Carbon Reduction Recommendations Report

for

Witney Parish Council

April 2026

Carbon & energy assessment of Corn Exchange

Market Square, Witney OX28 6AB

Funded by Westmill Solar Co-operative

WESTMILL SOLAR CO-OPERATIVE LIMITED

ENERGY SOLUTIONS OXFORDSHIRE®

ORGANISATION OVERVIEW

Report overview

Helen Watts from EiE met Janine Sparrowhawk on 21 April 2026. Recommendations in this report are based on our site visit & information obtained; we consider finances, carbon impact, and ease of implementation. Savings and costs are estimated using data provided and from our recent work. Below is a summary of the opportunities recommended; further pages provide detail on each opportunity.

Energy savings recommendations - summary

Opportunity	Payback (years)	Savings current & future energy prices (£ / yr)	Estimated costs (£)	Carbon impact (tCO_2e / yr)
1) Manage heating	1.1	271	300	0.63
2) Conduct an out of hours survey	-	See details	0	0
3) Upgrade lighting to LEDs	9.9	844	8,400 to 9,800	0.69
4) Add draught proofing to external doors	-	See details	50 to 70	0
5) Investigate glazing solutions	44.6	271	12,100 to 16,500	0.63
6) Manage summer heat	-	See details	1,500 to 2,000	0
7) Add solar PV panels	8.7	3,573	31,096 to 35,880	2.34
8) Consider an air to water heat pump system	-	See details	35,000 to 45,000	8.02
	TOTAL	**£4,959 per year**	**£88,446 to 109,550**	**12.30 tCO_2e per year**

Site details

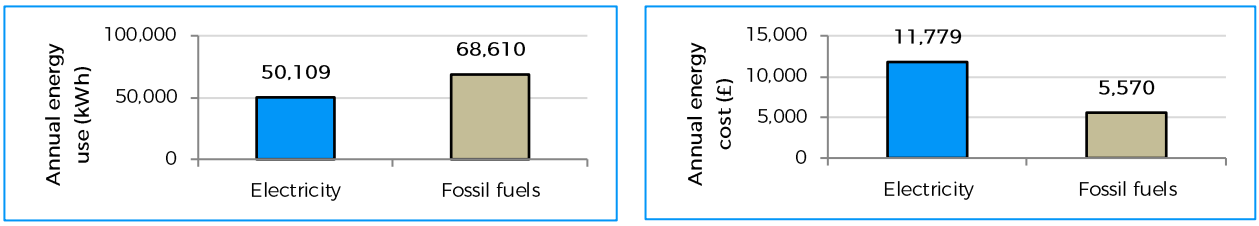
The Corn Exchange was built in 1863 and refurbished in 2015. There has been a café (open six days a week) in the entrance of the ground floor since 2021. The 561m^2 area consists of the café, theatre, Gallery meeting room, kitchen, various toilets and offices. The building is owned by Witney Town Council, is Grade II listed and in a Conservation Area. Levels of insulation in the walls and loft are unknown. Documents from the refurbishment make brief mention of insulation boards used on the ground floor but no further information. Windows are all single glazed and draughty in places. Some lighting has been changed to LEDs. Gas boilers heat radiators throughout and the theatre has an air handling system. There is one electricity and one gas meter, both read by the council monthly. The gallery room is used approximately 25 hours per week and theatre similarly. The Energy Performance Certificate (EPC) is rated C and Display Energy Certificate B.

ENERGY PROFILE

Energy consumption annual profile

Fuel type	Annual Energy use (kWh)	Cost per kWh (p)	Standing charge (p/day)	Approx. annual cost (£)
Electricity	50,109	21.7	248	11,779
Gas	68,610	7.9	41	5,570

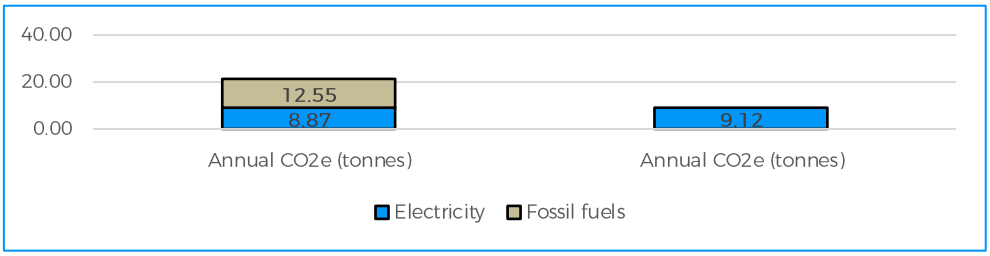
Energy profile breakdown for Corn Exchange consumption (left) and costs (right)



Consumption is based on information provided.

