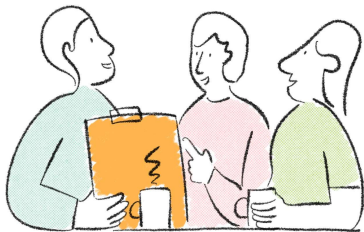


Thermal Imaging Scheme and Improving Home Comfort in Sampford Courtenay

Kate Royston, Tamar Energy Community

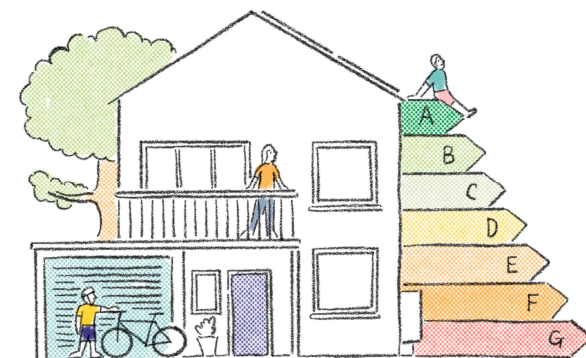


TIC Scheme in partnership with West Devon Borough Council



This Evening's Agenda

- Introductions
- The Thermal Imaging Camera Scheme and working in communities
- Talking about Retrofit – Cosy, Efficient and Future Ready Homes
- Thermal Imaging as a retrofit tool and how to use it
- Next Steps
- Community energy opportunities
- Questions and discussion

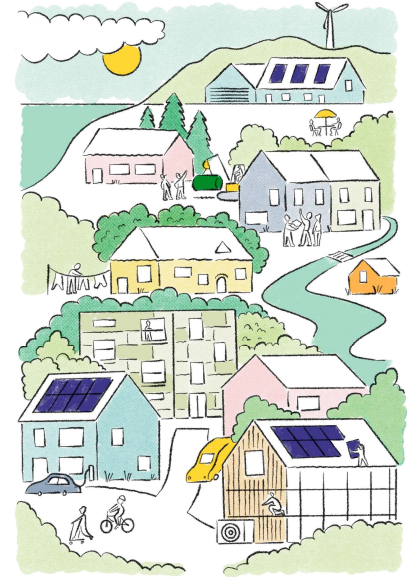


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Introductions

- Who's in the room!



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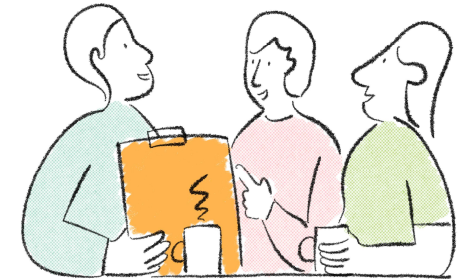
Tamar Energy Community (TEC)

- Community energy organisation – not for profit – working in partnership with WDBC in West Devon
- We're part of a Devon & Cornwall wide network of community energy organisations delivering free energy and retrofit advice and support to our vulnerable householders; and Retrofit services for self-funding households
- We've developed a portfolio of community owned rooftop solar and undertaken a feasibility study for a heat network
- We also work with communities and stakeholders to progress understanding of, and engagement with the journey towards net zero

Retrofit and Energy Advice services we provide

Our team of qualified and impartial home energy and retrofit advisors provide:

- Free home visits for eligible households across West Devon (gross annual household income less than £36k, poor health or other vulnerabilities)
 - Includes support with energy suppliers, bills, reducing usage, easy measures and crisis support, checking on heating and insulation etc. and referrals into grant schemes
 - This includes referrals into West Devon HUG2 scheme and ECO4
- Events, talks and drop-ins including Tamar Energy Fest every November
- Free retrofit advice visits for eligible households (any income, primarily hard to treat properties, hard to reach households and those on a low income)
 - Focused on supporting households to better understand the next steps to improving their homes and where possible signposting next steps
- Paid for whole house plans delivered by our partners at Dartmoor Energy. A comprehensive plan of the steps needed to futureproof your home, how much this might cost, and the order of works. Subsidies available until end March 2025.
- Further, paid for, support to assist in taking forward a whole house plan into design and installation



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The TIC Scheme

- Opportunity for communities to come together to use thermal imaging cameras to analyse homes within their area ... and learn more about how they could be more energy efficient.
- Supports West Devon Borough council's ambitions to make homes more environmentally friendly while helping people through the ongoing cost of living crisis.
- The information provided by the cameras can help inform what retrofit work could be done to make properties more energy efficient.

How does the TIC scheme work?

- Community champion steps forward to help organise the scheme, look after the camera, encourage participation and support TEC with events, referrals and questions
- Kick off event with TEC and community to:
 - talk about how to use camera
 - understand more about retrofit
 - sign up to use camera if interested
 - sign up for free Retrofit Advice Visit if of interest
- Community members use the camera and note their findings
- Follow up event with TEC and the community
 - share and discuss findings and experiences
 - talk more about next steps and opportunities to improve the energy efficiency of the community's homes
 - and community buildings / community energy opportunities
- Next steps to enable ongoing support within your community

Benefits and opportunities for Sampford Courtenay

- Improve energy efficiency and home comfort of homes within the community
- Reduce spending on energy bills, often with businesses outside the area. This enables more money to be retained within your 'purse' and your local economy
- Enable Sampford Courtenay to meet its sustainability goals and objectives?

