# HOW TO: Make Sustainability Interventions to Historic Buildings

**London Historic Buildings Trust**

Sarah Buckingham, Trustee

Training supported by capacity grant funding from;

Historic England

LONDON HISTORIC BUILDINGS TRUST

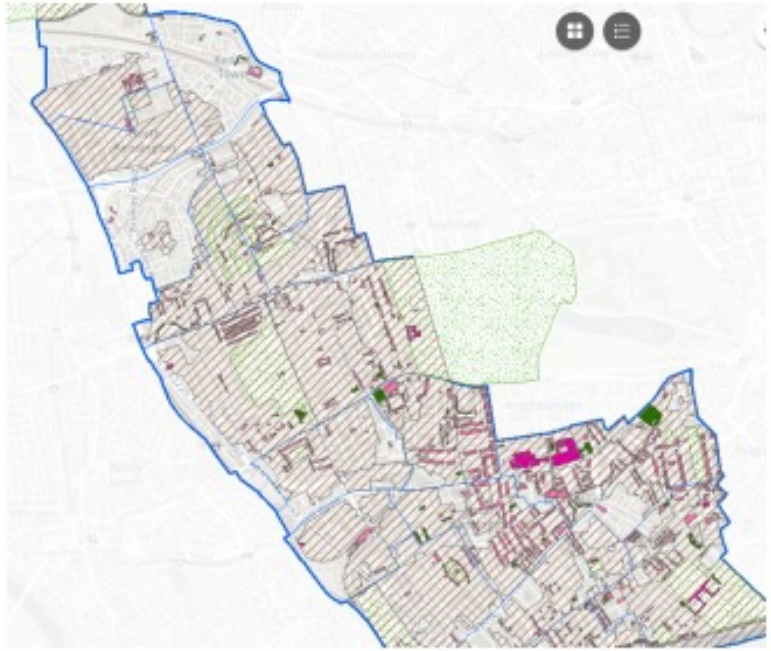
# About LHBT

- Charity, founded 30 years ago
- Only London-wide building preservation trust
- Saving At-risk Heritage: *'sustainable projects, innovative social solutions and cultural benefits'*
- How we work:
    1. Delivering Projects
    2. Peer to Peer support
    3. High Street Heritage Action Zone
    4. Training
    5. Consultancy

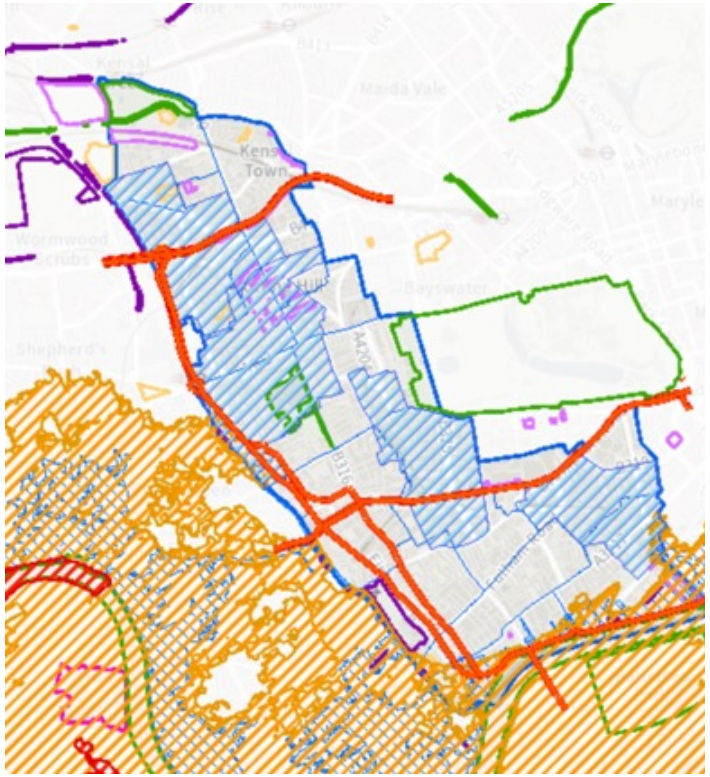

LONDON HISTORIC BUILDINGS TRUST

# My perspectives

## RBKC Key Facts



- Around 75% of the borough is in a conservation area.
- We have around 4,000 'listed buildings' – equating to around 11,000 individual listed properties.
- We also have 15 Registered Parks and Gardens, including several at Grade I.



LONDON HISTORIC BUILDINGS TRUST

# What will we be covering today?

- Reasons for retrofitting for sustainability purposes
- Challenges for retrofitting
- The context of planning and listed building consent
- The types of interventions that might be made and their conservation implications
- Top Tips when considering sustainability interventions to historic buildings
- Links to further resources

LONDON HISTORIC BUILDINGS TRUST

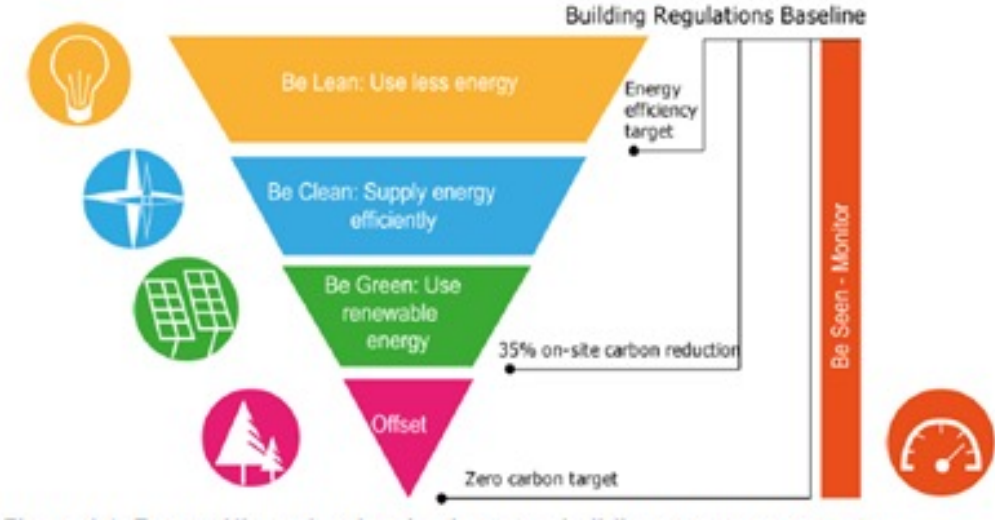
# What do we mean by ‘Retrofitting’?