123.02 tonnes avoided CO_2e over 10 years by implementing recommendations (based on tonnes of CO_2e per year)

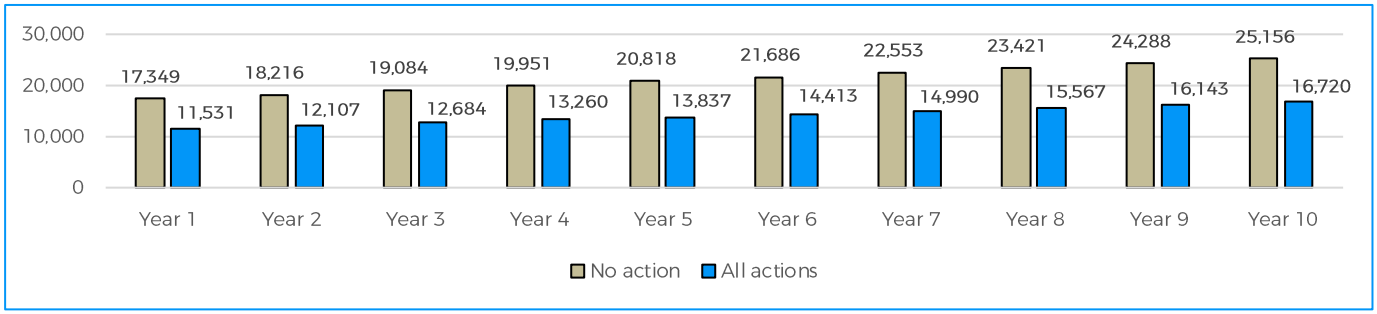
21.42 tonnes CO_2e from current annual energy consumption
9.12 tonnes CO_2e from implementing recommendations



Based on current annual CO_2e minus CO_2e implementing all actions using 2025 UK greenhouse gases coefficients.

£71,270 energy savings over 10 years by implementing all report recommendations

Corn Exchange energy spend in the next 10 years



Savings are 'no action' minus 'all actions' using Laser mid-range predicted UK electricity price rises.

ENERGY SAVINGS RECOMMENDATIONS

1) Manage heating

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
3,431	271	300

Your heating is controlled by an Ambiflex system, which is little understood and timings are unknown. It is suspected that heating may be on continually. The Air Handling Unit (AHU) is also a mystery. In order to save energy, carbon and money, we recommend getting a heating engineer / AHU contractor to service and explain the system, ensuring that controls are well-documented in the process. The following suggestions may help to guide your discussions:

Understand how the Ambiflex system works and review control settings – Engage an expert to point out what settings are possible and document the controls so they can be regularly updated according to building use. Check heating times and set temperature and reduce where possible, e.g. during milder winter weeks. Ensure times match occupancy as closely as possible. Leaving heating on unnecessarily when no one is in the building wastes energy.

Manage TRVs – Thermostatic radiator valves (TRVs) can be reduced in areas where users spend short amounts of time (corridors and toilets). Other spaces can be set to medium. Reset TRVs when possible.

Review boiler output temperature – Check the output temperature of your condensing gas boilers. They ideally run at 60 to 65°C to benefit from the efficiency of condensing; any hotter and efficiency is lost.

Map problem areas – Determine which rooms have issues of under or overheating due to the radiators. For cold rooms ensure the problem is not a faulty TRV or obstructions in front of a radiator.

Manage heating zones – Identify if boilers have separate radiator circuits that can be set differently. A heating engineer can determine if zones exist or can easily be introduced. If there are zones, review zone timing to reduce heating at some of the site when possible.

Calibrate temperature sensors – Arrange for a contractor to compare thermostat readings with actual to ensure accuracy. Arrange for inaccurate units to be replaced.

Balance radiators – When some radiators are unable to adequately heat rooms, contractors can reset input valves on all radiators to improve comfort if this has not been done recently; this has a cost.