Introduction to Retrofitting

- Retrofitting – doing things to improve existing buildings to make them as energy efficient as possible (ideally net zero)
- Whole house approach – looking at your home as a whole, and as a system
 - Ongoing maintenance
 - Fabric first – helping your home retain as much of its heat as possible
 - Deal with damp – deal with any causes of damp and make sure ‘rainwear’ is suitable for heavier downpours
 - Ventilation – making sure that the air is fresh and regularly changed
 - Renewable heat and hot water system(s) with the right controls
- Aim – warm, healthy home which costs less to heat and as close to net zero as possible

A great video to explain retrofitting

- <https://youtu.be/Ucf0-L8y9Q0>



Courtesy of Stoke Climsland Carbon Zero Homes Project

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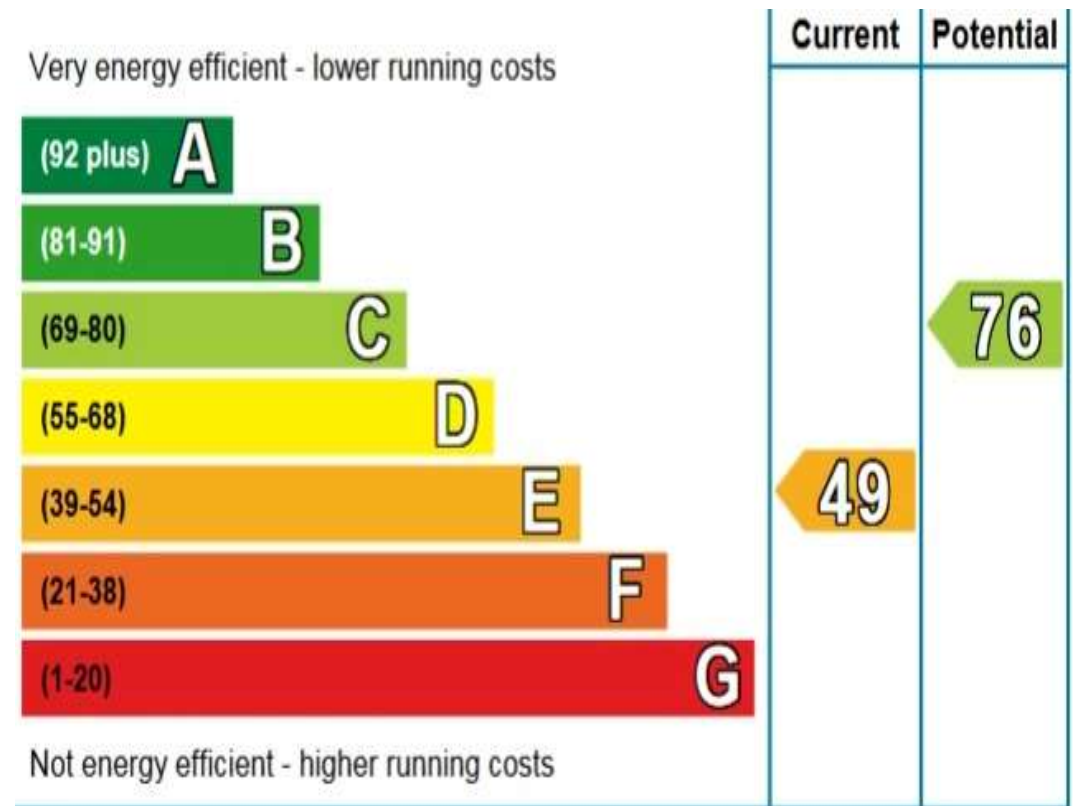


Retrofit in practice - Householder's Journey

- It's important to look after your home and have a plan for its upkeep and futureproofing
- An initial retrofit advice visit can be a start point
- A whole house survey, done with you, where affordable, or via a grant scheme (e.g. HUG2) can be very helpful
 - Retrofit plan for your home laying out the various measures needed and the order in which the work should be done – fabric first
 - Depending on the work required there may be a need for more, or less, detailed design
- Alternative tools may be available including the Devon Retrofit Guide and the Plan Builder Tool on Energy Saving Devon website: <https://www.energysavingdevon.org.uk/>
- Determine how the work needed can be paid for e.g. own savings, home loan (e.g. Lendology), government scheme(s), perhaps a mix?
- Length of time to do work – could be a 15 year plan, or doable in months
- Choosing installers to do the work

Energy Performance Certificate (EPC)

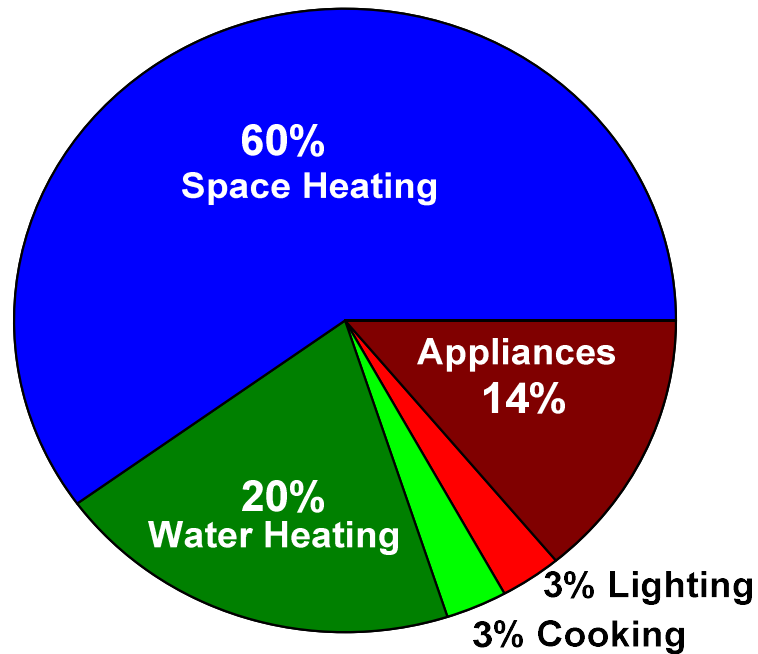
- The current way of understanding the energy efficiency of your home is through the use of an Energy Performance Certificate
- This is needed when a home is bought/sold, rented or when certain retrofit work is done
- Look up your own here (if there is one): <https://find-energy-certificate.digital.communities.gov.uk/>



