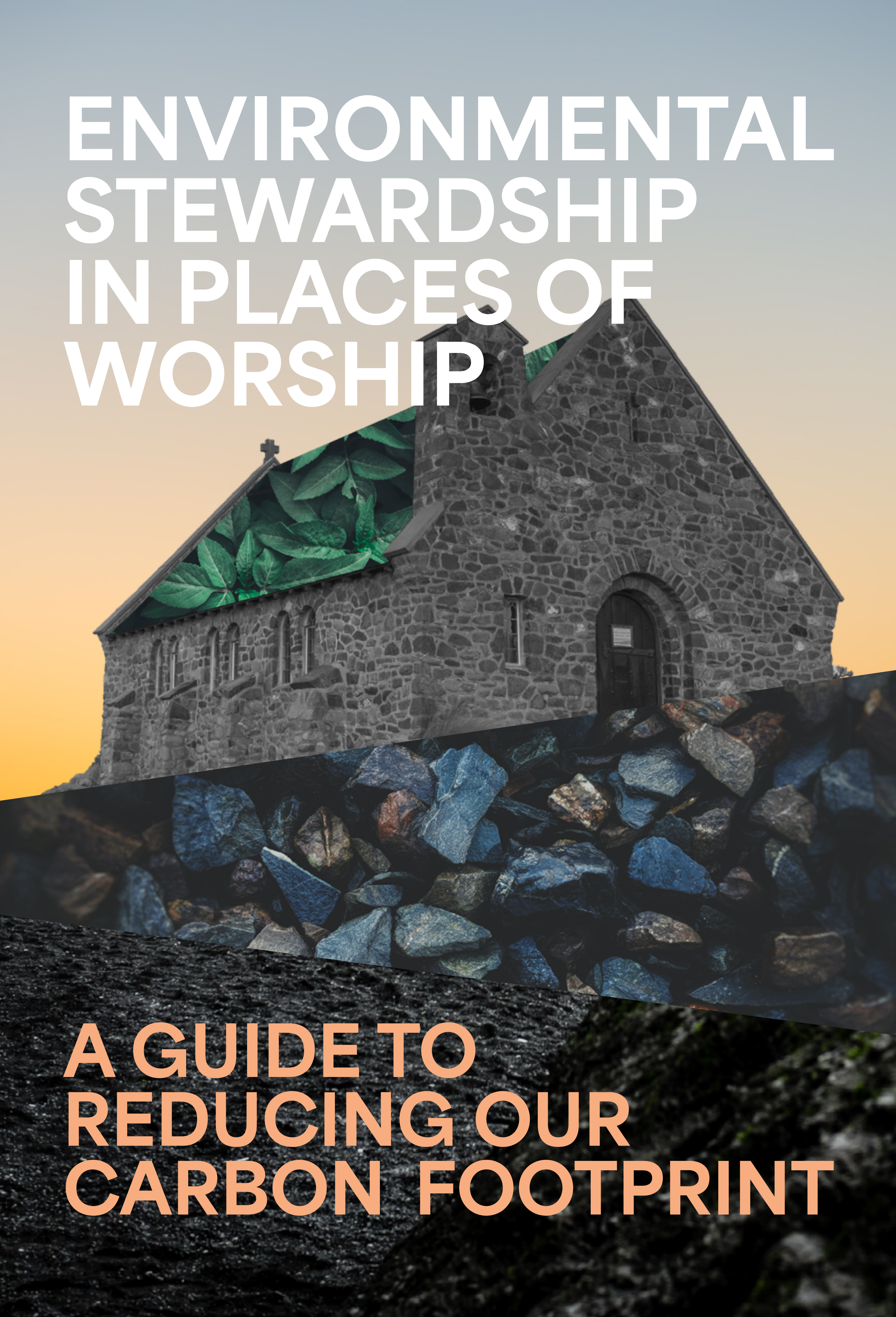
ENVIRONMENTAL STEWARDSHIP IN PLACES OF WORSHIP



A GUIDE TO REDUCING OUR CARBON FOOTPRINT

CREDITS

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INTRODUCTION

We all know that the climate is changing; we've read it in the news, seen worrying predictions of the future and heard stories of people already struggling all around the world. It is sometimes hard to see a way to move forward against such a massive problem, and particularly to see the changes that our community and place of worship might need to make to do our bit.

This Guide exists to help you do that, to learn more about climate change and what you can do in response. Places of worship are at the foundations of communities across the country. Their changes can send out ripples, bringing others into your building to see what you have done, and starting to take action themselves.

We've talked to **churches, mosques, synagogues and more** to learn from their experiences and to help you to better understand how they managed it, the challenges they had to overcome, and the choices they made. The actions covered in this guide are intended to be applicable across all UK places of worship, but faith specific guides can also be used to go further (see **Further Resources**). Please use this guide as much as it is helpful for you, share it with others and make connections with other faith communities that are already making changes.

The guide includes a straightforward overview of climate change and what responding to it means for places of worship. It provides 'decision trees' to help guide you through the initial stages of taking action to reduce the impact of your place of worship on the environment. Case studies offer examples of how similar actions have already been applied in places of worship. Links to further resources and a glossary of key terms are offered to support the next stages of the journey.

CLIMATE CHANGE AND PLACES OF WORSHIP

What is Climate Change? The Earth is getting warmer. The average global temperature today is around 1.2˚C above the temperature average in the 19th Century. Much of this increase has been in the last two decades. This means that the Earth is holding on to significantly more of the Sun's energy than in the recent past. The rate of change we are seeing is unprecedented in Earth's climate history.

This effects the temperatures we experience, the rainfall we get, how powerful and frequent storms are, sea levels, and incidences of wildfire. These effects are not felt evenly around the world. For example the Arctic is warming four times faster than the global average, while Europe is warming at twice the average.

"Places of worship can support the resilience of communities and nature in coping with climate change."

