

CAR Showroom, Cambridge  
10 July 2019

# Sleepwalking into Unsustainability



Bill Bordass

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*From the editor*

## The sleepwalking profession?

Climate change is the biggest issue of our time. It makes Brexit look like a little red, white and blue blip on a landscape that is heating up, perceptibly. As I left the AJ office to grab some lunch this week, walking out into summer weather in February, I couldn't help thinking that most of us are like those frogs in a pan of water over the fire, enjoying the comfort for now, ignoring (or blissfully oblivious to) the imminent lethal outcome.

Maybe this particular balmy spell has nothing to do with global warming; maybe that particular extreme storm doesn't, either. But the trend, and the science behind it, is overwhelming. According to the IPCC report, we've got 12 years to reduce global warming to 1.5°C or face droughts, floods, extreme heat and poverty for hundreds of millions of people. Twelve years. That's about how long it takes from land assembly to occupation for a large scheme. If we've all known about climate change for years, why has the issue been ignored, or seen as unfashionable, or viewed as a quirky 'add-on', for so long? What will it take to wake us all up?

We're focusing on climate change now because business – and architecture – doesn't have an option. The construction industry is one of the key causes of global warming. Within that, we're highlighting the challenge of reducing 'whole-life carbon' emissions, because it's not enough to look just at the energy use of buildings in operation. What about all the embodied carbon inherent in the materials and the processes required to build a project in the first place?

To kick-start our coverage, the AJ invited an advisory group of architectural, engineering and environmental experts to discuss the issues and advise us on how we can support the profession in this area. The fact they met with barely a week's notice highlights the urgency of the issue – and what came out of that meeting feels like a game-changer.

Architects cannot, of course, take sole responsibility for 'fixing' climate change, but they are at the heart of the building process and have the opportunity to forge a new role. Reducing carbon emissions goes to the heart of what being a 'professional' means – acting for the public good and with an awareness of the wider world

Reducing carbon emissions goes to the heart of what being a 'professional' means – acting for the public good and with an awareness of the wider world

# Structure of the talk

- 1. Background**
  - 2. What went wrong?**
  - 3. It could all have been very different**
  - 4. What can we do now?**
  - 5. DISCUSSION**
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# 1

## BACKGROUND

*[In the 20th Century] ... we built a really inefficient environment with the greatest efficiency ever known to man.*

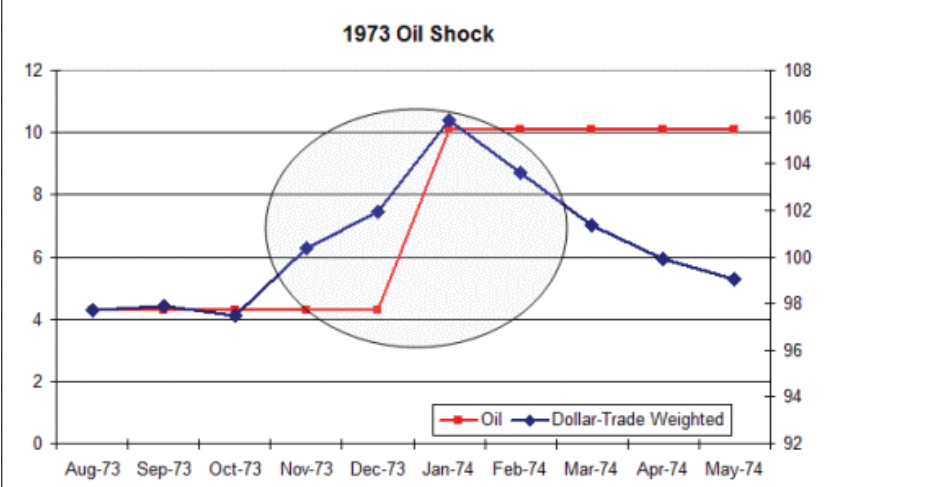
ANDY KARSNER, Assistant Secretary, Energy Efficiency and Renewable Energy, Department of Energy, USA until mid-2008.

*In embracing petroleum so comprehensively in the 20<sup>th</sup> Century, humanity confounded mobility with freedom and may well end up with neither.*

JAMES BUCHAN, *New Statesman*, 33, 17 July 2006.

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# At the end of 1973, we had the oil crisis



*In 1974, coal supplies also ran short in the UK, through trade union action, bringing on the 3-day week and bringing down the Tory Government ...*

