

# Benefits of Display Energy Certificates in the UK

by Donald Leeper  
CIBSE - UK

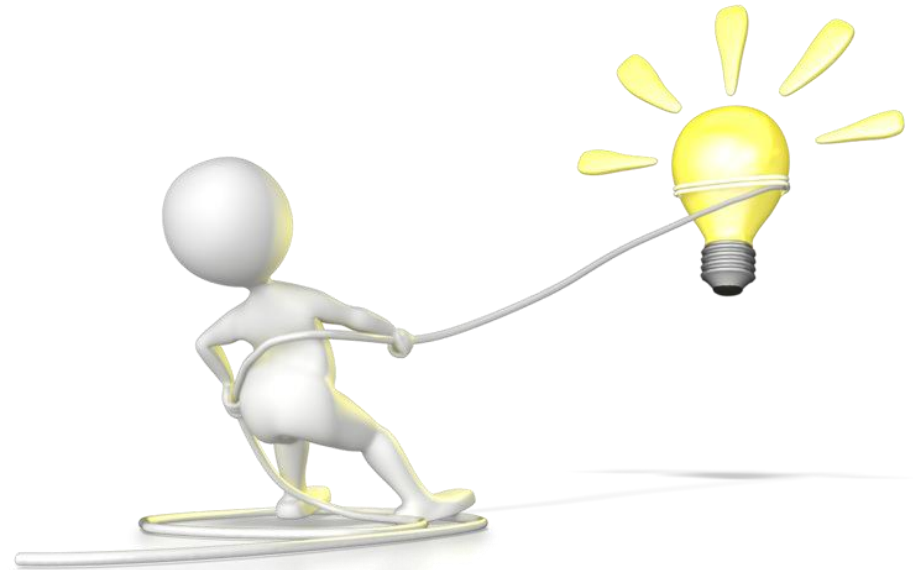


The difference between  
design intent and reality



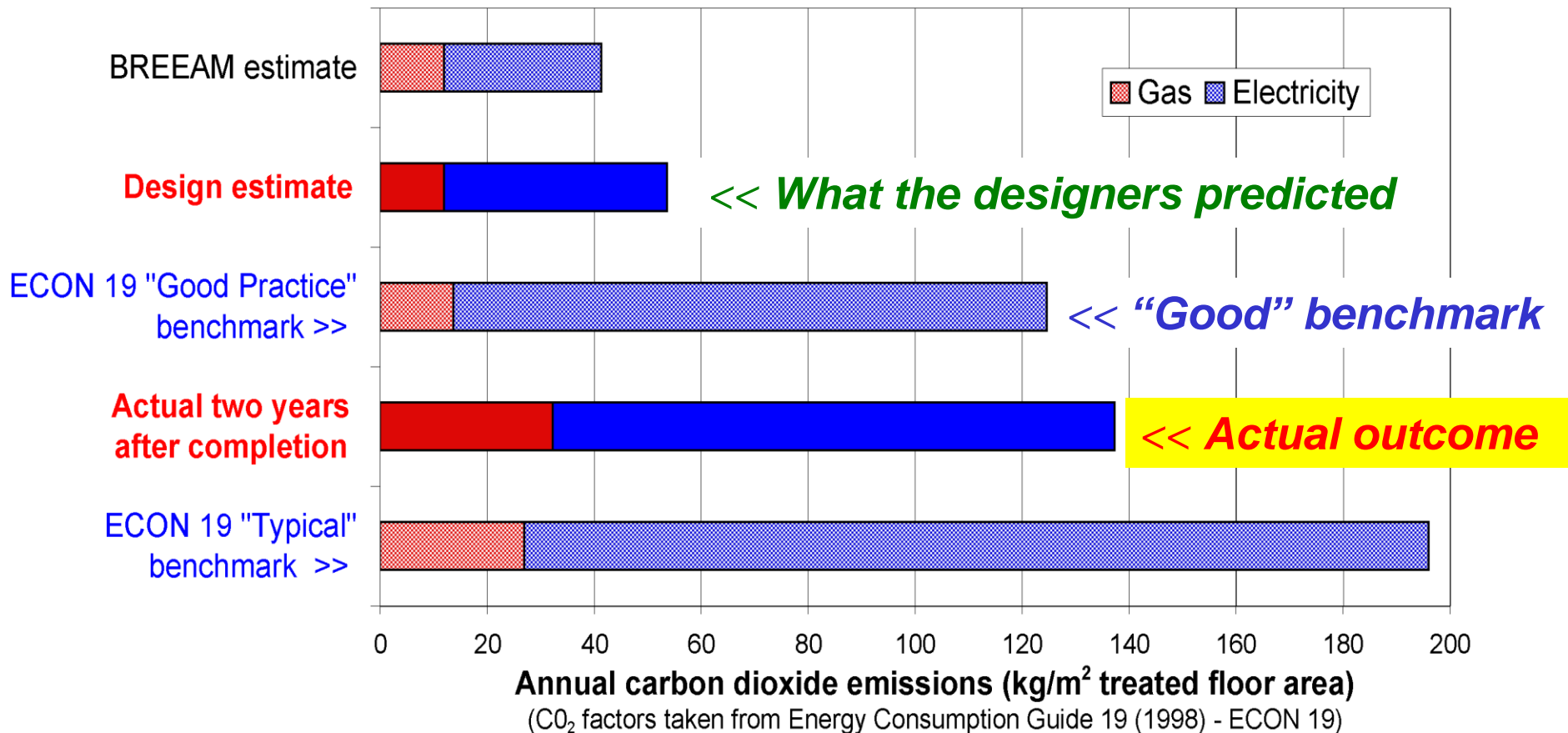
# Energy Ratings – capturing:

- Asset Ratings – based on calculations - EPCs
- Operational Ratings – based on measurements - DECcs



# The Credibility Gap: *We couldn't deliver low-energy and carbon performance reliably in the 1990s. We're still finding it difficult.*

*Data from the winner of a Green Building of the Year Award*



# For most designers and builders, *performance in use is another country ...*

*“in theory, theory and practice are the same, in practice they aren’t”*  
*SANTA FE INSTITUTE for research into complex systems*

*“designers seldom get feedback,  
and only notice problems when asked to investigate a failure”*  
*ALASTAIR BLYTH CRISP Commission 00/02, UK*

*“unlike medicine, the professions in construction  
have not developed a tradition of practice-based user research ...  
Plentiful data about design performance are out there, in the field ...  
Our shame is that we don’t make anything like enough use of it”*  
*FRANK DUFFY Building Research & Information, 2008*