However it is in the **global south** where the impact of this change is now being most acutely felt - with extreme weather events, changes to rainfall, loss of glaciers and wildfires profoundly effecting communities that are already economically marginalised. The unprecedented rate of change this warming is having on the environment is also putting huge pressure on species we share the planet with. The effects of this global warming is a major contributor to **biodiversity** loss and ecosystem collapse.

Extensive research since the 1980s shows that without doubt the rapid increase in **greenhouse gases** over the last century in our atmosphere is the primary cause of climate change. Greenhouse gases in our atmosphere insulate the Earth and regulate how much of the Sun's energy goes back out into space. These gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and various fluorocarbons (HFCs and HCFCs).

The dramatic increase in greenhouse gases put into the atmosphere since the 1800s is almost entirely due to human activity. CO_2 from **fossil fuels** (natural gas, coal and oil) use in electricity power stations, boilers and vehicles is the greatest contributing factor to this. Food production releases CH_4 and N_2O and can negatively affect forests, wetlands and other places that help take CO_2 out of the atmosphere.

Most **greenhouse gases** are long lasting in the atmosphere. Their growing build-up is the main reason the Earth is warming rapidly beyond natural variations. Further climate change will only stop when we stop adding more **greenhouse gases** to the atmosphere. There is great urgency to do this as soon as possible as we are already close to damaging levels of global temperature rise.

This is important for places of worship in two ways: Firstly, climate change is happening now, and this will be increasingly disruptive and dangerous. Places of worship can support the resilience of communities and nature in coping with this. Secondly, much disruption and damage can be avoided if **greenhouse gas** emissions fall quickly. Places of worship can overcome their reliance on fossil fuels and support local communities to **'decarbonise'** - live without causing **carbon** (CO_2 and CH_4) and other **greenhouse gases** to be released. This guide focuses on the latter action.

Sources: IPCC Sixth Assessment Report; 'The Arctic has warmed nearly four times faster than the globe since 1979', *Nature* Journal 2022

DECISION TREES

In this part of the guide, different **actions for reducing the carbon footprint of a place of worship** are presented. The actions are divided into four themes:

REDUCING HEATING USE

P.8-9

CHANGING HEATING SUPPLY

P.10-13

GENERATING ELECTRICITY ONSITE

P.14-15

TRAVEL TO WORSHIP

P.16

These themes and the actions covered were chosen based on a survey of worshipers about how they would most like to see their buildings change in response to climate change.

Each theme has a decision tree. Working down from the top the 'tree' starts with potentially quicker and easier gains, progressing to more complicated actions. Answer the questions within the black boxes to find an action you could consider taking. The order of the actions is only a recommendation and you can skip or change the order of actions as appropriate to your situation. Words underlined are explained in in the Glossary part of the guide.

START

Do you know how best to use your current heating system?
- NO → 1
- YES → Are there draughts in the building?

Are there draughts in the building?
- NO → Is there an internal door/entrance lobby?
- YES → Is the building watertight?

Is the building watertight?
- NO → 2
- YES → 3

Is there an internal door/entrance lobby?
- NO → 3
- YES → Are the windows single glazed?

Are the windows single glazed?
- YES → 4
- NO → Is the ceiling insulated?

Is the ceiling insulated?
- NO → 5
- YES → Are the walls well insulated?

Are the walls well insulated?
- NO → 6

1

Heating control systems are often not user friendly, and things such as flow temperature and pressure of a boiler can be changed to maximise how efficient the heating is. Sometimes room layout can disrupt the circulation of heat around the building. Contact a local heating engineer to get help 'optimising' your current heating system. The next boiler service could be a good opportunity for this. Even if you plan to replace it soon, it can save money and carbon emissions to do this.

2

If the building has **water leaks** (eg. through the roof) or penetrating damping on the walls, this needs to be addressed at the same time as air tightness measures such as insulation. Buildings with water ingress are harder to heat, and this can complicate insulation or changing heating systems.

3

Draughts and air flow: Air leaking out of a building takes heat with it (when it's colder outside), which wastes money and carbon.

Fairly simple modifications to doors, window frames, ceilings and walls can reduce energy demand. This is typically filling gaps around frames, patching gaps in walls, using draught excluder tape around doors, loft hatches etc, and draught excluders for doors. Be careful not to block intended air flows (like air bricks) that might be required for ventilation or other reasons.

Open doors are welcoming to arrivals at Places of Worship, but they also transfer heat out of the building. Enclosed lobbies with internal doors closed after use will help with this. Where creating such an entrance is not possible, having someone stationed at the front door to welcome and keep the door closed between arrivals would also help.

This is also a good time to consider the flooring of your building. Heat is also lost through the floor, and this is often more easily addressed than other heat 'sinks'. Bare solid stone, tile or suspended wooden floor boards with gaps between boards will draw heat out from a building. Replacing standard tiles with insulated flooring; maintenance of floor boards; replacing carpet underlay with a thicker or better insulated version; and using rugs with good insulating properties, will all reduce heat loss. For older buildings with stone walls, take care and seek advice on whether new flooring can go right up to the wall without damp proofing.

4

Windows (including glazed doors) can be an important area for heat loss from a building. Heat transfers quite easily through a single pane of glass. The glass itself is cooled by contact with the outside air, and on cold days can create localised cold patches and draughts.

Double glazing and secondary glazing improves the barrier between outside and inside. Double glazing can halve the thermal transfer from inside to outside (U-values of **5** compared to around **2.5**).

Secondary glazing is an option if an existing single pane window must be retained (e.g. a stained glass window). This is less effective than double/triple glazing at stopping heat loss, but will still reduce heating needs and can be less expensive. Both approaches will also reduce outside noise. Where installing double or secondary glazing is not possible, fabrics and enclosures (e.g. curtains or shutters) over windows will also reduce heat loss.

REDUCING HEATING USE

5

Insulate roof/ceiling or install false ceiling: Heat rises, and roofs are often a leading cause of heat loss in buildings.