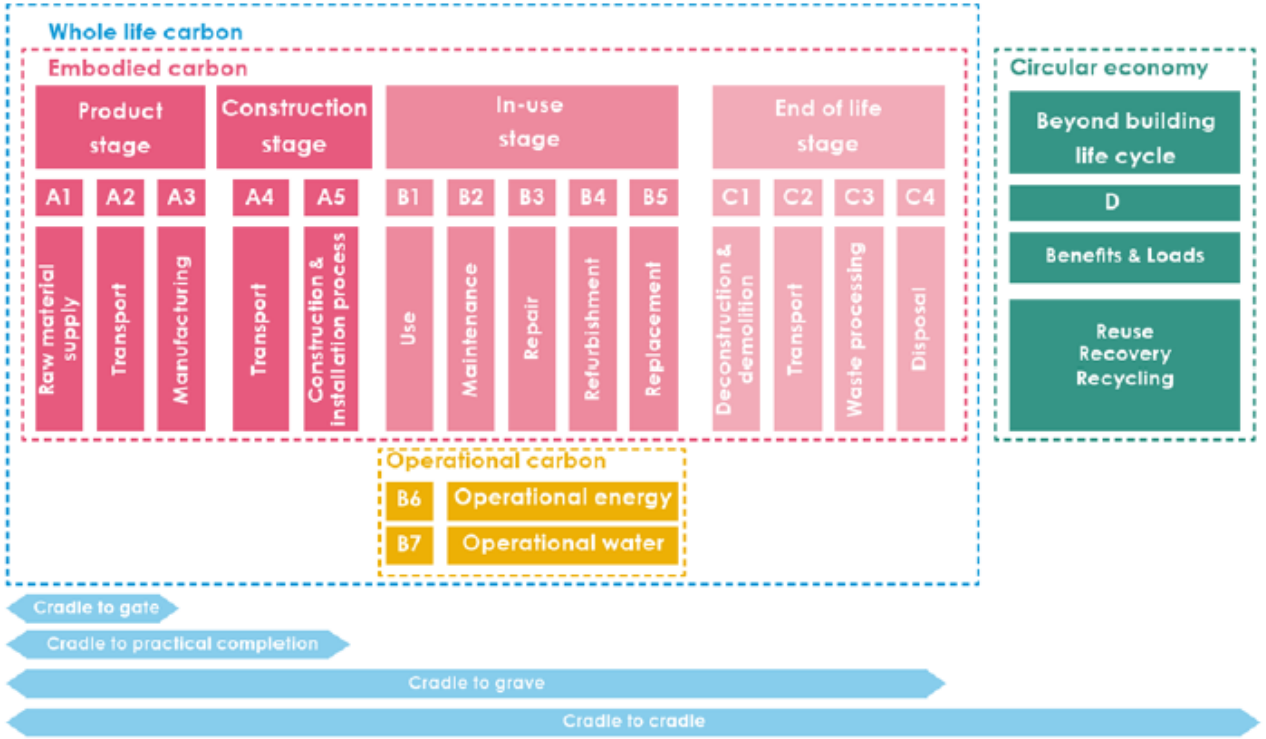
- Literally - to furnish (something, such as a computer, airplane, or building) with new or modified parts or equipment not available or considered necessary at the time of manufacture.
- What it has come to mean very recently, in the context of sustainability is to adapt existing buildings in order to
  - Reduce energy demand by upgrading the fabric or fittings; and
  - Supply more efficient energy, particularly through the use of renewable energy sources.

LONDON HISTORIC BUILDINGS TRUST

# Context

## GLA Energy Hierarchy




HM Government

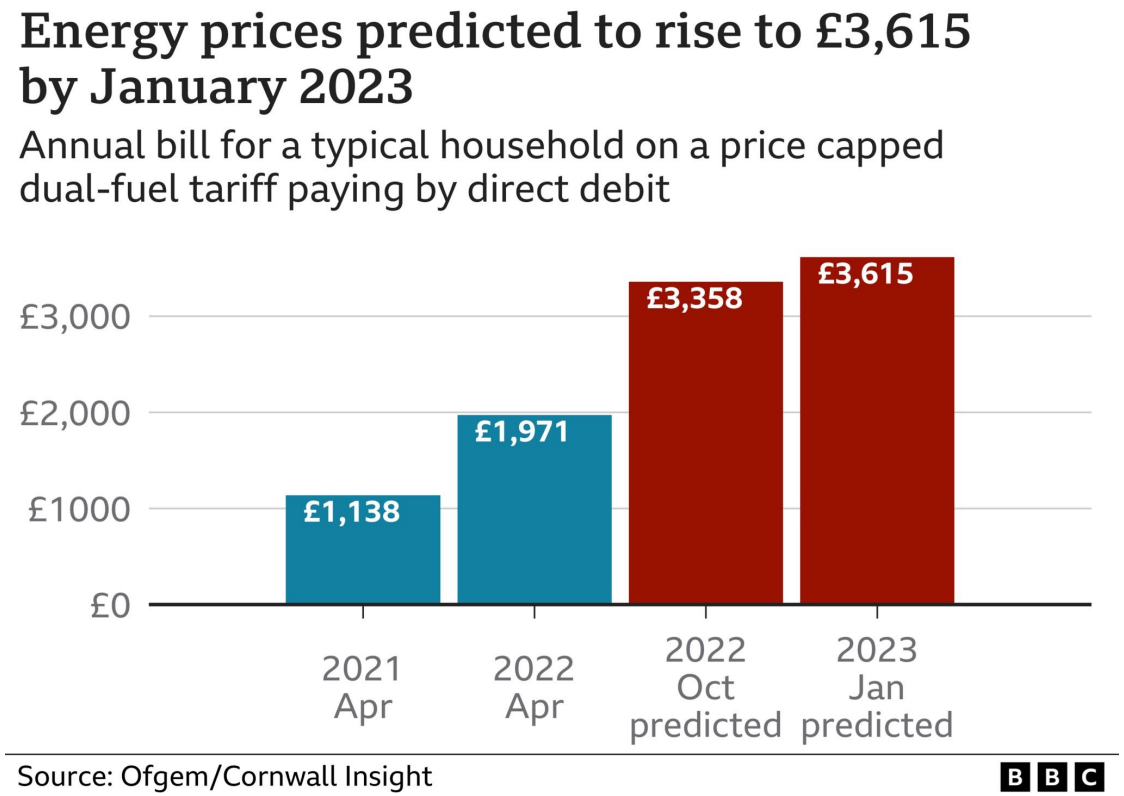
**Conservation of fuel and power**

**APPROVED DOCUMENT**

**L**

LONDON HISTORIC BUILDINGS TRUST

# Why retrofit now?




LONDON HISTORIC BUILDINGS TRUST

# Challenge – uncharted territory


LONDON HISTORIC BUILDINGS TRUST

# Challenge – developing understanding




LIVING

## How tech entrepreneur Justin Cooke turned a stately home into the ultimate family pile

Accustomed to modern loft living, Cooke presented his wife-to-be with this draughty old property in Kent as a perfect starter home, but what was it that attracted the hip young couple?

