United Nations Forum on Energy Efficiency and Energy Security: Taking Collaborative Action on Mitigating Climate Change

Overview of Standards for Promoting Energy Efficiency in Buildings

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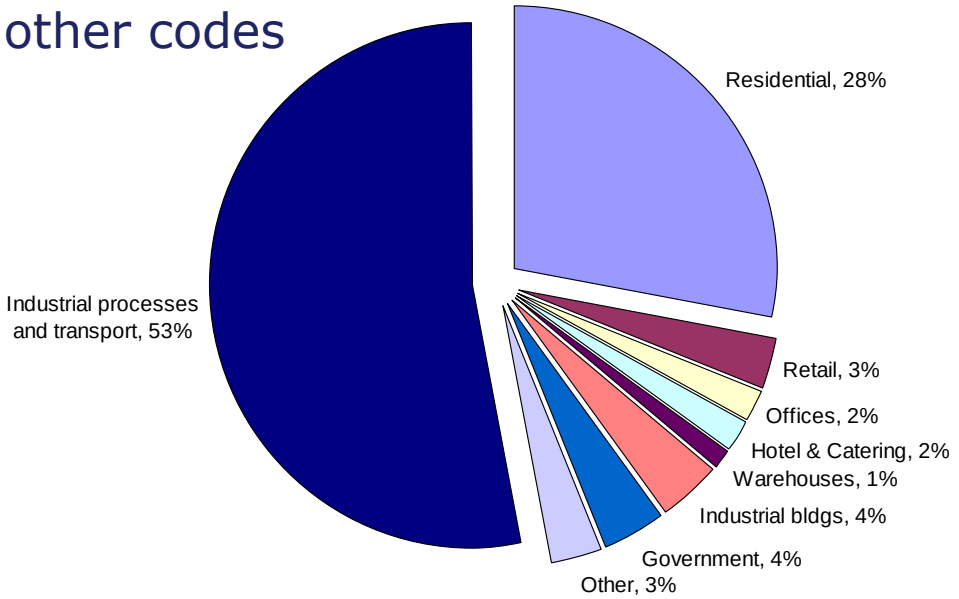
PARTNERSHIP CARBONVISIONBUILDING

Overview

- Introduction to energy standards for buildings
- Summary of previous research
  - 1992 survey of status of standards in 57 countries
  - 1994 paper available from *Energy - The International Journal*
- Selected findings from ongoing research
  - Updating 1992 survey
- Comments on standards as a form of market transformation