In buildings with double height (or higher) ceilings, warm air will more readily accumulate higher in the building. Insulating board and loft insulation materials will increase the roof or ceiling's resistance to heat loss. This means warm air accumulates more readily where it is needed. Roofs must be watertight before being insulated.

In buildings with very high ceilings, installing a new false ceiling to lower the height will reduce the volume of space to be heated, and accumulate warm air more usefully. Even suspending fabrics like banners across the building, from or below the ceiling while not obstructing people, will cause more warm air to circulate lower in the building. Changing ceiling height or material may affect the acoustics of a building, and depending on building use, this might be an important consideration.

6

Insulating walls: How good walls are at preventing heat loss from a building largely depends on the material(s) and configuration of the wall. Buildings with internal cavities are usually easier to heat than solid walls (especially if heating is not used constantly) and cavities filled with an insulating material are even better.

The first step in this process is to understand what the materials of your walls are. This will let you know how much of an improvement you might expect, and what options you have. Some solid wall materials such as sandstone may also introduce moisture control issues to consider.

CHANGING HEATING SUPPLY

START

Is your building reasonably energy efficient?

YES → **Does the area of main use have high vaulted ceilings?**

- YES → 1
- NO → **Is the building used regularly (4+ days per week)?**
  - NO → 1
  - YES → **Does the building have substantial spare indoor space?**

NO → **Are you able to make changes in 'Reducing Heat Use'?**

- NO → 1
- YES → Start with Energy Efficiency

1

Localised/Zonal Heating Options: In buildings with very high ceilings and/or poor insulation, it is challenging to provide warmth to people in the building through circulating warm air–as traditional boiler and radiator systems do. Where a building is not in regular use, it might not be cost effective to install new heating that warms the whole building. In these circumstances, localised heating can be more effective to keep people warm.

Radiative heating uses infrared to warm people from electric panels that can be installed in almost any building type, instead of warming the air directly. Electric heaters can also be installed under seats/benches/pews so people can be warm where they spend most time instead of heating the whole building. These solutions have lower up-front costs than other low carbon options such as heat pumps, and are particularly cost effective when the building is not heated through most of the week. The main drawback is that the building as a whole is not heated. If there are reasons for maintaining a minimum temperature at all times this cannot be the only source of heating, but could be secondary heating to boost warmth when needed.

High ceilings and low insulation does not always rule out technologies such as heat pumps however. Newcastle Cathedral has recently installed air source heat pumps and underfloor heating in the nave, despite high ceilings. Underfloor heating, and focusing heating on one area are significant features here - it shows heat pumps with careful consideration can be installed in most settings.

Start with Energy Efficiency. Up to a point, it is good to limit how much heat your building loses to the outside before changing how you heat your building.

Simple energy saving steps such as draught proofing, warmer flooring and low energy lighting can be quick and cost saving in a short time. It also means a smaller and less expensive heating system might be needed when you come to change and that new system will work more effectively at lower running costs.

Buildings don't always need to be super energy efficient before new low carbon heating is installed, but taking steps 1-4 on **Reducing Heating Use** should be considered before looking at new heating options.

Does the building have substantial spare indoor space?

- YES → 2
- NO → **Is maintenance needed on flooring, or can flooring be adapted?**
  - YES → 4
  - NO → 3

2

Consider a Biomass Boiler – see p.12

3

Consider a Heat Pump – see p.13

4

Consider a Heat Pump with Underfloor Heating - see p.12

START

Does the building have a hot water cylinder, or space for one if not?

- YES → 5
- NO → **IF building use does not entail lots of hot water** → 6

5

Consider Solar Thermal - If you have a hot water tank (usually a metal cylinder surrounded by insulating materials) or space to have one installed (including in the loft area) you can accumulate hot water for 'on-demand' use. This works well for heat pump systems that otherwise cannot provide instant hot water by themselves, by accumulating heat over time.

This also works for solar thermal panels. Panels containing special tubes placed on a sunny roof work to provide hot water to a building. They can be used to supplement the hot water needs of a building that uses a reasonable amount of hot water. They can reduce energy bills for hot water over time.

6

Consider In-line Hot Water Taps with Heat Pump: If you use a lot of hot water in the building, then a hot water cylinder might be essential to fully replace your existing heating system with a heat pump. However, if you use hot water infrequently in the building - such as with the bathroom sink and occasionally washing dishes - an in-line hot water tap could be a solution.

These are small electric heating systems installed near the water tap to heat water on demand. This can mean not having space for a hot water cylinder isn't necessarily a barrier to replacing your current gas or oil based system. When heating large volumes of water the difference in operating cost may be a factor so greater consideration should be given in this instance.

2. BIOMASS BOILERS

Biomass boilers use wood/other biomass pellets or logs in place of oil or gas. It is considered 'carbon neutral' as the Carbon dioxide (CO_2) released when it is burned is 'biogenic' as opposed to 'fossil' carbon. This means the source of carbon in the biomass has been taken from the atmosphere by plants/trees growing in recent decades and not from the prehistoric atmosphere. It is still important to consider the source of the biomass - sustainably grown biomass produced as locally as possible is best. The moisture content of biomass should also be known (see 'Ready to Burn' criteria) to avoid harmful build-up in the boiler and reduce local air impacts. Specific biomass boilers using correct fuel can be used in smoke control areas - the installer should make this clear. See www.mcscertified.com for suppliers. An important consideration for a biomass boiler system is that it takes up more space than other heating systems inside the building (or needs a suitable annex outside). If space is limited inside the building and using/building an outbuilding then other options will be more suitable. Fuelling, maintaining and cleaning (ash) biomass boilers can be more involved than for other sources of heating.