Home maintenance

- Keeping your home in good repair
- Checking guttering and down pipes (rainwater gear) at least once a year; and checking its able to support more intense rainfalls
- Sorting out slipped roof tiles etc. promptly; and keeping roofs free of moss
- Keeping vegetation and soil away from the walls
- Cleaning the exterior including windows regularly
- Maintaining windows and painting wooden windows and doors

Fabric First – Energy use in the home



- Most energy in the home is used for space heating
- Reducing this is a priority

Fabric First – Reducing heat loss

Heat will always try and escape to the coldest spots.
The goal is to get rid of as many cold surfaces as possible

Loft insulation (~£8/m²)
Room-in-roof insulation
Flat roof insulation
(~£40/m²)

External wall insulation
(EWI)

~£125/m²

Cavity wall insulation (CWI)

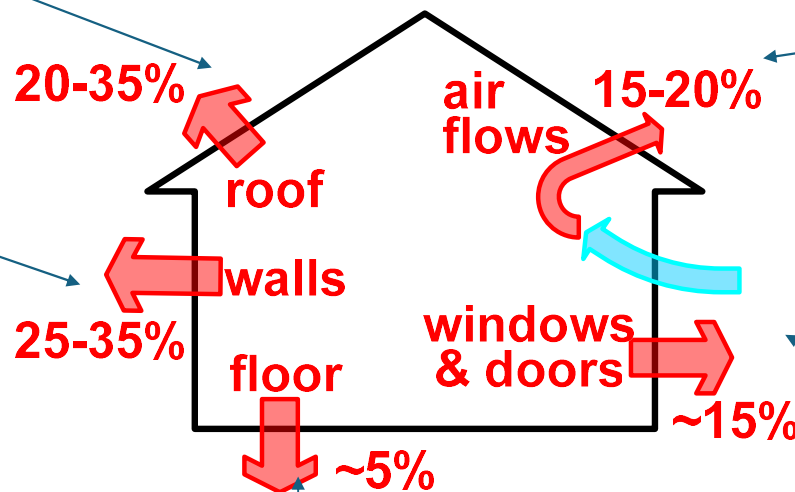
~£9/m²

Internal wall insulation (IWI)

~£182/m²

Party wall insulation (PWI)

~£450/wall



Draught management

- Some airflow is important

Double and triple glazed windows and insulated doors with draught proofing

- Rough cost per window for double glazing £650

Floor insulation

- Suspended floor (~£35/m²)
- Solid floor

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Ventilation and Damp

- Ventilation is very important for our health and the health of our homes
- Ventilation is important for managing damp
- Damp surfaces / walls will need approx. 40% more energy to warm them up. It's important to get rid of excess moisture within a home.
- Controlled ventilation is better than uncontrolled ventilation
 - There are various ways of improving ventilation from opening windows regularly, to room fans/hydrostats, to whole house ventilation systems which may cost several thousand pounds

Renewable heating and hot water

- Renewable – generated from a natural resource that can be renewed e.g. wind, sun, air, water
- Heating systems can ideally be upgraded once fabric is improved
- If it's done the other way around, your heating system will be too big for your needs, and will be less efficient
- Example costs:
 - Air Source/Ground Source heat pumps ~£14,000 per system
 - Solar PV installation ~ £7000 per system
 - Storage heaters ~ £1000-£1500 each (assumes renewable electricity from grid/solar PV)

Heating controls and heat emitters

- Good heating controls are essential
- The householder also needs to understand how to use them properly.
- Heat emitters include radiators and underfloor heating. These should be sized to allow the heating system to be as efficient as possible.
- A renewable heat pump based heating system may operate at lower temperatures and generally requires larger emitters
 - A correctly sized, installed and maintained air source heat pump (ASHP) operates at 300-500% efficiency
 - Electric heaters (e.g. storage heaters) are 100% efficient
 - Gas and oil boilers are generally between 70-85% efficient

Grant Opportunities

When you're replacing fossil fuelled heating with a heat pump you may well be eligible for a grant from the **Boiler Upgrade Scheme (BUS)**. This grant provides a grant towards the cost to households of installing a heat pump or a biomass boiler:

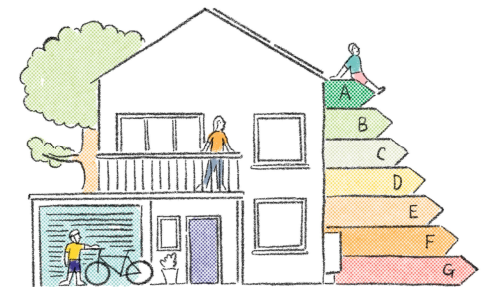
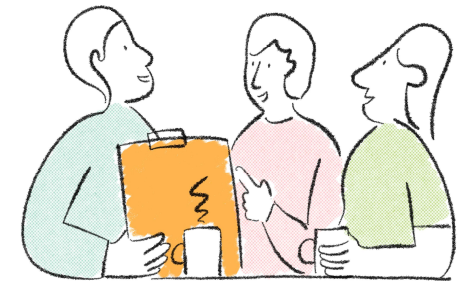
- £7,500 towards cost of heat pump
- £5,000 towards cost of biomass boiler
 - More information here: <https://www.gov.uk/apply-boiler-upgrade-scheme>

Grants may also be available **to low-income households in homes with a low EPC (generally D-G)**.