Andréa Childs

Sunday April 08 2018, 12.01am, The Sunday Times

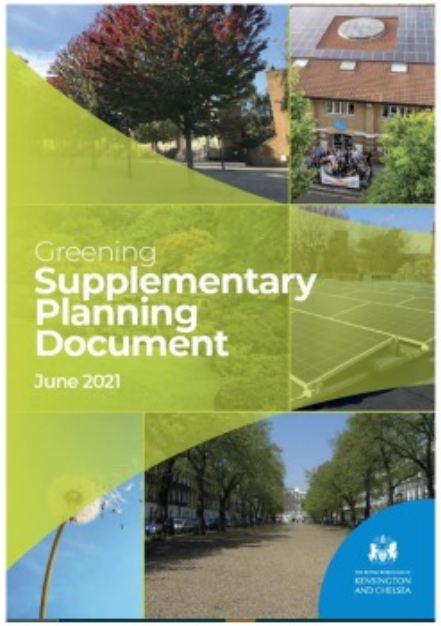
Justin and Jaime Cooke with their children, Alberta, Gibson and Monty, at Bayham Hall
GAVIN SMITH

Jaime Cooke sits in her sun-drenched kitchen and recalls the first time she saw Bayham Hall, the mansion near Lamberhurst, Kent, she shares with her

LONDON HISTORIC BUILDINGS TRUST

# Response

## Possible Planning Responses






| Key | | |
|---|---|---|
| Acceptable and no Planning Permission (PP) or Listed Building Consent (LBC) needed. | Likely to be acceptable - PP or LBC likely to be needed | Permission/consent needed, but not likely to be acceptable. |

| | Non-Heritage Building | Conservation Area Building | Listed Building |
|---|---|---|---|
| **Reduce Energy Demand - Be Lean** | | | |
| **Insulation** | | | |
| Cavity Wall | Acceptable if the construction allows. | Acceptable if the construction allows. | If construction allows, but LBC likely to be needed. |
| Solid Wall Insulation Internal | Need to avoid impermeable materials which will trap moisture and cause condensation. | Need to avoid impermeable materials which will trap moisture and cause condensation. | Likely to be unacceptable in most circumstances. |
| Solid Wall Insulation Internal External | Depends on the effect on the building's appearance and on the surrounding townscape. Need to avoid material which will trap moisture and cause condensation. | Will affect external appearance and affect the character of the CA. May be limited circumstances in which part of a building could be treated. | Likely to be unacceptable in most circumstances. |

LONDON HISTORIC BUILDINGS TRUST

# Challenge – keeping the balance

LONDON HISTORIC BUILDINGS TRUST

# Responses

## A proactive response – the Local Listed Building Consent Order


LONDON HISTORIC BUILDINGS TRUST

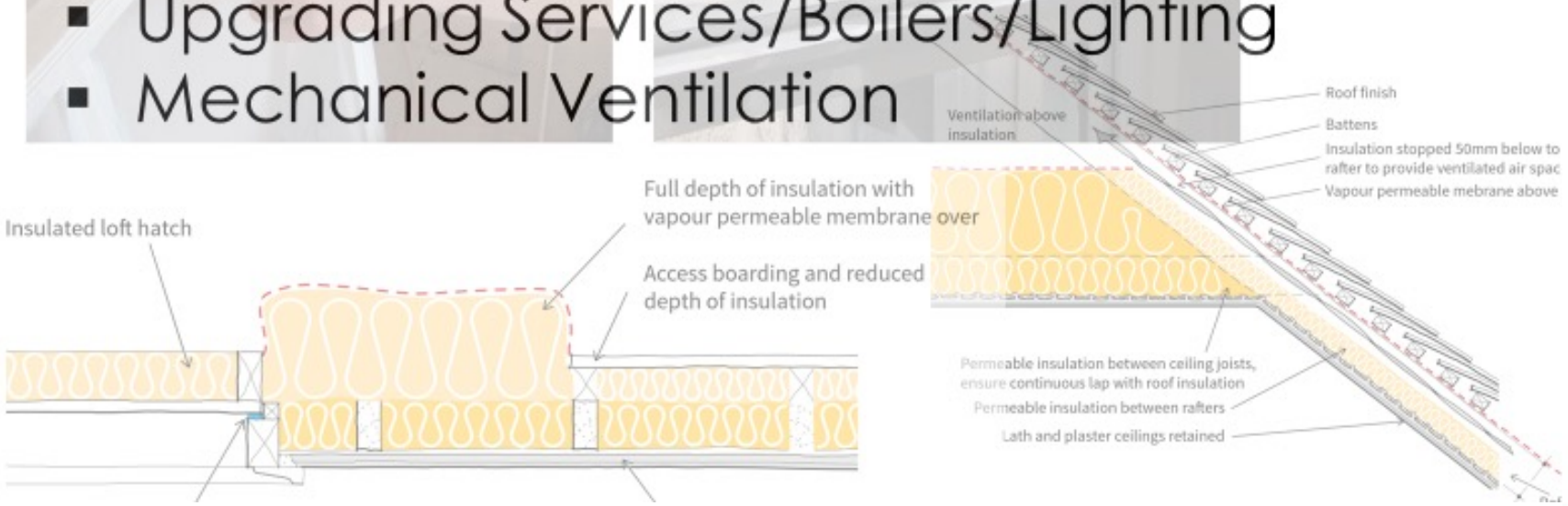
# Before you start retrofitting ……

- Make sure you understand the building's age, construction (including materials) and location (including exposure, orientation and degree of sheltering).
- Make sure you understand the significance of the building.
- Make sure you understand the conservation status of the building – is it in a conservation area, is it listed?
- Make sure the maintenance of the building is up to date.
- Remember – traditional buildings 'breathe'

LONDON HISTORIC BUILDINGS TRUST

# Reducing Demand

- Insulation
- Improving Thermal Bridging
- Windows
- Damp Proofing
- Upgrading Services/Boilers/Lighting
- Mechanical Ventilation




