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CIBSE HVAC Systems Group, Saffron Hill
29 April 2026

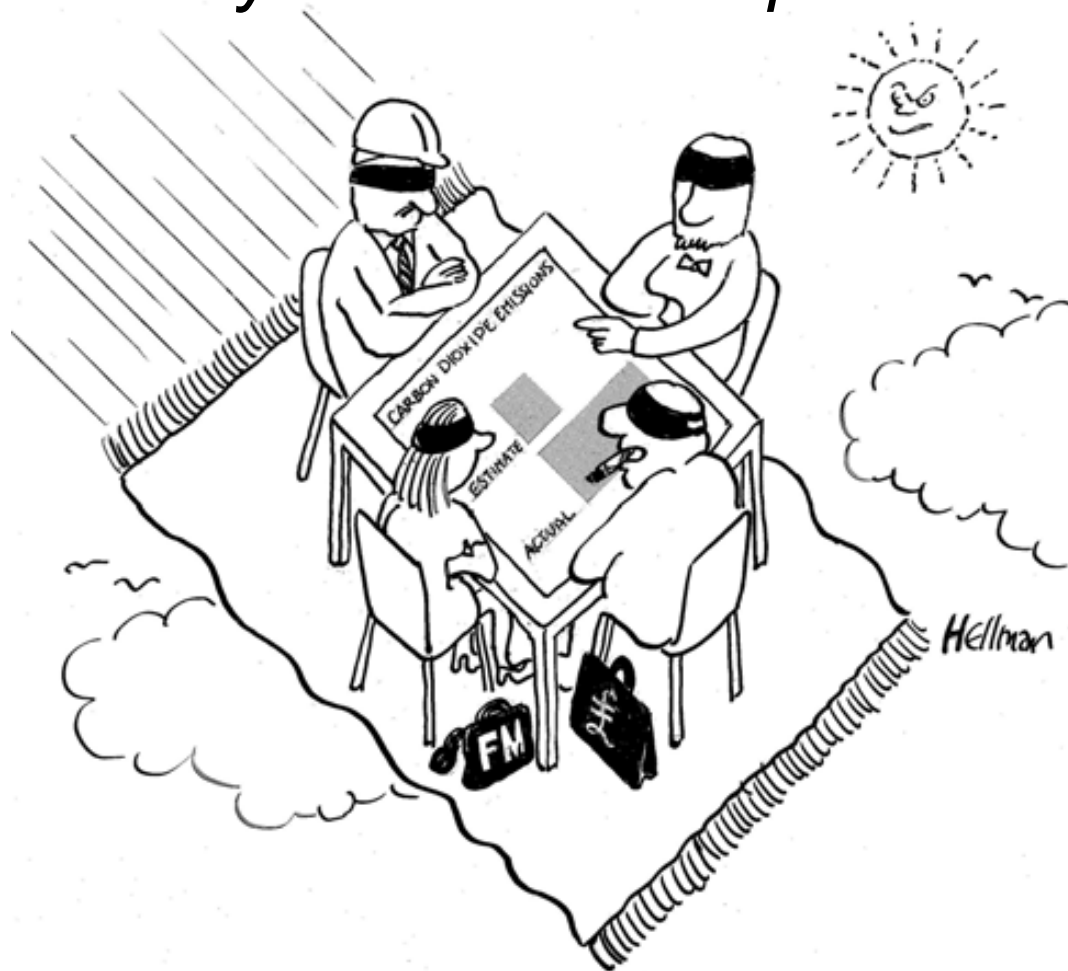
THE PERFORMANCE GAP:

***Why systems go wrong,
or were they just born that way?***

Bill Bordass

USABLE BUILDINGS
www.usablebuildings.co.uk

Have you ever seen this?
When do you think it was published?

