

Energy efficiency recommendations for a two-bed detached house in Tewkesbury



The property

- Two-bed detached house built 1967–1975.
- Insulated cavity wall construction and solid flooring throughout.
- Post-2002 uPVC double glazing.
- Gas-fired condensing combi-boiler.
- EPC D.

Challenges

- Risk of damp entering from high external ground level. Lowering the ground level in these areas and adding gravel drains if replacing the concrete pathway would help move moisture away from the property.

Outcomes from installing all recommended measures

Current

- Energy spend: £2,350 a year.
- Carbon footprint: 3.3 tonnes CO₂ a year.

Potential

- Savings of £1,600 a year.
- CO₂ reductions of 3.6 tonnes a year, making the property carbon neutral.
- Greater comfort.
- Prevention of damp ingress to the property.



The report was extremely useful; it went into every aspect of energy saving, also considered unintended consequences such as damp and mould. I'm very glad we had it done.

- Homeowner

Highlighted recommendations



Radiator reflectors

Heat from radiators can be lost through walls, especially if they are uninsulated. Reflectors behind radiators on exposed walls are a simple solution, reflecting heat back into the room.

Independent research conducted by the Building Research Establishment suggested savings of up to £8 per radiator per year in an average home with uninsulated brick or stone walls. Costs are minimal (around £25 for a pack of five reflectors) making this a simple and effective measure.

Address heat loss through the open chimney

Removing the chimney completely would eliminate heat loss but is expensive. Fitting a cowl or cap on top of the chimney and inserting a 'chimney sheep' into the opening would provide protection from weather and reduce draughts. Available in many sizes, chimney sheep are an inexpensive way of keeping heat in.

Replace the front door

The main front door and adjacent glass panel are leaking heat. Draught-proofing should be kept in good condition and fitting a thick curtain across the area will help until budget is available for a replacement door.

Install a solar PV array

A 3.2kWp solar array with potential to increase to 4.8kWp on the front elevation would make the most of the available roof space. Further PV panels could then be installed on the other aspects though they might not produce as much energy per square metre. Optimisers or micro-inverters would minimise the effects of shading from the chimney.



Ventilation

Good ventilation is essential for internal air quality and to prevent damp and mould and must be fully considered especially when insulation is retrofitted. There are intermittent extractor fans in the bathrooms and an open vent in the kitchen; replacing these with humidistat-controlled units with heat recovery should be considered if further insulation is introduced. None of the windows in the house have trickle vents so these can be retrofitted if high humidity levels are a problem.

This document was produced as a part of the Low Carbon Communities project, by Severn Wye Energy Agency on behalf of Tewkesbury Borough Council.



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Energy efficiency recommendations for a end-terrace house in Tewkesbury



The property

- Two-bed end-terraced house.
- Built in 1897 with loft conversion and flat-roof extension of unknown date.
- Mainly solid brick construction with cavity wall extension.
- Solid flooring with a suspended timber section in the lounge.
- EPC E52.

Challenges

- Deterioration of brickwork below damp proof course (DPC) should be monitored to prevent damp inside the extension. Brickwork with a higher moisture content creates a thermal bridge, enabling more heat to pass through it.
- Deterioration of DPC. There are signs of a remedial silicone DPC being applied so damp may have been an issue in the past. Building regulations recommend the DPC should be at least 150mm (6") above ground level so this could be addressed when pathways are maintained.

Outcomes from installing all recommended measures

Current

- Energy spend: £1,230 a year.
- Carbon footprint: 2.1 tonnes CO2 a year.

Potential

- Savings of £1,000–£1,200 a year.
- CO2 reductions of 3 tonnes a year, making the property carbon neutral.
- Greater comfort.
- Prevention and mitigation of damp.



[We are] currently considering options relating to further insulation improvements, reducing draughts and future heating for the property.

- Homeowner

Highlighted recommendations



Internal wall insulation (IW)

Internally insulating external walls can significantly reduce heat demand but can be very disruptive to install. This could be minimised by doing one room at a time as they are redecorated, and/or starting with the most frequently used rooms.

Any damp issues must be remedied before installation.

The insulating materials should be sympathetic to the wall type. Modern buildings can withstand vapour-closed materials but these can potentially trap moisture within the walls of a traditional build. Wood-fibre insulation (such as Steicoflex036) with appropriate membranes and finishes is recommended, taking special care at floor/ceiling junctions and around services to minimise thermal bridging.

Insulating throughout to a depth of 60mm could see total savings of around £290 a year.