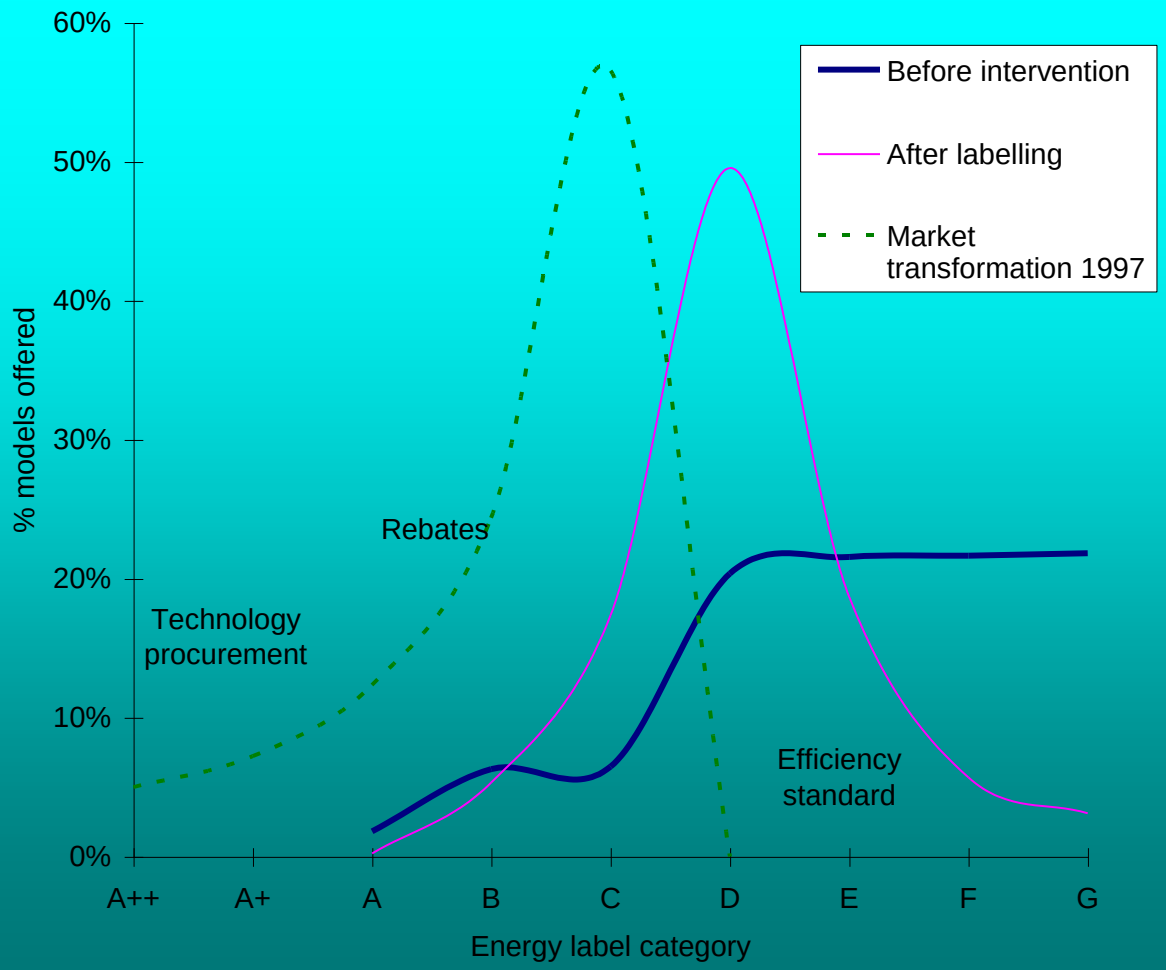
Principal Approaches to Energy Standards for Buildings

- A set of rules that direct how a building uses energy
  - Separate or subsumed within other codes
- Mandatory or Voluntary
- Design
  - New buildings, what sector?
- Performance
  - Existing and new
  - What sector?
- Green buildings
  - What role does energy play?



Buildings just under half of UK CO2, of which two thirds are residential buildings