Broaden maintenance checks – Your boilers will be serviced regularly. Review what checks are made and discuss with your contractor if further testing for efficiency is possible, such as burner or flue checks.

Air Handling Unit – Engage an expert to find out what settings are possible and advise on most efficient use. Ascertain what functions AHU has. Can it be used to cool or heat air or is it just for adding fresh air? If there are air filters, are these being changed or cleaned at regular intervals?

Actions

- Engage a contractor to show you how the system works and arrange servicing or further checks as necessary
- Review the above suggestions and carry out as appropriate to improve heating efficiency.

Costs and savings

Savings are based on reducing heating by 5%, though actual savings may be much higher. Costs are only for a contractor's time for a day.

2) Conduct an out of hours survey

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
See details	See details	0

The amount of energy used overnight in your building is unknown. There is no access to half hourly energy data. Carrying out an 'out of hours' energy survey will help identify wasted energy when the building is not in use. The survey requires taking meter readings and finding & switching off energy using items that are not needed to reduce wasted energy. We recommend conducting an out of hours energy survey.

Gas meter readings are submitted as cubic metres, amounts can be converted to kWh using an on-line calculator: http://www.energylinx.co.uk/gas_meter_conversion.html

Actions

- In order to identify wasted energy out of hours, conduct a survey of energy use, arranging to switch off any items left on unnecessarily. These may include: lights, heating, fans, machinery on stand-by, and other appliances. Then establish a baseline of energy use: the minimum kW per hour outside of occupied hours.
- Conduct the survey at the end of a workday when no users are in the building.
- Switch off any items not needed. Check control manuals for heating, cooling, and air handling, if these need to be timed. Manuals can often be found on the internet.
- Take gas and electricity meter readings at the start of the survey and again first thing the next working morning, before users arrive. Note the time when all readings are taken.
- Calculate the average hourly out of hours energy use by subtracting the first meter reading from the current reading and dividing by the number of hours between both readings. Convert gas readings to kWh. This results in your average electricity and gas kW per hour.
- Regularly collect out of hours meter readings again and compare to the original baseline from the survey. If there has been an increase in kW per hour, further action to switch off unnecessary items may be needed.

Costs and savings

There may be savings from actions identified. There is no cost to this action.

3) Upgrade lighting to LEDs

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
3,891	844	8,400 to 9,800

There are some non-LED lights installed in the building that can be replaced with LEDs to reduce energy use and maintenance as well as providing improved lighting quality. These include 54 double 5ft fluorescent tubes. LED lights are more energy efficient and exist for nearly every lighting type. They can reduce electricity use by up to 50% compared to other lighting. Additionally LEDs last at least 50,000 hours before they need to be replaced (fluorescent lights last 15,000 hours) resulting in reduced maintenance costs. We recommend replacing lights with new LED light fixtures to reduce the cost of lighting.

When selecting replacement lights there is also an opportunity to provide better lighting rather than using equivalent lights. Consider both the light quality preferred (known as colour temperature) that ranges from warm white, cool white or daylight and the level of brightness needed (measured in lumens). Ensure that, whichever contractor you use, they offer a minimum 5-year failure replacement guarantee.

You already have motion sensors for lights in many areas. Also consider light level sensors that can reduce lighting in naturally bright locations, e.g. near windows.

Actions

- Engage a lighting contractor to carry out an inventory of current lighting noting number and type of each light. For all non-LED lights discuss LED replacements. Generally LEDs are installed as entirely new fixtures rather than using existing fixtures.
- Discuss additional lighting controls, such as sensors, with contractors.
- We recommend contacting at least three lighting contractors for quotes.
- Choose a preferred contractor and arrange for the lights and controls to be installed.

Costs and savings

Savings are based on LEDs using less energy and lights being on 1,250 to 2,250 hours per year (25 to 45 hours over 50 weeks, depending on location) at 21.7p per kWh. Costs are based on the lighting inventory above and include the cost of installation. Actual quotes from lighting suppliers may differ.

4) Add draught proofing to external doors

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
See details	See details	50 to 70

There are draughts from gaps at several exterior doors. There is an opportunity to reduce heat loss. Any gaps around the doors will let in cold air and draughts; blocking gaps with draught proofing will greatly reduce this. We recommend adding draught proofing to reduce discomfort during colder months.

