

# The Practical Application of Energy Efficiency Improvements in Social Housing

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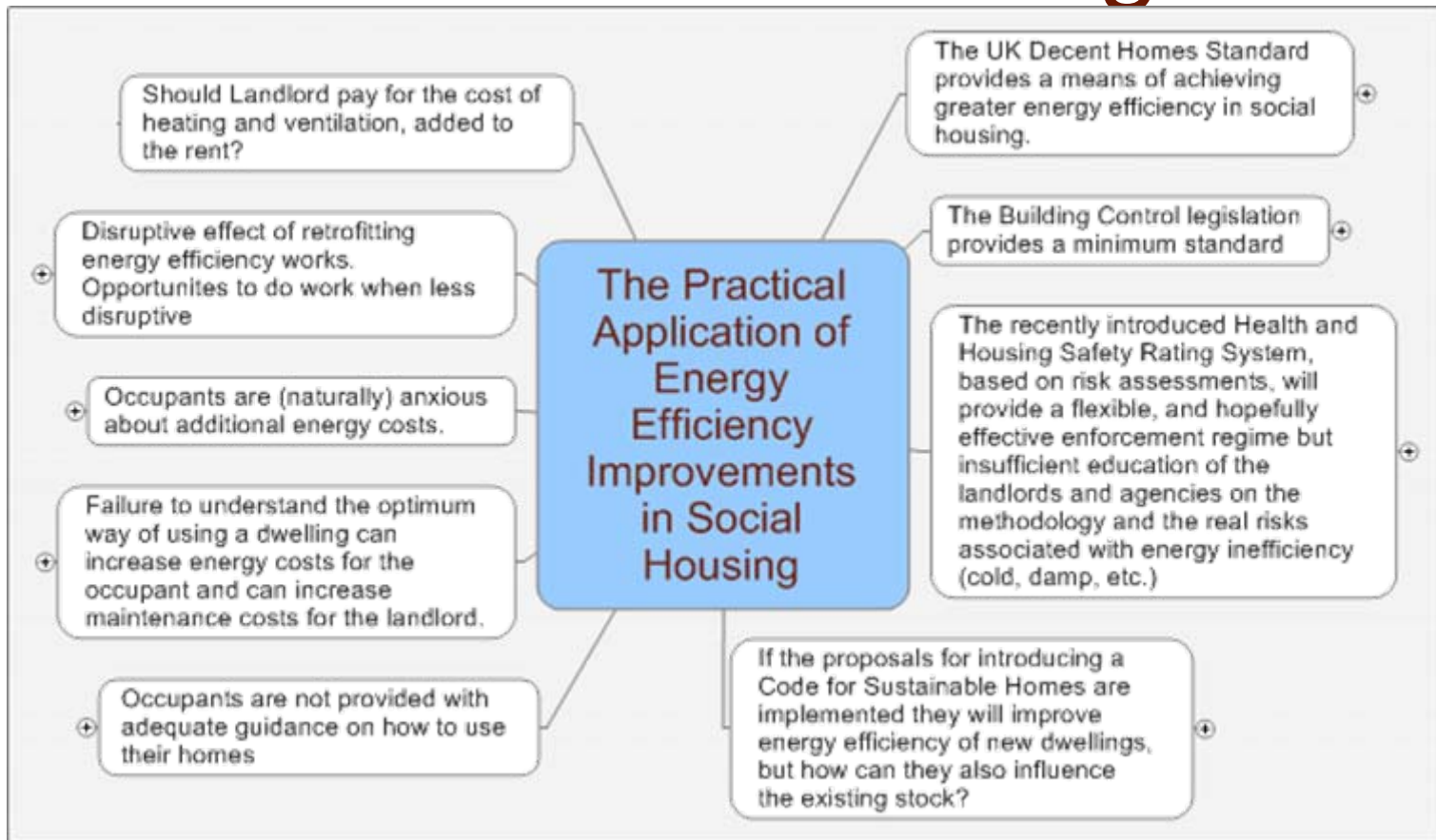
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**Association of Building Engineers**

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# The UK Decent Homes Standard

A decent home is one that meets the following criteria:

- is above the current statutory minimum standard for housing;
- is in a reasonable state of repair;
- has reasonably modern facilities and services;
- provides a reasonable degree of thermal comfort.

# The Building Control legislation provides a minimum standard

- Part L
  - Limit heat loss by
    - Insulation of building
    - Airtight building
    - Insulation of pipework, etc.