4. HEAT PUMPS WITH UNDERFLOOR HEATING

With standard radiators heat output is concentrated in particular parts of the building - often against walls, and in large rooms not very near to seating. Installing heating elements under the floor instead allows for an even and efficient circulation of warm air in a building. It can improve any heating system, but is particularly effective with heat pumps. Note that electric underfloor heating (i.e. not a 'wet' system) can be installed fairly cheaply, but may be expensive to use. To be installed the existing flooring needs to be taken up (and in some cases replaced with new flooring). This can be disruptive and not all building floors are suitable. However if renewing, repairing or re-levelling for access is planned for anyway then this can be an opportunity to consider underfloor heating. Underfloor heating was installed in part of Newcastle Cathedral as part of a wider refurbishment project, for example, through access to grant funding.

CHANGING HEATING SUPPLY

3. HEAT PUMPS

Air source and ground source heat pumps are an alternative to gas and oil based heating for keeping buildings warm with much lower greenhouse gas emissions. When installed and used appropriately they are also more affordable to run.

Heat pumps use electricity to take low level heat from outside of a building and upgrade it to a useful temperature for use inside the building. The key difference between these heat pumps is where they draw energy from - the air or ground. The efficiencies and costs vary between the two types, but one of the biggest considerations is installation, with ground source requiring digging or boring. Depending on the system and conditions they offer two to four times more heat out for every unit of electricity used than a standard electric radiator.

While they can come in air-to-air varieties (heat provided through an air blower), heat pumps usually heat water to circulate around the building in pipes like a gas boiler. They do need a larger surface area to provide heat than oil/gas boiler systems. If you don't have opportunity to install underfloor heating (see Action 4, p.12) slightly larger radiators will do the job. The 'flow temperature' (warmth of the water in the pipes) is lower for a heat pump than for a traditional system. To help heat accumulate better, the building should hold onto heat as well as possible - so this is best suited when draughts and water tightness are addressed, and windows, roof and walls are as well insulated as you can make them. Heat pumps cannot provide instant hot water by themselves - they need a hot water storage tank they can heat or supplementary heating for this (see Action 6, p.11).

Heat pumps are happier with gradual changes and will work more efficiently and cost effectively when operated to their strengths, and not when rapidly heating cold buildings in a short time period routinely. They are more suitable for maintaining a steady temperature in a frequently used building than to quickly heat a space for a few hours of use (Action 1 is an alternative in this case). In most instances an air source heat pump (ASHP) is more suitable than ground source when upfront costs and distribution are considered but an initial conversation with an approved installed (e.g. see www.mcscertified.com) should make this clear.

START

Does the building have an unobstructed roof, not heavily shaded?

NO

IF there are funds to invest

YES

Is the building used regularly (4+ days per week)?

1

Join a Community Renewable Energy Project: Without suitable space to install renewable energy generation on the building itself, you could participate in a local renewable energy scheme.

This could be in the form of investing funds to buy solar PV that is installed on another building and sharing future revenue, and/or being a customer for a local renewable energy scheme through a long term contract to buy its electricity (often at a fixed price).

Community energy can help keep more wealth within the local area and improve resilience to supply disruption (if using battery storage or a microgrid) and energy price fluctuations. It can be a challenge to set up these schemes but there is support and guidance through Community Energy England and Ynni Cymunedol Cymru.

YES

2

Install Rooftop Solar PV: Solar photovoltaic (PV) panels use light from the sun to generate electricity through the 'photovoltaic effect'.

These panels supply your building with electricity and any surplus can be exported to the National Grid. This provides you with low carbon electricity, reduces how much electricity you have to buy from your electricity supplier and gives you revenue from the National Grid.

At the moment the best financial performance of a PV system is when you use it to replace electricity from your energy supplier. If your building is used regularly and the PV is the right size for how much electricity you use, the system will pay for itself over time and make energy bills more predicable.

Make sure you have an energy supplier who offers you the best rate available on the electricity tariff rate to make the most of your panels. You can couple it with a battery storage system to increase savings further if you have space for a battery and funds to do so. If you have a listed building or are in a conservation area there are further considerations, but solar PV can still be installed. You will need Listed Building Consent and you should speak to your Local Authority planning team if in a conservation area to get the requirements for development.

An approved PV installer (for example see www.mcscertified.com) can help navigate this.

NO

Does the building have three-phase electricity connection?

NO

3

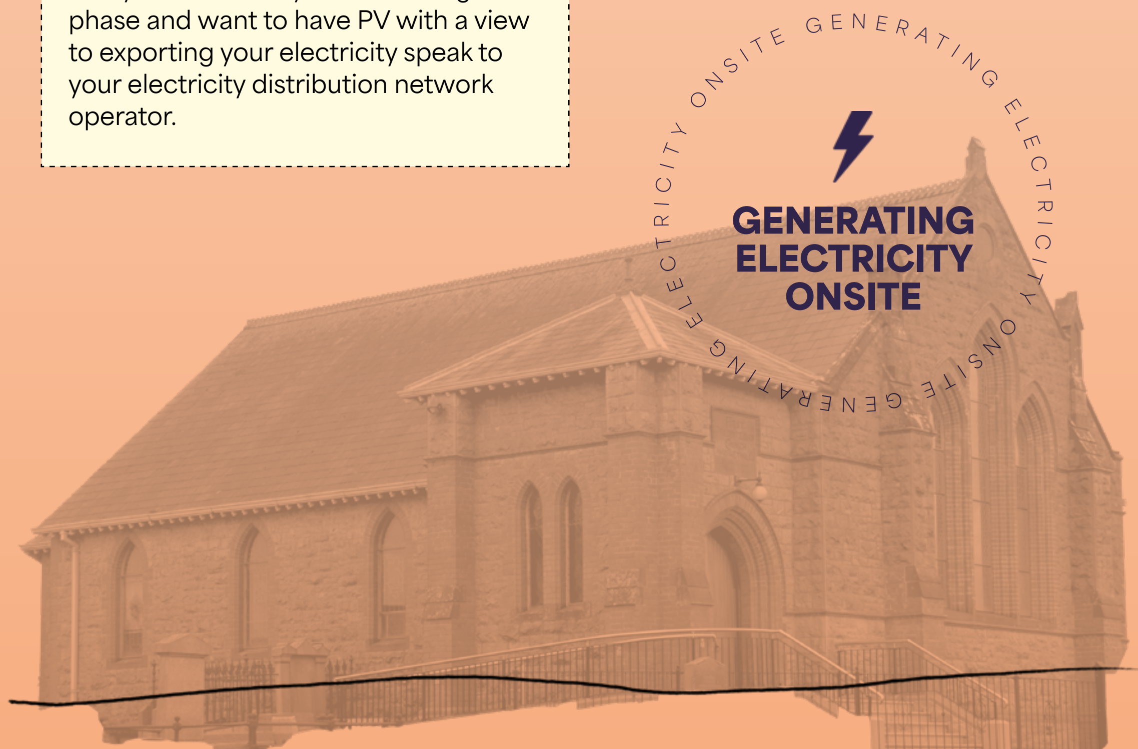
Speak to Your Electricity Distribution Network Operator about Connections: If your building does not use electricity for most days of the week on average, you could still host a PV system on your rooftop, but with a view to exporting your electricity to neighbours.

