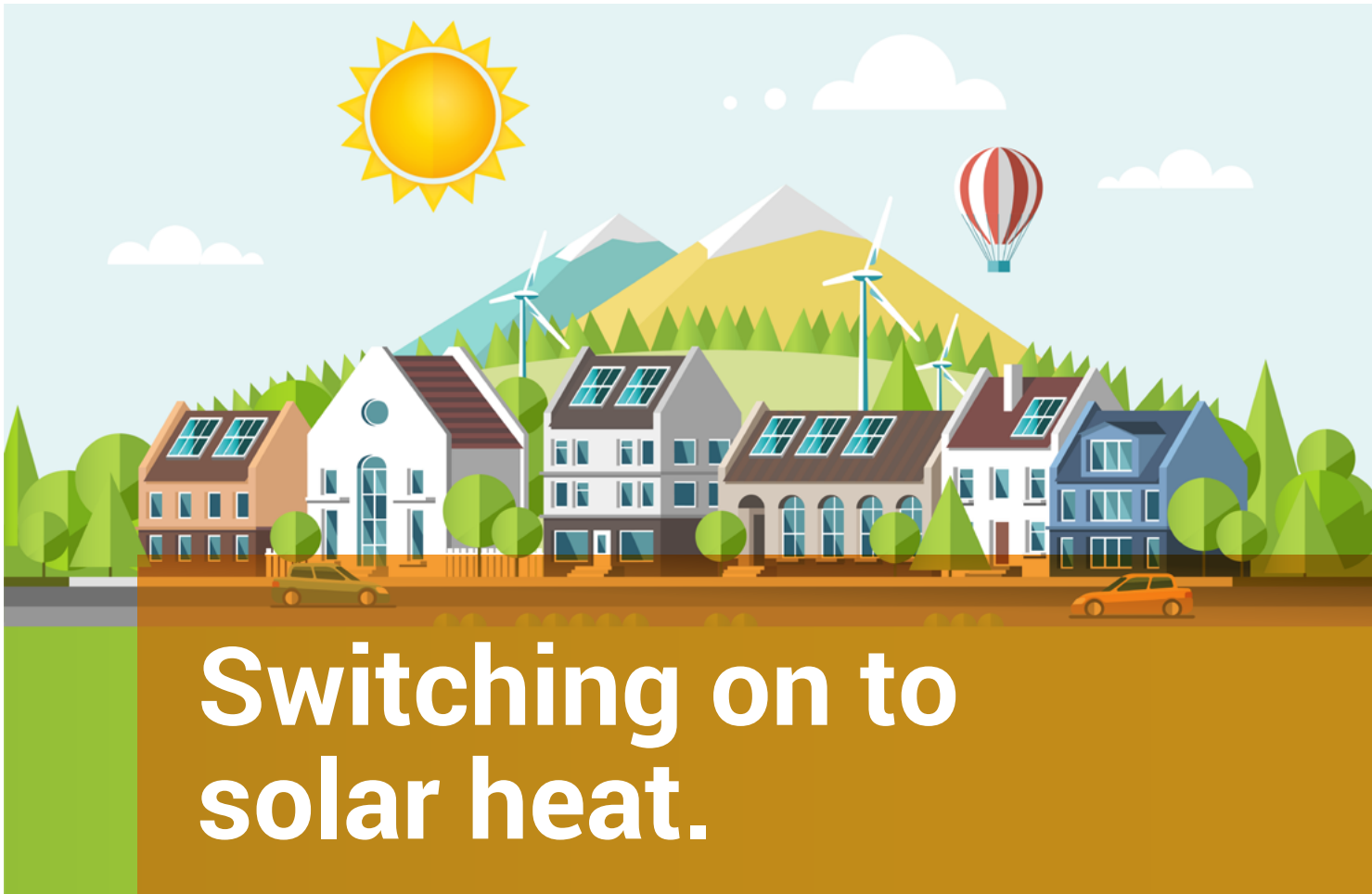


Designing for Energy.

How do we build a fossil fuel free future?



Switching on to solar heat.

Around 90% of UK homes use fossil fuels for heating and hot water.

Heating is the UK's biggest source of carbon emissions. Decarbonising heat is key to achieving Net Zero.

It is essential that we prevent expansion of fossil fuel heating and find renewable and sustainable solutions to powering our homes. As the UK commits to Net Zero CO2 emissions by 2050 we must work toward building carbon free communities by shifting demand to high efficiency and integrated energy solutions with net zero emissions.

Decarbonisation through electrification of heat.

The Future Homes Standard is expected to phase out fossil fuel heating installations from new-build homes by 2025, with heat pumps being cited as a good way to heat a home effectively and efficiently using electricity.

On-site generation: a step away from grid-dependence.

CO2 emissions have been slashed from grid electricity as we increase renewable generation, but the carbon content still remains high, and relying on power from the grid for the energy-intensive process of heating our homes would be very expensive.