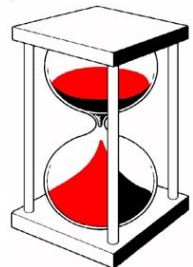
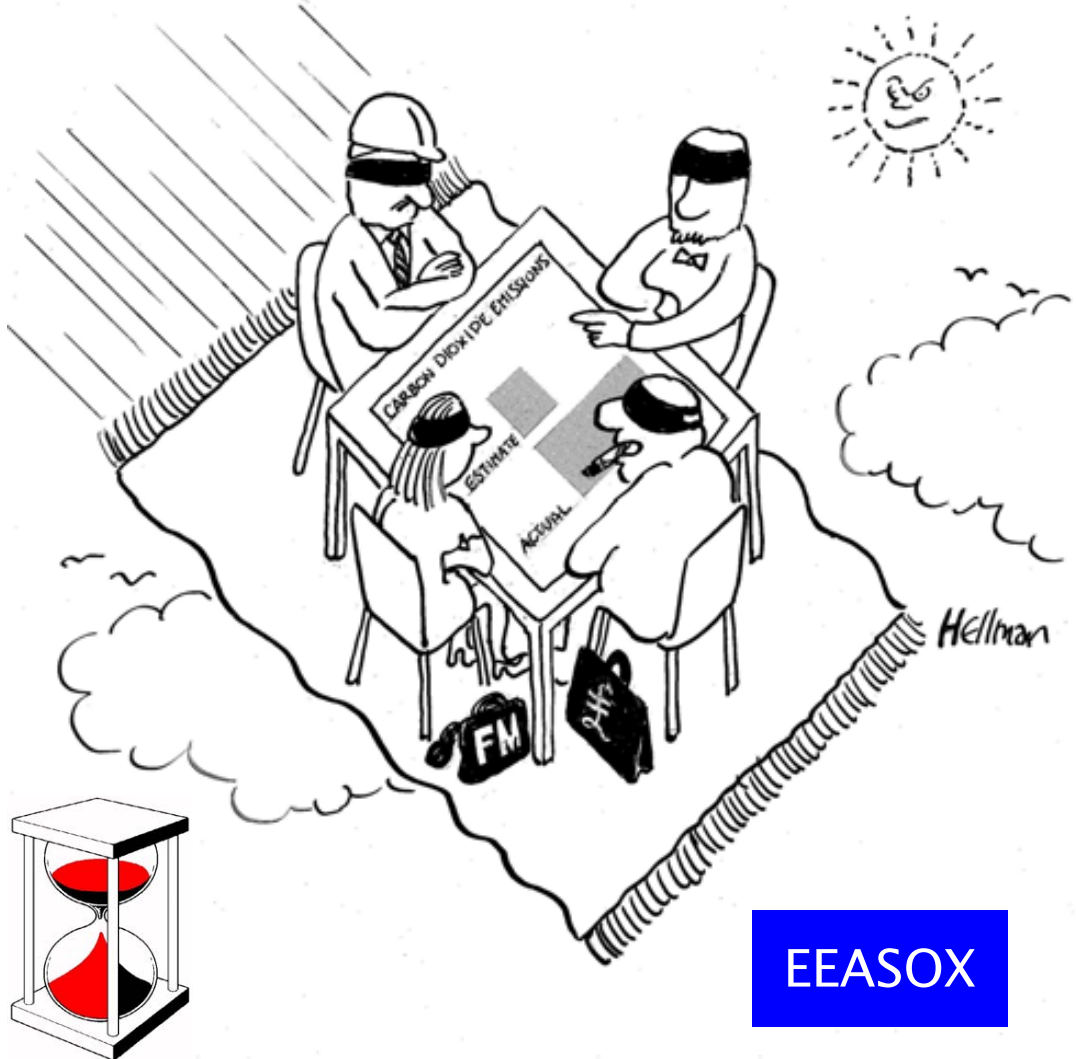


Client, designer, builder + FM all in denial of performance gaps.
We should have put a policymaker in there too.

FLYING BLIND

Everything you wanted to know about energy in commercial buildings but were afraid to ask

Data shown from a Green Building of the Year award winner 1996 - Thirty years ago!