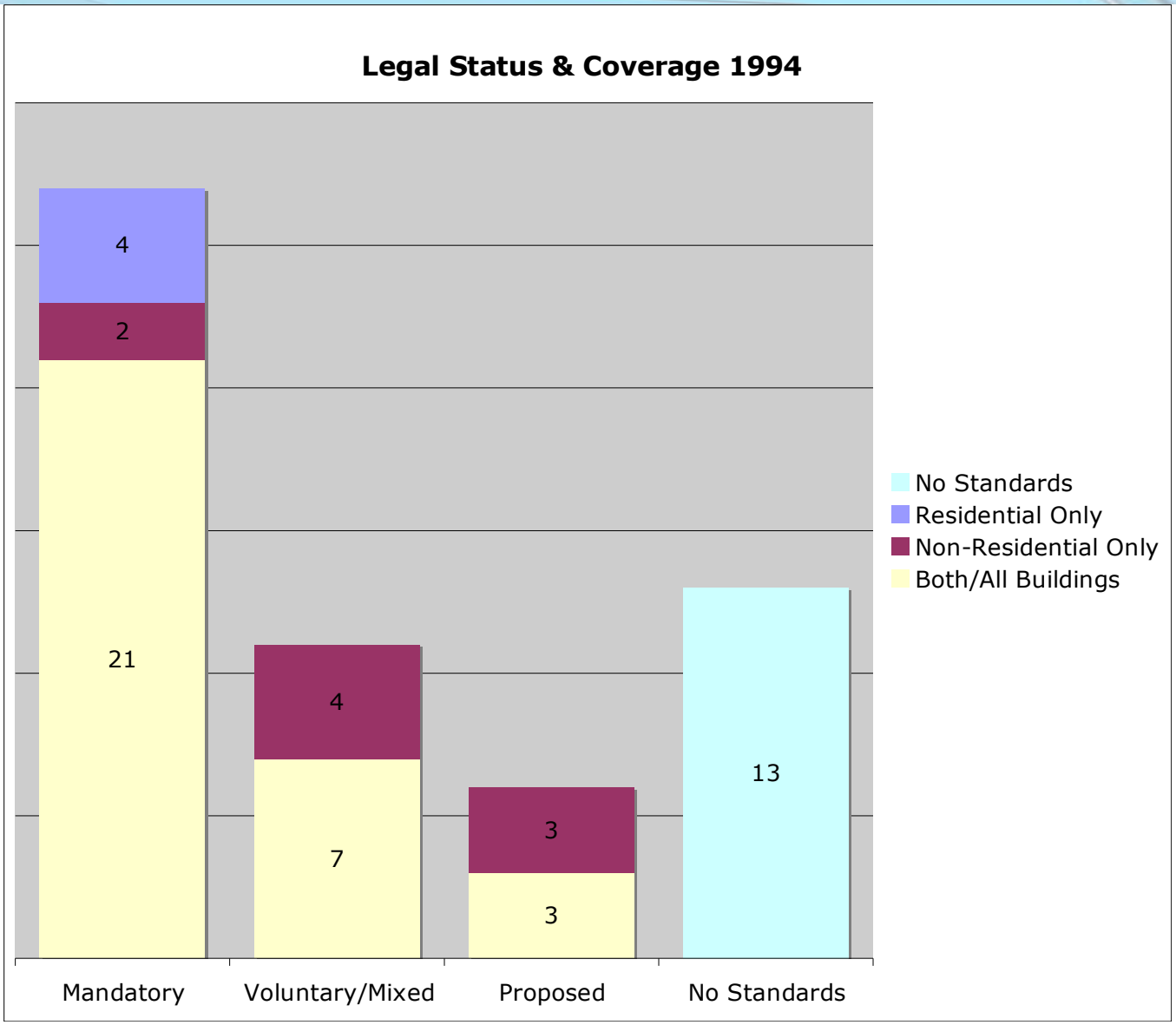
Market Transformation Theory



- 200 mandatory labelling and standards schemes globally over several decades
- Residential and non-residential equipment and lighting
- Further and faster with Energy Using Products Directive

Source: M. Hinnells, ECI

Who Uses Standards?



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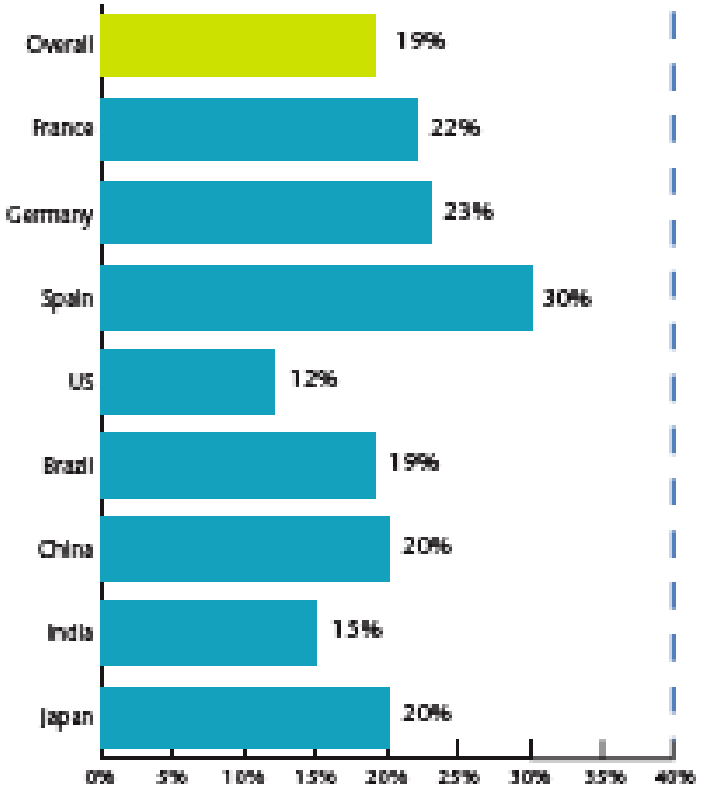
How Have Standards Changed?