Ventilation

Install trickle vents to the double-glazed units and replace extractor fans with humidistat-controlled units with heat recovery to manage excess humidity; this is especially important if insulation is being upgraded.

Controlling humidity helps reduce the risk of condensation damp and mould, therefore we recommend using a humidistat control which will automatically boost the fan when humidity reaches a set level.



Loft room insulation

Roof rooms should be fully insulated, including access doors. Thermal imaging revealed some insulation in the sloping and flat ceilings, but this could be improved. Removing the plasterboard and replacing existing insulation with 100mm of wood fibre to meet building regulations, and recovering with insulated plasterboard, could see savings of approximately £40 a year. It is important to maintain adequate ventilation behind the insulation.

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Energy efficiency recommendations for a detached house in Tewkesbury



The property

- Five-bed detached house with two occupants.
- Built in 2014, block and beam suspended floors, and cavity walls.
- Bulk LPG-fired central heating with programmer.
- Zoned room thermostats and thermostatic radiator valves.
- EPC B81.

Challenges

- Damage to building fabric: cracks in plaster and defects in brickwork should be monitored to ensure there are no issues with water ingress before further installations.

Outcomes from installing all recommended measures

Current

- Energy spend: £1,700 a year.
- Carbon footprint: 3.54 tonnes CO₂ a year.

Potential

- Savings of £850 a year.
- CO₂ reductions of 3.5 tonnes a year.
- Greater comfort.



The owners are currently considering further insulation improvements, reducing draughts and future heating for the property.

- Assessor

Highlighted recommendations



Monitor energy use and generation

The new Octopus Flux tariff takes advantage of the lower rates to charge the battery, heat hot water and export energy when required. To get the best use of this, it would be an advantage to understand the benefits of exporting energy vs using it towards heating or hot water.

The Octopus comparison app will download the data from the smart meter and compare the cost and use for each 30-minute period to show which Octopus tariffs may be best value for the customer.

Voltage optimiser

This would reduce the incoming voltage to the building to 220 volts AC which can reduce the amount of electricity used. The Energy Saving Trust identified potential savings of around 5% on electricity demand in domestic properties. Check your home's suitability for this measure with a qualified electrician. Costs to purchase are typically in the region of £300–£500 plus install.

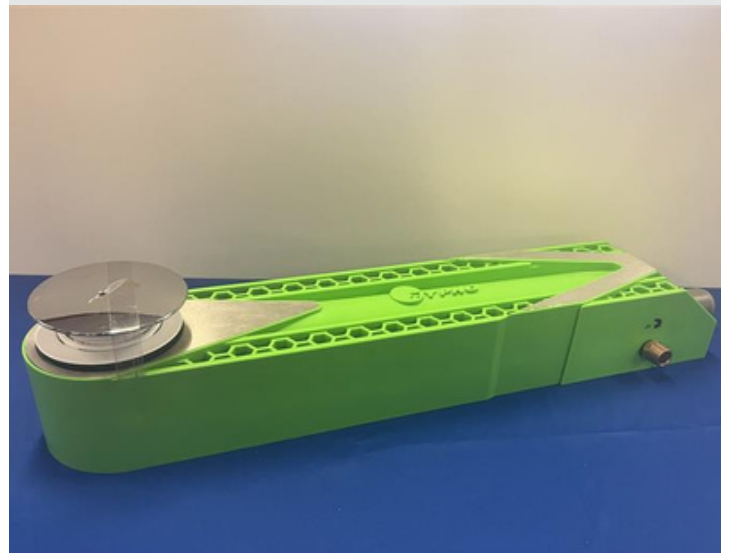
This technology can also increase the output of PV panels by a few percent as it reduces the workload of the inverters.

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Waste-water heat recovery system

This uses a heat exchanger under the bath or shower tray to capture the heat from waste water and transfer it to the cold-water shower feed. It doesn't need power and has no moving parts so is a fit-and-forget technology that improves shower efficiency by between 30% and 75%. This could be installed the next time bathrooms are refurbished.

Cost are around £450–£600 (plus fitting) and save around £50 a year.



Install a de-aerator

These devices dissolve air from the water in the heating system so the boiler can heat water more efficiency and can be turned down with no loss in heat output. This can produce energy savings of up to 15% and can last up to 40 years. Removing air also helps prevent sludge build-up and prolongs the boiler life.

De-aerators currently cost from £150 plus installation. Fitting requires the heating system to be drained so consider installing a de-aerator during routine boiler servicing or maintenance.