*“I’ve seen many low-carbon designs, but hardly any low-carbon  
buildings”*  
*ANDY SHEPPARD Arup, 2009*

SOURCE: for this slide and several others, with thanks to Hywel Davies, Technical Director, CIBSE

# New buildings: *What do we normally find?*

- Too often they perform much less well than anticipated, *especially for energy and carbon, often for occupants, and with high running costs.*
- Unmanageable complication is the enemy of good performance. *So why are we being forced to make buildings more complicated in the name of sustainability, when we don't get simple things right?*
- Buildings are seldom tuned-up properly and controls are poor. *So if we have more to do, what chance do we have?*
- Design intent is seldom communicated well to users. *Designers and builders tend to go away at handover.*

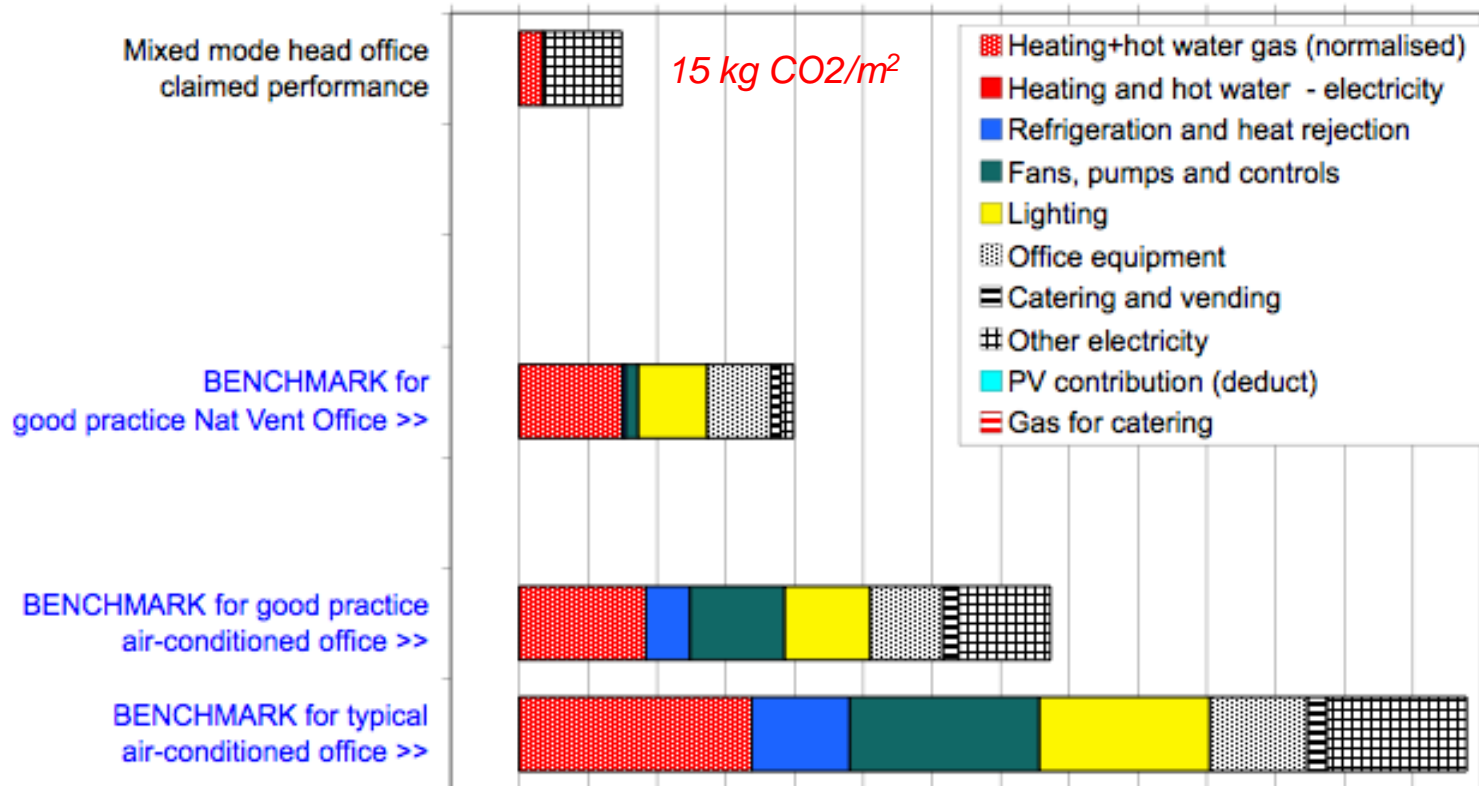
# Design intent to reality: perspectives

1: the design claim, as published

## Annual CO<sub>2</sub> emissions of energy use in a low-energy office building

kgCO<sub>2</sub>/m<sup>2</sup> Treated Internal Floor Area at UK ECON 19 CO<sub>2</sub> factors of 0.19 for gas and 0.46 for electricity

<< Onsite renewable supply << >> Building energy demand >> expressed as CO<sub>2</sub>