# The UK soon introduced its very first *Non-domestic energy building regulations*

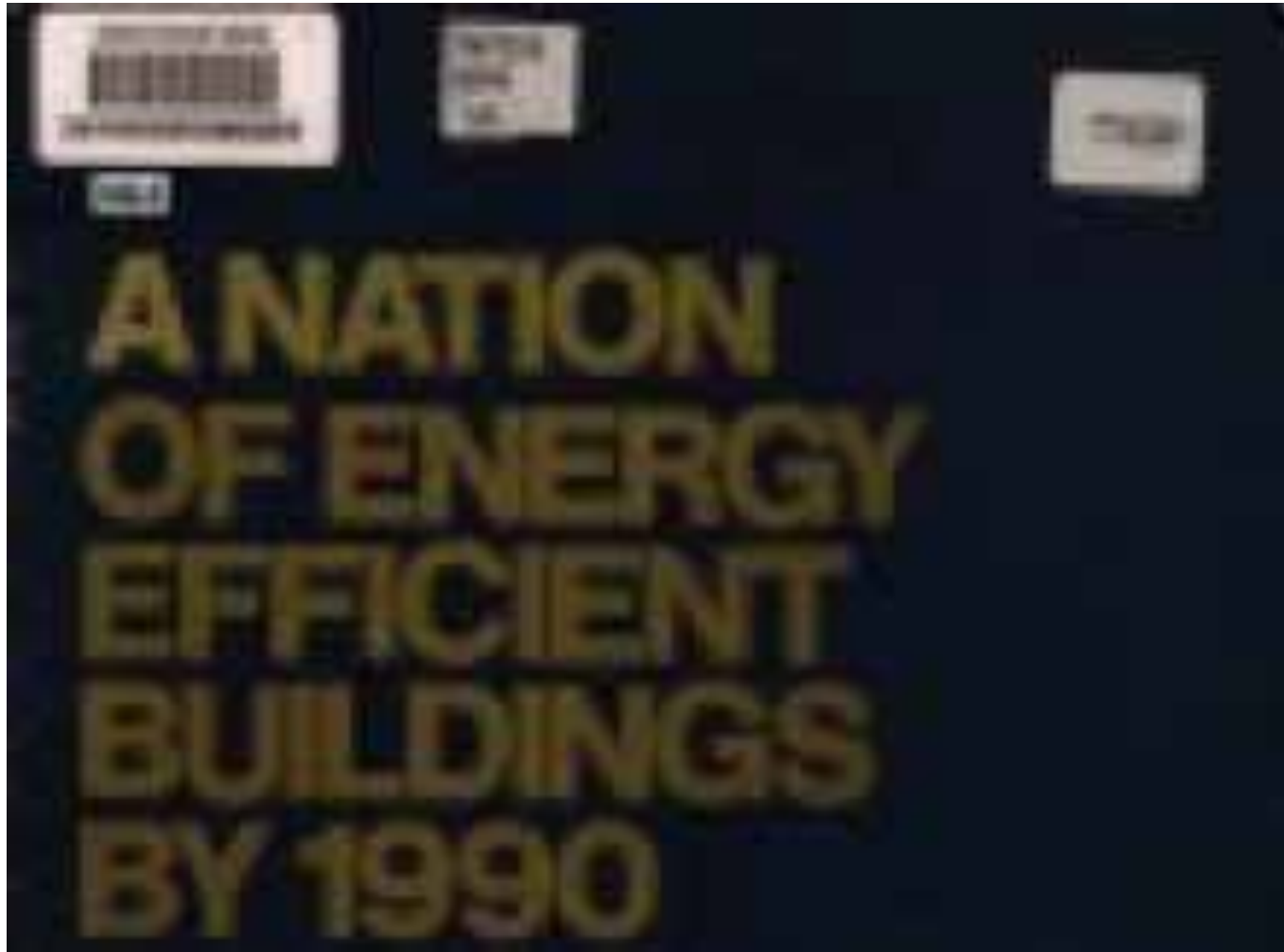


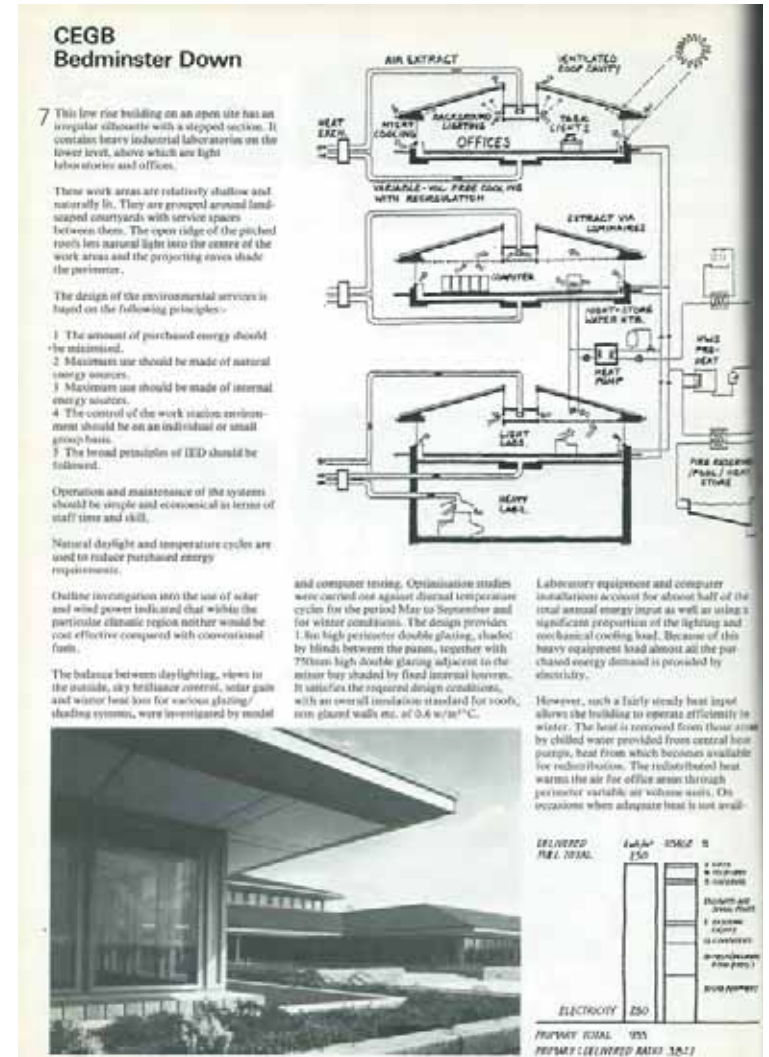
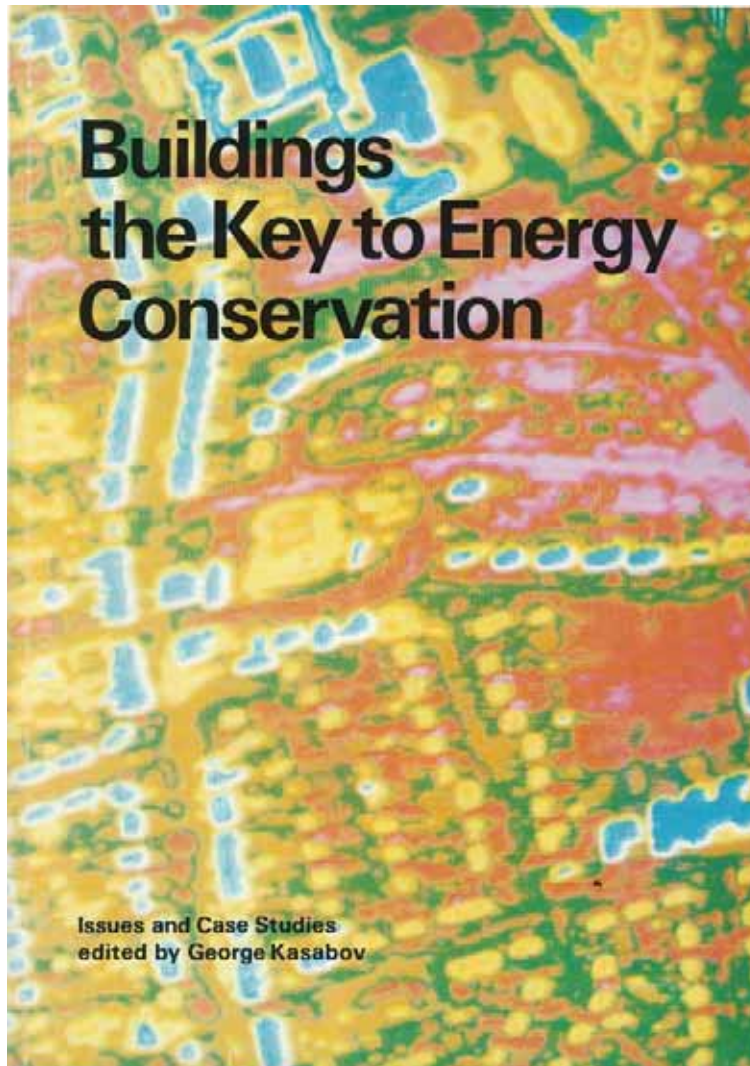
## History of “Part L”