Examples of draught stripping can be found online here:
https://www.screwfix.com/p/stormguard-self-adhesive-brush-pile-weatherstrip-white-5m-3-pack/30322

https://www.screwfix.com/p/stormguard-epdm-rubber-p-strip-white-20m/33145

The best way to determine if draught proofing is required on a door is to feel around the door when the heating is on and it is cold outside. Draughts will be very evident and remedial action can be taken.

Actions

- Add draught stripping to the door or door frame. If draught stripping is not suitable to attach (e.g. if the gap is not uniform), consider engaging a contractor to suggest improvements to the door frame.

Costs and savings

Savings are difficult to calculate, but this action will help reduce draughts and discomfort in winter months. Costs for a pack of three 5m brush pile weather strips are £13 and a pack of 20m rubber draught proofing strip are £14. Both could be attached by a volunteer.

5) Investigate glazing solutions

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
3,431	271	12,100 to 16,500

Windows are single glazed and double glazing is not permitted. Some windows do not close properly or have gaps around them. There is an opportunity to improve windows through refurbishment suitable for listed buildings or adding secondary glazing. Both help reduce heat loss & draughts to keep the building comfortable in cold weather. We recommend engaging specialist contractors to discuss opportunities.

Refurbishing windows – This includes addressing draughts by improving airtightness, including: refinishing frames and glazing, or adding sealant. Further information is at these links:
https://www.historicengland.org.uk/advice/your-home/looking-after-your-home/repair/windows/

Other contractors may offer a sealant service; one product is here:
http://www.theenergysavers.co.uk/#!quattro-seal/c4rn

Secondary Glazing - These inner windows are suitable for Grade II listed sites and can be designed to open. Consider thickness of glass and U-value of the secondary window. Insulation is rated in U-values that measures heat loss through a structural element of a building; the lower the U-value the better the insulation. There are a number of specialist companies that can advise on glazing improvements for listed buildings and those of historic interest and related issues such as avoiding condensation. Links are below.

Installing secondary glazing can reduce heat loss without affecting the aesthetic of historic buildings. Historic England says that carefully designed secondary glazing allows the original windows to be retained unaltered, and where necessary repaired, reducing air leakage and conducted heat losses. As a result there is no loss of historic fabric and often the insulation is reversible. For more information see:
https://historicengland.org.uk/images-books/publications/eehb-secondary-glazing-windows/heag085-secondary-glazing/

The Victorian Society says that 'The secondary frames are aligned with the external window frames, cause the least visual disruption' (https://www.victoriansociety.org.uk/advice/windows-and-double-glazing).

Also see:
http://www.stormwindows.co.uk/
https://www.selectaglaze.co.uk/sectors/heritage-listed-buildings

An alternative is removable magnetic Perspex glazing, numerous providers exist. See:
https://www.magneglaze.co.uk/secondary-glazing/

Actions

- Engage qualified contractors to discuss window refurbishment and secondary glazing options.
- Define the work needed for windows. Obtain quotes from three appropriate contractors for window refurbishment and / or the design and installation of secondary glazing.
- Choose a preferred supplier and arrange for the work to be carried out.

Costs and savings

Savings are based on reducing annual heating expenditure by 5% based on approximately 55m^2 of windows having secondary glazing added. Costs for secondary glazing are based on £220 to £300 per m^2, including installation. Window refurbishment may be less than this. Final costs depend on glazing and frame specifications.

6) Manage summer heat

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
See details	See details	1,500 to 2,000

Spells of hotter weather are becoming more common during the UK's summer. Using air cooling to address this is costly, particularly in naturally ventilated buildings.

The landing outside the Gallery room has three windows above and gets very hot. The Gallery room also gets too warm in the summer. It has blinds but these are rarely used, and it is unknown what sort of blinds they are (whether they are thermal blinds, for example). Adding exterior shading is not possible since it is a listed building.

The following are suggestions to help manage indoor temperatures during hot weather:

Review insulation – Sufficient building insulation can help reduce heat gain in the summer, particularly through roofs and walls. Ensure the building is properly insulated to help manage summer heat.

Solar reduction window treatment – Consider applying solar reduction treatment to the windows on the landing to repel the heat. For examples see: https://www.windowfilm.co.uk/

Shades for skylights – Another possibility is external blinds, which exist for skylights and can be attached by a member of staff. For example see: https://www.roofblinds.co.uk/catalog/velux/velux-awning-blinds

Close blinds and curtains – Closing curtains or blinds will help prolong indoor comfort. Ideally close curtains and blinds the previous evening before a particularly hot and sunny day.