LONDON HISTORIC BUILDINGS TRUST

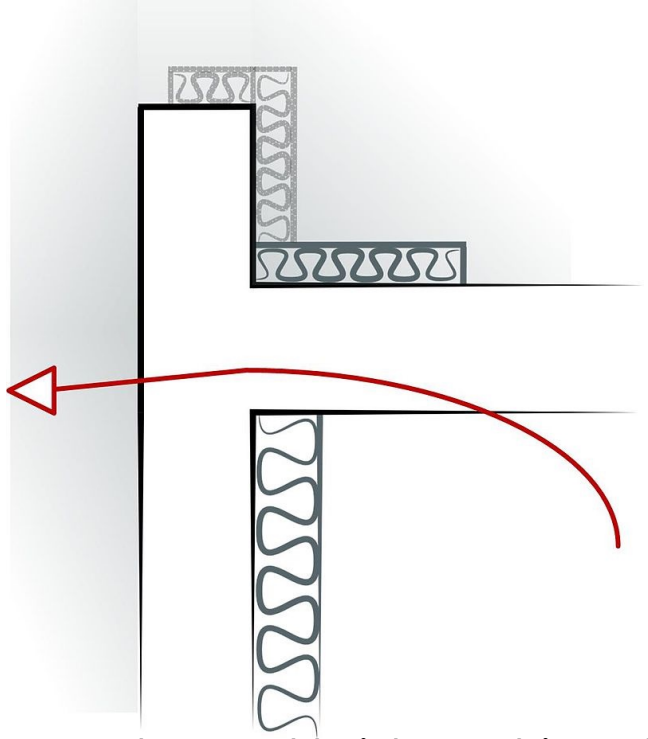
# Insulation

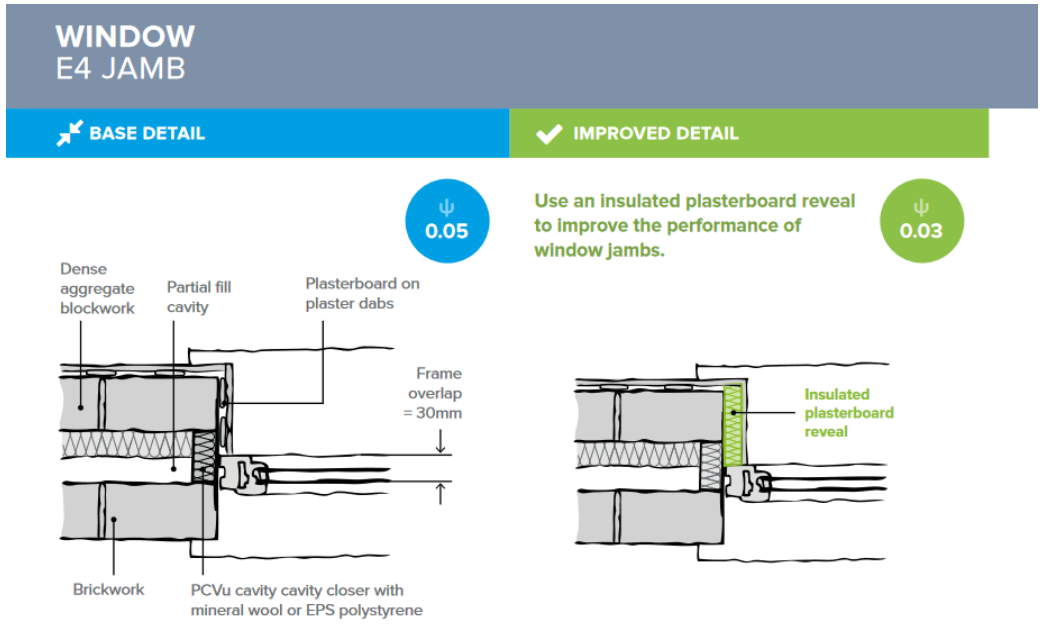
**Possible types: -**

- Walls – internal
- Walls – external
- Roofs – cold roof
- Roofs – warm roof

LONDON HISTORIC BUILDINGS TRUST

# Improving/Avoiding Thermal Bridging






Thermal bridge at junction. Heat moves from the floor structure through the wall because there is no thermal break.
Illustration from https://commons.wikimedia.org/w/index.php?title=User:AmisDeLaThermique&action=edit&redlink=1

LONDON HISTORIC BUILDINGS TRUST

# Upgrading Windows


LONDON HISTORIC BUILDINGS TRUST

# Secondary Glazing

Historic England

## Energy Efficiency and Historic Buildings

Secondary Glazing for Windows

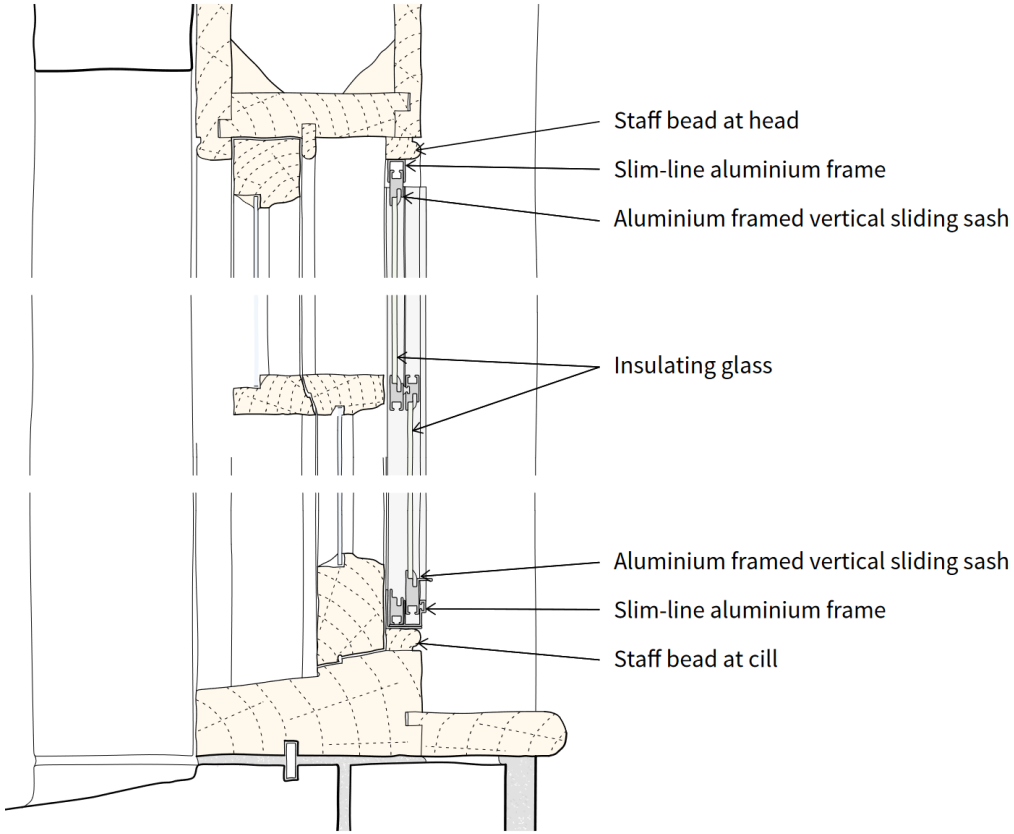
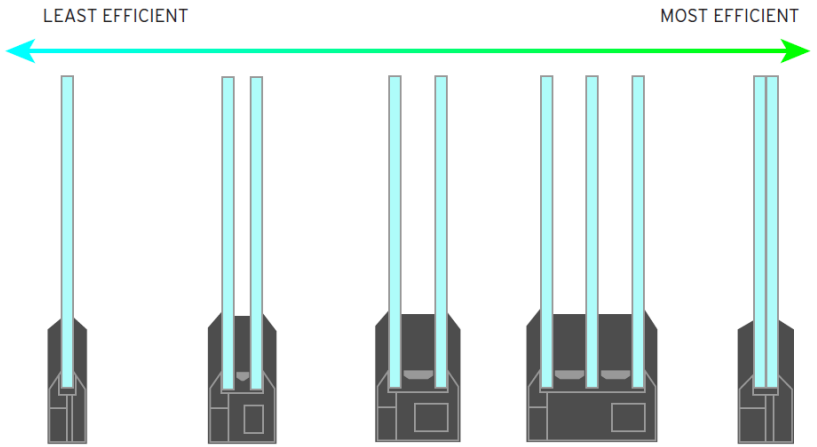