- **1962** onwards – anti-condensation, not energy efficiency.
- **1972** Conservation of fuel and power provisions for dwellings Part F...
- **1974** Ditto non dwellings – Part FF.
- **1985** Provisions recast:-
  - Functional requirement – make reasonable provision.
  - Guidance in Approved Document L – some ways of complying.
- **1990, 1995, 2002** Requirements improved and re-focussed first on energy efficiency and then on CO<sub>2</sub>.



# The American Institute of Architects *published a policy document*







*but 10 years later, in 1990 ...*

## Tales of the unexpected

*Office buildings claimed to be energy efficient, in reality often fall short of their quoted performance because of simple calculation errors and unknown energy-consuming extras. Matthew Coomber reports.*

BUILDING owners beware – your energy-efficient building may not be as efficient as you have been led to believe.

Bill Bordass, an independent energy consultant and something of a guru in the field of energy efficient design, claims many offices are touted as energy efficient, but turn out not to be on closer examination.

He is helping to prepare a series of case studies of energy use in offices as part of the Energy Efficiency Office's Best Practice programme.

The studies detail energy usage and cost figures for each

energy consumption elements missing or had recorded building areas much larger than that actually serviced," he says.

Errors in calculation had arisen either through mismeasurement of floor area or a failure to understand what constitutes the treated area, that is, the area of a building that consumes energy, in whatever form.

"We found that energy researchers have a tendency to look in great detail at where the energy goes, but will often ask somebody else for a building area." Usually rounded up or

Bordass says some people measure energy consumption by the whole building, some by building services only, and some by landlord's building services only. "This can produce great discrepancies when you come to measure the floor area and the devices properly," Bordass notes.

In addition, tenants can be confused about who pays for services, resulting in the doubling-up or omission of important elements of the energy bill.

The next problem concerns the assumptions that the people



## Two-to-one discrepancy between measured and predicted performance of a 'low-energy' office building: insights from a reconciliation based on the DOE-2 model

L.K. Norford, R.H. Socolow, E.S. Hsieh, G.V. Spadaro<sup>1</sup>

*Center for Energy and Environmental Studies, Princeton University, Princeton, NJ, USA*

Received 1 February 1989; accepted in revised form 25 April 1994

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### Abstract

Computer models of building energy use, if calibrated with measured data, offer a means of assessing retrofit savings, optimizing HVAC operation (on- or off-line), and presenting energy-consumption feedback to building operators. The calibration process itself can pinpoint differences between how a building was designed to perform and how it is actually functioning. Our initial goal was to identify why the actual annual energy consumption of an office building was 325 kWh/m<sup>2</sup>, over twice the predicted value of 125 kWh/m<sup>2</sup>. Part of our effort to understand its performance involved calibrating a DOE-2 model prepared at the design stage. In the process, we formulated calibration guidelines and developed insights that may be of use to others. Of particular interest are the major sources of the wide discrepancy between predicted and actual energy use. Unanticipated tenant energy consumption, both during the day and the night, contributed 64% of the two-fold increase. Heating, ventilation and air-conditioning (HVAC) equipment operation beyond the expected 10 h per weekday contributed 24%. We attributed the remaining 12% to HVAC equipment not operating up to specification; building conductive heat loss in excess of the design-stage prediction; and minimum outdoor-air intake differing from the design value. The calibration process involved working on major input parameters independently of the others, then combining the results into one simulation. The calibrated model accounted for 94% of measured site energy for the building.

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... and in Australia, *though its NABERS system has improved things in rented offices*