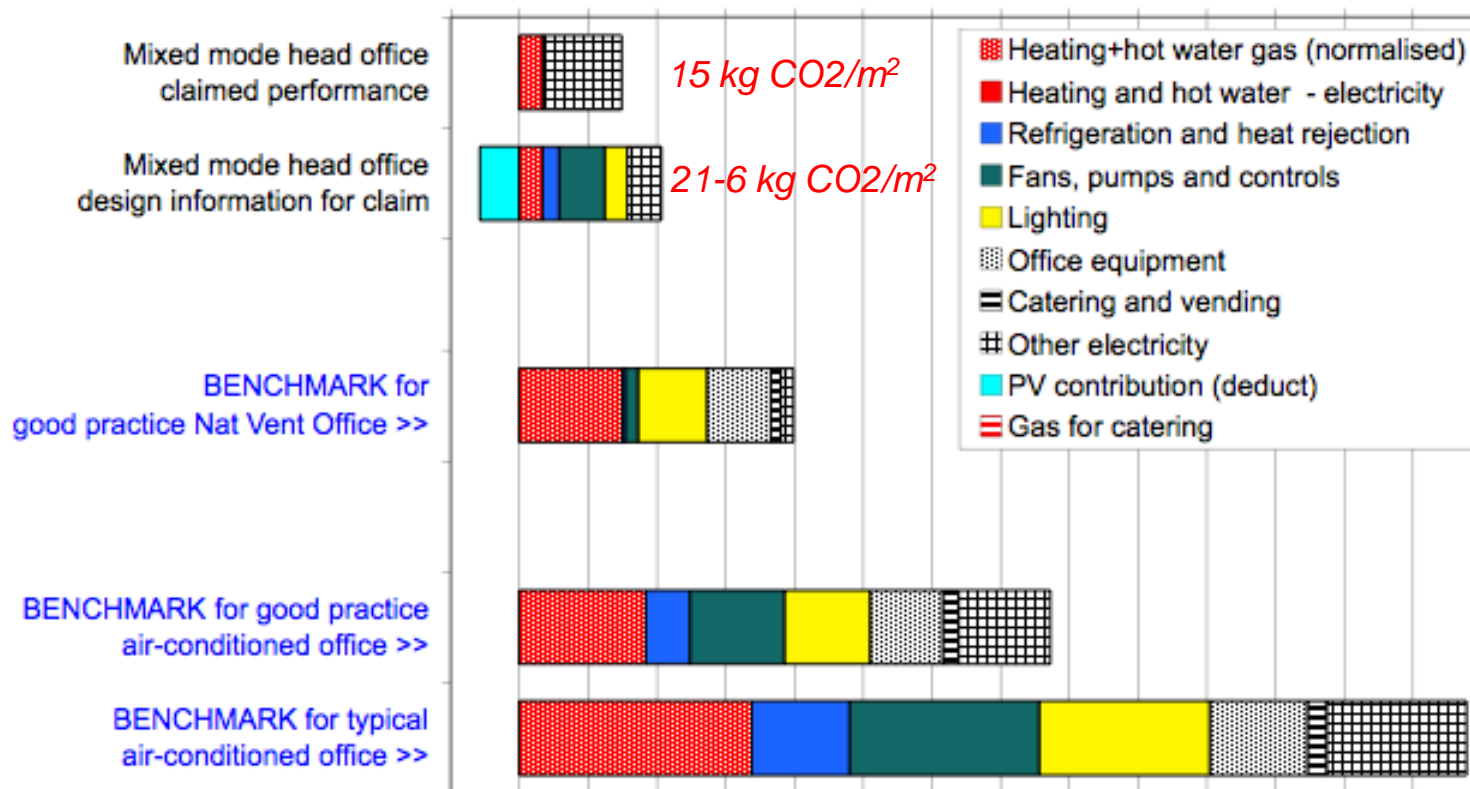
# Design intent to reality: how the gap widens

## 2: the basis for the design claim

### Annual CO<sub>2</sub> emissions of energy use in a low-energy office building

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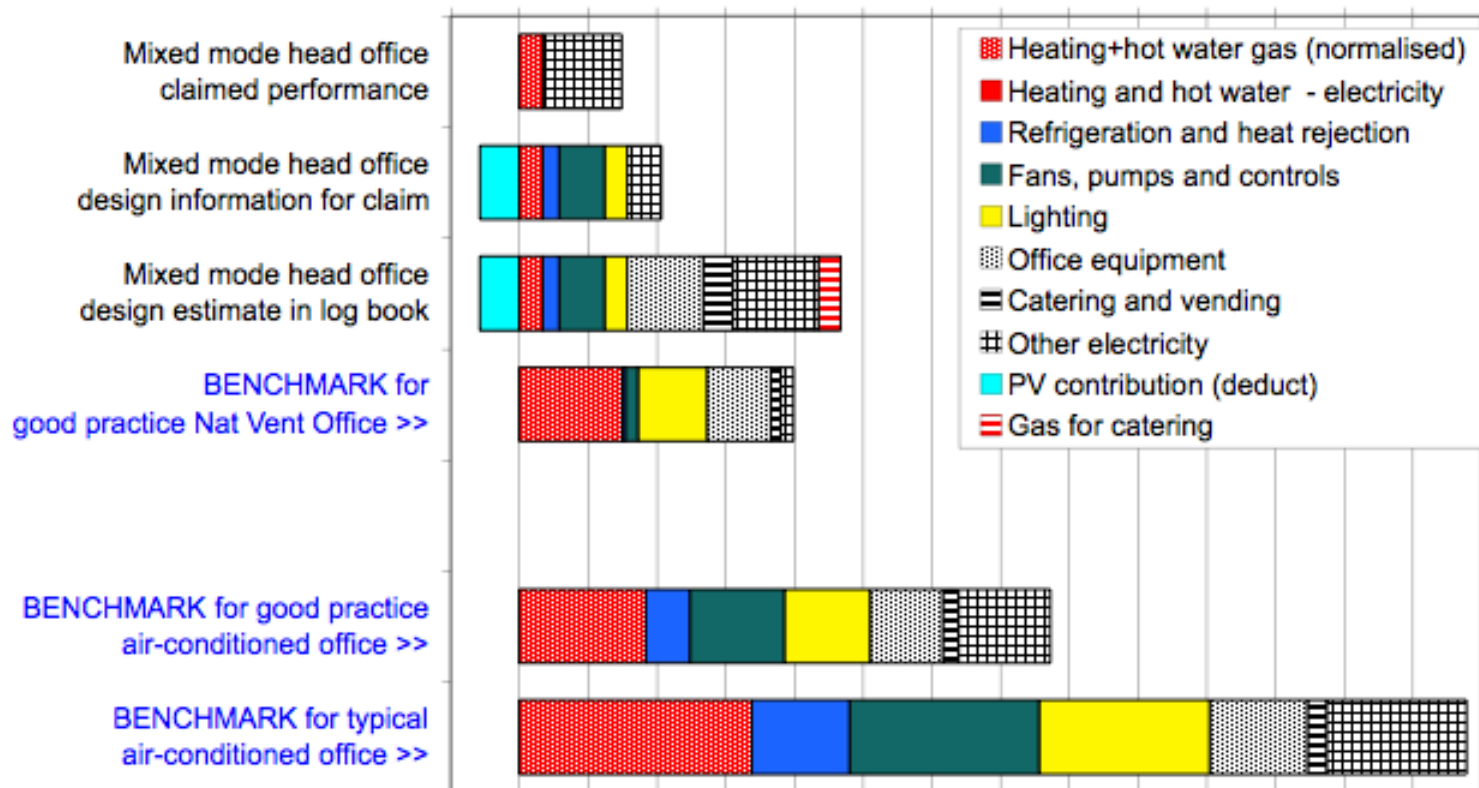
# Design intent to reality: how the gap widens