Illustration – Historic England 2016

LONDON HISTORIC BUILDINGS TRUST

# Other window upgrades

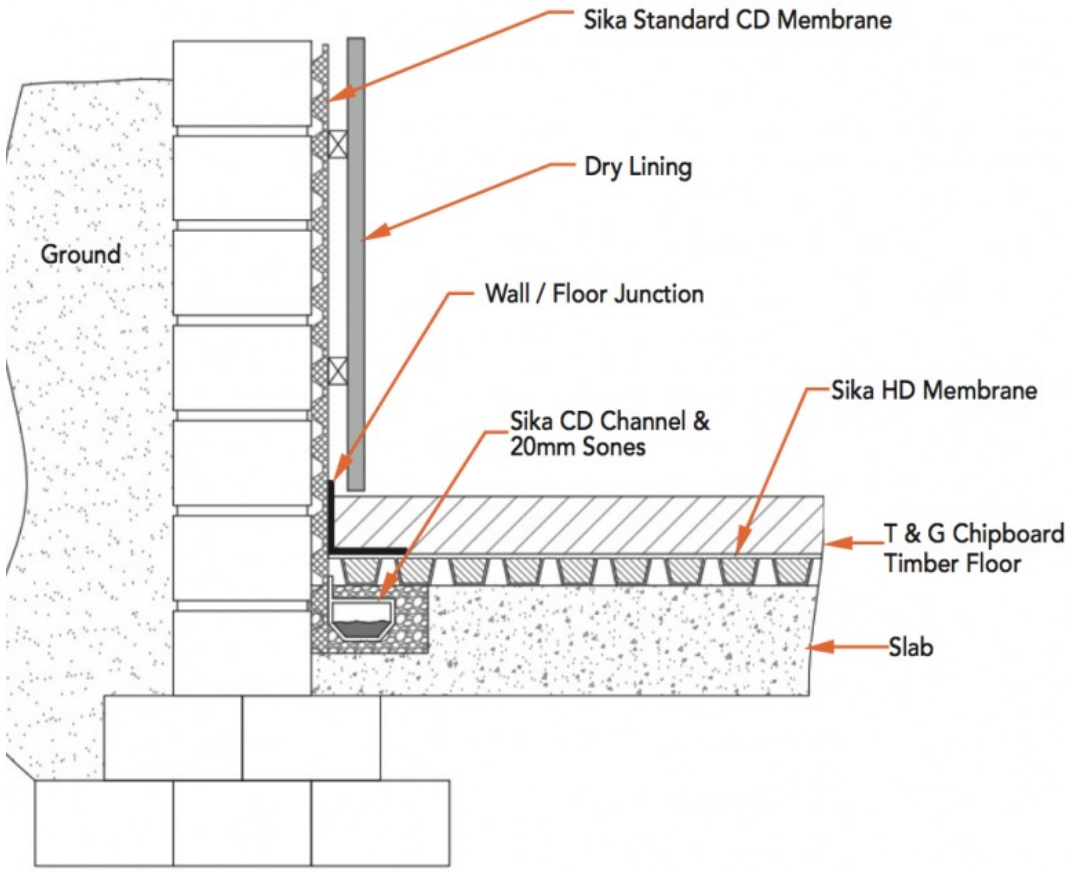
- Draft proofing
- Curtains or blinds
- Shutters
- Re-glazing




| | Single Glazing | Slim Double Glazing | Double-Glazing | Triple Glazing | FINEO |
|---|---|---|---|---|---|
| Thickness | 4mm | 11mm | 28mm | 36mm | 6.7mm |
| U-Value ($W/m^2K$) | 5.8 | 1.9 | 1.2 | 0.8 | 0.7 |
| Light Transmission | 90 | 80 | 80 | 71 | 80 |
| Sound Reduction Rw (C;Ctr) dB | 29 (-2; -3) | 31 (-2; -5) | 31 (-2; -5) | 32 (-1; -5) | 35 (-2;-5) |