Association for the Conservation of Energy

October 2001



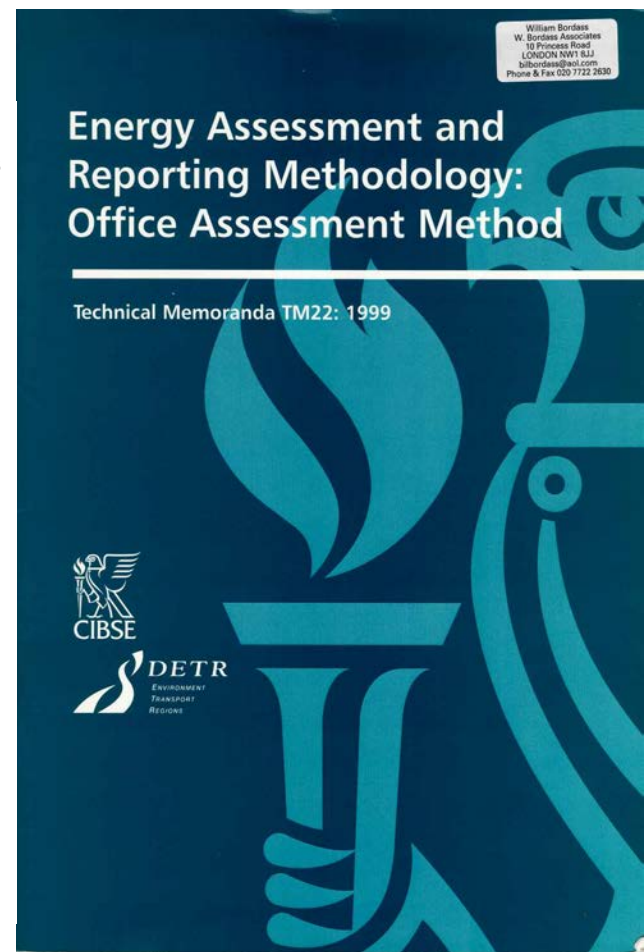
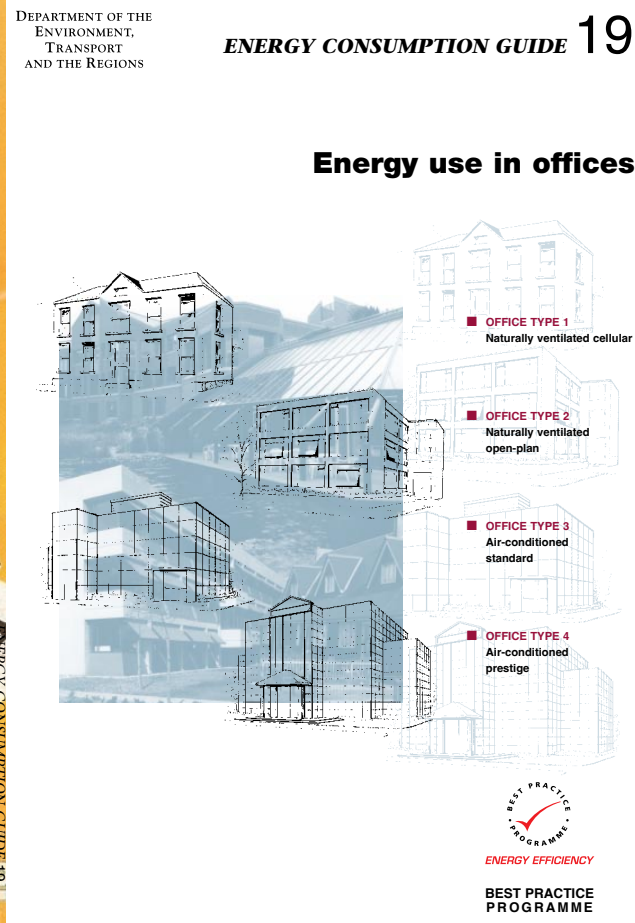
Energy Efficiency Advice Services for Oxfordshire

Some techniques behind *Flying Blind*

1995-2002

1991-1998

1999



And many more since:

e.g. CIBSE TM23, TM31, TM39, TM44, TM46, TM47, TM61-64

What tends to go wrong technically - 1:

Slippage from design intent to practical reality

1. During initial estimation:

- *Only typical spaces included*
- *Only normal services included* - “regulated loads”
- *Night loads not considered*
- *Near perfect control assumed*

What tends to go wrong technically – 2: ***Slippage** from design intent to practical reality*

1. During initial estimation

2. During design development:

- *Altered client requirements*
- *Lack of incentives in buildings built for rent*
- *Fabric changes from original intent*
- *Services changes from original intent*

BUT NOT NECESSARILY RE-CALCULATED

What tends to go wrong technically - 3: ***Slippage** from design intent to practical reality*