There are three or four schemes. They tend to be quite complex, and it can be advisable to discuss your options with an independent advisor.

- **Warm Homes Local** – a new scheme which should be open from April 2025. West Devon Borough Council should be running a local scheme in partnership with TEC and others.
 - Eligibility includes annual gross household income less than £36,000 and an EPC of D, E, F or G
- **ECO4** – Energy Company Obligation Round 4 – funded by the electricity companies (from green levies). Various installers may be able to offer funding. Householders may need to 'top-up' the grant
 - Eligibility includes annual gross household income less than £31,000 and an EPC of D, E, F or G. Homes with EPC's of F and G are more likely to provide the right incentive to an installer to take the job on.
- **Great British Insulation Scheme (GBIS)** is presently under review and can provide grants for insulation for households with an EPC of D-G; and in Council Tax Bands A-D

If you think you may be eligible for a grant, a good place to start is to ask Tamar Energy Community (TEC) for a free visit to provide independent advice.



Thermal Imaging

- A thermal image is essentially a visual map of the surface temperatures of a floor, wall or ceiling, made from thousands of temperature measurements taken by infrared-sensing equipment, and displayed against a temperature scale.
- To achieve the best results with a thermal imaging report, it is recommended that thermal imaging surveys be undertaken, and the images accurately interpreted by a qualified specialist, to determine whether construction appears to be in accordance with good standards

The TC004 TOPDON TIC

- Simple to use 'Point and Shoot' Camera
- On/Off switch. Be patient when switching on ... takes a while to initialise
- Then just point it at what you want to look at
- To take a picture, quickly click the trigger on the other side to the screen

Section 2 Product Overview

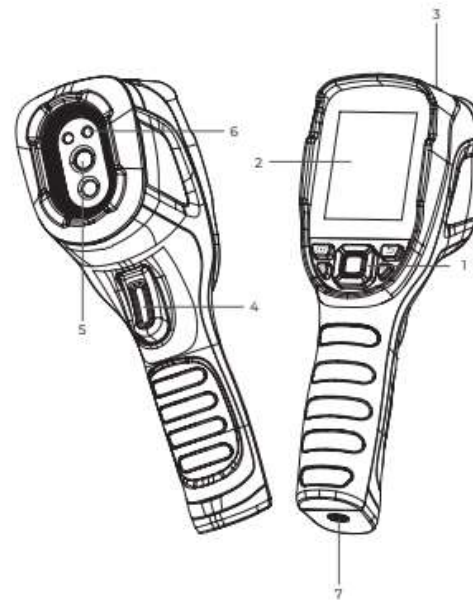


Figure 2.11

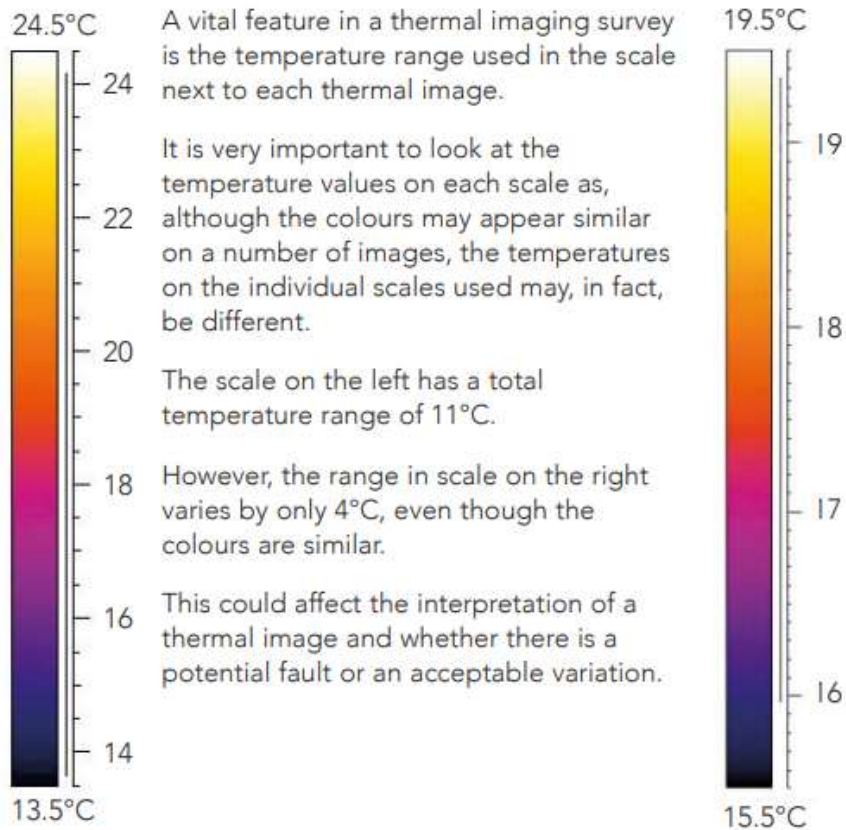


Section 1 What's in the Box?