To do this you might need a stronger (three phase) electricity connection if you have single phase. A qualified electrician (there are also guides on the internet for how to do this) can easily check this. If you are on single phase and want to have PV with a view to exporting your electricity speak to your electricity distribution network operator.

YES

4

Supply to a Community Renewable Energy Project: If you're not using electricity throughout the week, have good roof space for solar PV and a good electricity connection, you could look to being part of a community or commercial power purchase agreement (PPA). There are models for this where you only lease the use of the building's roof to host the PV and receive discounted electricity, with the rest exported to other partners. Have a legal professional review the terms of such agreements and be familiar with conditions and obligations.



TRAVEL TO WORSHIP

START

Is there formal/informal car sharing by worshipers?

NO → 1

YES ↓

Do worshipers without mobility issues, living less than 1 mile away, walk to services?

NO → 2

YES ↓

Is there secure storage for bikes, mobility scooters?

NO → 3

YES ↓

Does the building own a car park?

YES → 4

1

Increase car sharing: Vehicles with more people in them use less fuel per person per mile travelled. The weight of the car takes most of the energy required to move people around so three people sharing a car uses less fuel than three separate cars being used, particularly if people are travelling from the same area or along a somewhat common route.

There are a couple of things to consider with car sharing, such as how cost of fuel will be spread to ensure fairness and safety for those involved, but encouraging or enabling car sharing reduces carbon emissions and can save worshipers money.

2

Encourage walking/cycling to worship: Walking remains the lowest carbon way to travel. Not everyone is in a position to do so, but for those who can, promoting walking to your place of worship reduces local air pollution as well as globally impactful greenhouse gases.

3

Add secure storage for bicycles and mobility scooters: Cycling, scooters and electric mobility scooters are other low carbon alternatives that reduce climate change impacts and may increase participation for people without access to a car or bus. A big barrier for using bicycles and mobility scooters throughout the year is a lack of secure, and ideally sheltered, storage while people are inside the building. This can include designated storage inside the building as well as outside of it.

4

Host an electric vehicle charging point: If your building has designated car parking you could install an electric vehicle charging point. This supports building users who have or are considering electric vehicles by allowing them to recharge at the building. Hosting electric vehicle charging can also bring revenue as the charger can be used by others when the building is not in use. There are several companies who can install and operate electric vehicle charging points on your land with various ways to arrange funding and revenue. You will need a three phase electricity network connection for this and you should ensure that you buy credible (as a rule of thumb it is preferable to use suppliers who are not backed by 'REGOs') 100% renewable electricity.

GENERAL CONSIDERATIONS

Consider who you need involved to implement the solutions appropriate for your building. As you will see in the case studies, you will need a team around you for both practical projects and raising awareness and community support for them. There may be members of your community perfectly placed to help you.

BUILDING OWNERSHIP

This is an important issue when considering altering a building and how costs and benefits from energy saving measures and new heating or power systems are shared.

Not owning the building your place of worship is based in can be a potential barrier but it does not mean action to tackle climate change cannot happen. A 'green lease' where commercial tenants and landlords agree terms to improve the environmental sustainability of their building is an option.

Note: The Better Building Partnership website has advice on this topic.

(PDF, 3.0MB)

ELECTRICITY SUPPLY

Does the building have single or three phase electricity supply? This essentially means how much power can flow in and out of an electricity connection to the local electricity network. Three phase connections can handle more. A lot can be done on single phase connections – like installing solar PV, but there limits to the size of solar PV, heat pump or other electric heating, and electric vehicle charging possible. A qualified electrician can tell you what connection you have. Your Distribution Network Operator can upgrade you to three phase if needed.

Find your Network Operator

OTHER ACTIONS TO TAKE

Ensuring all indoor and outdoor lighting at the building are LED rather than incandescent or metal halide will save energy when the lights are on.

Motion sensors, timers and signage to turn off lights will further save energy - reducing the cost and carbon emissions of the building. LEDs come in large varieties now, and this also means a choice of colours (from quite clinical bright white to warmer yellows) and fittings.

For outdoor lights make sure that they are wildlife friendly - some LED colours (blues and reds) have been found to affect birds and insects, but yellow and green colourations don't have this effect. If you are unsure, speak to staff in lighting departments when purchasing.

You can know if your current bulbs are not LED by how hot the air near the bulb gets and the wattage of the bulb - a standard room light LED will be 3 to 10 watts while the same light from a non-LED will be 60 to 100 watts. New LEDs usually pay for themselves through energy saved in just a few years and will go on saving money for several years after.