Close windows and door and use fans – During outdoor temperatures 25°C or more, many users will open windows and doors to feel a breeze. If indoors is much cooler, instead use portable fans whilst closing windows and doors. This will provide air movement without overheating. If useful, install indoor and outdoor thermometers to display temperatures.

Purge indoor heat – Prolonged hot weather can lead to a build-up of indoor heat. Insulation can trap heat inside for longer. Overnight or early in the morning, when outdoor temperatures are cooler (e.g. 17°C), open windows, doors, rooflights, and even loft hatches to let hot air escape. Be sure to close these again before the temperature rises.

Actions

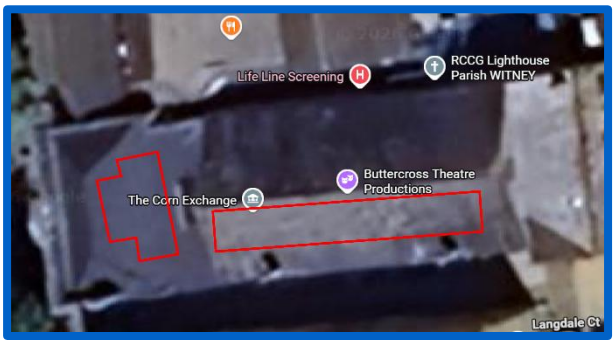
- Review the above suggestions and carry out as appropriate to improve comfort during hot weather.

Costs and savings

Savings are only from the absence of using air cooling systems, however these actions will improve comfort. There will be costs for adding curtains, blinds, or shading, or purchasing electric fans.

7) Add solar PV panels

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
13,218	3,573	31,096 to 35,880



It is unknown whether you would get planning permission for adding solar to the roofs; you would need to apply. However, there is sufficient space to install south and east facing solar PV panels on the roof to generate electricity from sunlight, which will reduce the amount drawn from the National Grid saving you energy costs and carbon. We recommend, subject to planning and survey, a smaller east facing 7.36 kWp array of 16 panels, generating an estimated 5,851 kWh per year and a larger 16.56 kWp solar array of 36 panels generating an estimated 16,179 kWh of electricity per year. For every kWh generated from solar panels that you use on site you will save 21.7p (your daytime electricity rate). Surplus solar electricity is exported back to the National Grid and you will receive approximately 5p to 15p per kWh from the Smart Export Guarantee, paid through your electricity supplier. We anticipate 60% of electricity generated will be used on site.

Find an MCS certified installer at this link: https://mcscertified.com/find-an-installer/

In addition to installing an array of solar PV panels on the roof, an inverter is installed indoors to make the electricity compatible with your building's electricity demand. While the sun shines every day, the amount generated is affected by temperature and cloud cover; weather data is used to estimate performance. Consider a battery to store electricity that would have been exported for use when the sun is not shining.

Actions

- Engage a solar PV contractor to design a solution for your premises. They will assess feasibility of the project, considering obstructions, such as trees and other buildings. Speak to the designer about batteries for storing electricity that would have been exported. You can then engage a number of contractors with the design for quotes on installation.
- Contact at least three solar panel contractors to obtain quotes. Installation quotes need to include a structural assessment of the roof to determine if it can bear additional weight.

Costs and savings

Savings are based on using UK solar data to estimate generation from 460W solar PV panels, exporting at 8p per kWh. Costs are based on £1,300 to £1,500 per kWp. Prices from contractors will differ.

8) Consider an air to water heat pump system

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
43,224	858	35,000 to 45,000

The current boilers were installed in 2015 and will likely need replacing in the next ten years. It is wise to consider what your replacement options are before this happens so that you are ready. One option is an air source heating system (ASHP) that uses electricity but will deliver 3 units of heating from 1 unit of energy, making it over 300% more efficient than current heating. Inertia in the air is increased via compression through the heat pump and transferred to a wet heating system and radiators. We recommend investigating an air source heating system as a potentially efficient and low cost heating solution.

ASHPs run at 40 to 60°C, whereas conventional boilers run at 60 to 80°C, so require slightly longer heat up times and some maintaining of background temperature throughout most of the heating season. ASHPs qualify for a government rebate, claimed through installers, helping reduce the payback period of investment.