Reading thermal images

The importance of the temperature scale



Thermal cameras are similar to digital photographic cameras, but they detect infrared radiation which is electromagnetic radiation (EMR) with longer wavelengths than those of visible light and is therefore generally invisible to the human eye.

How the camera converts the image

A thermal camera converts the intensity of radiation to a visible image or thermogram in which every pixel records a temperature that is assigned a colour. Warm objects stand out clearly against cooler backgrounds when viewed using a thermal imaging camera as the warmer the object, the more infrared radiation it emits.

A temperature scale is added to the image to aid interpretation. It is essential that the equipment is calibrated and set correctly to get accurate results.

More usage tips

- Keep a note of the pictures you've taken; and ideally also take a normal photograph, so you can remember better what images you have taken.
- Settings mean images automatically saved. This is the easier setting
- Images can be retrieved from the camera by plugging it into a laptop or similar via a USB cable.
- Once you've saved the images on your own device, please delete from the camera
- We're keen to learn from one another; we can think about how we can record and share images and what they might mean

Importantly for meaningful results

The conditions needed before and during a thermal imaging survey are as follows:

- Ideally no significant changes in external temperature during the 24 hours before the survey!
- **A temperature difference between inside the property and outside of at least 10°C during the survey**
- No sun shining directly onto the external walls of the property during the survey

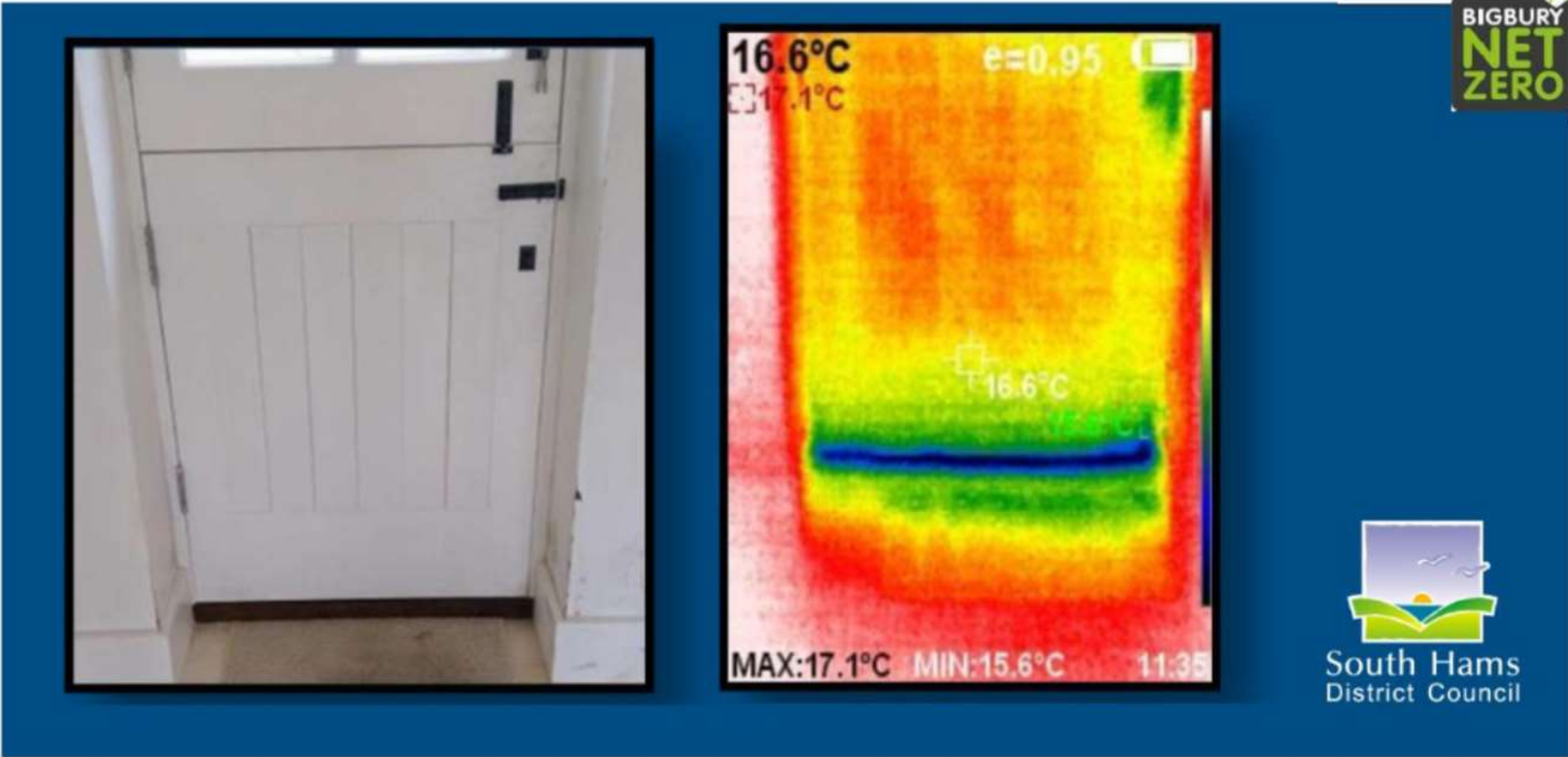
Using a TIC in your home

Some of the best places and scenarios to use a thermal imaging camera in your home:

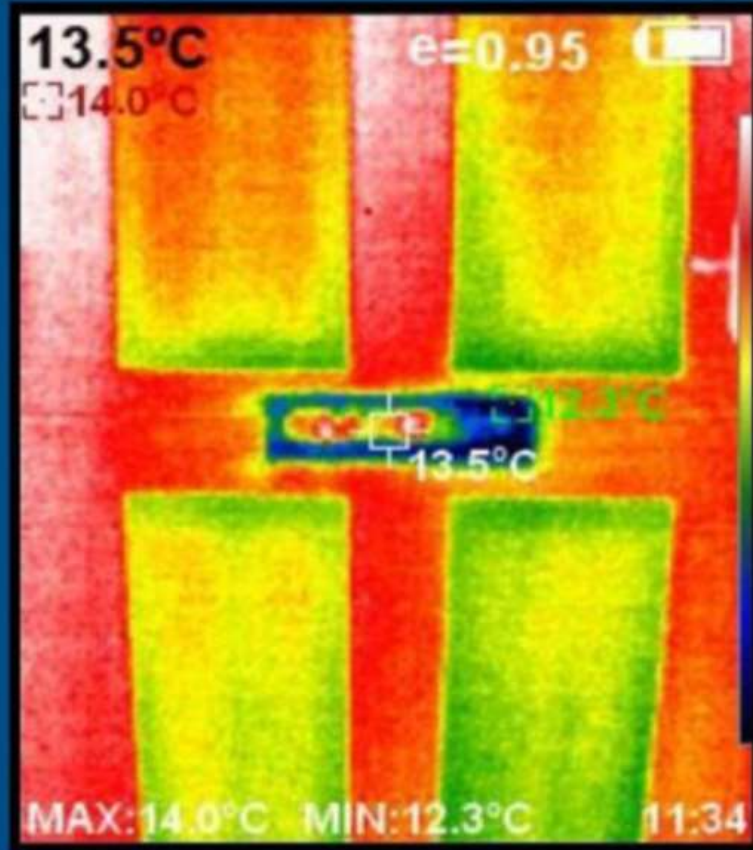
- Perimeter of the ground floor, particularly corners where skirting or door seals are.
- Joints between French doors and flooring
- Wall areas around the window, checking the window frame and sill for possible incorrect cavity closing/installation of window.
- Ceiling downlights.
- Ceiling junctions near gable walls.
- Ceiling at junctions with external walls, particularly corners.
- Space around dormer windows.
- Space around the perimeter of other doors leading outside, checking the frame for gaps and missing or poor performing seals
- Loft hatches – are they insulated?
- They can also be used to check how evenly temperature is distributed across radiators

See TIC Crib sheet which you can use when going around your property.

Appendix 3 - Use Example Images – Bigbury Net Zero Thermal Imaging trial funded by South Hams District Council

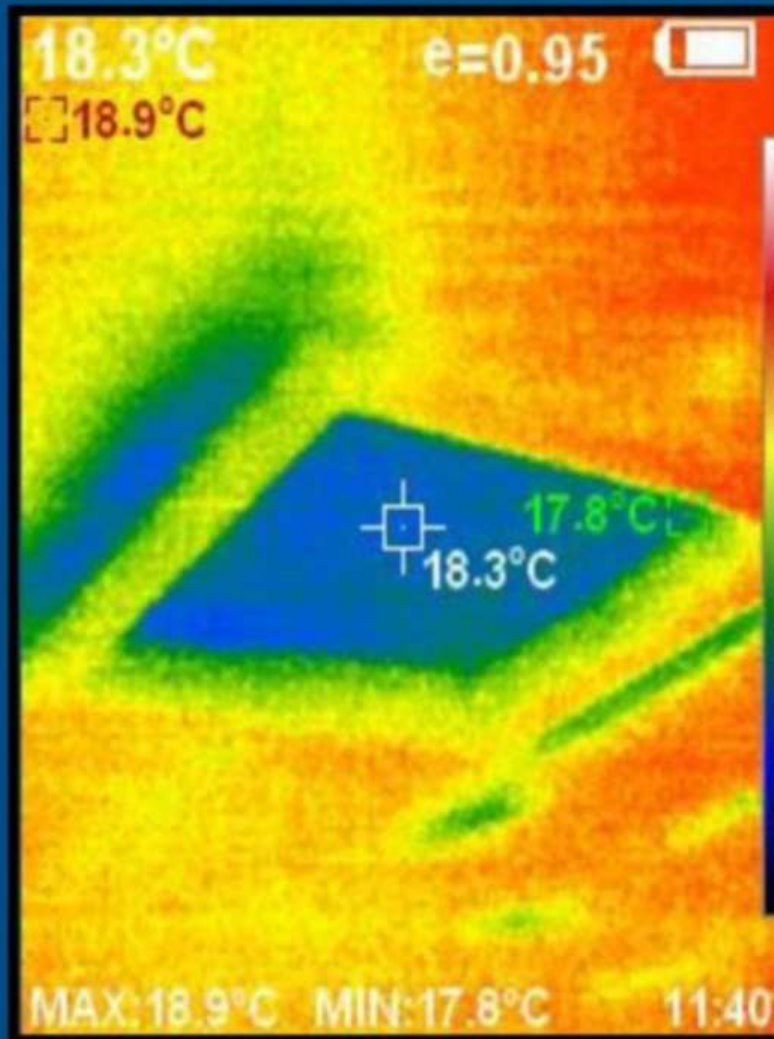


Example 1 - Bottom of a front door, gap between the door and door frame.