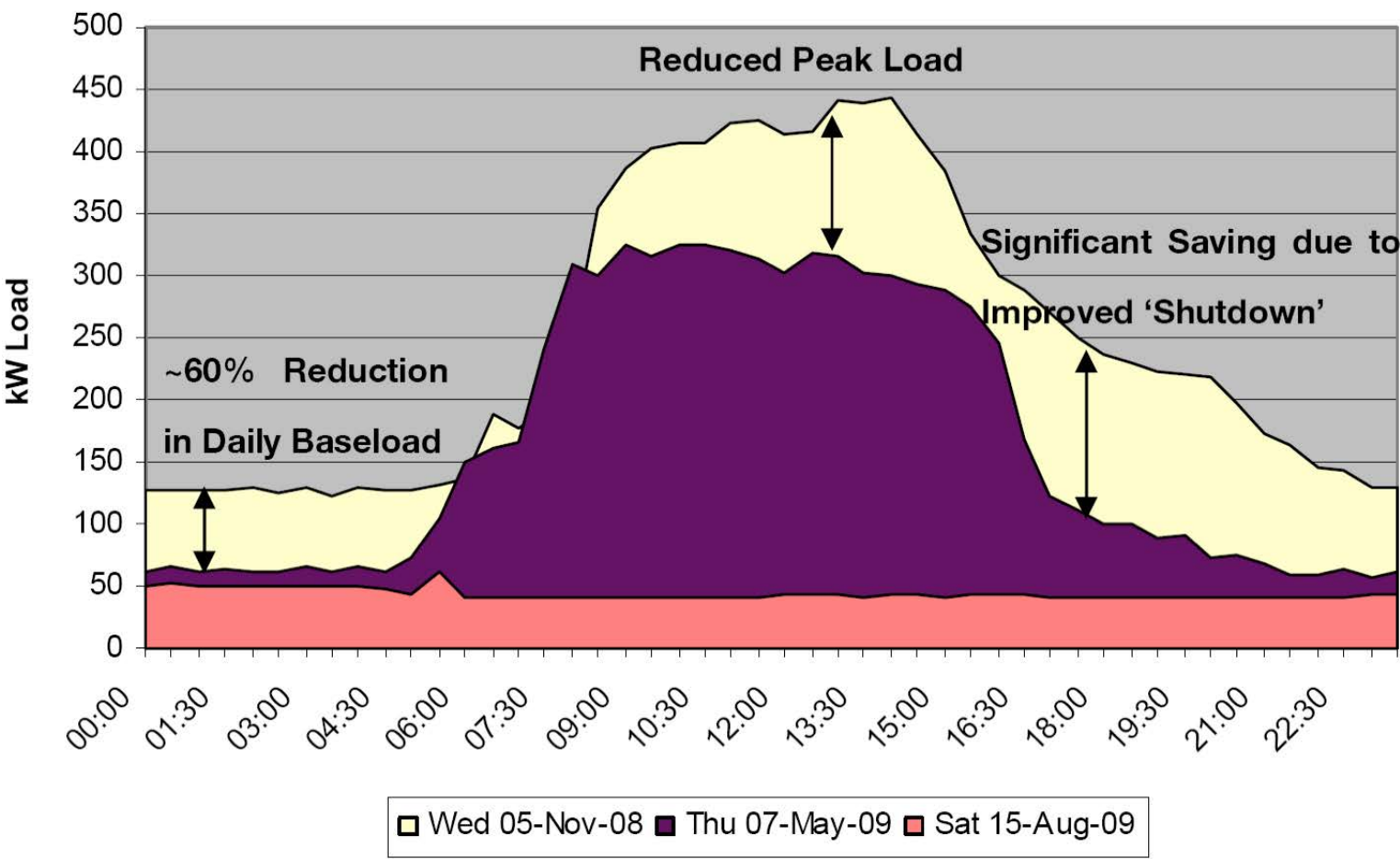
1. During initial estimation
2. During design development
- 3. During construction and commissioning:**
 - *Commercial negotiations, salami-slicing*
 - *Cost-cutting – what I call “vandal engineering”*
 - *Contractor-design elements*
 - *Product selections and substitutions*
 - *Shortcomings in build quality*
 - *Shortcomings in commissioning, control + metering*

What tends to go wrong technically – 4: *Slippage* from design intent to practical reality

1. During initial estimation
2. During design development
3. During construction and commissioning
- 4. After handover:**
 - *Little or no follow-through, aftercare and feedback*
 - *Landlord-tenant splits: costs passed on to tenants*
 - *Fitouts can easily conflict with design intent*
 - *Management often rates service before economy*
 - *Outsourced FM, often lowest common denominator*

Aftercare management will often pay for itself

Intervention in a new secondary school



Saving over £ 50,000 p.a. in electricity bills: avoid default to ON

So why do performance gaps still persist?

“Any building without a feedback system is stupid. It will continue to make the same dumb old mistakes, rather than interesting new ones.”