# Why good buildings go bad while some are just born that way

Dr Paul Bannister, Exergy Australia Pty Ltd

## ABSTRACT

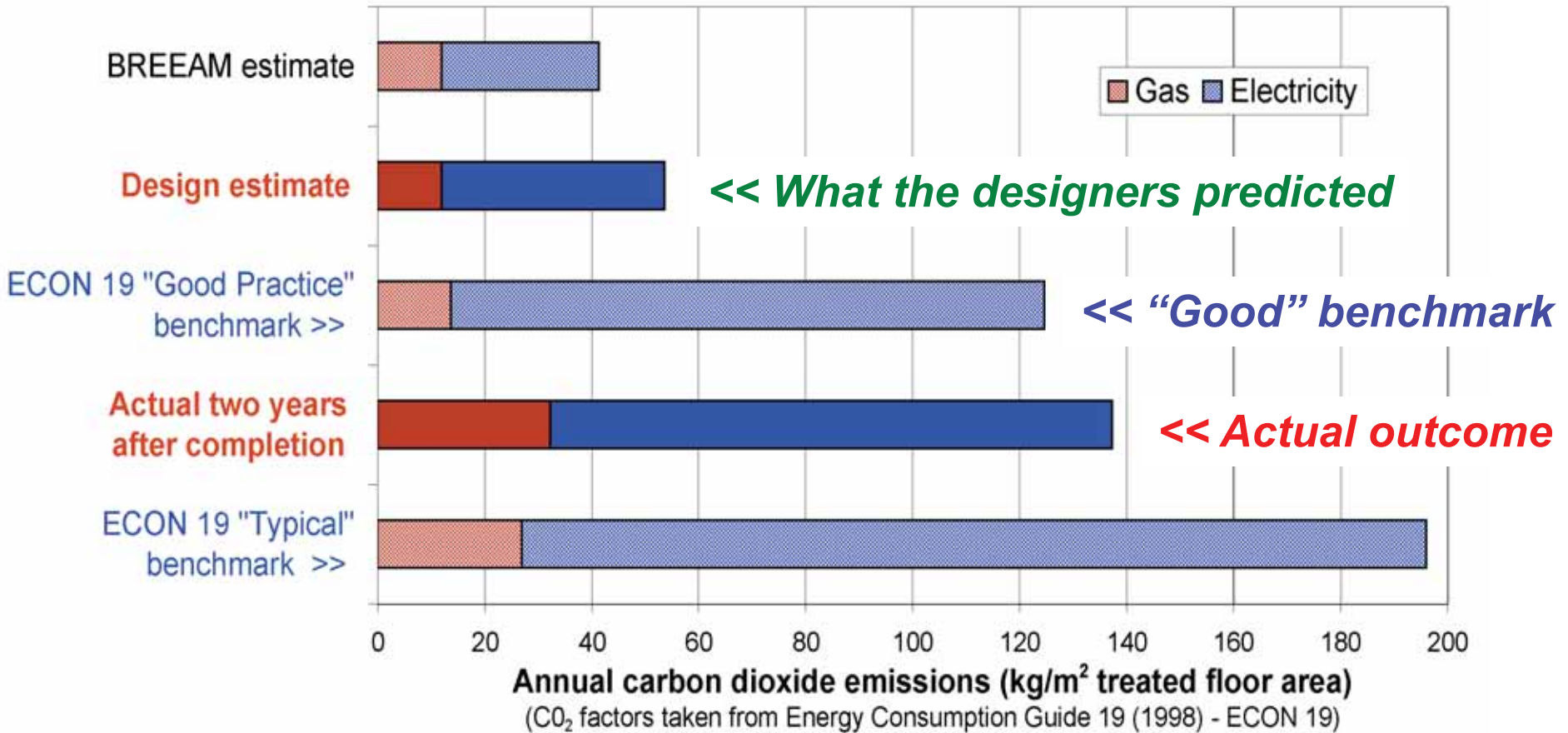
With the realisation that climate change is not going to be resolved by inaction or unrealised promises, the issue of actual building performance has become focal in today's commercial buildings sector. With this has come the genuinely problematic issue of delivering and operating buildings at levels of efficiency higher than have been achieved before.

While some argue that good design is all, those involved in operating buildings are generally aware that the issues of delivering and operating high-efficiency buildings are somewhat more complex. A building that has a good theoretical performance may not perform well in practice, while many lesser buildings may be easier to operate and improve.

In this paper, a range of issues that cause apparently well designed buildings to perform poorly are explored, with particular emphasis on the issues affecting base buildings under the Australian Building Greenhouse Rating scheme. These issues include items that can be seen as the responsibility of various participants in the supply chain, as well as many that are the product of numerous such participants. It is identified that delivering and operating high-efficiency buildings is a complex and multifaceted problem that requires a holistic rather than reductionist view of the building process. Some guidelines for more reliable delivery of efficient buildings are also provided.

# BREEAM for offices was introduced in 1990, *but performance gaps persisted...*

**Data from the winner of the Green Building of the Year Award 1996**



# New non-domestic buildings:

## *What we found in the Probe studies 1995-2002*

- They often perform much worse than anticipated, especially for energy and carbon, often for occupants, and with high running costs, and sometimes technical risks.
- Design intent is not communicated well through the process; and designers and builders go away at handover.
- **Unmanageable complication: the enemy of good performance.**
- Buildings are seldom tuned-up and controls are a muddle. So why are we making things complicated?
- Modern procurement systems make it difficult to pay attention to critical detail. **A bad idea when promoting innovation.**
- **“The English spare no expense to get something on the cheap”. ... NIKOLAUS PEVSNER**