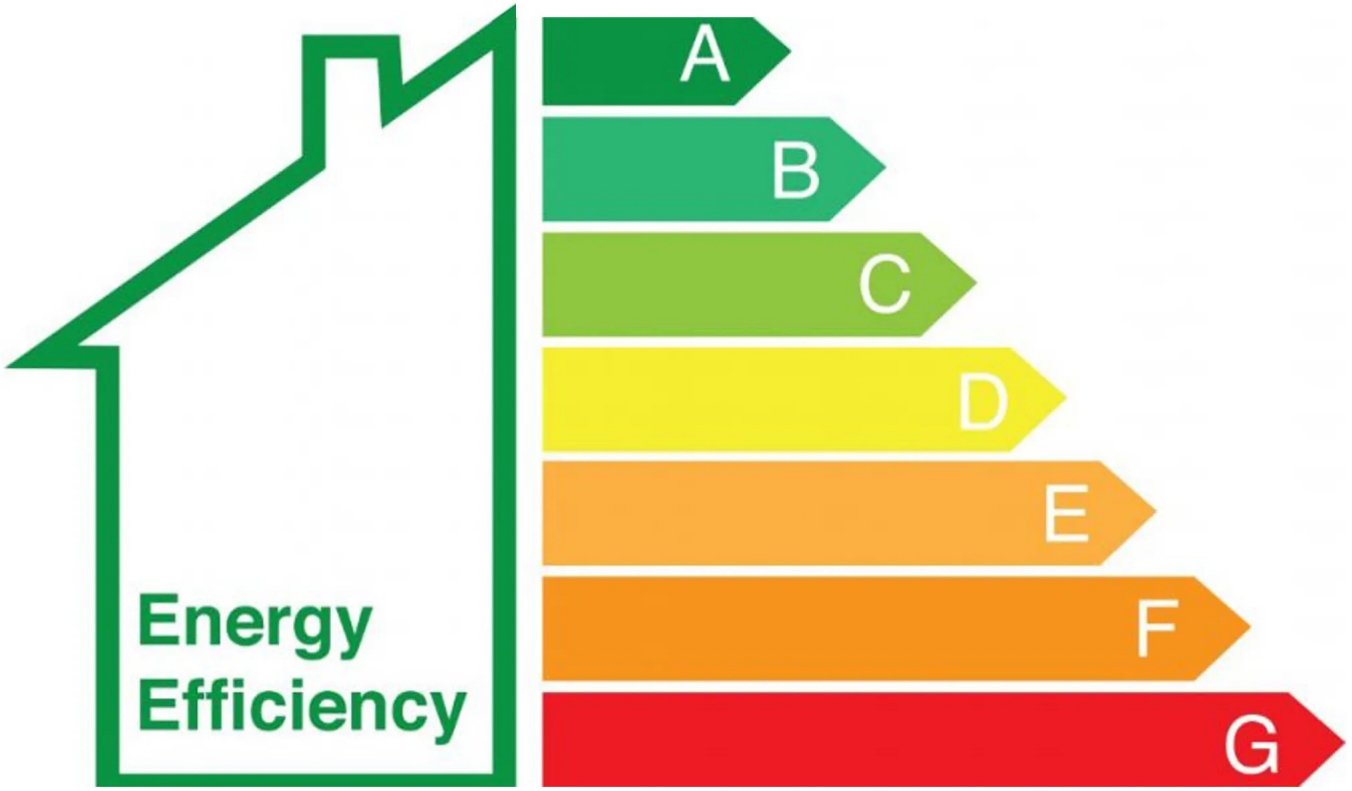
LONDON HISTORIC BUILDINGS TRUST

# Damp Proofing




LONDON HISTORIC BUILDINGS TRUST

# Upgrading Services




## The cost of cooling: how air conditioning is heating up the world

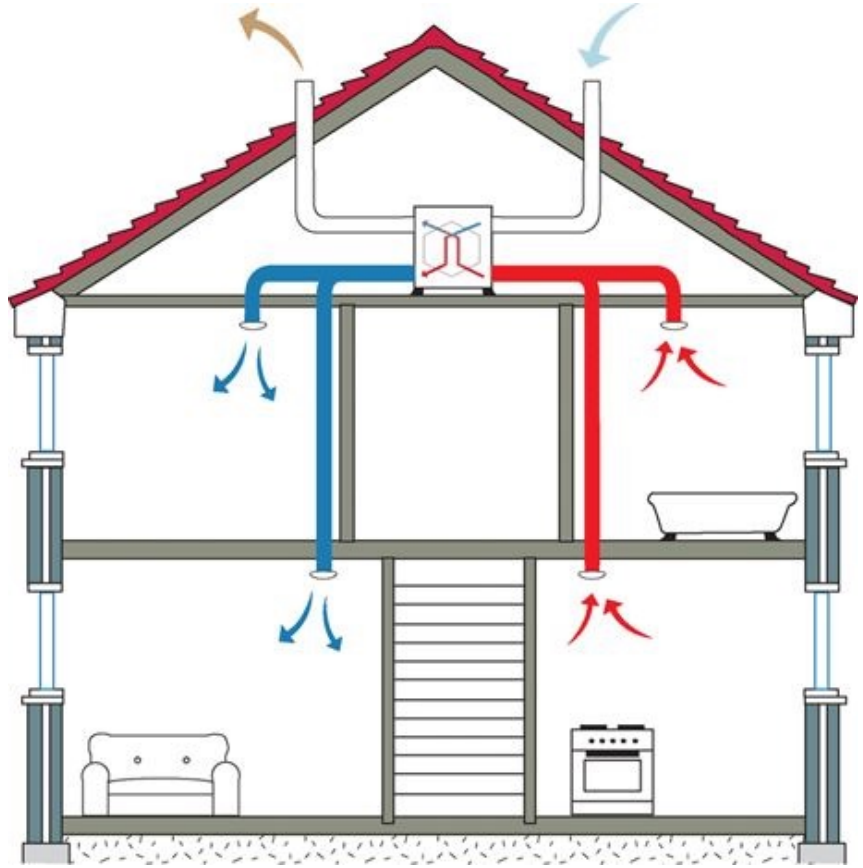
As temperatures rise, a new book delves into the environmental toll of America's favorite way to cool off

Air conditioners outside a building in Seoul. The harmful chemicals that make our lives comfortable contribute to the climate crisis. Photograph: Yonhap/EPA

Aliya Uteuova in The Guardian
Sun 25 Jul 2021

LONDON HISTORIC BUILDINGS TRUST

# Mechanical Ventilation



LONDON HISTORIC BUILDINGS TRUST

# Renewable energy


LONDON HISTORIC BUILDINGS TRUST

# Wind

LONDON HISTORIC BUILDINGS TRUST

# Solar Equipment

## Owners of a £750,000 listed home told to tear down solar panels that caused 'significant visual impact'

- **Andrew and Claire Ashley have been ordered to rip down the £10,000 panels from the grade II-listed property**
- **The panels will have 'a significant visual impact which will diminish the special interest of the building', said the local council**

By DAVID WILKES FOR THE DAILY MAIL
**PUBLISHED:** 23:08, 17 October 2012 | **UPDATED:** 09:28, 18 October 2012


## Listed Churches all over England are installing solar panels

Let there be light – and a cut in the fuel bills

Lucy Stephens • Saturday 18 July 2015 22:17 • Comments


Rev Dr Mark Powell on Melbourne church in Derbyshire *(Andrew Fox)*

LONDON HISTORIC BUILDINGS TRUST

# What is covered by the LLBCO?

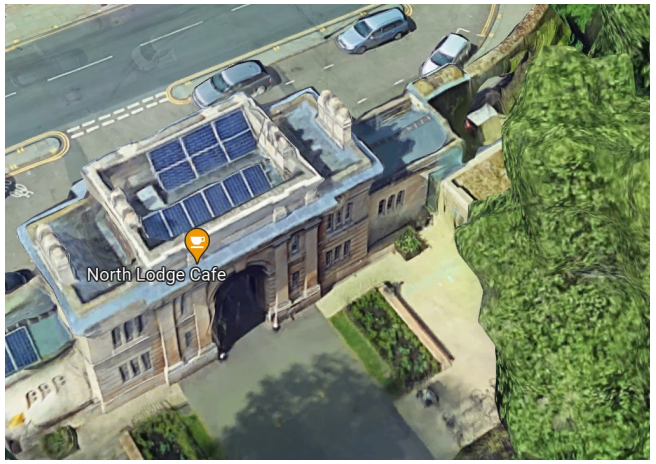
- Whole borough.
- All Grade IIs and some Grade II*'s
- No churches in Ecclesiastical Use.
- The most sensitive Grade II* buildings are excluded
- Other Grade II* buildings are covered by the Order



LONDON HISTORIC BUILDINGS TRUST

# What is consented in the Order?

- Solar PV panels, solar thermal equipment and solar slates are explicitly included.
- We have taken care to specify what is meant by associated equipment, which is also included.


LONDON HISTORIC BUILDINGS TRUST

# What are the Conditions?

- It mirrors the provisions of the GPDO, so that planning permission is not needed.
- Panels are not consented on roof slopes facing a highway.
- Condition vii) seeks that the equipment is maintained in good order and removed as soon as reasonably practicable when no longer needed and works of making good are to match existing.



