

Encouraging members to reduce personal energy consumption

This resource has been kindly shared by Michael Popper MA (Cantab) CEng MCIBSE MEI from P3r Engineers Ltd. EcoSynagogue is very grateful for his expertise and generosity. EcoSynagogue and its constituent Synagogue members have no responsibility for advising on these matters, the notes are made available purely as an information resource and that Synagogue members should take professional advice.

This resource is being used to support the following Audit questions...

11. Our Synagogue encourages members to reduce their personal energy consumption in the way they heat and light their homes and places of worship.
12. Our Synagogue encourages members to reduce their personal energy consumption in the way they insulate their homes and places of work.

Our Synagogue encourages members to reduce their personal energy consumption in the way they heat and light their homes and places of worship:

There are three steps to minimising the energy consumption and associated carbon emissions of heating and lighting a building, whether a home or place of worship.

STEP 1 – REDUCE ENERGY DEMAND

The main energy heating demand comes from the building heat loss through walls, windows, roof and floor. Installing loft insulation, cavity wall insulation and replacing windows with double glazing is the most effective form of energy reduction.

In addition, considerable heat demand is caused by draughts through ill-fitting doors and windows and through open chimneys. A simple low-cost measure is to add draught-strips to doors and windows, and to fit simple chimney stoppers in fireplaces. Care should be taken to ensure there is enough background ventilation to provide air freshness and to remove moisture from normal activities such as cooking and bathing, reducing the risk of condensation and mould.

STEP 2 – USE ENERGY EFFICIENTLY

The building systems should be as energy efficient as possible and operated to minimise waste.

- All light bulbs should be LED (not halogen, fluorescent or incandescent)
- Lighting controls could include dimmers and/or PIR presence detectors where appropriate
- Replace old boilers with modern high efficiency ones
- Heating controls should include timeclock, room thermostat and thermostatic radiator valves as a minimum

- Consider smart heating controls such as Google Nest, British Gas Hive for homes, or commercial controllers (BMS) for places of worship
- Fit zone controls so that areas can be separately controlled according to occupancy patterns. These could include programmable thermostatic radiator valves
- All hot water cylinders should have thermostats
- Heating and hot water pipes should be insulated
- Buy energy efficient appliances
- Good housekeeping
 - o Turn off lights
 - o Reduce thermostat settings
 - o Use hot water sparingly – fit low volume taps and shower heads
 - o Monitor energy consumption on a regular basis using smart meters

STEP 3 – RENEWABLE ENERGY

The final step is to utilise renewable energy. These systems are costly and so their size and cost will be minimised following the energy demand reduction in Step 1 and the energy efficiency measures of Step 2.

There are several available systems whose appropriateness should be carefully considered as each has its own benefit and downside. The most common are listed below:

Solar PV	Roof mounted panels for electricity generation	Ideally needs southerly facing roof Without batteries, the size should be limited to the base electrical load of the building as there is less benefit in exporting (see Financial Incentives below) Battery systems are costly https://energysavingtrust.org.uk/advice/solarpanels/
Solar thermal	Roof mounted panels for hot water generation	Ideally needs southerly facing roof Can be beneficial for homes. Mostly offsets hot water demand in summer months https://energysavingtrust.org.uk/advice/solarwater-heating/
Air source heat pumps	Replaces boiler with outdoor box (similar to an air conditioning unit)	Can replace existing boilers, although it is recommended that the building insulation is improved as the radiator temperature is lower. Care needed to ensure the unit noise does not disturb close neighbours https://energysavingtrust.org.uk/advice/air-towater-heat-pumps/
Ground source heat pumps	Replaces boiler with an indoor unit	Can replace existing boilers, although it is recommended that the building insulation is improved as the radiator temperature is lower. More efficient and expensive than air source. Ground source is a pipework network in either horizontal trenches or vertical boreholes https://energysavingtrust.org.uk/advice/ground-towater-heat-pumps/

Our Synagogue encourages members to reduce their personal energy consumption in the way they insulate their homes and places of work.

Insulation standards are increasing with the latest version of the Building Regulations. However, it is widely considered in the architectural and engineering professionals that the new Regulations have not gone far enough in responding to the Climate Emergency.

The Passive House concept was developed 30 years ago in Germany and is now accepted as the most feasible way to achieve net zero energy buildings. They are so well insulated that there is no need for a heating system. The building is heated by solar gains through the windows and human activity from cooking, bathing, and appliances. The standard is for new and existing buildings, the latter called EnerPHit.

<https://www.passivhaustrust.org.uk/>

Levels of insulation are such that the overall thickness of walls and roofs would be 500-600mm compared with 300-400 for normal construction. Windows should be triple glazed.

Another guide to insulation is contained in the London Energy Transformation Initiative (LETI) Design Guide and Retrofit Guide, which call for similar standards to Passive House.

<https://www.leti.london/cedg>

<https://www.leti.london/retrofit>