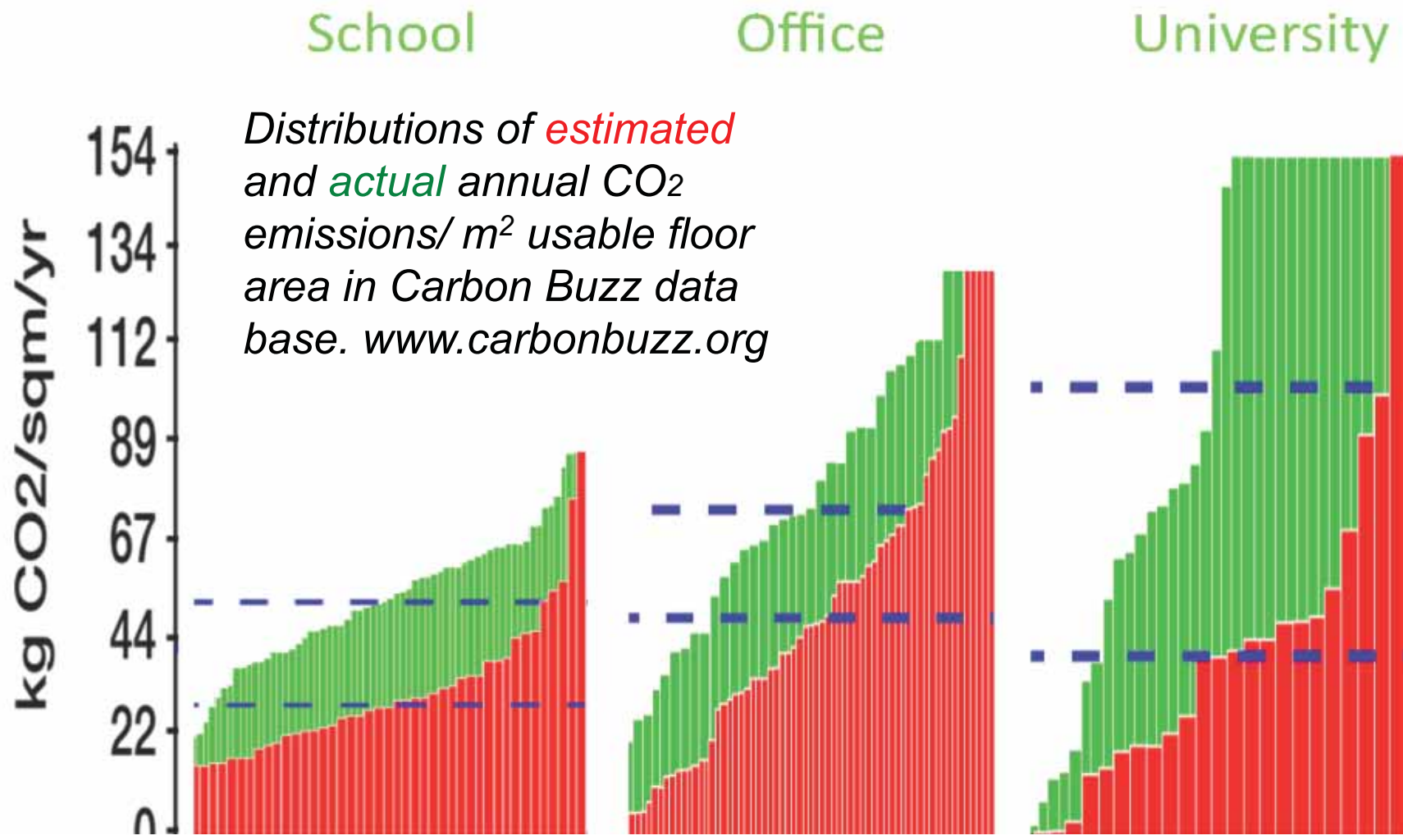
# New non-domestic buildings:

## *What we found in the Probe studies 1995-2002*

- They often perform much worse than anticipated, especially for energy and carbon, often for occupants, and with high running costs, and sometimes technical risks.
- Design intent is not communicated well through the process.  
**SO ... *Understand how buildings work in use, follow through after handover, and learn from the experience.***
- **Unmanageable complication: the enemy of good performance.**  
**SO ... *Stop making buildings complicated in the name of sustainability and get the simple things right.***
- Buildings are seldom tuned-up and controls are a muddle.  
**SO ... *Design to enhance usability and manageability.***
- Modern procurement systems make it difficult to pay attention to critical detail. **SO ... *Change the processes.***
- **AND THEREFORE... Focus on in-use performance, communicate it clearly and manage it properly.**



# Evidence of UK performance gaps is now overwhelming; *in some other countries too.*



# Even CIBSE admits it

## *UK Chartered Institution of Building Services*



### CARBON BITES

From the CIBSE ENERGY PERFORMANCE GROUP

#### The Performance Gap

##### What is The Performance Gap?

There is significant evidence to suggest that buildings do not perform as well as anticipated at design stage. Findings from the PROBE studies (Post Occupancy Review of Buildings and their Engineering) demonstrated that actual energy consumption in buildings will usually be twice as much as predicted. This was based on post-occupancy reviews of 23 buildings previously featured as 'exemplar designs' in the Building Services Journal (BSJ) between 1995 and 2002. More recent findings from the Carbon Trust's Low Carbon Buildings Accelerator and the Low Carbon Buildings Programme have demonstrated that in-use energy consumption can be 5 times higher than compliance calculations. Both studies suggest that lack of feedback following occupancy is one of the biggest contributors to this gap. Another key factor is that calculations for regulatory compliance do not account for all energy uses in buildings. These calculations are commonly misinterpreted as predictions of in-use energy consumption, when in fact they are simply mechanisms for compliance with Building Regulations. Unregulated sources of energy consumption such as small power loads, server rooms, external lighting, etc, are rarely considered at design stage. Yet these typically account for more than 30% of the energy consumption in office buildings, for example.



# The gaps occur in new housing too: *a full 40 years after the 1973 oil crisis*

Minister launches Hub-led project  
performance challenge **Ecobuild**

A new project to examine the energy performance of new homes is unveiled today. The industry-backed project brings together leading housebuilders and industry experts to investigate the actual performance of homes and better understand how this compares to that expected by the original design. Communities and Local Government minister Rt Hon Don Foster MP announced a new £380,000 grant for