- Different building types
  - Existing buildings rather than new
    - E.g., Energy Performance of Buildings Directive
- Different technical focus
  - carbon rather than energy or cost
  - reducing consumption, not just improving efficiency
- Social attributes
  - Focus on institutional attributes rather than physical ones
  - Adaptive comfort as a standard
- Working with industry
  - Voluntary standards as "stretch" goal
    - coupled with mandatory standards & information labeling

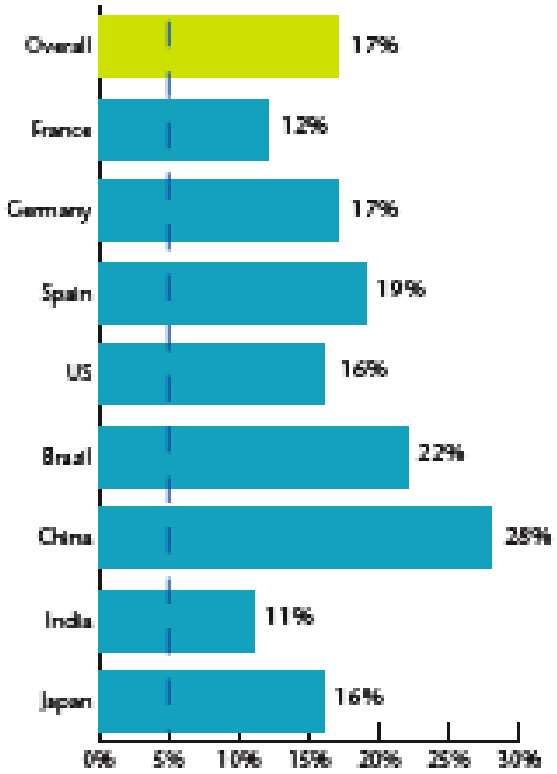
World Business Council for Sustainable Development
Energy Efficiency in Buildings initiative (http://www.wbcsd.org)

Figure 11: Estimates of buildings' contribution to total emissions



(Question: "What percentage of CO_2 emissions do you think buildings give rise to – directly and indirectly?")

Figure 12: Estimates of cost premium for "a certified sustainable building"