3: what it said in the log book supplied at handover

## Annual CO<sub>2</sub> emissions of energy use in a low-energy office building

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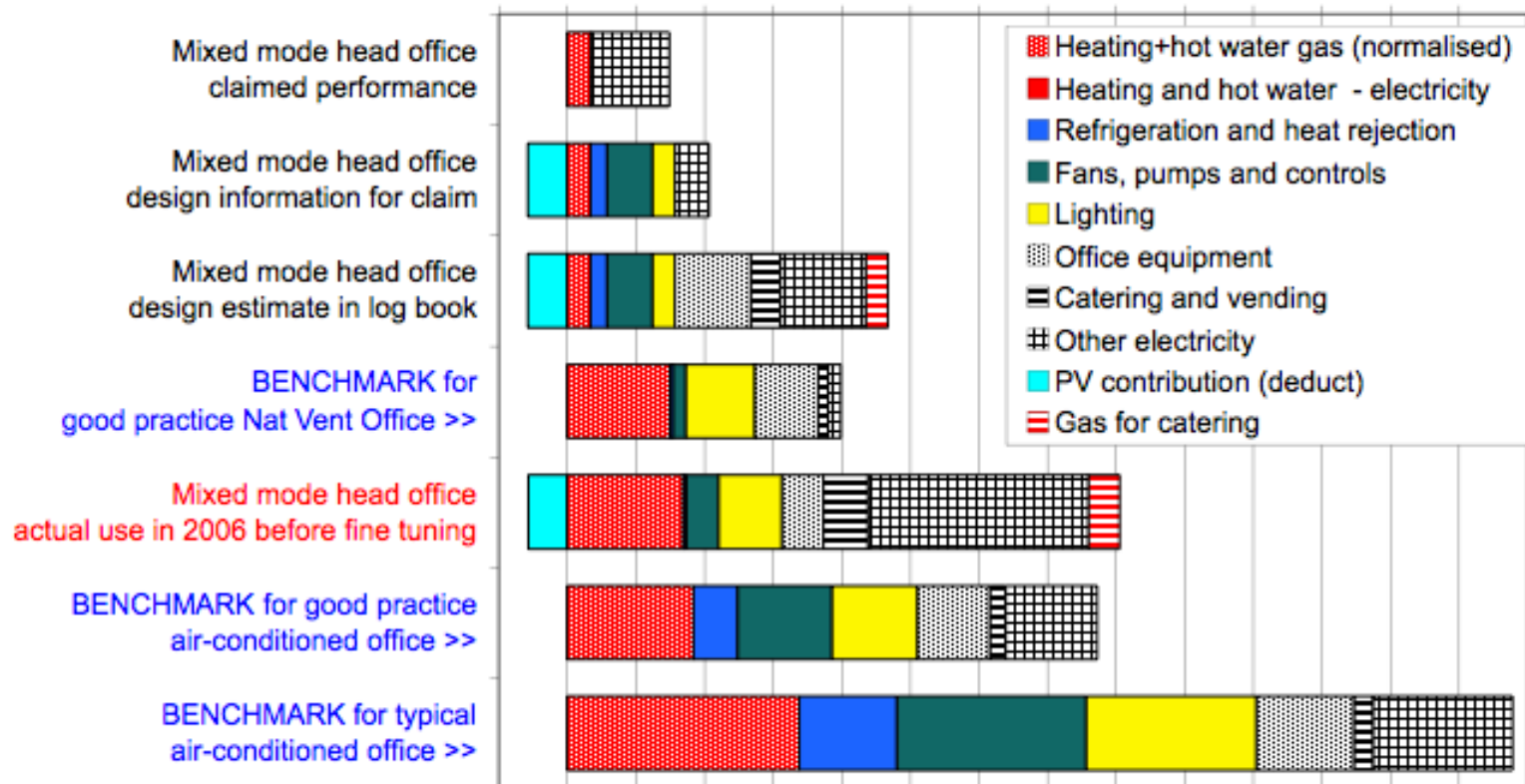
# Design intent to reality: how the gap widens

4: actual performance in use, before fine tuning

## Annual CO<sub>2</sub> emissions of energy use in a low-energy office building

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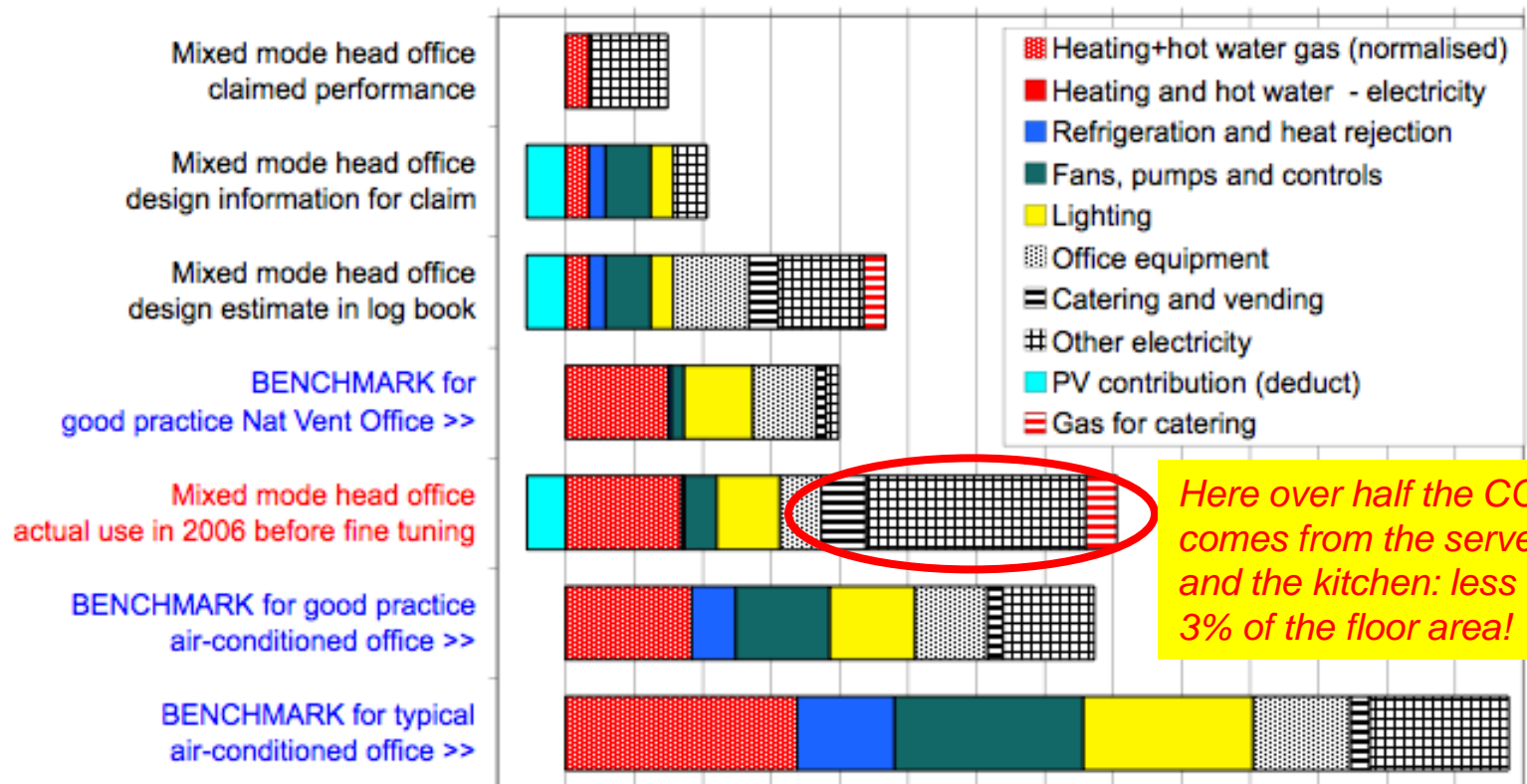
# Components of energy performance:

5: designers need to influence “unregulated” loads!

## Annual CO<sub>2</sub> emissions of energy use in a low-energy office building

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<< Onsite renewable supply << >> Building energy demand >> expressed as CO<sub>2</sub>



Here over half the CO<sub>2</sub> comes from the server room and the kitchen: less than 3% of the floor area!

# Operational Ratings & Display Energy Certificates

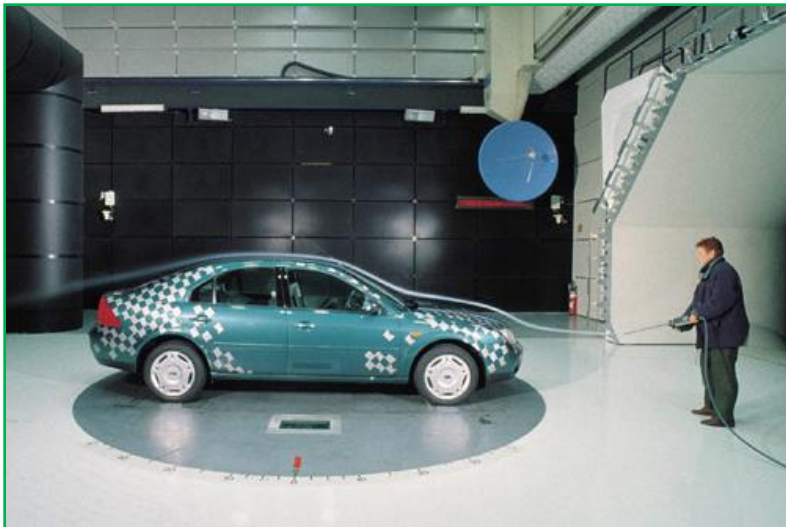
## Occupiers must:

- Obtain/provide a DEC annually for “public buildings”, defined as buildings having a: *“total useful floor area over 1000m<sup>2</sup> occupied by public authorities and by institutions providing public services and frequently visited by the public”*
- Possess or control a valid Advisory Report
  - Contains recommendations to improve energy performance
    - Filtered from generic list & building walk around, or
    - From a detailed energy audit
  - Divided into no/low cost, medium cost and high cost measures
  - Valid for up to 7 years

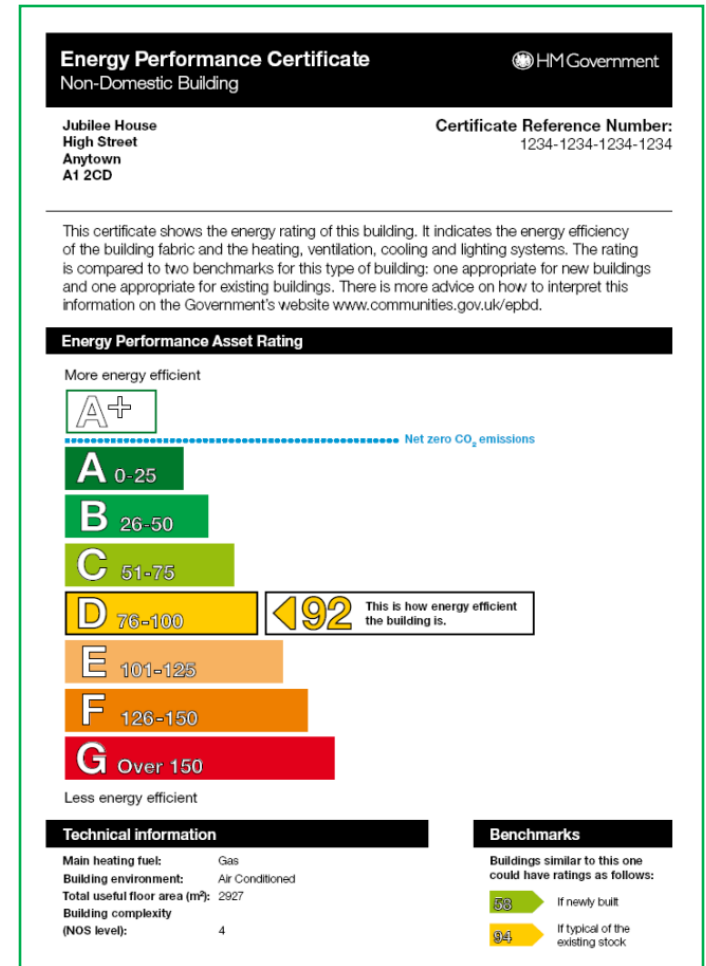
Owners have a duty in law to co-operate

# Asset Ratings & Energy Performance Certificates

- What do my EPC and Recommendations Report tell me?