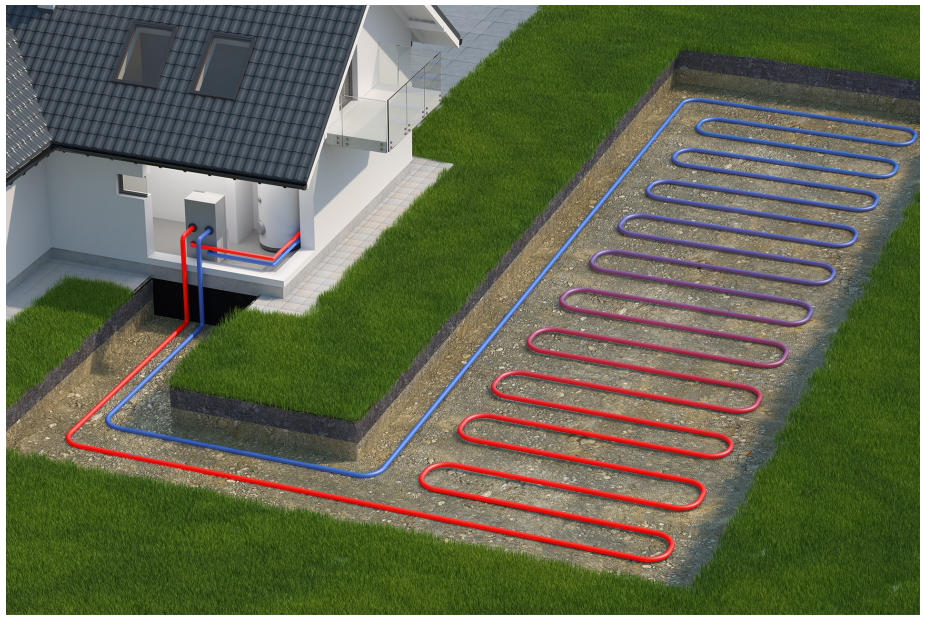
LONDON HISTORIC BUILDINGS TRUST

# Condition vi) of the Order

- Condition vi, of the Order requires the written sign-off of position, size, fixing, colour and finish, associated equipment, and any minor strengthening works to the roof.
- It is a light-touch way to fine tune design.
- Seeking approval for the condition will answer residents' concerns regarding transparency and allow monitoring.
- We will be producing design advice to support residents seeking for approval.


LONDON HISTORIC BUILDINGS TRUST

# Air Source/Ground Source Heat Pumps



LONDON HISTORIC BUILDINGS TRUST

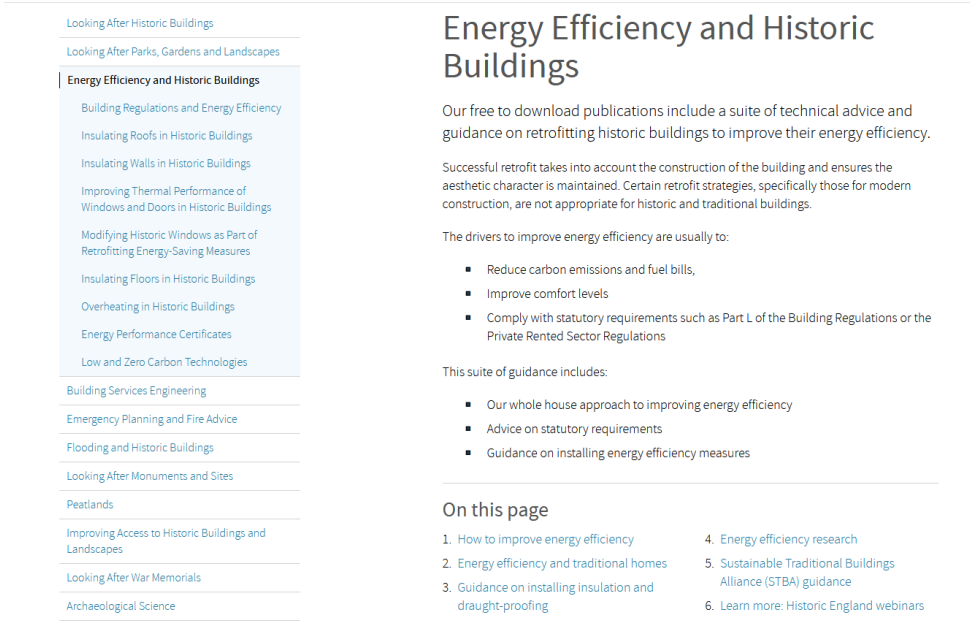
# Top Tips

- Remember that sensitive retrofitting of historic and other traditionally constructed buildings should be able to secure some improvements in energy efficiency.  Even if you can't reach the same standards as new buildings, you can save energy and improve comfort.
- Understand the building as a whole -  how is it constructed, how is it used?  Respond to these characteristics in your retrofit plan, which looks at the building as a whole.
- Check if a property is a listed building, in a conservation area or if there are any other restrictions such as an Article 4 Direction.  If it is a historic building, identify its heritage significance, including any contribution made by its setting.
- Repair works which make the building weather tight will improve its energy efficiency, so always consider these before designing retrofitting measures.
- Think about the whole life-cycle carbon cycle and if necessary, demonstrate that in your retrofit plan.
- A Design and Access Statement, Sustainability Strategy or Energy Strategy should show how sustainability measures have been incorporated into a larger scheme, particularly where you need listed building consent or planning permission.
- Manage any risks to historic fabric, e.g. through reduced ventilation or potential build-up of condensation, arising from retrofitting works.

LONDON HISTORIC BUILDINGS TRUST

# Links and Resources

- British Standard BS 7913:2013: 'Guide to the Conservation of Historic Buildings'
- Building Regulations: Conservation of fuel and power: Approved Document L
- Historic England webpages on Energy Efficiency and Historic Buildings https://historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/



Looking After Historic Buildings
Looking After Parks, Gardens and Landscapes
Energy Efficiency and Historic Buildings
Building Regulations and Energy Efficiency
Insulating Roofs in Historic Buildings
Insulating Walls in Historic Buildings
Improving Thermal Performance of Windows and Doors in Historic Buildings
Modifying Historic Windows as Part of Retrofitting Energy-Saving Measures
Insulating Floors in Historic Buildings
Overheating in Historic Buildings
Energy Performance Certificates
Low and Zero Carbon Technologies
Building Services Engineering
Emergency Planning and Fire Advice
Flooding and Historic Buildings
Looking After Monuments and Sites
Peatlands
Improving Access to Historic Buildings and Landscapes
Looking After War Memorials
Archaeological Science

Energy Efficiency and Historic Buildings

Our free to download publications include a suite of technical advice and guidance on retrofitting historic buildings to improve their energy efficiency.

Successful retrofit takes into account the construction of the building and ensures the aesthetic character is maintained. Certain retrofit strategies, specifically those for modern construction, are not appropriate for historic and traditional buildings.

The drivers to improve energy efficiency are usually to:

- Reduce carbon emissions and fuel bills,
- Improve comfort levels
- Comply with statutory requirements such as Part L of the Building Regulations or the Private Rented Sector Regulations

This suite of guidance includes:

- Our whole house approach to improving energy efficiency
- Advice on statutory requirements
- Guidance on installing energy efficiency measures

On this page

1. How to improve energy efficiency
2. Energy efficiency and traditional homes
3. Guidance on installing insulation and draught-proofing
4. Energy efficiency research
5. Sustainable Traditional Buildings Alliance (STBA) guidance
6. Learn more: Historic England webinars

LONDON HISTORIC BUILDINGS TRUST

# Links and Resources contd.

***'Energy Efficiency and Historic Buildings: How to Improve Energy Efficiency'* (2018).** https://historicengland.org.uk/images-books/publications/eehb-how-to-improve-energy-efficiency/

***'Energy Efficiency and Traditional Homes'* (2020).** https://historicengland.org.uk/images-books/publications/energy-efficiency-and-traditional-homes-advice-note-14/

**'Energy Efficiency and Historic Buildings - Application of Part L of the Building Regulations to historic and traditionally constructed buildings' (2017).** https://historicengland.org.uk/images-books/publications/energy-efficiency-historic-buildings-ptl/