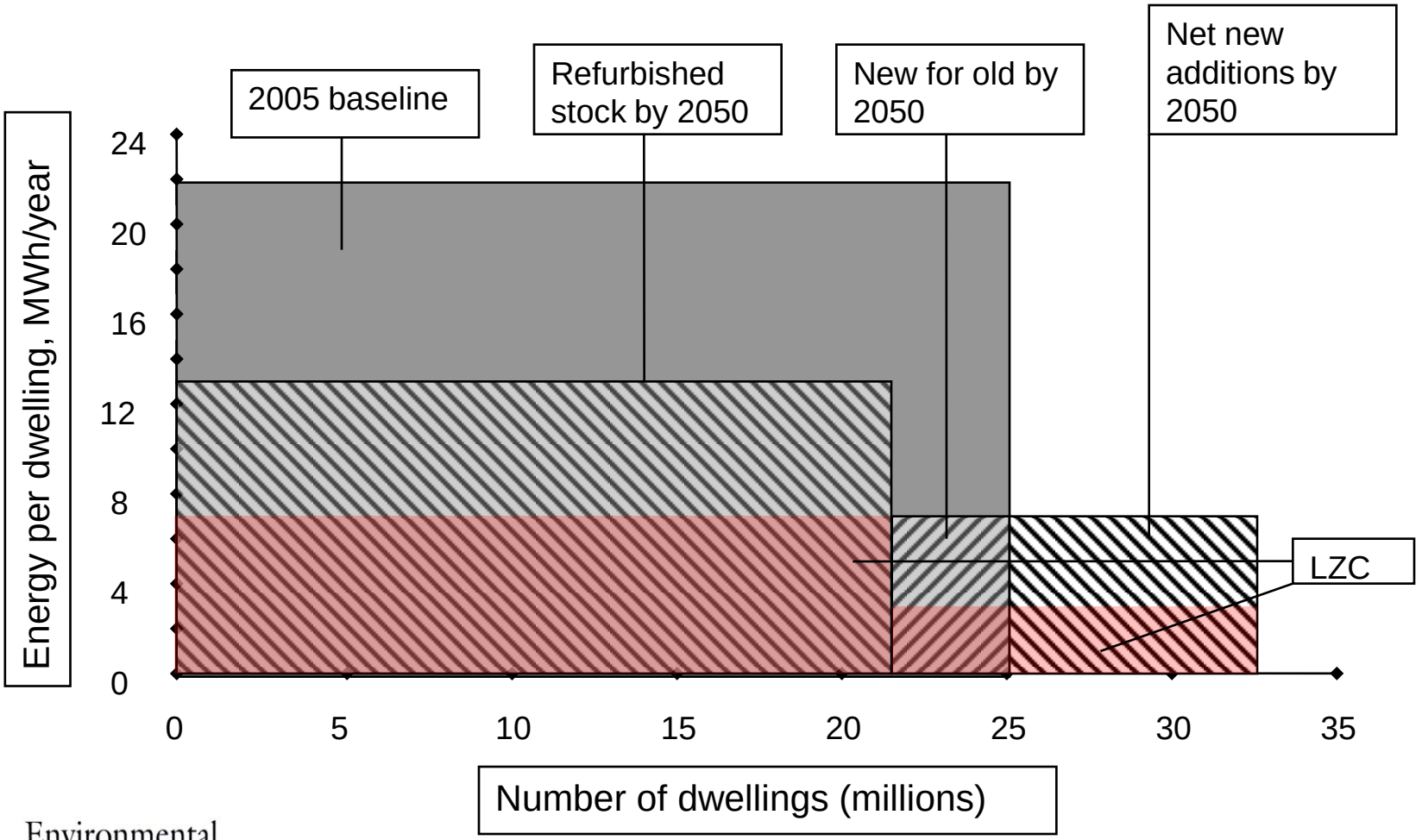


(Question: "How much more do you think a certified sustainable building would cost to build relative to a normal building?")

Source: Lippincott Research

40% House

Energy/CO_2 impacts of UK housing stock to 2050



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Source: G. Killip, ECI

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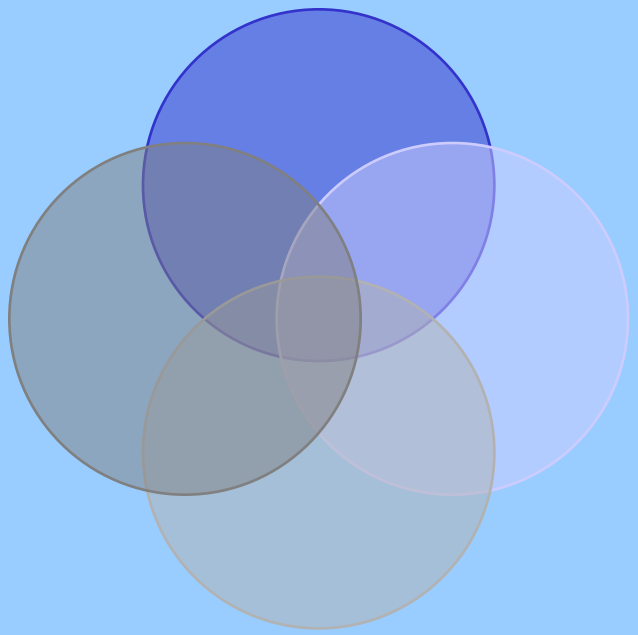
An Integrated Approach to CO_2 Reductions