AMORY LOVINS - *Rocky Mountain Institute*

BUT

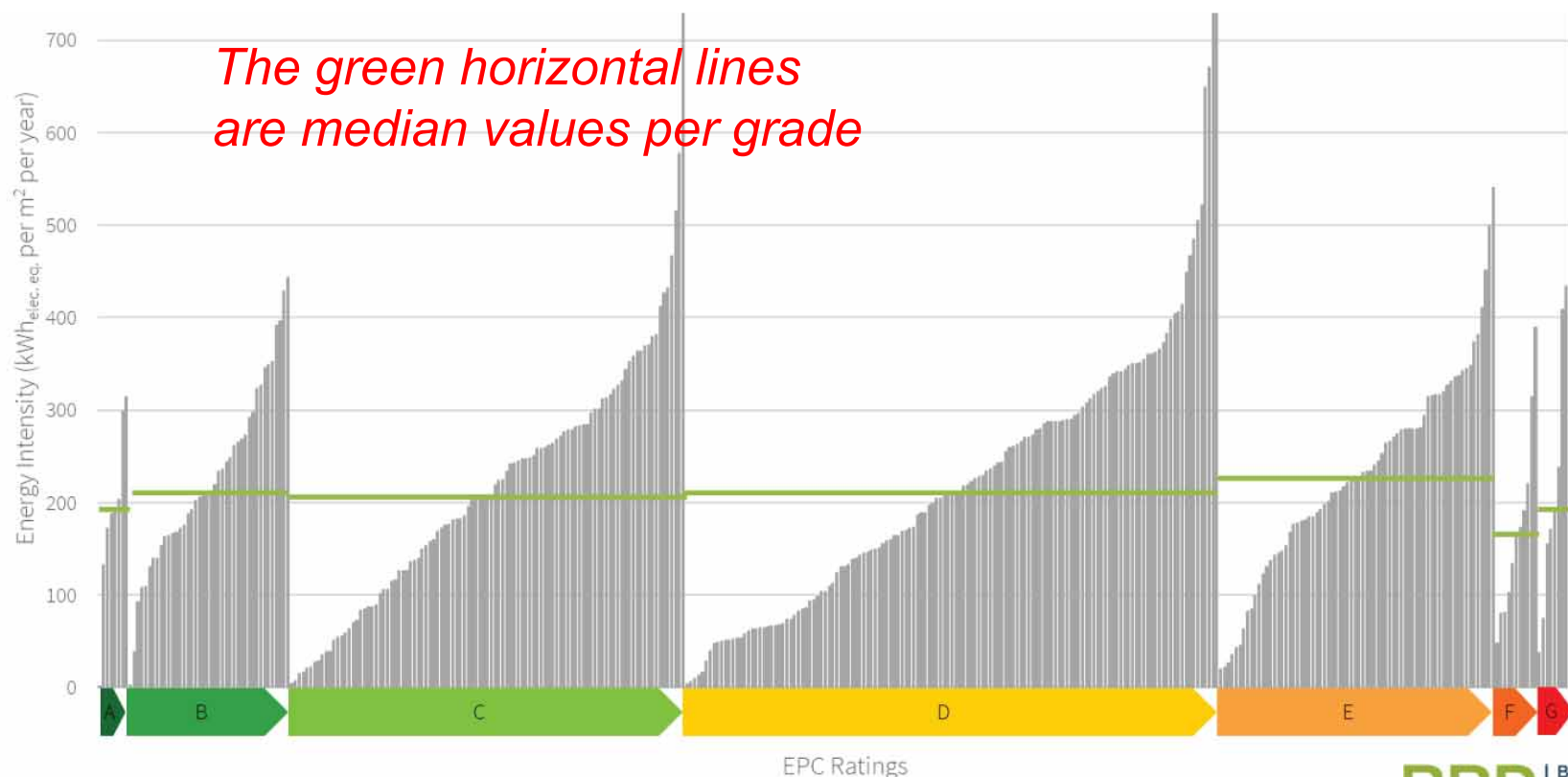
*Our engineers design to the rules,
not for good outcomes”*

PARTNER – *Building services engineering consultancy*

But some rules we follow are more like rituals:

Office actual energy use/m² NLA vs. EPC Grade

A Dysfunctional Market

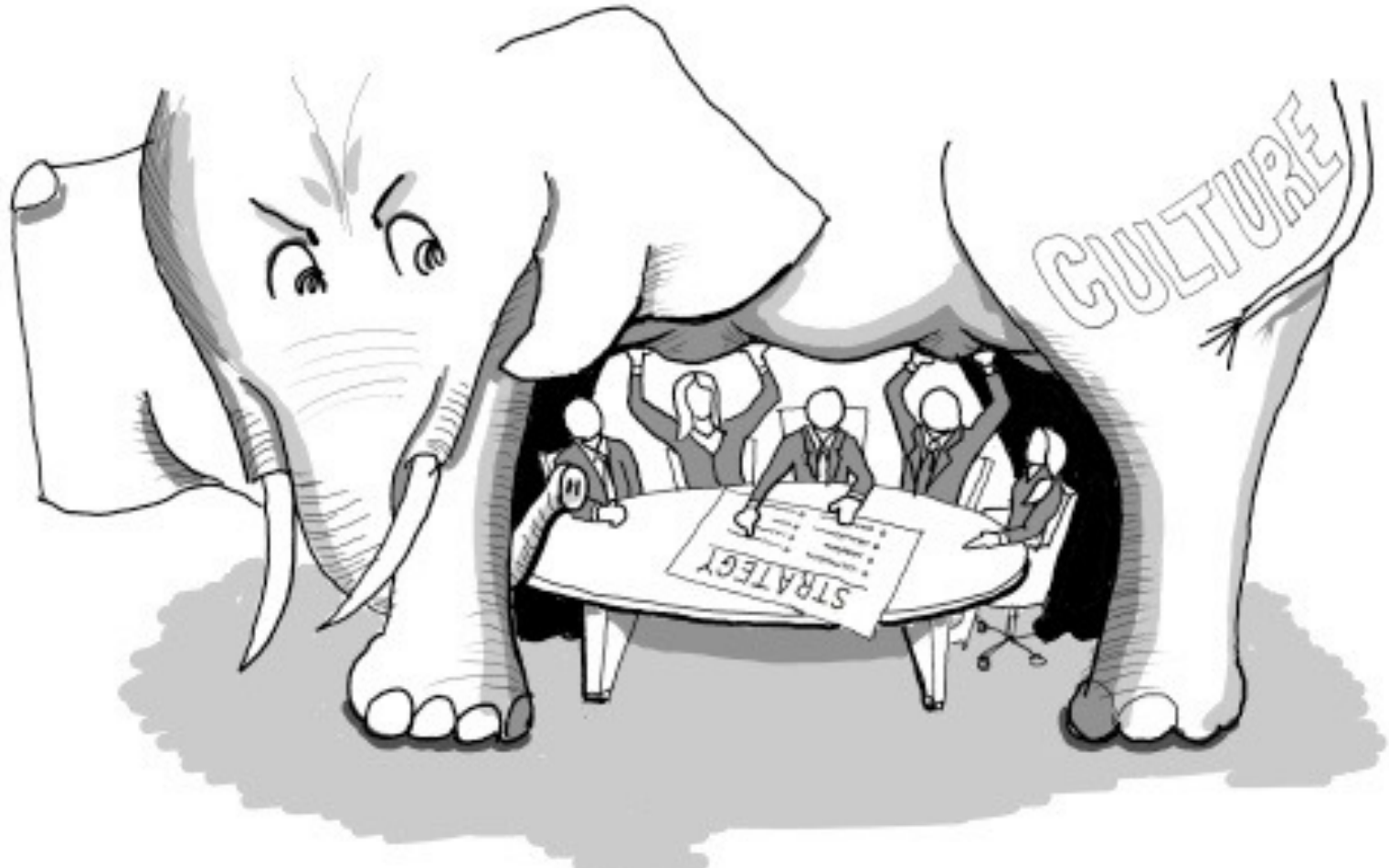


What went wrong?

- Privatisation and outsourcing of government's in-house capabilities, *including BRE*.
- Consequent loss of *the Energy Efficiency Best Practice programme and its Energy Consumption Guides that ALL energy end uses and were due for a massive update*.
- UK implementation of the Energy Performance of Buildings Directive focused too much on theoretically-calculated "*regulated loads*", and on carbon rather than energy.
- Government tends to regard in-use performance as more to do with the construction industry than the public interest.
- Built environment professional institutions have proved unable to fill the voids that had opened up.

So, 50 years after the first oil crisis, we're still Flying Blind.

The elephant isn't in the room,
IT IS THE ROOM!



WE HAVE A SYSTEMIC PROBLEM: Blindness to performance in use
It's not just the construction industry, it's the way we all go about things

It might have been very different
had government taken energy certificates seriously

Ambitions of Europrosper research project 2000-04:

Display energy certificates based on actual energy use, not theoretical.

Achieved for public buildings only, but not supported. In 2011, Treasury sank commercial DEC's.

Transparency between design expectations and in-use performance outcomes. *Sunk by building services consultant to Ministry who said EPCs and DEC's were apples & oranges.*

Multiple performance indicators
But benchmarking not supported.

Energy Certificate

Building Energy Performance >		As built:	In use:
Certificate type	FULL	Asset Rating	Operational Rating
Building Type	Office		
Whole or part of building	Whole building		
Very energy efficient			
A			
B			
C			
D			
E			
F			
G			
Not energy efficient			
Asset rating method: UK National Standard 2004		Calculated	Actual
Operational rating method: UK Office Tailored Benchmarks 2002		48	83
Units used: kg CO ₂ per sq m of net area per annum >			
Occupancy level Square metres net lettable area per person		14	12
Equipment heat gain level Watts per square metre net		12	12
Weekly occupancy hours Hours per week		55	58
Heating performance ratings		AB CDEFG	AB CDEFG
HVAC performance ratings (cooling, fans and pumps)		AB CDEFG	AB CDEFG
Lighting performance ratings		AB CDEFG	AB CDEFG
Management rating (for in-use performance only)			AB CDEFG
Internal Environmental Quality			Not assessed
Risk level			Not assessed
Further information can be found in the Energy Log Book			
GB 2004			
			
Directive 2002/91/EC			

So what do we do now?