South Hams
District Council

Example 2 – Letter box

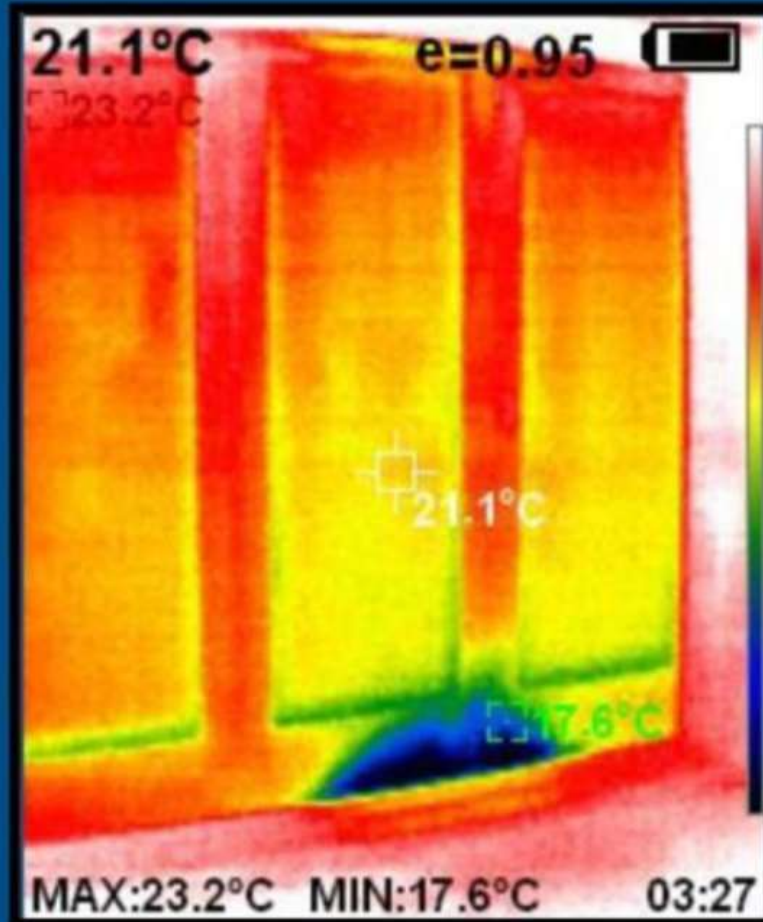


BIGBURY
**NET
ZERO**



South Hams
District Council

Example 3 – loft hatch, poorly sealed.



Example 4 – French doors, uneven break between door frame and door.

Next Steps

- Sign up with Michele if interested to use the camera.
- If you're interested in a free Retrofit Advice Visit (RAV) please use our on-line link (<https://tamarenergycommunity.com/request-support>) or leave your details with me today
- A more detailed Whole House Plan is available as a chargeable service. This is something you may want to do after a RAV or have as your next step.
 - We have generous discounts available until the end of March 2025
- Support each other – we'd like to understand the best ways of facilitating this
- Join us for the Follow Up event where we hope we can all share our learning and discuss how to encourage greater retrofit uptake

Community Energy Opportunities

- Are there opportunities for larger scale energy generation in/around the Parish?

What's an average house in Devon and Cornwall?

- All sorts of housing types (stock) across Devon and Cornwall
- Solid wall homes, Cornish Units, Terraces, 1950s-2020s
- Big, small ... in the centre of town, in the country

- Every house is individual, although same types can be similar

- Retrofitting is needed at scale to meet Devon and Cornwall's climate targets
- Retrofitting can be less expensive if groups of properties are done together

- Rough guide price for a whole house retrofit? Very much dependant upon measures needed.

Useful Resources



A **useful video** to explain retrofitting and importance of a planned approach <https://youtu.be/Ucf0-L8y9Q0>

Devon Retrofit Guide: <https://www.energysavingdevon.org.uk/document/devon-retrofit-guide/>

Warmer Bedford Cottages - Guide for Residents: <https://tamarenergycommunity.com/warmer-bedford-cottages/>

Planning Responsible Retrofit of Traditional Buildings: <https://historicengland.org.uk/images-books/publications/planning-responsible-retrofit-of-traditional-buildings/>

DIY Draughtbusting and Secondary Glazing: <https://tamarenergycommunity.com/wp-content/uploads/2025/02/Draught-Busting-and-DIY-Secondary-Glazing-Manual-Feb-2014.pdf>

Thermal Imaging resources:

WDBC: <https://www.westdevon.gov.uk/sites/default/files/2023-11/Thermal%20Imaging%20Camera%20User%20Guide.pdf>

NHBC: <https://www.nhbc.co.uk/binaries/content/assets/nhbc/foundation/thermal-imaging-report-guide.pdf>

Octopus: <https://octopus.energy/blog/how-to-use-flir-thermal-camera/>

Which: <https://www.which.co.uk/reviews/insulation/article/how-to-use-a-thermal-camera-to-cut-energy-bills-aZzS22N7CDyK>

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Contact Details

Kate Royston, Tamar Energy Community

- 07969 569 444
 - kate.royston@tamarenergycommunity.com
 - <https://tamarenergycommunity.com>
-
- To sign up for a free home visit: <https://tamarenergycommunity.com/request-support>