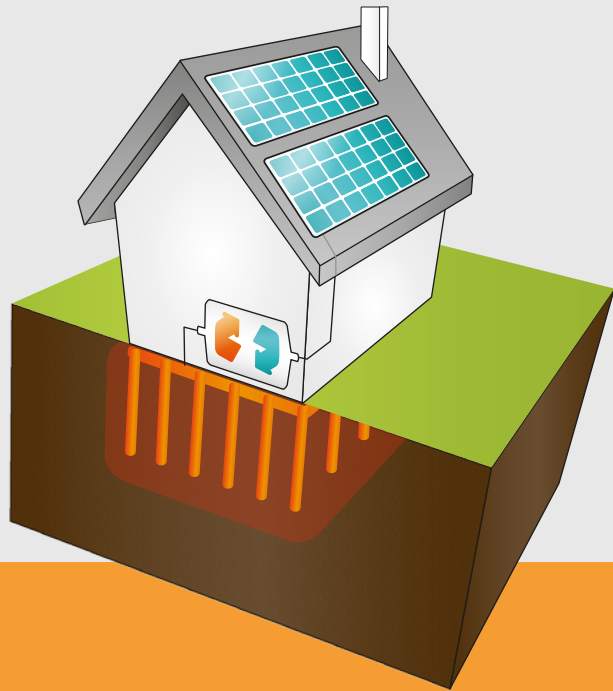
As we make this shift from fossil fuels to the electrification of both heating and transport, we will inevitably add substantial load to the UK electrical grid. The limitations of the UK's present electricity-network capacity and the costs and time associated with upgrades to infrastructure and storage could prove to be a serious obstacle.

There has been a lot of focus on solar PV, but this technology converts only visible light into electricity. Most of the sun's energy reaches the earth as heat or infra-red radiation. Hybrid PV-T panels capture both forms of energy.

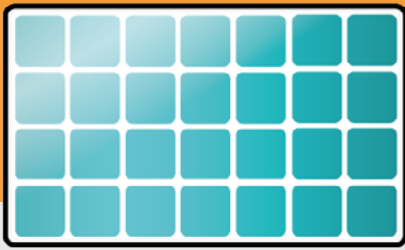
Seasonal imbalance remains a challenge for solar generation. A viable system requires energy storage.

Thermal storage – A breakthrough in energy efficient housing.

Domestic thermal storage could be key to the long-term solution for the industry. CAPLIN SOLAR'S Earth Energy Bank is an inter-seasonal thermal storage technology that can meet a home's full annual hot water and heating requirements using just solar energy. The system stores heat in warmer months so that it can be used during colder times of the year.



The system consists of three core components:



SOLAR GENERATION

Advanced solar energy capture, collecting both electrical and thermal energy, using hybrid PVT arrays.



THERMAL STORAGE

Caplin Solar's patented EARTH ENERGY BANK provides inter-seasonal energy storage within the footprint of the building.



HEAT RECOVERY

Energy recovery using a conventional ground source HEAT PUMP, within a system that enhances its efficiency.

Integrated solar technology for new homes.

Hybrid photovoltaic-thermal (PVT) panels collect thermal energy and generate electricity. The heated fluid from the panels is pumped through the Earth Energy Bank, a matrix of shallow bores that sit within the footprint of the house. In winter the stored heat is extracted using a Ground Source Heat Pump. A sophisticated controller manages the flow of energy within the integrated system determining the best energy source to meet demand.

A system centred on enhancing efficiency.

Ground Source Heat Pumps are one of the most efficient ways to decarbonise heat. When combined with thermal storage the valuable opportunities for GSHP deployment are massively increased.

The Earth Energy Bank is simple, quick to install, and inexpensive. It requires no additional land to be excavated, no costly equipment to be used. It is contained within the building's foundations, making it ideal for use in multi-occupancy developments and housing estates.

The combination of technologies within this system significantly boosts the standard operating performance

of both the PVT panels and Ground Source Heat Pump. The higher source temperature enhances the performance of the GSHP and advanced cooling of the panels results in higher electrical output and less heat loss through thermal radiation.

This multi-award winning system is scalable and economical. First installed in 2013 in a highly successful demonstrator, the Solar House, it is the product of 9 years of Research & Development and has been independently studied by world leading energy research institute, IESD.

Earth Energy Banks are now powering houses nationwide and are currently being installed in a 47 home energy positive commuter village in Northants.

In association with

Caplin Homes
caplinhomes.co.uk

Carbon Free Group
carbonfreegroup.com

DualSun
dualsun.com



“Maximise on-site or nearby renewable energy production and self-consumption...”

to completely cover or exceed the total energy demand of each building with the minimum exchange of energy with the grid.”

- Roadmap to 2050



CAPLINSOLAR
thermal energy storage