- Many construction-related institutions, including CIBSE, require their members to understand and practice sustainable development.
- How can members do this unless they understand the consequences of their actions? *The real outcomes.*
- If they don't, they are working outside their region of competence ...
- **or in other words, not acting in a fit manner for a professional !**

***SO WE NEED TO WORK - BOTH INDIVIDUALLY AND
COLLECTIVELY - TO CHANGE OUR PROCUREMENT SYSTEMS,
SO THAT ALL WORK TO BUILDINGS
STOPS DIVERGING FROM GOOD INTENTIONS AND INSTEAD
CONVERGES ONTO GOOD OUTCOMES.***

The need for culture change is now becoming explicit *triggered by the Grenfell public inquiry*

Share your views on CABE's Future Professional consultation, a roadmap for evolving the standards, values and practices of the building engineering profession.

The events at Grenfell Tower, the subsequent public inquiry and ongoing programme of regulatory reform have highlighted the urgent need for stronger professional oversight, greater transparency and a cultural change within the construction sector.

Future Professional sets out CABE's proposals for how the Association will meet these challenges, laying the foundations for long-term development. The consultation forms a vital part of CABE's ongoing commitment to ensuring that CABE Members, and the wider construction and built environment community, are equipped to meet the highest expectations of competence, ethics, and accountability.

CONSULTATION ENDED 15 FEBRUARY 2026



Soft Landings can reinforce the “golden thread”

Key findings from its application 2009-2025

STAGE 1 – INCEPTION AND BRIEFING

Client leadership is key.

Champions need to be designated.

STAGE 2 – DESIGN AND CONSTRUCTION

A question of **attitude** – no additional costs.

Regular reality-checking is essential.

Clients must not drift off – too often they do.

STAGE 3 – PREPARATION FOR HANDOVER

Dialogue with occupiers+operators **needs more care**.

STAGE 4 – INITIAL AFTERCARE *typically Year 1*

Difficult for **contractors** not to **revert to type**.

Helps to have a **client budget** for fixing things quickly.

STAGE 5 – LONGER TERM AFTERCARE *Years 2+3*

Needs some **independent, disinterested input**.

Needs **funding outside the building contract**.



the **SOFT LANDINGS FRAMEWORK**
for better briefing, design, handover and building performance in-use



Moving from design for compliance to *Design for Performance*

[OUR RESOURCES](#)[OUR MEMBERS](#)

Design for Performance

The Design for Performance Project is an industry initiative led by Verco and including BSRIA, Arup and the Usable Buildings Trust (UBT), and supported by the BBP, which aims to change the way we design new office developments in the UK. The project looks abroad to the hugely successful Australian NABERS Commitment Agreement and explores the applicability and opportunity of developing and testing such a framework in the UK.

The energy efficiency of new offices in the UK is subject to Building Regulations Part L and represented in market transactions by Energy Performance Certificates (EPCs). Developers, owners and occupiers of new and refurbished buildings might reasonably expect that these mechanisms will produce a building that is energy efficient in operation. However, both focus on design and technology that improves predicted building performance, not on achieving directly measureable improvements in performance in-use.

The consequence has been a *design-for-compliance* culture, and a disconnect between the regulatory framework and the influence it has on the energy use and associated carbon emissions it is supposed to be limiting – the so-called ‘Performance Gap’. Voluntary