CLOSING THE GAP BETWEEN

DESIGN



AS-BUILT  
PERFORMANCE

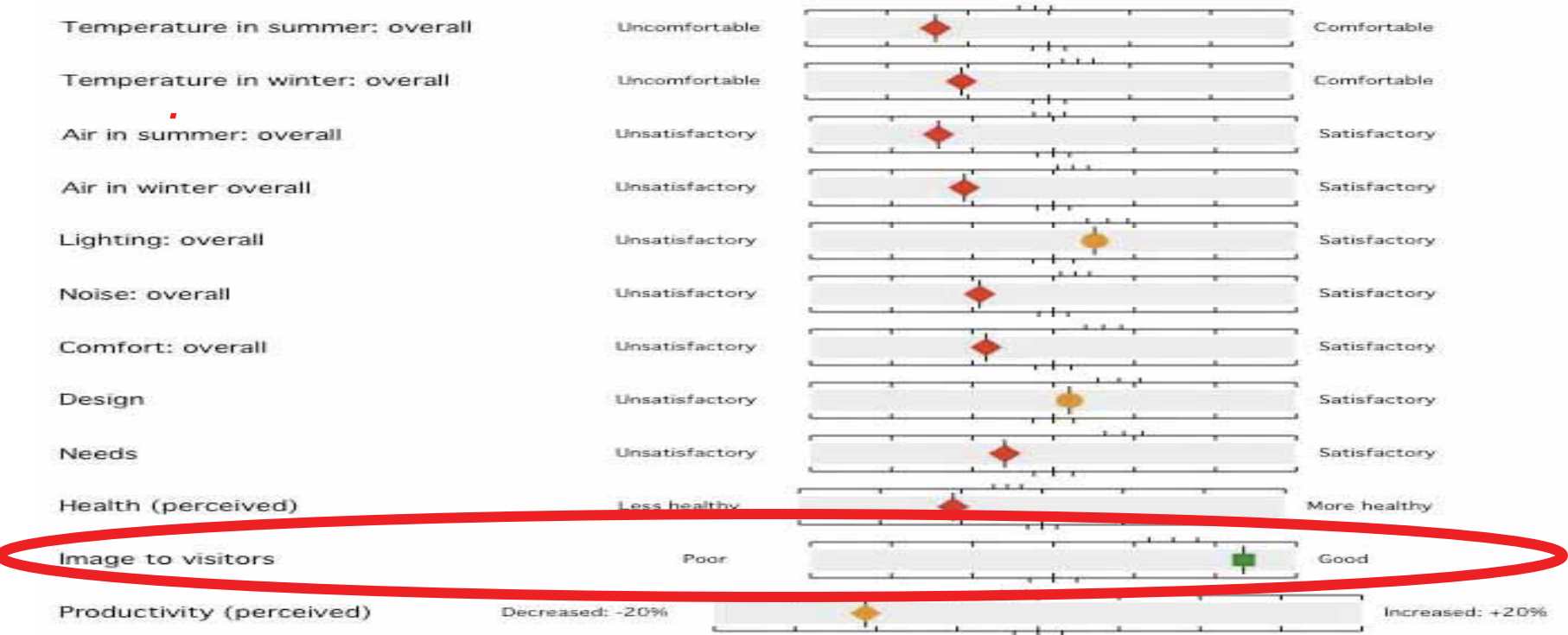
**END OF TERM REPORT**

*July 2014*



# Performance gaps are not just for energy: *occupant survey, multi-award-winning school*

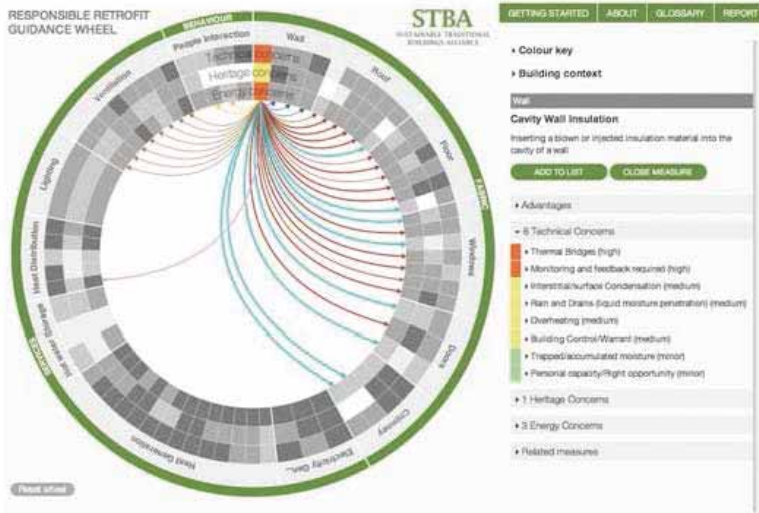
*RED: below average; AMBER: Average; GREEN: Above average*



*“ ... the architecture showed next to no sense. It leaked in the rain and was intolerably hot in sunlight. Pretty perhaps, sustainable maybe, but practical it is not.” ... STUDENT*



# The gaps are not just for new buildings: *Knowledge base for retrofit*



## SOME CONCLUSIONS

Industry and policy lack understanding of traditional building performance.

Lack of connection between research intelligence and guidance procedures.

Significant uncertainty in application of models and software.

Some methods used are inappropriate.

A systemic approach is necessary to avoid unintended consequences.

There are good opportunities, but some will need to be developed using a rather different basis and structure.

# Simple dysfunctions in recent buildings: *Poor window design, leading to overheating*





Wasteful overprovision in new buildings:  
*Five times too much light in a “low energy” building’s kitchen*



## Controls for End Users





Usability criteria	Ranking (controller as supplied)	
	Poor	Excellent
Clarity of purpose	●	
Intuitive switching	●	
Labelling and annotation	●	
Ease of use		■■■
Indication of system response		■■■■■
Degree of fine control	●	



This control for lighting has clear switching with four settings clearly illuminated, plus an off setting. The numbers by the setting are arbitrary.

Apart from the numbering, the switch is not labelled as to what it does. The red light for setting 1 is on the far left of its button, hinting that there be more than one stage for each setting. Is the off button for system off, or does it apply to each of the four stages in turn? Does the vertical button to the right raise or lower the lighting generally, or on each setting? In the absence of clear annotation, the user is forced to experiment.



Usability criteria	Ranking (controller as supplied)	
	Poor	Excellent
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Degree of fine control		

This controller is clearly a control device for ventilation. The knob at the lower left appears to offer control over a setpoint (presumably for temperature), against an arbitrary scale of plus or minus. In the absence of controller feedback, the user would need to learn the settings by experimentation. The function of the knob on the right is clearer, with three fan speed-settings, but is it for room ventilation or a fan in a heating/cooling unit? Probably the latter, as experience has forced the facilities manager to append a label telling users not to switch off the fan.

*“we sell dreams and install nightmares”  
– CONTROLS SUPPLIER*



Technology - management interactions:  
*conclusions from the Probe studies of public and commercial buildings and confirmed by later work*

		Technological complexity	
		More	Less
Building management input	More	Type A  Effective, but often costly	Type D  Rare, not replicable?
	Less	Risky with performance penalties  Type C	Effective, but often small-scale  Type B

Diagram first appeared in: *Probe 19: Designer Feedback*, Building Services, the CIBSE Journal, page E21 (March 1999).