- They tell me the potential energy performance of my building under standard conditions



# Operational Ratings & Display Energy Certificates

- **What is a Display Energy Certificate?**

it's a certificate showing the actual energy use of the building compared to typical energy use of similar buildings of that type

- **How does it differ from an EPC?**

- more like a miles per gallon reading than “0-60 in 6 seconds”



- it tells you how effectively the asset is managed

- a measure of real operational energy use

- based on energy use per unit area – quick and easy to measure compared to an EPC

# What's in a DEC?

If it goes through the meter, it goes into the DEC



Includes fixed services, fit out, installed equipment and all other energy uses within the building

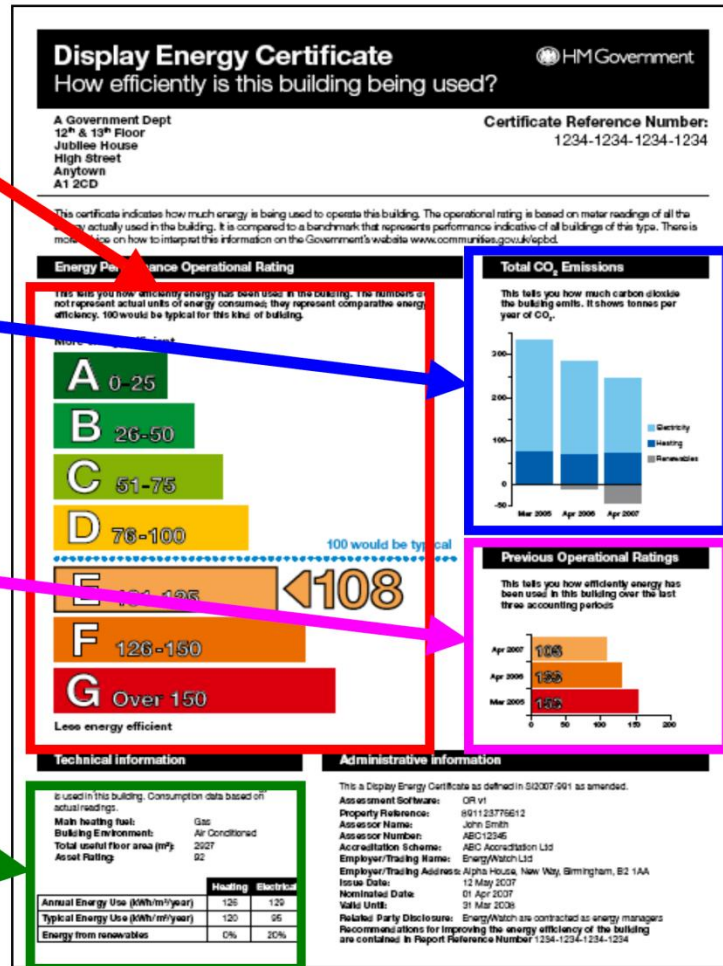
# What is a DEC?

Headline indicator

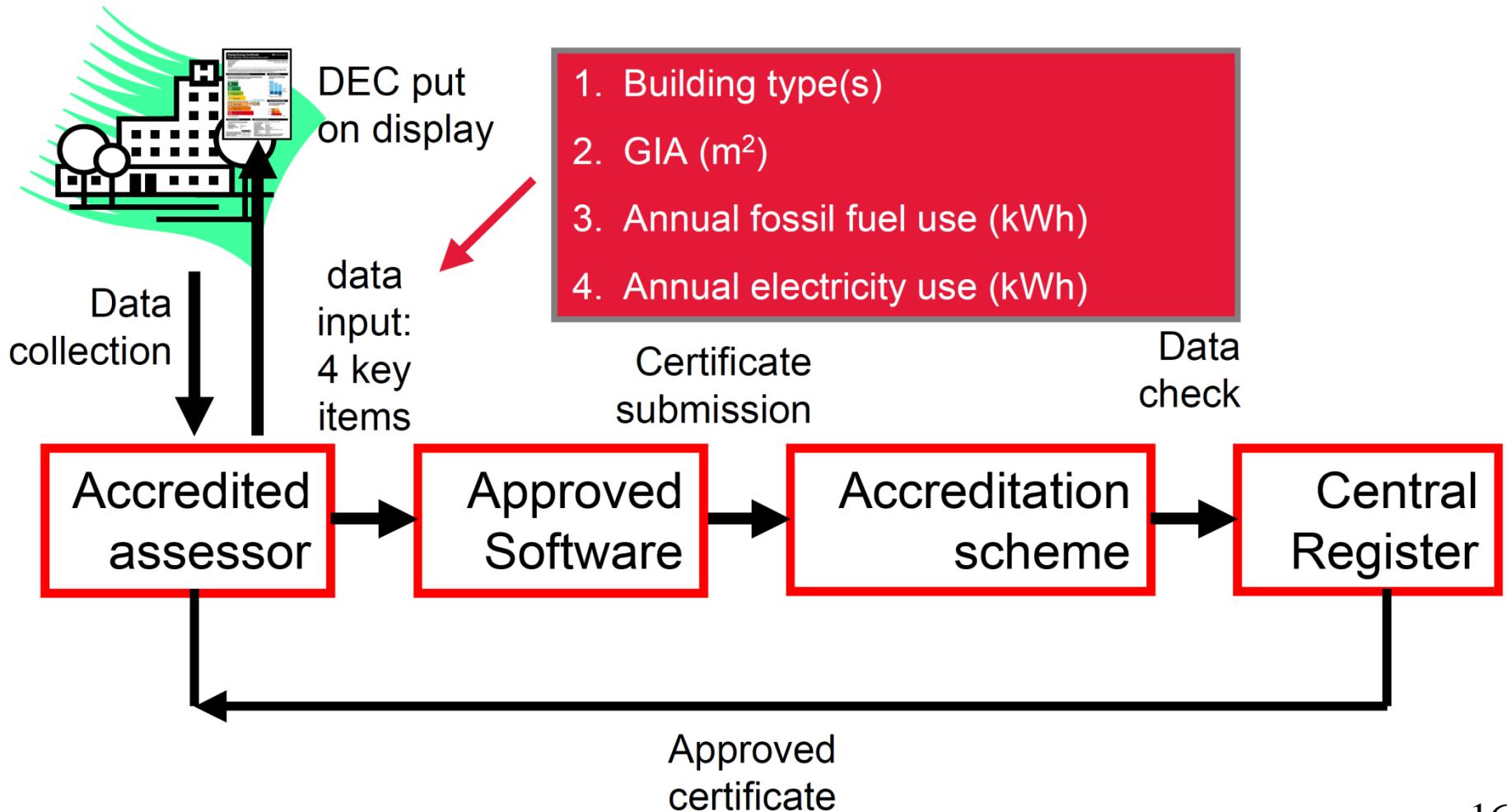
3 years unadulterated CO<sub>2</sub> emissions tonnes/year

