple to spec. and using existing onsite trades, the Energy Carbon system arrives on site made up in kit form and to an individual building design.

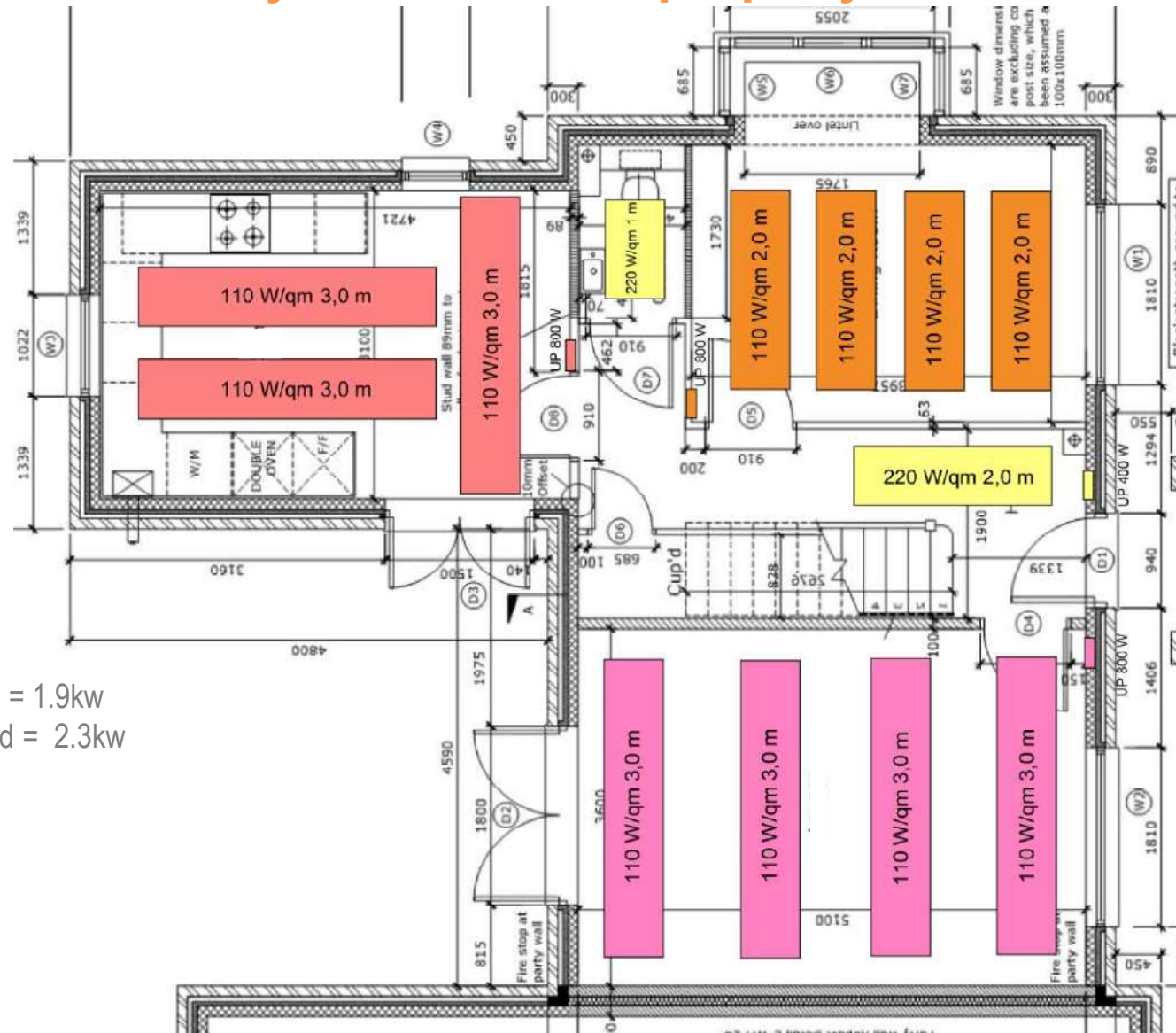
Each room is split into zones with it's own control system that can be linked to a hub. As we are using only 36v our transformers can either be located centrally or flush mounted into each room space where convenient.

Our installation plans are easy to understand as is our instruction and testing manual. Simply fit the fleece into the ceiling, connect to the transformer and controller, perform minimal tests and that's it.

As the system does not rely on pipework, radiators or ducting, a installation can be carried out on a room by room basis with minimal disruption to occupants as part of a rolling refurbishment plan.

The following pages show an example layout plan for installation demonstrating the level of coverage achieved.