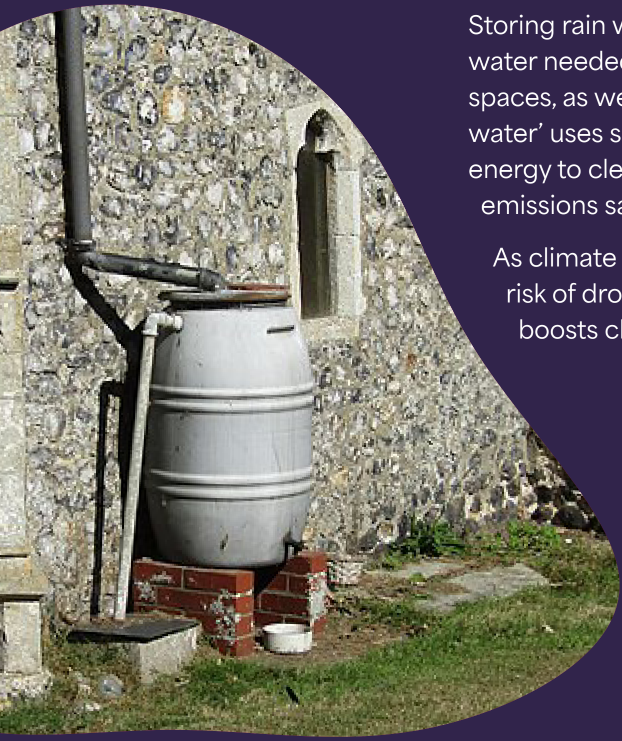
REVIEWING COSTS

The costs to buy and install technologies such as heat pumps, solar PV and underfloor heating have fallen in recent years and may continue to do so. Similarly the costs of running and maintaining your current heating system will no doubt change. Grants and incentives from the Government and other sources also come and go. Whereas if at one time it did not seem financially feasible or beneficial to get a low carbon technology for your building, it is worth revisiting this regularly. Energy efficiency, especially for heating, is always sensible to invest in.

UNDERSTANDING THE BUILDING BETTER

Thermal cameras are increasingly available and there are charities and NGOs set up to help you understand your energy use and where there are particular issues. In Greater Manchester for example the Carbon Coop offer services with thermal cameras and other tools to identify how much heat (therefore money and carbon emissions) being lost from where in a building.

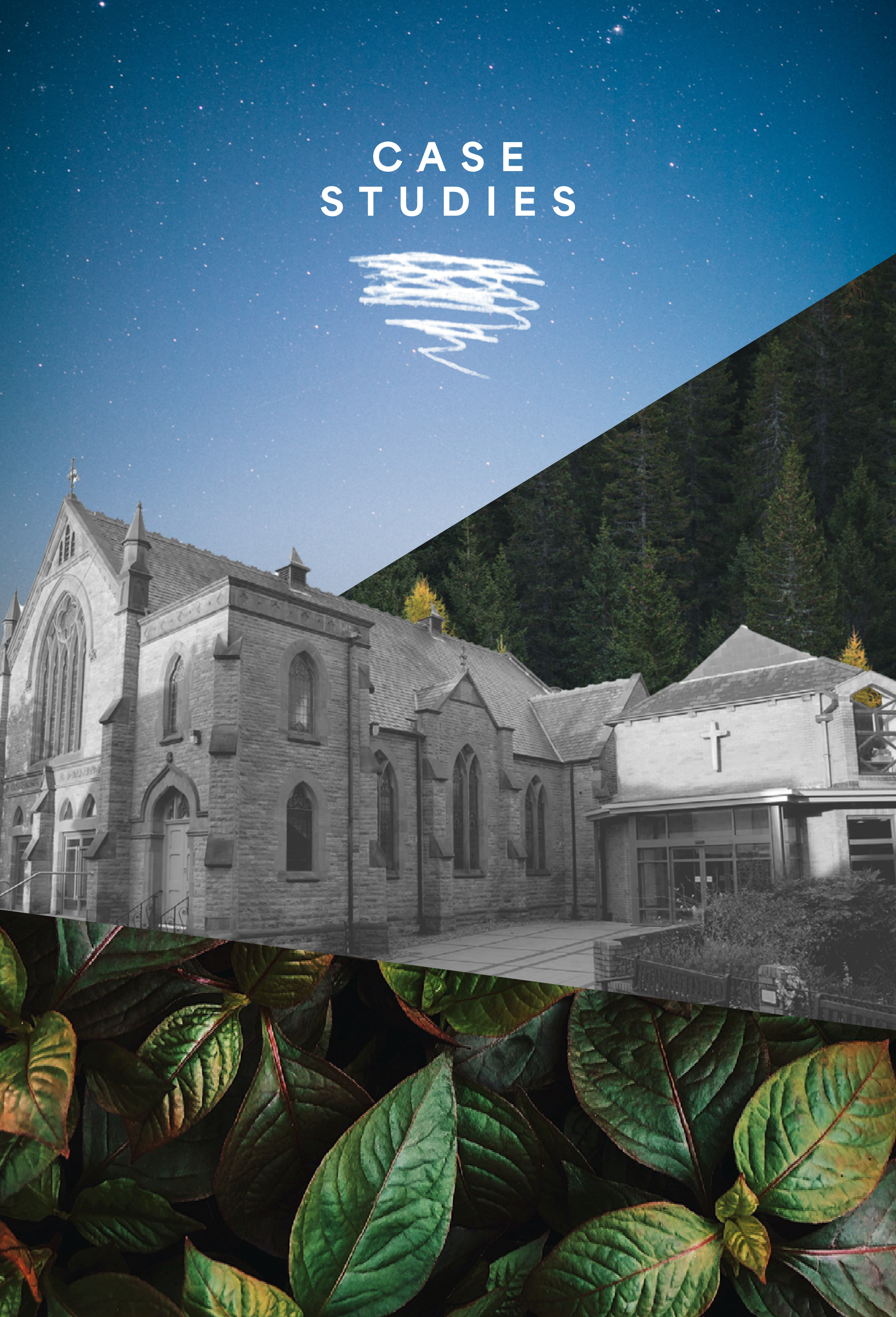
RAINWATER HARVESTING



Storing rain water from guttering in water butts reduces water needed from the mains supply for watering green spaces, as well as appropriate connections for 'grey water' uses such as flushing toilets. Mains water takes energy to clean and distribute, so there is a carbon emissions saving from this.