Year-on-year rating  
NB annual renewal

Non-electricity, Electricity kWh/m<sup>2</sup> Actual and Benchmarks

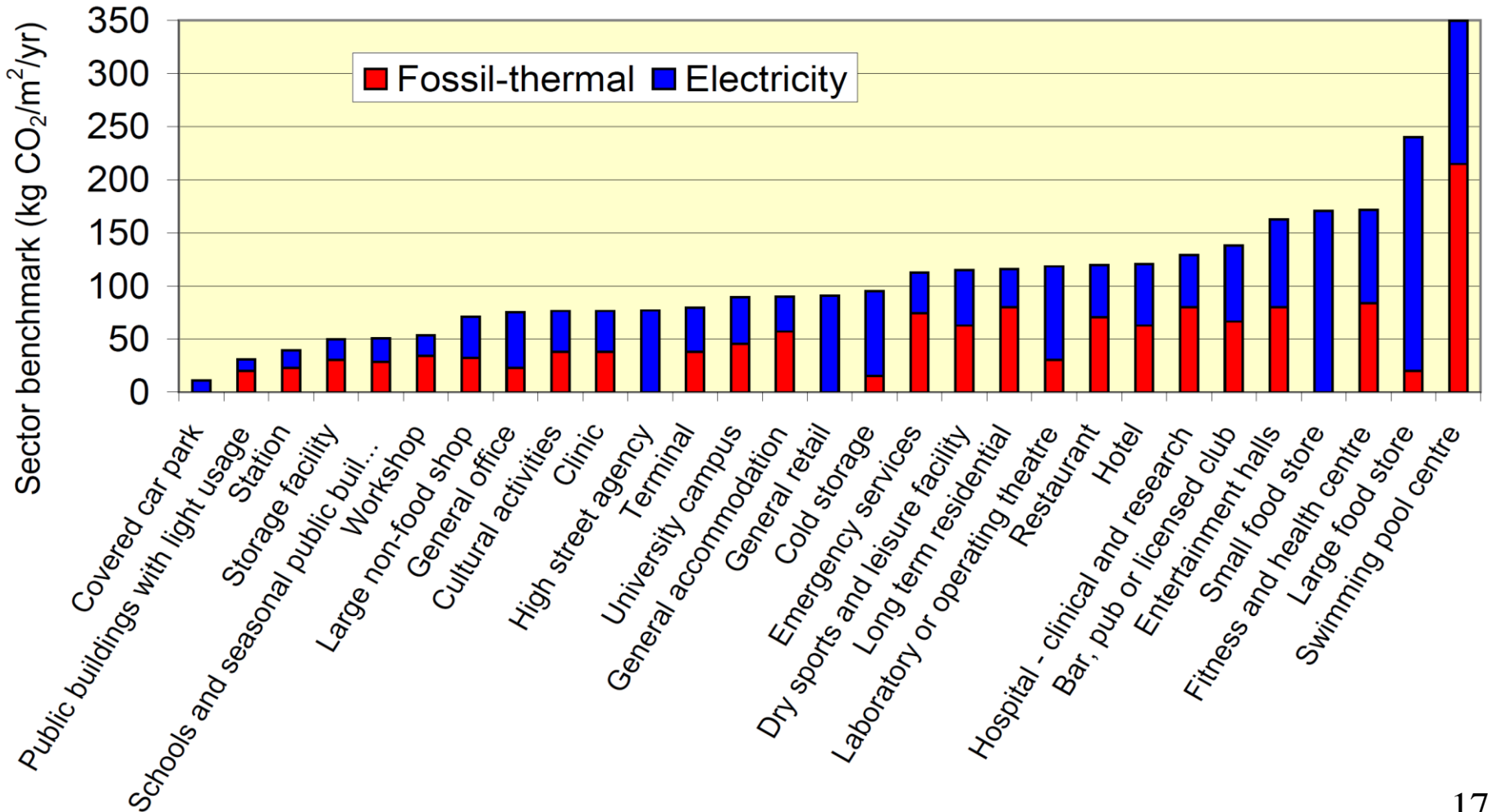


# Process for producing a DEC



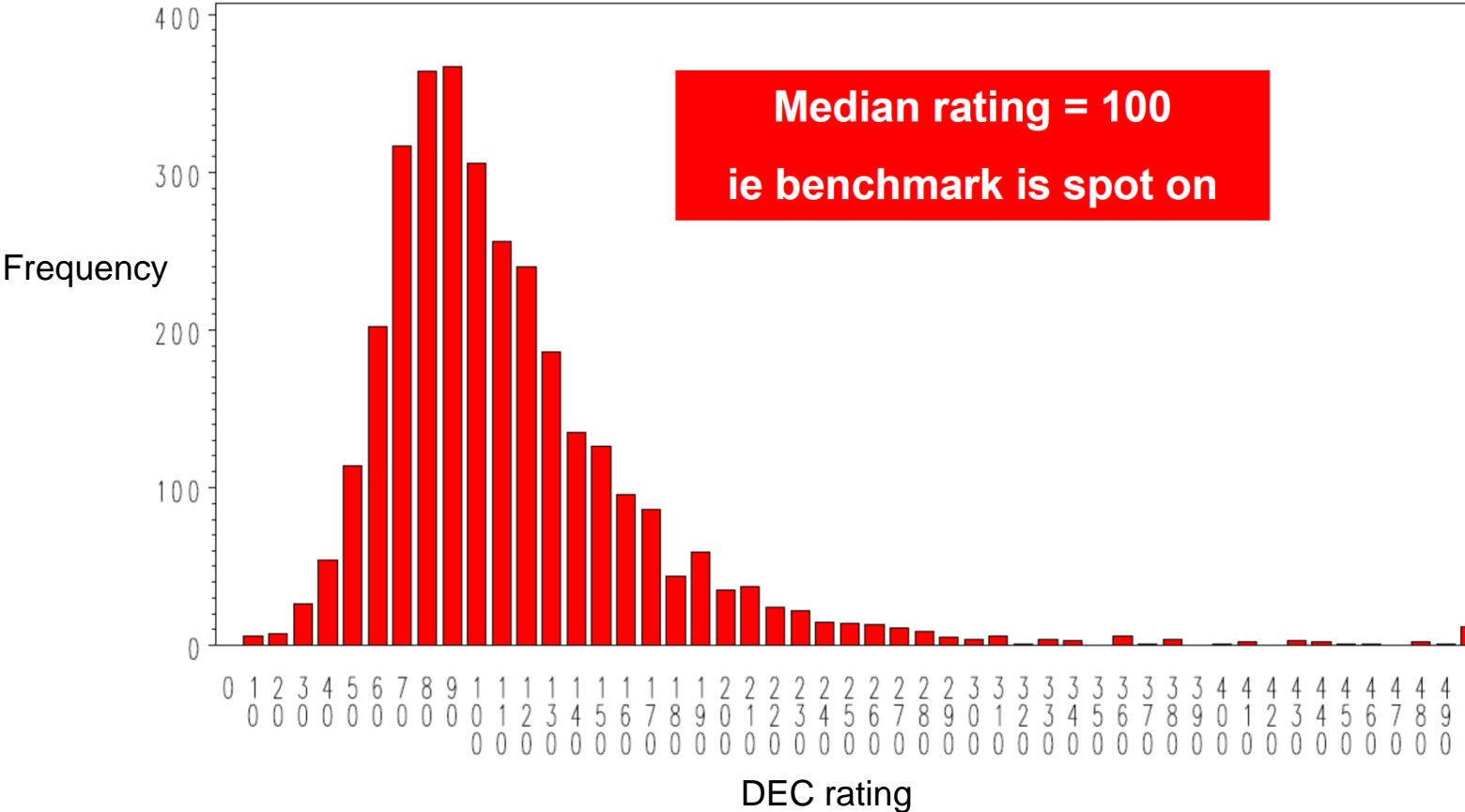


# Benchmarks for UK (ex Scotland)



# DEC ratings for 3,230 offices (CIBSE review)

BM category 1: General Office. BMV(Elec)=95 BMV(Htg)=120 Number of DECS = 3,230  
Overview analyses of filtered data - midpoint distribution and grade charts  
25/7/10 - hold.decm3g - decv01\_bmcatcharts.sas 25/7/10 14:08



# Key messages

## Plan needed for implementing EPBD recast and to get all Non-Domestic Buildings (NDBs) having a DEC by 2017

- Robust universal rating infrastructure is ready for roll-out to private sectors
- Software system and human resources are in place and fully proven
- Appropriate provisional benchmark categories and building type allocations need to be agreed rapidly with each sector
- Provisional hours of use and separable allowances (including allowing unmetered estimates) can be set for each sector
- A full pilot run followed by sector analysis can be done at low cost following tried and tested approach employed for public buildings, **without displaying DEC**

## Important issues to resolve but do not need to distract from DEC roll-out:

- Should commercial offices account for intensity of use and occupant density
- Advisory reports (may not be required by EPBD recast)

# Economic Influences

**Like others, the UK Government's focus is increasingly on energy:**

- **Price**

Heating and Electricity – charges have risen over 50% since 2008

- **Supply**

Life expiring infrastructure and security of external supply



# UK Fuel Poverty

## Families in fuel poverty set to rise to 9 million

### ENERGY

## Fuel poverty fears grow as energy debt hits £478m

By Simon Read

PERSONAL FINANCE EDITOR

Fresh fears that millions are heading into fuel poverty are raised today as figures reveal that consumers now owe £478m to their energy suppliers.