BUILDING ENVELOPE

OCCUPANT BEHAVIOUR

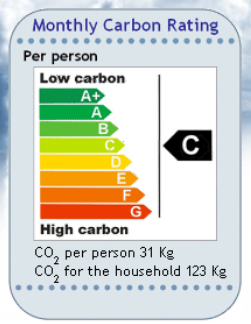


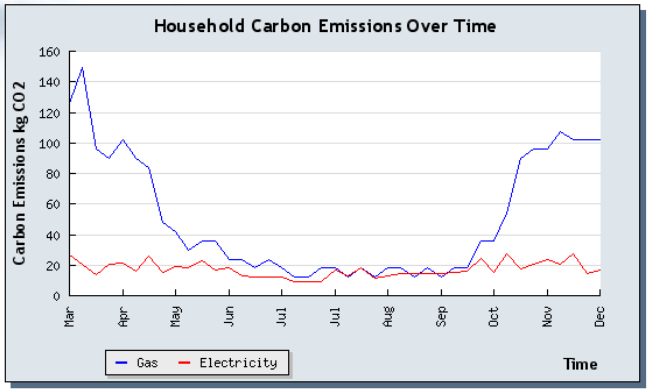
PLUG LOADS

MICRO-GENERATION

Source: G. Killip, ECI

Buildings Don't Use Energy: People Do





Total household energy use and carbon emitted

The results for 'last month' and 'last quarter' are in terms of the weekly average.

You have been taking readings for 41 weeks
Comparing your results with the average of **34** households (All users/All housetypes)

Carbon emissions Kg CO_2

	Last week	Last Month	Last Quarter
Per person	30 (52)	31 (45)	22 (37)
Per household	119 (136)	123 (122)	86 (93)

Gas use as kWh

	Last week	Last Month	Last Quarter
Per Person	133 (205)	135 (173)	87 (141)
Per Household	533 (534)	541 (470)	350 (351)

Electricity use as kWh

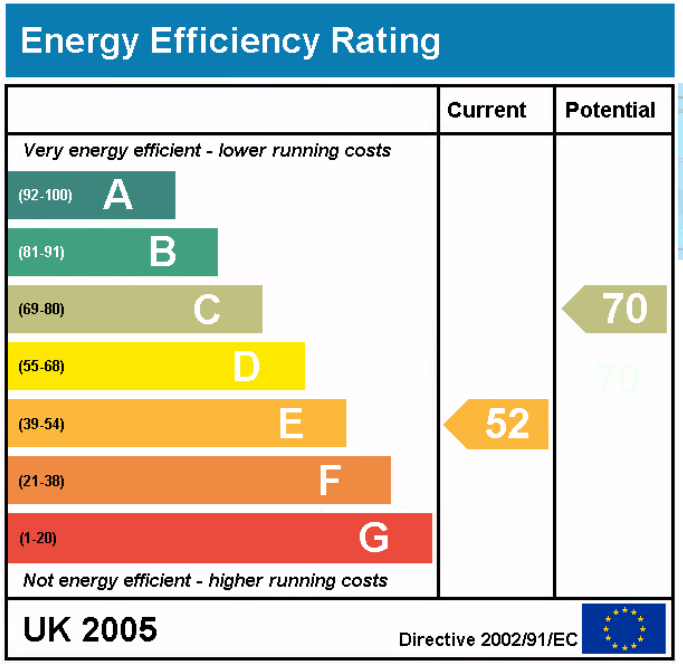
	Last week	Last Month	Last Quarter
Per Person	9 (26)	10 (23)	10 (21)
Per Household	34 (68)	40 (64)	39 (53)