For further details see:
https://www.theecoexperts.co.uk/heat-pumps/types
https://www.renewableenergyhub.co.uk/main/heat-pumps-information/commercial-heat-pumps
https://www.daikin.co.uk/en_gb/product-group/commercial-heat-pumps.html

Some older radiators are not suitable for ASHPs as they lack sufficient surface area to emit enough heat. This will be the case with the vast majority of your radiators. Your heat pump designer can review radiators to see which need to be replaced. The pipework in the building will also need reviewing. Under floor heating is best suited to air source heat pumps. It suits the temperature of heat produced by the heat pump. Ensure there is sufficient back-up heating available in case of extremely cold temperatures. The requirement for such a system will depend on what system is eventually selected. Installers of systems will suggest various options, one of which is keeping a gas boiler for occasional use.

Solar PV panels can supplement electricity costs for heat pumps for further savings.

Thought may be needed in the location of the outdoor unit since it is a listed building, however there is ample space behind the building.

Actions

- Discuss the potential for an ASHP system at the site.
- Engage a qualified contractor to determine the feasibility of the project and develop drawings and specifications.
- Request quotes from three competent and qualified suppliers.
- Choose a preferred supplier and arrange for the system to be installed.

Costs and savings

Savings are based on replacing fossil fuels with electricity, savings 8.02 tonnes of CO_2e per year. This will save £858 per year at your current tariffs. Costs are based on heat pumps, pipework, new radiators, and removal of the current heating system. There may be additional costs for improving the electricity supply to the site, etc.

RESOURCES & NEXT STEPS

Insulation

Whether insulation was added to walls or lofts when the refurbishment took place in 2015 is not known. There may have been some floor insulation added, but that is the only information you currently have. Adding any wall insulation in the listed building is unlikely because of the interior design. However, exploring lofts to see if there is any insulation is definitely worthwhile. Adding loft insulation to a depth of 300mm will save energy. Loft insulation costs £20 to 25 per m^2 fully installed and will save approximately 15% of your heating bill if there is none present already.

Funding

Possible sources of funding for the recommendations in this report:

ESOx Green Fund (https://www.energysolutionsoxfordshire.org/get-match-funding-with-our-green-fund/) 25% match grant for recommendations in this report. The current round closes 10th June 2026.

Enterprise Oxfordshire may also have funding opportunities for businesses from time to time. Check here: https://enterpriseoxfordshirebusiness.com/net-zero-subpage-funding-and-grants/

You can also **sign up to the ESOx newsletter** at this link (see bottom left): https://www.energysolutionsoxfordshire.org/articles/

Solutions fit for the future

This report recommends installing new electrical products. We recommend discussing some technical considerations with your contractors. While UK electricals must comply with safety standards, there is currently no requirement that items are able to communicate with other electrical systems to maximise operating efficiency both on site and within the National electricity grid. For example, heat pumps use electricity and are best operated in tandem with solar PV panels and batteries to minimise use of more expensive grid electricity. As electricity networks make more use of data sharing, **ensure contractors consider compatibility when installing** the items below to help avoid later upgrades:

Solar PV panels – Ensure inverters, which convert DC power generated to AC power compatible with your site, have **'modbus'** interface. This enables communication with other devices, including batteries.

Heat pumps – Ensure these include **OpenADR** (automated demand response), which allows better electricity management, particularly in areas where sub-stations have grid constraints.

Your action progress update

Our report recommendations may help you choose what actions your organisation would like to act on. After a number of months, we will ask for an update on your progress. Some actions will be completed, some in progress, and others not yet started. Below is an example of how you can indicate your progress (tick one box per row). There is no expected completion date for any action, however your information is extremely important for helping us track project improvements.

Opportunity	Action completed	Action in progress	Not begun but intending to	Not begun, not intending to	Not applicable
1) Manage heating	◯	◯	◯	◯	◯
2) Conduct an out of hours survey	◯	◯	◯	◯	◯
3) Upgrade lighting to LEDs	◯	◯	◯	◯	◯
4) Add draught proofing to external doors	◯	◯	◯	◯	◯
5) Install secondary glazing	◯	◯	◯	◯	◯
6) Manage summer heat	◯	◯	◯	◯	◯
7) Add solar PV panels	◯	◯	◯	◯	◯
8) Consider an air to water heat pump system	◯	◯	◯	◯	◯