**Guidance on roof insulation:** https://historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/insulating-roofs-in-historic-buildings/

**Guidance on wall insulation:** https://historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/insulating-walls-in-historic-buildings/

**Guidance notes on windows and doors:** https://historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/windows-and-doors-in-historic-buildings/

**Guidance on floor insulation:** https://historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/insulating-floors-in-historic-buildings/

Link to the Bloomsbury Passivhaus case study: https://passivehouseplus.ie/magazine/upgrade/historic-london-house-gets-near-passive-transformation

LONDON HISTORIC BUILDINGS TRUST

# Links and Resources contd.

**Guidance on LZC technologies:** https://historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/low-and-zero-carbon-technologies/

**STBA, *'Planning Responsible Retrofit of Traditional Buildings'* (2015).** https://historicengland.org.uk/images-books/publications/planning-responsible-retrofit-of-traditional-buildings/responsible-retrofit-trad-bldgs

**STBA, *'Responsible Retrofit Guidance Wheel'* (2014).** http://responsible-retrofit.org/wheel/

**Westminster City Council, *'Retrofitting Historic Buildings for Sustainability'* (2013).** https://www.westminster.gov.uk/retrofitting-historic-buildings

**GLA London Solar Opportunity Map:** https://www.london.gov.uk/what-we-do/environment/energy/energy-buildings/london-solar-opportunity-map

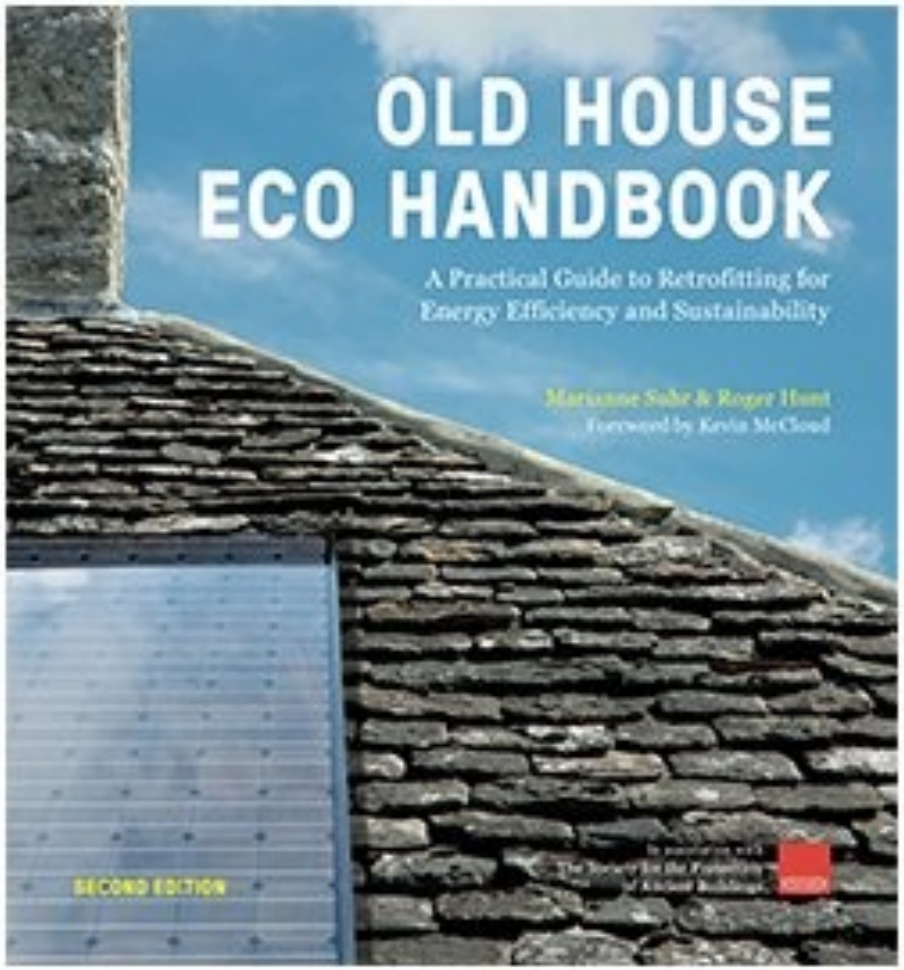
**GLA London Heat Map:** https://www.london.gov.uk/what-we-do/environment/energy/london-heat-map

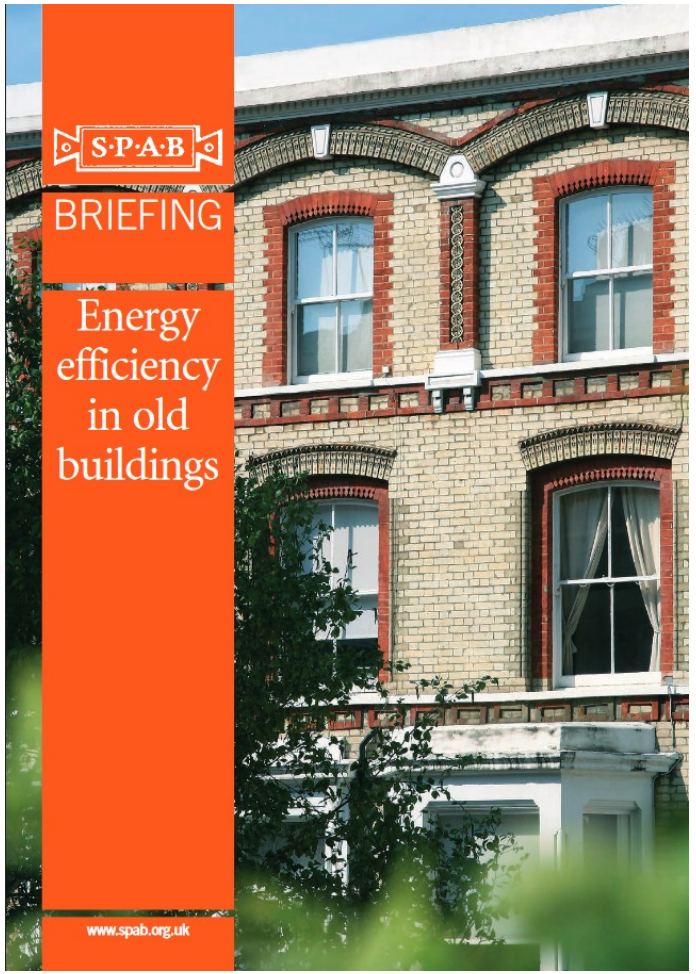
**UK Green Building Council, *'Circular economy guidance for construction clients'* (2019).** https://www.ukgbc.org/ukgbc-work/circular-economy-guidance-for-construction-clients-how-to-practically-apply-circular-economy-principles-at-the-project-brief-stage/

**GLA, *'Design for a Circular Economy'* (2019).** https://www.london.gov.uk/sites/default/files/design_for_a_circular_economy_web.pdf

LONDON HISTORIC BUILDINGS TRUST

# Links and Resources contd.




LONDON HISTORIC BUILDINGS TRUST