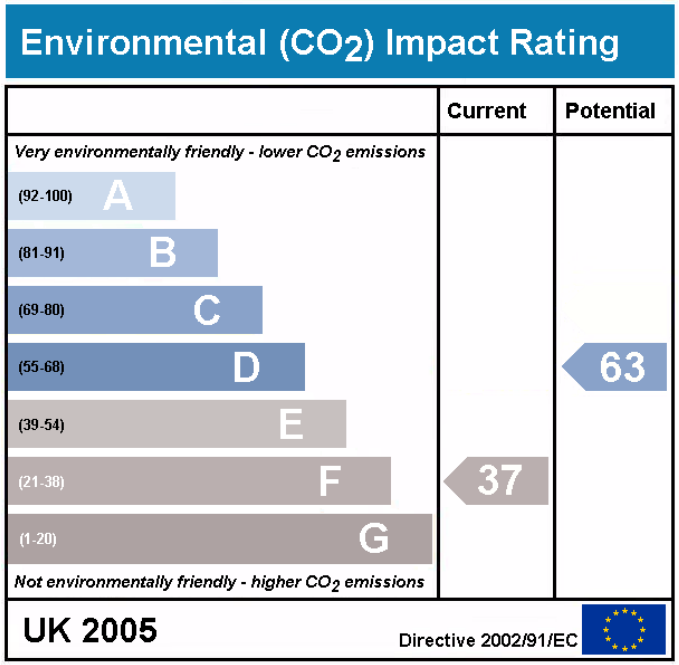
Source: G. Bottrill, ECI

Standards for:

- Personal carbon allowances
- Feedback devices in homes & buildings

Labeling





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The future of commercial buildings?