# Technology - management interactions:

*conclusions from the Probe studies of public and commercial buildings and confirmed by later work*

		Technological complexity	
		More	Less
Building management input	More	Type A <div>High Performance</div>	<div>Will ordinary people be able to look after them?</div>
		<div>Big danger, especially for public buildings</div>	<div>Simple Smart</div> <div>Sense and Science</div> <div>Type B</div>

*Secure Type A*  
*Seek more Type B*  
*(and possibly Type D)*  
*Avoid Type C -*  
*unmanageable complication.*

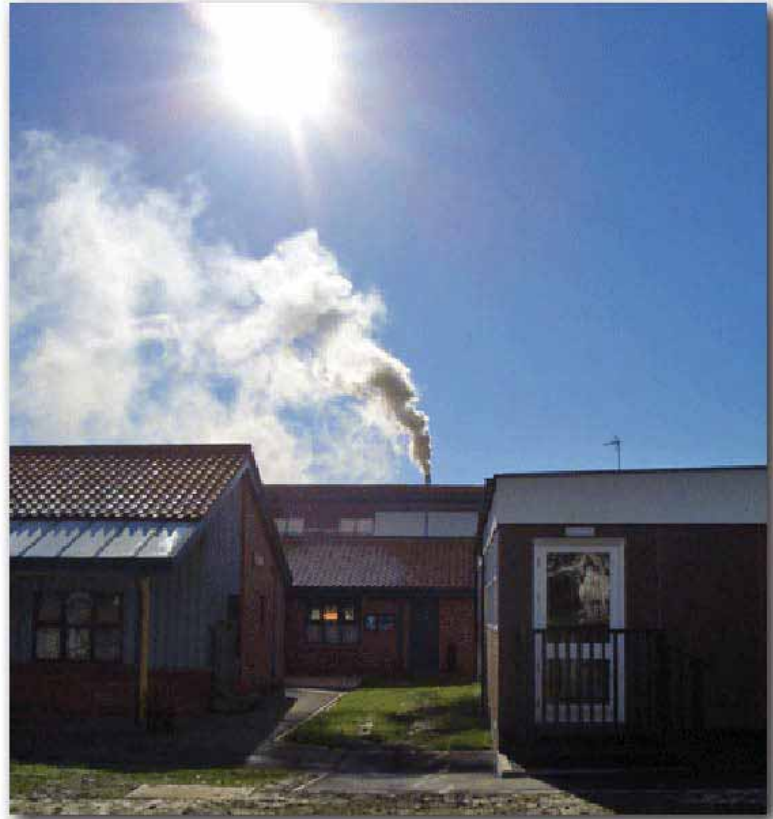
Controls, manageability and usability  
need much more attention at all stages



*“An intelligent building is one that doesn’t make its  
occupants feel stupid”* ... ADRIAN LEAMAN

*“We sell dreams and install nightmares”* ... BMS SUPPLIER

# Don't procure what you can't afford to manage



# In spite of these insights from the 1990s, *complication has burgeoned in recent years*

- Technical complication
- Legislative complication
- Contractual complication
- Bureaucratic complication
- Tick-box procedures: feature creep
- Complication for building users and managers

***So less money to spend on basics***

*The complication disease has now spread to housing too!*

**AND NOTHING JOINS UP PROPERLY!**

*“Complexity is profitable, [it] makes people believe you understand it.”*

JON DANIELSSON



# 45 YEARS AFTER THE OIL CRISIS *and now* in **CLIMATE and** **ENVIRONMENT EMERGENCY**

*We don't even have much of a clue  
about how buildings use energy,  
or what we really need to do about it.*

**THIS IS A SCANDAL !**

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# What industry and government has been missing: *The evidence under our noses*

*“in theory, theory and practice are the same, in practice they aren’t”*

*SANTA FE INSTITUTE for research into complex systems*

*“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*

*“Architects prefer to learn through direct personal experience. Engineers prefer principles and established rules.”*

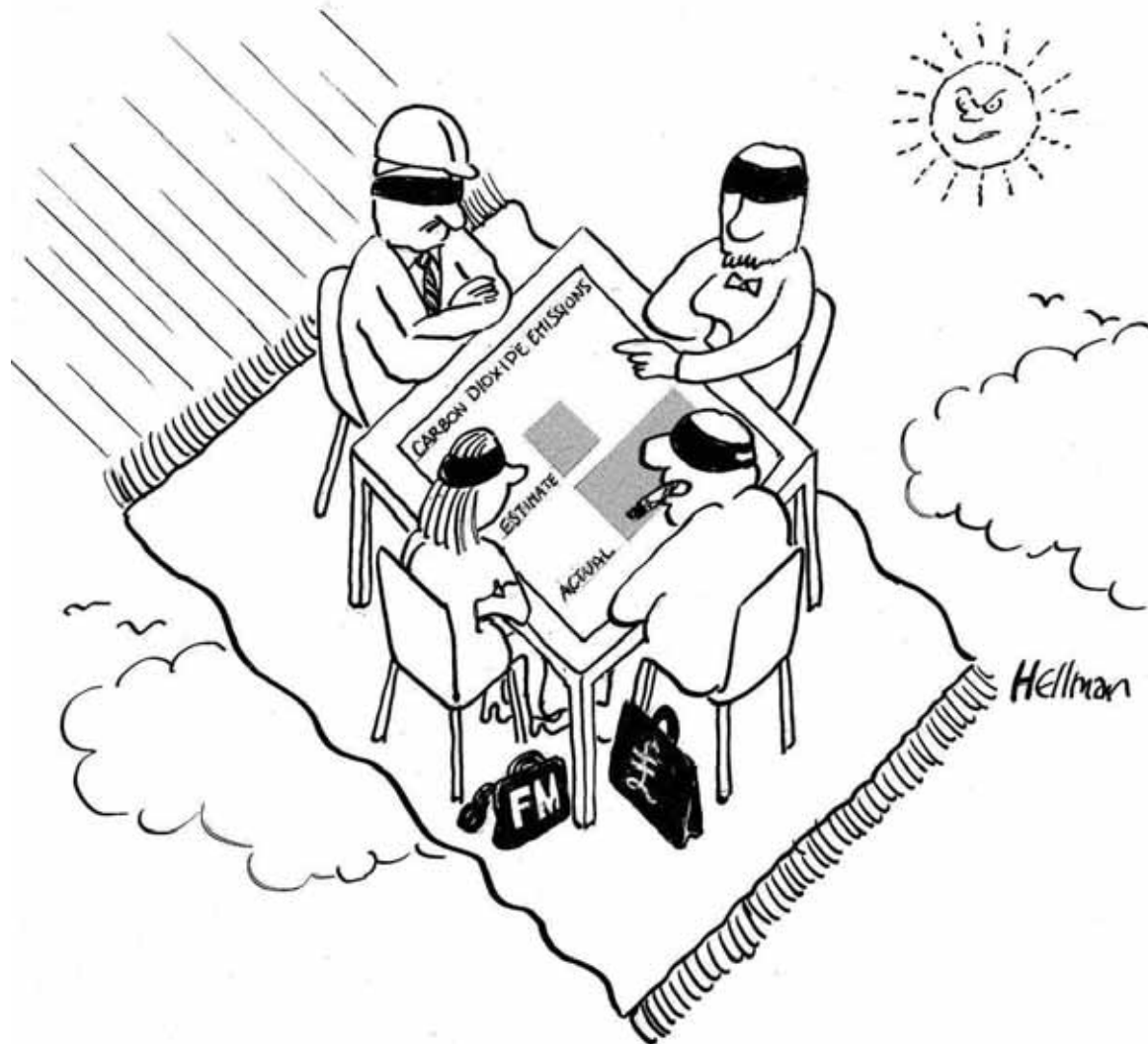
*PORTSMOUTH SCHOOL OF ARCHITECTURE: How do we learn?*