Additional slides about Listed and Traditional Buildings

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Traditional Buildings

- A building constructed before 1919 is classed as traditional
- Traditional buildings are generally of solid wall or solid timber frame construction
- Construction often follows a local vernacular utilising local materials, construction methods and design.
- According to the STBA⁽ⁱ⁾ traditional buildings make up about 25% of the UK's total building stock.
- Many traditional buildings have evolved over the years with alterations, additions and changes which may have impacted their character and their performance

(i) <https://historicengland.org.uk/images-books/publications/planning-responsible-retrofit-of-traditional-buildings/>

Listed Buildings

- A listed building is one of special architectural or historic interest which is included in the register held by Historic England.
- Buildings can be listed at Grade II, II* or I.
 - Grade I buildings are of exceptional interest - only around 2.5% of listed buildings are Grade I
 - Grade II* buildings are particularly important buildings of more than special interest – around 5.8% of listed buildings are Grade II*
 - Grade II buildings are of special interest – around 91.7% of all listed buildings are in this class and it is the most likely grade of listing for a home owner

Listed Buildings and Improvement

From Historic England:

“Listed buildings can be enjoyed and used, like any other building.

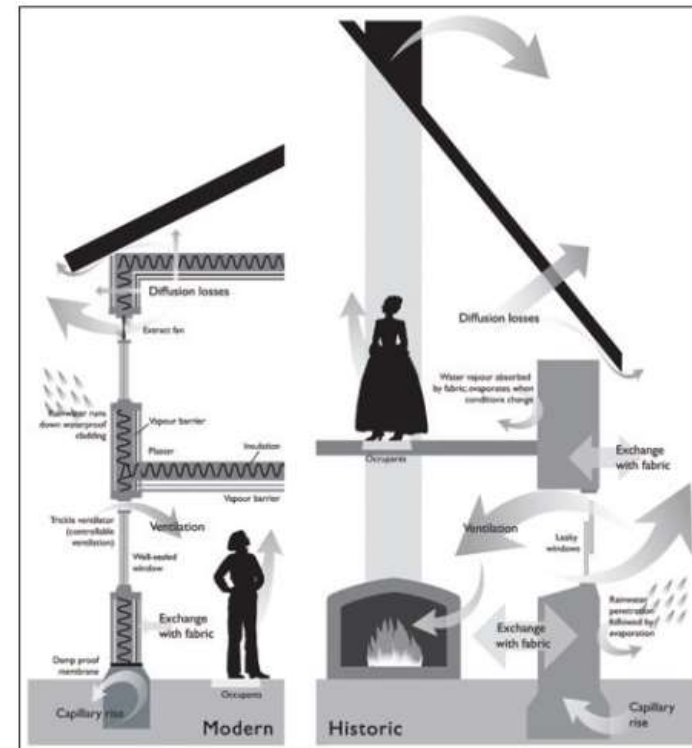
Listing doesn't prevent any change or freeze a building in time, it simply means that listed building consent must be applied for in order to make any changes to that building which might affect its character as a building of special interest.

Listing status covers the entire building, so works which require consent might include the replacement of windows and internal alterations, for example.”

<https://historicengland.org.uk/listing/what-is-designation/listed-buildings/#b5797b67>

Understanding Traditional Buildings

- Traditional buildings are constructed from different materials and in different structural forms compared with modern buildings and consequently they perform differently.
- They usually heat up and cool down more slowly.
- They deal with moisture differently, allowing rain, groundwater and internal moisture (from washing, cooking and breathing) to move in a controlled way into and through their semi-permeable fabric.
- They also rely on sunshine, wind, heating and adequate internal ventilation through windows, chimneys and draughts in order to keep dry.
- In good condition and with regular maintenance, the system stays in balance.
- Changes to fabric performance, heating and ventilation, if not correctly undertaken, can change this balance and lead to problems of overheating, moulds and ill health



<https://historicengland.org.uk/images-books/publications/planning-responsible-retrofit-of-traditional-buildings/>

Respected, Valued and Understood

- It's a privilege to live in a traditional building – many continue to perform well – thermal mass retaining heat in winter and cool in summer
- Understand, value and respect a traditional building and approach retrofit accordingly
- Be clear about what you'd like to achieve and how this can be done, keeping the building in balance, ideally using natural materials
- Seek advice from professionals such as a Retrofit Advisor/Assessor who is knowledgeable about traditional buildings
- If listed and/or in a conservation area/national park/national landscape seek advice from the relevant authorities once you understand the opportunities and considerations yourself and have an initial plan

A different approach for traditional buildings?

- As discussed, consideration and understanding of the building's needs is important, but not the whole story.
- “Planning responsible retrofit of traditional buildings” is a valuable resource in helping to understand this:
 - “Achieving responsible retrofit often requires compromises between different values.
 - It also requires a Whole Building Approach whereby there is integration of:
 - the fabric measures (such as insulation, new windows, draught proofing)
 - and services (particularly ventilation, heating, controls and renewables)
 - along with proper consideration of how people live and use the building.
 - All of these must be adapted to the context of the building (its exposure, status, condition, form etc). When these are integrated well, a building is in balance.”
- This shouldn't be any different to how retrofit of any building is approached

Supporting Householders in Traditional Buildings

- TEC is offering free Retrofit Advice Visits to householders including those in traditional properties to support their retrofit journeys
- Where interested a householder may then choose to self-fund a Whole House Plan; or be referred to appropriate grant funding where eligible.
- Our Retrofit Advisors visiting traditional properties have undertaken the Level 3 in Traditional Buildings course
- We also work collaboratively with our historic building officers to assist householders through grant funded programmes; and to enable shared learning