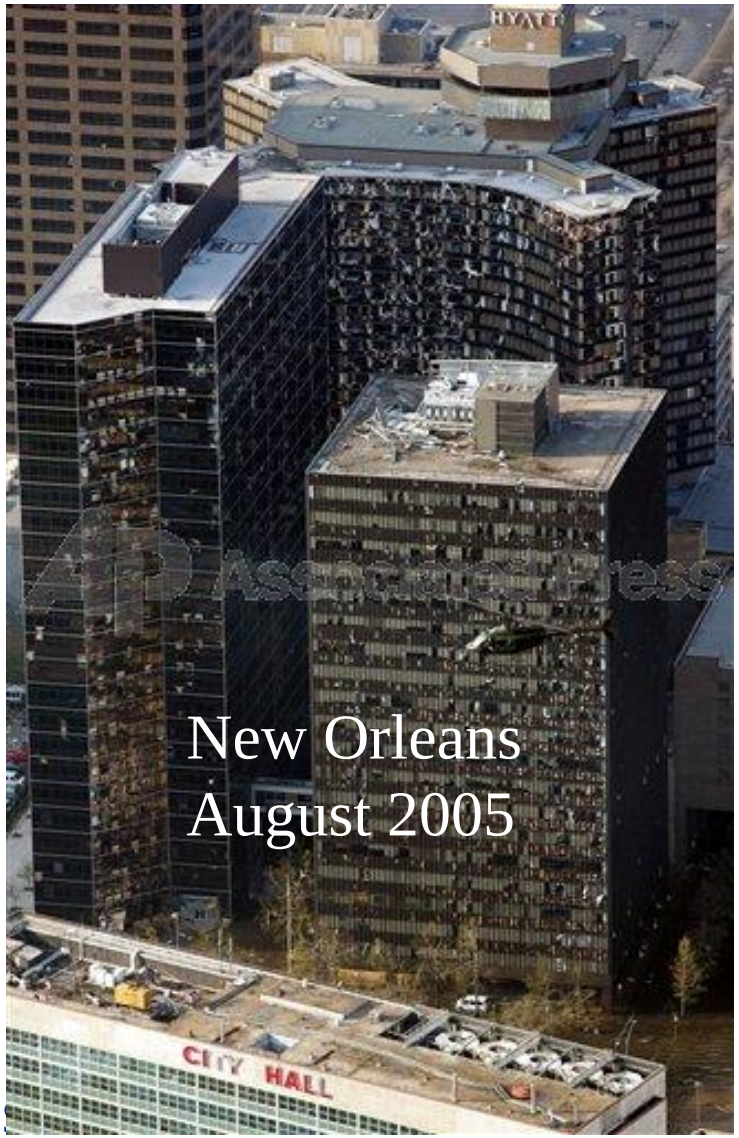
Source: CoStar Group

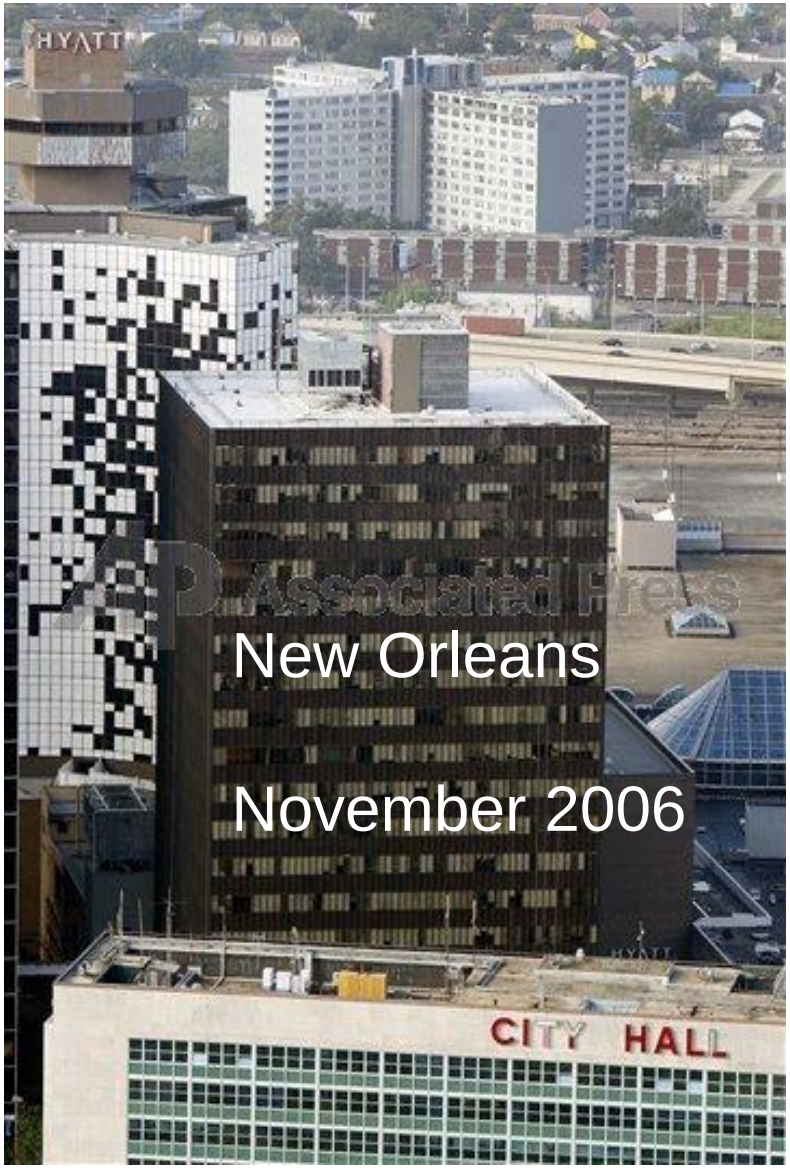
Is Good Energy Performance Enough?

Source: S. Roaf

HERIOT WATT UNIVERSITY

Brittle Buildings





LEED PLATINUM BUILDINGS: WRONG INDICATORS?

Challenge: Life in a Post-Carbon Society

- UK has set reduction targets of 60% CO2 by 2050
  - Some are calling for 80% reduction
- Dramatic change is needed in every sector
  - Buildings
    - Residential & commercial
  - Transport
  - Industry
- Technological change is necessary but not sufficient
  - Radical reconfiguration of our relationship with the world around us
- Resilient buildings and adaptive lifestyles