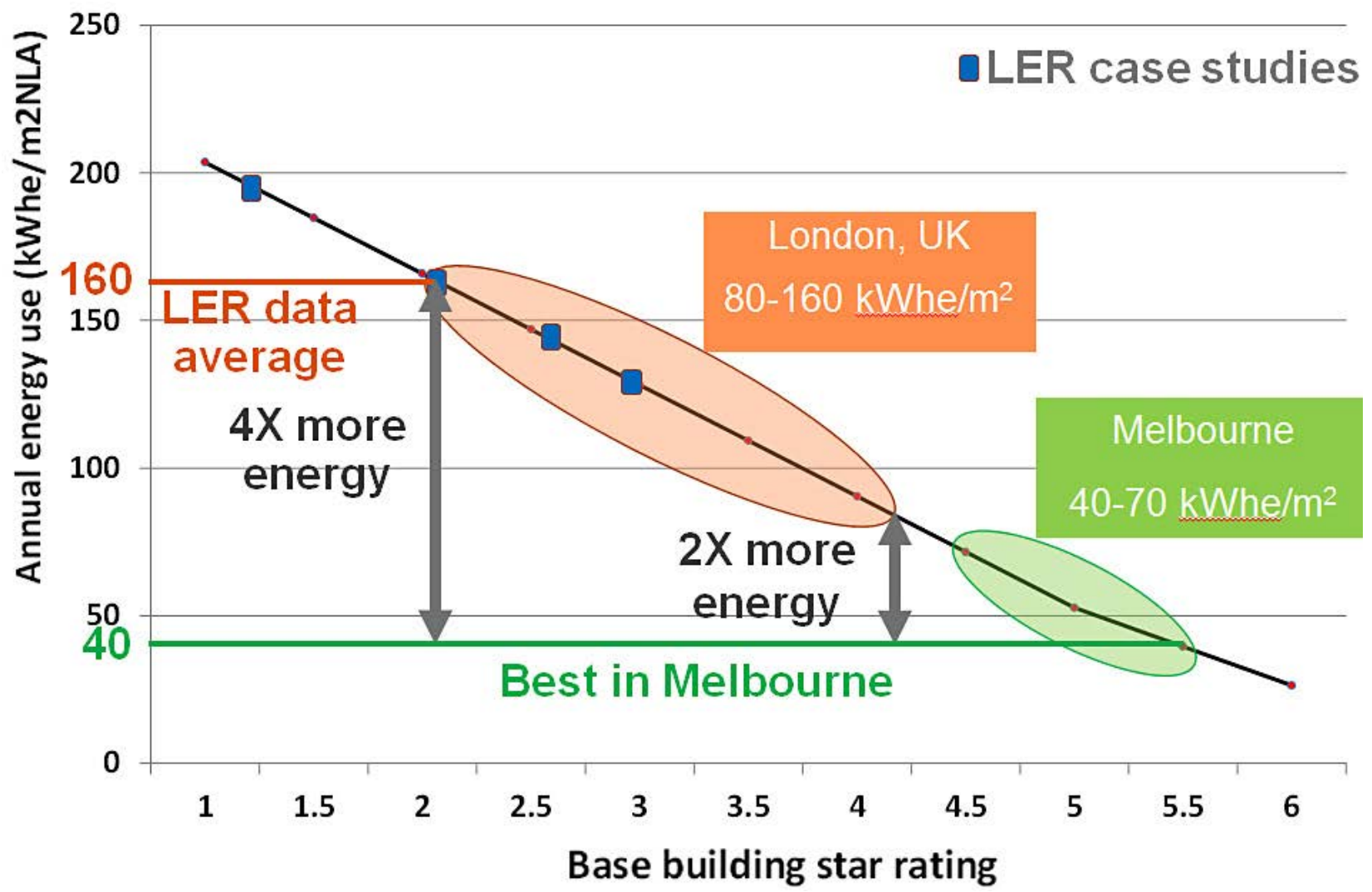


DESIGN FOR PERFORMANCE

A new approach to delivering energy efficient offices in the UK

JUNE 2019

Potential reward in landlord annual energy use: *London (without CAs) & Melbourne (with CAs)*



Might we be starting to get there? Nov 2025

Far too late: we could have had integrated certification

Leeds office achieves 5-Star NABERS UK Energy Rating

The 11&12 Wellington Place office development in Leeds has made history by becoming the first new building in the UK to achieve a 5-star NABERS UK energy rating. For the engineering team, it's just the beginning, as they push for even greater efficiencies to future-proof the investment

Posted in October 2025



'Five stars is excellent, but that's just the starting point for us. We see this building as having a lot more to give,' says Brad McHale, principal mechanical engineer at Arup. McHale is talking about the speculative office building 11&12 Wellington Place, Leeds, which has made history by becoming the first new building in the UK to achieve a NABERS UK 5* Energy Rating.

cibse
Journal

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Sign up to the CIBSE Journal newsletters



The first UK office with measured in-use operational performance that matches its declared design intent.

THANK YOU

Questions?

**CHANGED
PRIORITIES
AHEAD**



WOOZER

www.usablebuildings.co.uk

THE FUTURE: Outcome-driven projects

New professionals follow design intent through into reality

- Understand what is needed *strategic briefing*
- Make their overall expectations and intentions clear *strategic design*
- Are ambitious, but realistic *question assumptions, understand user needs*
- Confirm that things will work *technical feasibility, usability and manageability*
- Tell others what is expected *specify not just what, but why and how*
- Follow things right through the whole process *e.g. using Soft Landings*
- Collaborate to get things done well *communicate, train, inspect*
- Reflect on progress *manage expectations, undertake reality checks*
- Finish things off *commission, operational readiness, handover, dialogue*
- Help users to understand and take ownership *provide aftercare support*
- Review performance in use *including **POE and BPE***
- Work with occupiers to improve things *monitoring, review and fine tuning*
- Anticipate and spot unintended consequences *revenge effects*
- Learn from it all *and share their experiences*

The New Professionals: THAT'S YOU !