As climate change impacts increase, there is a greater risk of drought in the UK, so rainwater harvesting also boosts climate change resilience in the local area.

CASE STUDIES



CASE STUDY #1

KOL CHAI REFORM SYNAGOGUE

The journey for Kol Chai Reform Synagogue to taking significant environmental action started through a series of talks on the subject by local experts attended by a significant portion of the community invited by the Rabbi and key volunteers. Following this series a nucleus of keen community members formed the Kol Chai Green Group to lead the synagogue's environmental response. Like many other groups at this point they required more knowledge about how to actually create change in their building and community. To provide this direction they used the Eco-Synagogue programme to guide their actions and eventually achieved a silver award for their efforts.

The key achievement for the Green Group was the installation of solar panels in 2021. This was a long process and one that demanded extensive research and a large time commitment from members of the committee. As part of this work, which coincided with a rebuilding process they were also able install LED lighting and movement controlled fittings. They have also begun a range of other initiatives as directed by the Eco-Synagogue award including moving away from disposable crockery and installing a bike rack.

Like many other groups trying to take climate based actions, engaging the wider congregation and keeping them engaged and motivated was a key challenge. For the Kol Chai Green Group they found that utilising the support of leadership, through the Rabbi, was particularly important. They also used multiple methods to communicate their progress and achievements to the rest of the community, using the synagogue magazine, the synagogue's website, social media and WhatsApp. As part of the wider Green Group they had an organisational committee and a supporters group who while not taking part in decision making had an important role in energising the rest of the community.

(Pictured on p.20: Bramhall Methodists, p.22)

CASE STUDY #2

BRAMHALL METHODISTS

Led by a lay minister with a broad remit, Bramhall Methodist Church took inspiration from COP26 and the COVID pandemic to programme a Climate Year held in their community.

This consisted of a wide range of activities including lectures from scientists, bible studies across home groups, and eventually led to completing the bronze and silver levels of the A Rocha eco-church award. They began this work through creating an environmental committee following sermons and bibles studies on the topic of the environment. This committee consisted of five people from the congregation who were interested in taking part or identified as having useful skills or knowledge and were approached by the minister.

The biggest challenge for the work of the environmental team was maintaining the interest and buy-in of the wider community. In order to do this they used two methods. Firstly, the committee began its work by structuring the climate year to target key events they could run with a view of engaging and motivating the rest of the congregation on climate matters.

They adapted the long-running flower festival to an eco-festival, inviting the local community and hosting the local MP. They also engaged with the Make CoP 26 Count campaign for churches and some members travelled to Glasgow to participate in the peoples march. Secondly they included a representative from the wider congregation in all decision making meetings to hear a wider viewpoint from a less invested person who could help the team adjust their plans to better suit the wider community.

The eco-church award acted as a key guide for many of the steps the team took to change practices including adopting new rental agreements with other users of the building in regards to waste and correct energy use practices, phasing out non-LED lighting systems and maximising efficiency of their heating system with plans in place to upgrade it.

CASE STUDY #3

ST MARY OF FURNESS CATHOLIC CHURCH

Saint Mary of Furness in Ulverston, Cumbria became the first Catholic Church in the UK to provide public electric vehicle (EV) charging.

The church car park features a 22 kW EV charging point with a simple to use pay by donation set up. This happened when Father Paul Embery saw an opportunity to provide EV charging through the church to serve those wanting to adopt a low carbon vehicle in an area not well served by this infrastructure.

The installation came about when work was being done on the church's heating system. This prompted a consideration of the church's three phase electricity supply and whether it should be retained and put to use.

Seeing an opportunity, it was decided to have a certified electrician install a wall mounted EV charger (costing around £800 at the time) and use the church's three phase connection for a wider public good. As well as the lack of public charging at that time, Father Embery also noted that most local residents live in terrace housing with limited opportunity for their own EV charger at home. The charge point was immediately well received, with people getting in touch to say how helpful the charger is for the local community and those passing through. The charger is not only useful for worshipers during services - allowing them to more easily use an EV to attend - but it brings visitors to the church who may otherwise not have had it as a destination.

As an early adopter of this approach Father Embery has been able to reflect on how the scheme developed and the learning from it. Firstly, to consider whether multiple 'slow' chargers or fewer 'fast' chargers (measured in kW output) is best to meet the need you are trying to serve. Secondly, while the pay-by-donation approach has worked well in this case, with the charger meeting its costs, this might not always be appropriate. The alterative to an open access pay-by-donation approach is to have a payment system set up, and potentially managed by, a charging point provider. As with any long term contact with a third party, substantive legal advice and scrutiny should be sought.

This case study highlights that places of worship have the potential to affect change beyond the building itself and can help the wider public to live more sustainably. It also shows the value of taking opportunities like replacement, maintenance and repair, to be innovative and consider ways to benefit the environment and the public good.

FURTHER READING

Use this QR code or go to linktr.ee/ClimateandWorship

Here you can access the full list of further reading below, as well as information on **award schemes** and more **case studies.**

LEARNING MORE ABOUT CLIMATE CHANGE

If you'd like to find out more, there is lots more information available about climate change and what that means for our communities and buildings, including the **Met Office**, **Intergovernmental Panel on Climate Change** (IPCC), **UK Climate Change Committee** (CCC), **National Trust Climate Hazards Map**, and **Historic Environment Forum**.