Research published today reveals that nearly four million households are currently in debt to their energy supplier, owing an average of £131.

The figure has climbed 4 per cent in the past 12 months, and is 15 per cent higher than in 2008, according to uSwitch. Heating and electricity charges have soared 53 per cent since 2008, pushing the cost of the average yearly home energy bill up £433.

In the past year alone average bills have climbed £183 - 17 per cent - to £1,252. Ann Robinson, director of consumer policy at uSwitch said: "With households still struggling to absorb last year's price hikes, energy debt is on the rise again."

### Burning money The rise of fuel poverty

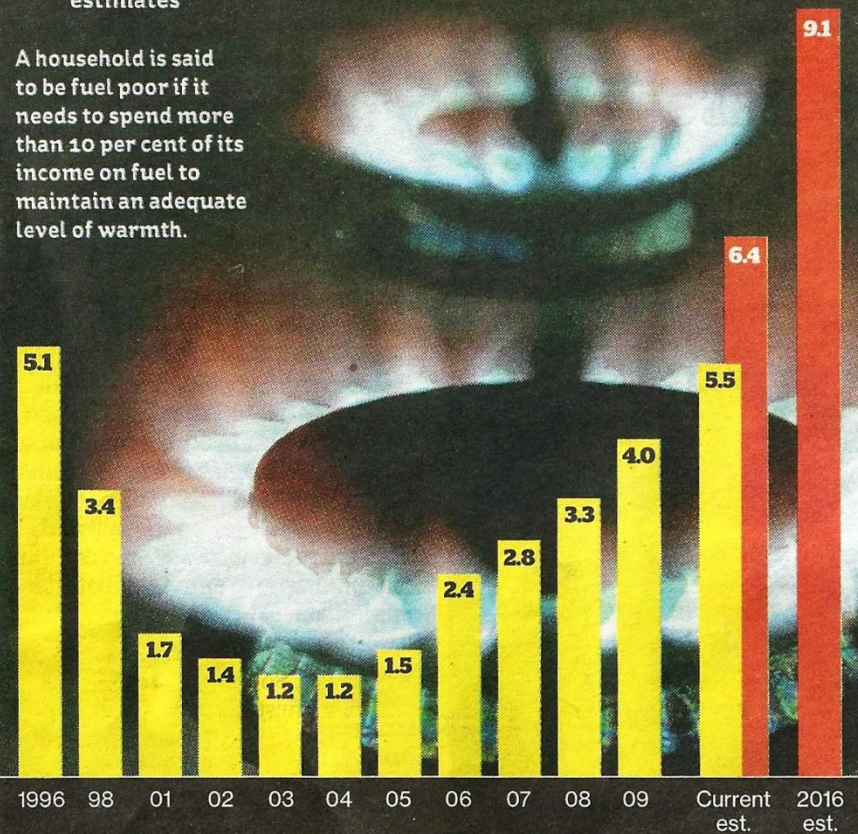
#### Number of fuel poor households in England

MILLIONS

Dept. of Energy and Climate Change estimates

Camco estimates

A household is said to be fuel poor if it needs to spend more than 10 per cent of its income on fuel to maintain an adequate level of warmth.



# CIBSE's Activities:

- Low carbon accredited assessors
- Launch of Online Knowledge Portal
- Soft Landings Principles
- Post Occupation Evaluation
- Promoting a New Buildings Engineering Industry



# Adverse Drivers:

- **Reducing oil reserves** with increasing oil usage in food production and transport
- **Growing world population** with less total food
- **Continued nuclear proliferation** and terrorism
- **Water shortages** by 2025 – UN warns of likely wars over water
- **Soil degradation**, desert spread, salination out of control by 2030?
- **Climate trends** – Amazon, Arctic, methane
- **Many National Economies** facing huge economic problems of debt

Their interactions will be key

# We must collectively move on

From Calculation → Measurement → To Response

*We have the knowledge and the means to make the 21<sup>st</sup> Century the most peaceful and prosperous time in all human history.*

[But] **Do we have the will?**

- *President Bill Clinton*





# The answer is with us



## Acknowledgements:

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