# The Building Control legislation

- Part L Performance Targets
  - Heating & hot water
    - Efficient appliances
    - Controls for timing and temperature
  - Lighting
    - Switching
    - Energy efficient

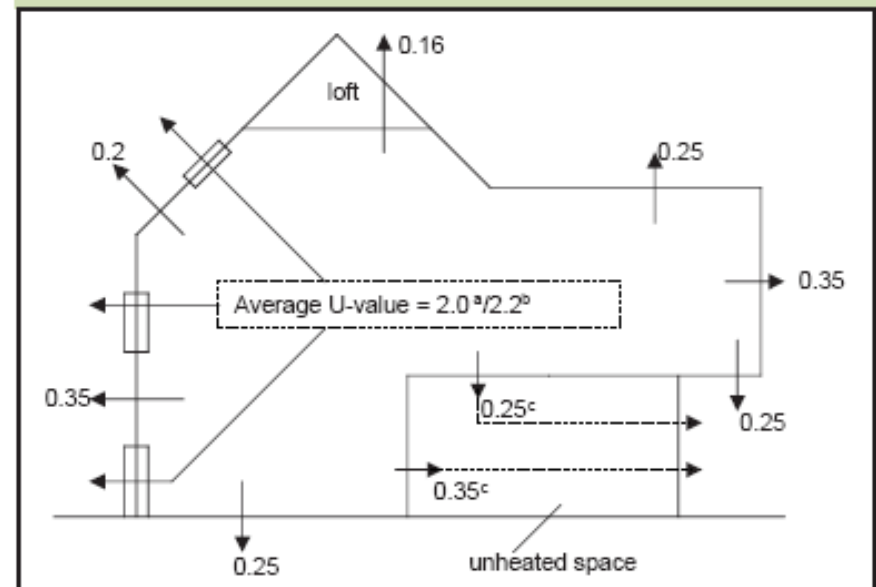
# The Building Control legislation

- Part L Performance Targets Prior to April 2006

**Table 1 Elemental Method: U-values (W/m<sup>2</sup>K) for construction elements**

Exposed Element	U-value
Pitched roof with insulation between rafters <sup>1,2</sup>	0.2
Pitched roof with integral insulation	0.25
Pitched roof with insulation between joists	0.16
Flat roof <sup>3</sup>	0.25
Walls, including basement walls	0.35
Floors, including ground floors and basement floors	0.25
Windows, doors and rooflights <sup>4</sup> (area-weighted average), glazing in metal frames <sup>5</sup>	2.2
Windows, doors and rooflights <sup>4</sup> (area-weighted average), glazing in wood or PVC frames <sup>5</sup>	2.0

**Diagram 1 Summary of Elemental Method**



# The Building Control legislation

- Part L Performance Targets from April 2006

Table 4 Standards for thermal elements W/m <sup>2</sup> ·K		
Element <sup>1</sup>	(a) Standard for new thermal elements in an extension	(b) Standard for replacement thermal elements in an existing dwelling
Wall	0.30	0.35 <sup>2</sup>
Pitched roof – insulation at ceiling level	0.16	0.16
Pitched roof – insulation at rafter level	0.20	0.20
Flat roof or roof with integral insulation	0.20	0.25
Floors	0.22 <sup>3</sup>	0.25 <sup>3</sup>

Table 5 Upgrading retained thermal elements		
Element	(a) Threshold value W/m <sup>2</sup> ·K	(b) Improved value W/m <sup>2</sup> ·K
Cavity wall*	0.70	0.55
Other wall type	0.70	0.35
Floor	0.70	0.25
Pitched roof – insulation at ceiling level	0.35	0.16
Pitched roof – insulation between rafters	0.35	0.20
Flat roof or roof with integral insulation	0.35	0.25

\* This only applies in the case of a wall suitable for the installation of cavity insulation. Where this is not the case it should be treated as for 'other wall type.'

# Health and Housing Safety Rating System

The recently introduced **Health and Housing Safety Rating System**, based on risk assessments, will provide a flexible, and hopefully effective enforcement regime but there may have been insufficient education of the landlords and managers on the methodology and the real risks associated with energy inefficiency (cold, damp, etc.)



# Condensation and mould



# Health and Housing Safety Rating System

- Scoring
  - Based on Statistics of likelihood
  - Risk Assessment

## HEALTH AND SAFETY RATING SYSTEM SCORES

### LIKELIHOOD

										Post 1980	Pre 1919	1 in	1		
10000	5600	3200	1800	1000	560	320	180	100	56	32	18	10	6	3	1
											Average				Model

### Justification

The presence of such severe dampness and the mould growth means there is a certainty of a harmful occurrence over the next twelve months. The condition would also have a psychological effect on any occupant.

# HHSRS

**Justification** Although there is some mould growth, it is not that serious. The over-riding problem is the dampness, and there is nothing to suggest the outcomes would differ from the average.

