Energy Efficiency

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Energy Efficiency

• How do we measure the energy efficiency of a home
• Where do we loose heat
• How can we improve the energy efficiency rating
Building Regulations

• 1894 – Homes built in accordance with Health Act
• 1965 – Building Regulations introduced, replacing local Bylaws
• 1976 – First time Building Regulations included thermal insulation for all buildings instead of only dwellings.
• April 2002 – Tightened further to include specific efficiencies for replacement boiler systems and replacement windows.
• July 2005 – Proposed changes to Regulations are split between New Dwellings – Part L1A and Existing Dwellings – Part L1B
• April 2007 – new dwellings now have to meet tight Carbon emissions targets.
Identifying the energy efficiency of a home

**Standard Assessment Procedure (SAP)**

- Governments procedure on a scale of 0 - 120
- Takes into account: *thermal insulation; efficiency and control of heating system; fuels used.*
- New build should score at least between 80-85
- Excludes lighting and electrical appliance use plus many other factors

**National Home Energy Rating (NHER)**

- Measure of energy efficiency of dwellings in terms of running costs
- Calculated using a detailed computer model taking into account virtually the same as SAP, but also takes into account *geographical location and running costs*
- Measured on a scale of 1-10
- NHER is a complete energy label
NHER Certificate

- NHER rating
- 'SAP' rating
- Carbon index
  (Tonnes of Carbon dioxide emissions each year)
Energy Performance Certificate

- Required for all domestic dwellings *
- SAP based software
- Energy and Environmental Rating (A-G)
- EPC comes with Energy Report
- Lasts for 10 years

* Timing depends on tenure
Heat Loss
Where the heat goes

- 25% Roof
- 35% Through the walls
- 15% Floor
- 15% Draughts
- 10% Windows
- 15% Floor
Fabric Heat Loss

Walls / Roof / Floors / Windows

Factors influencing fabric heat loss:
- Area of structure
- Temperature difference
- Insulation properties (U-values)
U - Values

• A U-Value is a measurement which of heat flow through a material

• U-Values depend upon the thermal conductivity and the thickness of the material

• The lower the U-Value, the lower the rate of heat loss
Ventilation Heat Loss

Draughts

“Uncontrolled / Unwanted ventilation”

• Gaps around: floors doors/window frames/roofs/Ceiling
• Unused chimneys
• Airbricks / open flue (old houses)

All fuel burning appliances require ventilation. It is difficult to build an air tight home.
Factors affecting heat loss

- Plan of building
- Proportion of external walls
- Location/exposure (high-rise flats)
- Cold end walls
- Exposed floors
- Cold bridging
- Building fabric
- Large windows
- Level of insulation
- Ventilation rate (draughty)
- Shading
Insulation
**Insulation**

The purpose of insulation is to reduce heat loss in order to achieve suitable comfort levels in the home without having to increase the heat from the existing heating appliances/systems.

It is essential that insulation is installed to an appropriate standard.
Cavity Wall Insulation

- Reduces heat loss through walls by up to 60%
- Can save up to 35% on fuel bills.
- Installation takes less than half a day to complete, and you won't have to move out of your home
- Cost: £450/500 but grants available to all
- Saving: £150/250 per year
Stretcher bond brick pattern
Cavity wall with ‘snapped’ headers
External Wall Insulation

E.g. Rigid Insulation Boards/metal carrier system
Cost £4000 based on 70 m²
Saving £150/300 per year
Rigid insulation boards with silver moisture barrier
Internal Solid Wall Insulation

- Plasterboard laminates /
  Wooden battens with a
  Vapour barrier
- New innovative products
  coming on the market

£2500 (contractor)

Saving: £100 - £150 per year
Pitched Roof Insulation

- Insulation is laid between and over the ceiling joists in the loft space.
- Install loft insulation to a depth of at least 280mm and you can save around 20% of your heating costs.
- Cost: £190-£300 Professional, £130-£150 DIY
- Saving: £160 - £200 (virgin loft)
Flat roof insulation

• Insulation can be installed above or below the roof surface (known as the roof deck)

• Warm deck = rigid insulation board on top of roof deck, with waterproof finish eg asphalt or roofing felt.

• Cold deck = Insulation added below the roof deck in the space just above the ceiling

See page 55 of Energy in the Home
Sealed Unit Double Glazing

- Double glazing can reduce heat loss through windows by up to 50%. Better still, new energy-efficient glass technology (low emissivity) can reduce heat loss by a further 10%.
- Cost: £400 (per unit) when replacing single glazed frames with sealed unit double glazing
- Saving: £40 - £60 per year (per unit)
Secondary Glazing

• Secondary glazing can be applied in different ways using a variety of materials

• Each method of glazing will have the same insulation properties if it is well fitted
Draught-proofing windows and doors

- 15% of heat can be lost through draughty, ill-fitting doors and windows.
- **Cost:** £45 - £60 DIY
- **Saving:** £40 per year
Floor Insulation

- Insulate under a suspended timber floor, or on top of a solid floor (e.g. A floating floor)
- Only worthwhile if renovating as additional costs are incurred.
- Typical costs of materials only: £250
- Saving £60
Hot Water Cylinder Jacket

- A priority measure
- **Cost** £10 (DIY)
- **Saving** £30 per year
Heat loss comparison between an uninsulated and an insulated house

House A uninsulated

- 35% heat loss
- 15% heat loss
- 10% heat loss
- 15% heat loss

House B insulated

- 25% heat loss
- 8% heat loss
- 5% heat loss
- 9% heat loss
- 9% heat loss

Estimated saving 57%
Energy Efficiency Measures

• Standard measures receive CERT funding
• DIY well worth considering with discounted materials available
• Tackle the BIG wins first
• Ensure you improve the efficiency of home before considering renewable technologies
Energy Efficiency

Questions
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