ADDITIONAL GUIDANCE

Some faith and heritage organisations have issued their own guidance which may be helpful to expand and develop the ideas given here:

- **A Rocha EcoChurch** Technology-specific guides
- **Church of England Checklist:** Easy tool to visualise actions advised through the Church of England Net-Zero route map
- **Church of England Environment Programme Webinars:** Addresses a wide range of environmental issues and practical advice for places of worship looking to make changes or create momentum within a congregation.
- **Church of England Net-Zero Carbon Church:** Practical tips for all faith buildings particularly those that are listed and historic buildings.
- **Climate Resilient Church:** Advice on Climate Resilience within a church building and community
- **The Ecological Gurdwara:** Specific advice for Sikh groups
- **Green Temple Guide:** Hindu specific guidance
- **Green Up!** Toolkit for Mosques and Islamic Groups
- **The Guardians of Creation Project:** Guidance for Catholic Dioceses on decarbonisation strategy and carbon accounting, at the diocesan level.
- **Historic England:** Guidance for heritage buildings on retrofit and zero carbon technologies
- **The Journey to 2030:** Support for parishes, schools and faith communities (with a focus on Catholic Social Teaching) to care for creation in all its forms.
- **Methodist Net Zero Advice:** 4-step process for Methodist buildings, but accessible and easily adapted to all places of worship
- **The Microgeneration Certification Scheme:** provides detail on heat pumps and finding an approved installer
- **Muslim Council of Britain Eco-Friendly Mosques:** 6-step programme for Mosques to become Eco-Friendly, includes checklist, practical steps and case studies
- **Muslim Guide to Energy:** Bahu Trust guidance on energy use in Mosques

GLOSSARY

Biodiversity: The measure of the variety and variation of life on Earth - or within a part of it (an eco-system)

Carbon: Often used as a short-hand for carbon dioxide, but also can refer to greenhouse gases generally, which as often quantified by their 'carbon dioxide equivalence'.

Decarbonisation: Changing how something is done so that fewer - or no - greenhouse gases are released. Changing lights to LEDs, walking or cycling instead of using a petrol/diesel car and draught-excluders to lower heating use are all examples of this.

Fossil Fuels: Oil, natural gas and coal are hydrocarbon fuels formed millions of years ago (predominantly in the carboniferous era) predominately from biological matter (plants and animals) buried under the Earth's surface. These 'fossil' fuels, when burned, release carbon that pairs with oxygen in the air to form carbon dioxide (CO_2) as well as other combustion products.

Global South: This is a term for countries currently at a lower stage of economic and industrial development - and have endured colonisation at some stage. Many countries in Latin America, Asia and Africa are considered part of the 'global south'.

Greenhouse Gases: The Earth's atmosphere includes gases that insulate the planet by limiting the heat that goes back out to space. These gases include carbon dioxide (CO_2), methane (CH4), nitrous oxide (N2O) and various fluorocarbons (HFCs and HCFCs). Without them the average temperature on Earth would be below freezing and not the more hospitable 15˚C we experience.Humans are increasing the concentrations of these gases in the Earth's atmosphere through using fossil fuels and agricultural practices. More of the sun's energy is being held in our atmosphere as a consequence, changing our climate.

Heat Pumps: Heat pumps take warmth from outside a building (in the air or ground depending on the technology) and 'upgrade' it to use inside the building at a higher temperature. It uses compression and expansion driven by an electric pump to concentrate diffuse energy from a large source (e.g. the air outside a building) into a small 'sink' (e.g. the water in a radiator system). How well this process works is referred to as the Coefficient of Performance (COP) - how much electricity you put in for the heat that you get out. Most 'air source heat pumps' use on average 1 kWh of electricity to provide a building with around 3 kWh of heat (a COP of 1:3). The ground stores heat better than the air, so a ground source heat pump will average around 4 kWh of heat for 1 kWh of electricity. Air source heat pumps are lower cost to install but their performance is lower when the air temperature is below 0˚C. Despite this they are common across Scandinavia because the maximum COP for standard electric radiators is 1:1.

Insulation: How well a building resists losing heat to the outside greatly depends of how insulated it is. Different materials have different insulating properties (often expressed as their 'U-value). Materials with pockets of air (insulting board, rock wool, foam etc) are better at insulating than solid materials like stone.

Low Carbon and Decarbonisation: Low carbon technologies and practices are typically defined by having no direct use of fossil fuels (oil, gas and coal). Decarbonisation is moving to low carbon technologies and practices.

REGOs: Renewable Energy Generation Obligations (REGOs) are issued to renewable electricity generators for every MWh of electricity they produce to evidence that the electricity is renewable. There is some confusion with REGOs because REGOs certificates can be sold separately from electricity they certify - so a company can buy REGOs (sometimes quite cheaply) without necessarily buying the renewable electricity. REGOs can make the origin of electricity more transparent, but because they can be sold separately there is concern that they can mask the actual electricity purchased by a supplier. Some suppliers will simply say they buy all their electricity from renewable generators (and have power purchase agreements for this) and this makes the origin of their electricity very clear. Other suppliers with '100% renewables' tariffs may only say that they use REGOs, but not explicitly that they only buy renewable electricity - and in this case it is not as clear where the actual electricity purchased comes form.

Solar Photovoltaic Panels (PV): Using light from the sun to make electricity – usually rectangle shaped panels that go on the roof. The electricity they produce is renewable and has a much lower impact on the environment across the panel's lifetime than fossil fuel energy. They are also typically a good financial investment. Electricity produced and used by the building saves money on electricity from the national grid and money is earned on the surplus exported to the grid. How often a building is used and the suitability of roofs are important considerations. There are examples of schemes where local communities have agreements so that more of the electricity produced is used locally.

Solar Thermal: Using warmth from the sun to heat water for buildings – specially designed absorbent and insulated tubes make the most of the sun's energy hitting the roof of a building to heat water for bathrooms and kitchens. Space for a hot water storage tank might be needed.