## Typical installation layout in a 100m2 property

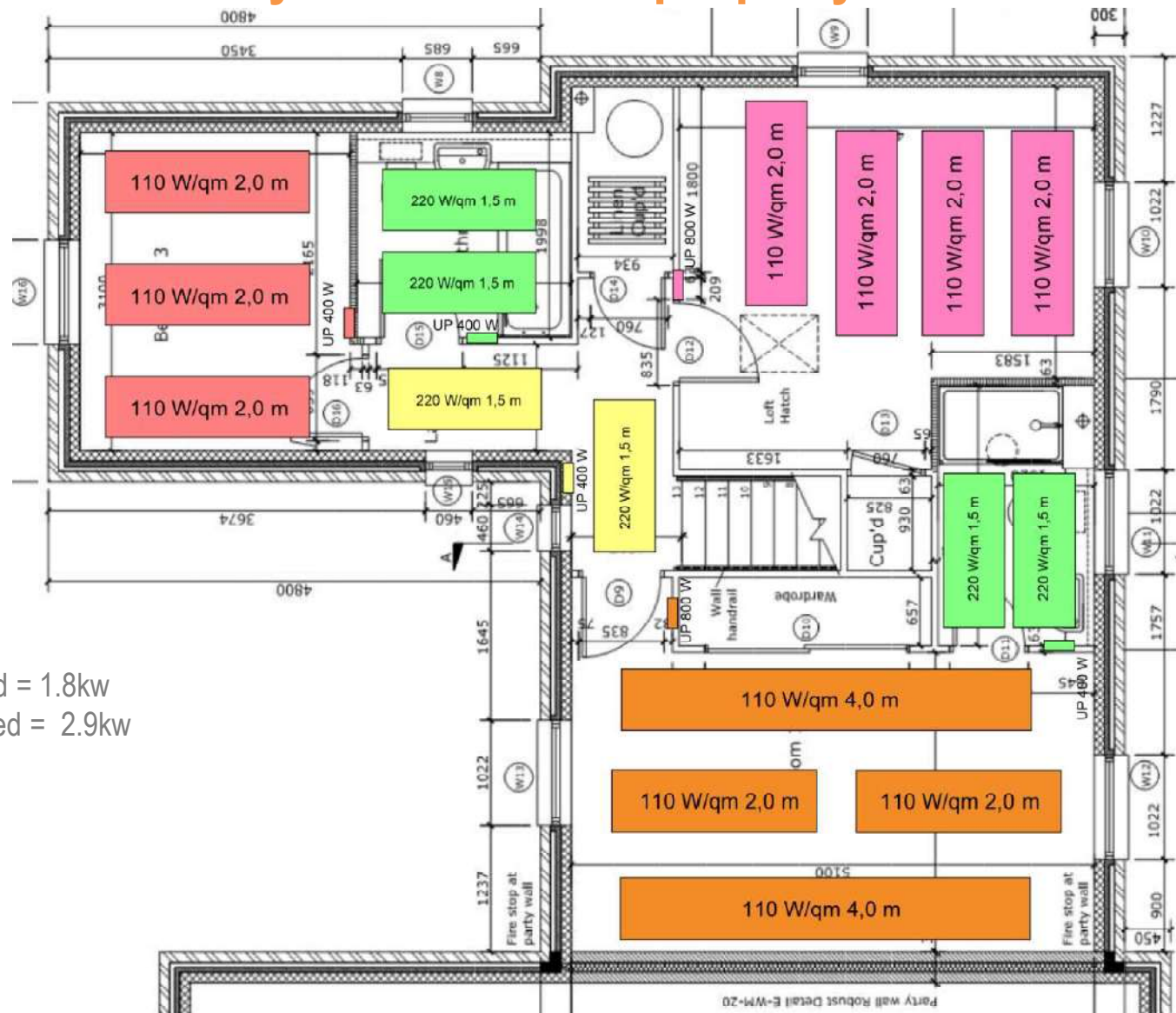


Total wattage required = 1.9kw  
Total wattage produced = 2.3kw

## Ground Floor



## Typical installation layout in a 100m<sup>2</sup> property



Total wattage required = 1.8kw  
Total wattage produced = 2.9kw

Energy Carbon Ltd.  
Kemp House,  
152 - 160 City Road,  
London EC1V 2NX



Tel +44 203 507 1659  
[hello@energycarbon.co.uk](mailto:hello@energycarbon.co.uk)  
[www.energycarbon.co.uk](http://www.energycarbon.co.uk)