		Model											
RATING		A	B	C	D	E	F	G	H	I	J	Score	1389
		<i>Average</i>											

## RATING SCORES AFTER IMPROVEMENT

**IMPROVE** Likelihood to 1 in 10 Outcomes to 0 | 0.1 | 1 | 99 %

**Justification** The minimum works would be to strip and properly recover the whole of roof; to renew the rainwater goods; and remove all damp affected plaster and replaster and redecorate the walls. This would reduce the likelihood to the average for the age of the property. (Clearly, other works are required to the house as a whole.)

		Improved											
NEW RATING		A	B	C	D	E	F	G	H	I	J	Score	139
		<i>Average</i>											

*Basis of averages: Population living in dwellings that are damp or have defective ventilation or heating*

# Code for Sustainable Homes

If the proposals for introducing a **Code for Sustainable Homes are implemented** they will improve energy efficiency of new dwellings measured at 5 levels

1. a base level that meets the minimum standard in each of the six essential elements;
2. three further levels that deliver all of the minimum standards and additional levels of sustainability either by meeting higher standards in some of the essential elements or by offering some of the optional elements; or a combination of both; and
3. a level which delivers 80% or more of the Code.

# Code for Sustainable Homes

The Code as currently proposed will have six essential elements:

1. energy efficiency in the fabric of the building and appliances in the building. This covers, for example, the standard of insulation or the use of solar heating. It may include 'A' rated kitchen appliances (where fitted) or low energy light bulbs;
2. water efficiency, for example, fitting dual or low flush toilets and reduced flow taps;
3. surface water management, for example sustainable drainage;
4. site waste management, as building construction is responsible for a significant proportion of waste that currently goes to landfill;
5. household waste management. This means providing space for bins, such as segmented kitchen bins for recycling waste;
6. use of materials, for example, using low allergy materials.

# Code for Sustainable Homes

In addition, homes built to higher Code standards may have some of the following features

- a) **Lifetime Homes**. This is about internal adaptability so that a home can be adapted for use of an elderly or disabled person;
- b) additional **sound insulation** which is important especially in apartment developments;
- c) **private external space** which may be a garden or a balcony;
- d) higher **daylighting standards** which is beneficial to health and reduces the need for electric lighting;
- e) improved **security**;
- f) a **home user guide**. This is a home log book and will advise purchasers on the details of the sustainability of their home.

# Guidance for Occupants on how to use their homes

- Insulation
  - Codes set standards – not variable by Occupant
- Heating
  - Codes set standards – variable by Occupant
- Ventilation
  - Codes set standards – variable by Occupant

# Guidance for Occupants on how to use their homes

- Occupants are not provided with adequate guidance on how to use their homes
  - Appliance > instruction book
  - Car > manual



# Condensation and mould



# Condensation and mould



# An optimum way of using a dwelling

- Remediating Condensation dampness and mould growth
  - Ventilation
  - Heating
  - Insulation

# Ventilation

- Ventilation
  - Automatic (i.e. humidistat controlled) extract fans, operating separately from lights

# Ventilation



MODULE	CONTROL	FUNCTION
	Basic	Fan operates by remote switch (optional). No module required
PCM	72573602 Pull Cord	Manual on/off control by pull cord switch
TM	72612601 Timer	Adjustable timer 1 to 45 minutes. Remote or light switch operation
HTM	72573601 Humidity	Adjustable humidity setting 40% to 90% RH, adjustable timer and pull cord boost
PRTM	72573903 Infrared	Passive infrared activation with adjustable timer overrun
PRHTM	72573901 Infrared	Passive infrared activation with adjustable humidity setting and adjustable timer overrun
2SM	72573601 Two speed	On/off by remote switch (optional), starts at full speed and reduces to trickle speed by integral pull cord.

# Heating

- Heating controlled by timed air thermostats, correctly set



# Additional energy costs.

- Occupants are (naturally) anxious about additional energy costs
  - Inadequately publicised research and reassurance to demonstrate that
    - intermittent heating can increase rather than reduce costs.
    - Switching off ventilation will increase moisture retention > reducing comfort levels

# Additional energy costs.

- Landlord can obtain benefits from increased comfort for Occupant:
  - Reduction in rent arrears and housing management costs
  - Reduction in dispute costs
    - Legal
    - Management
  - Reduction in repair costs
    - Kitchen units
    - Plaster
    - Flooring
    - Windows



# Landlord pay for heating and ventilation?

Should the Landlord pay for the cost of heating and ventilation, added to the rent?

“Big Brother”?

Tamper-proof/ automatic controls for minimum levels.

Recording of use data

User Choice:

Temperature within a “comfort range”

Excessive use?

# Disruption to Existing Dwellings

- Disruptive effect of retrofitting energy efficiency works.
  - Take appropriate opportunities to carry out major works when less disruptive
    - Insulation when property becomes empty/ refurbished
    - Heating works in warmer weather (but not school holidays when the home is crowded)
    - Ventilation and heating at the same time

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