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

*ANDY SHEPPARD Arup, 2009*

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*and some are still in denial about the true outcomes of what they doing*



## 2

**WHAT WENT WRONG?**

***More like a forgetting curve  
than a learning curve***

*In theory, theory and practice are the same;  
in practice, they aren't.*

SANTA FE INSTITUTE

*The social contract has been fractured by outsourcing.*

AL GORE

*The English spare no expense to get something on the cheap.*

NIKOLAUS PEVSNER

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# Building performance in use is in the public interest

- Buildings last a long time, well beyond the time horizons of their creators, with many players involved in different roles.
- As building users, the whole population has an interest in them working better in every respect.
- **Now we want to improve the performance of the stock,** *especially (but by no means only) in terms of energy and carbon. However ...*
- the feedback loop from performance in use to construction and policymaking is poorly closed, *a disastrous oversight.*

**SO DO WE UNDERSTAND WHAT WE ARE DOING?**

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# Why aren't designers and builders better tuned in to outcomes?

- Not what clients or government have asked them to do: *“hand over and walk away” is systemically embedded in standard procedures and contracts, so follow-through is not part of the standard offering.*
  - Clients and government haven't set aside time and money for tuning-up after handover, *and have often preferred to bury any bad news.*
  - The industry and the associated professions didn't fill the vacuum created while central and local government progressively outsourced its technical expertise, research and performance feedback work.
  - The policy emphasis has been on construction, not performance in use, *even when feedback information has been revealing problems.*
  - Rigid divisions between funding of capital and operational costs – *getting worse if anything, in spite of all the talk.*
  - “Post-Occupancy Evaluation” (POE) is a construction industry perspective, with handover the end, not the beginning! *Too often seen as academic and mostly about perceptions.* Hence BPE.
-

You can't tell if you have a good building  
*... unless you find out how it is working*

## Elizabeth Fry building has the last laugh

The story of the Elizabeth Fry building (AJ 23.4.98) contains a number of ironies. My favourite is that it didn't even make the shortlist of the Green Building of the Year Award in 1996.

*DR ROBERT LOWE*

*Leeds Metropolitan University*



## LETTER TO ARCHITECTS' JOURNAL

# It's the process, not just the product

## *Factors for success at the Elizabeth Fry Building, UEA*

- A good client.
- A good brief.
- A good team *(worked together before on the site).*
- Specialist support *(e.g. on insulation and airtightness).*
- A good, robust design, efficiently serviced *(mostly).*
- Enough time and money *(but to a normal budget).*
- An appropriate specification *(and not too clever).*
- A good, interested contractor *(with a traditional contract).*
- Well-built *(attention to detail, but still room for improvement).*
- Well controlled *(but only eventually, after monitoring and refit).*
- Post-handover support *(triggered by independent monitoring).*
- Management vigilance *(easier now, but needs to be sustained).*

**But only its technical features were mentioned when a Royal Commission used it an exemplar**

Academics and policymakers often ignore Case Studies, saying they are anecdotal: **THEY ARE NOT!**

## **FIVE MISUNDERSTANDINGS** (after Flyvbjerg)

1. *General knowledge is better than context-specific knowledge.*  
**NO:** *They complement each other.*
2. *You can't begin to generalise from a single case.*  
**NO:** *Individual cases and outliers can be bellwethers.*
3. *They might help you make hypotheses, but other methods are better for hypothesis-testing and theory-building.*  
**NO:** *They can also test hypotheses, using multiple methods.*
4. *They have a bias to confirming the investigator's bias.*  
**NO:** *They often provide new and richer insights,*  
**BUT** *they need to be done with a degree of independence.*
5. *They do not let one develop general propositions and theories.*  
**BUT:** *They help us develop coherent strategies for the future.*

*Why do people ignore advance warning signals - the dead canary in the coal mine?* **SEEKING MORE DATA IS OFTEN A DELAYING TACTIC.**



# So yet again ... *Some conclusions from TSB Building Performance Evaluation programme 2010-14*

*Significant problems with integrating new technologies, especially configuring and optimising BMSs.*  
Insufficient thought given to how occupants will use them.

*“Controls are something of a minefield.”*  
Tendency to make control of heating, lighting and renewable energy systems over-complicated. The one air source heat pump had operational issues in cold weather.

*Problems with automatic window controls.*

*Multiple systems fighting each other e.g. cooling vs heating, different heating systems jockeying for control.*

*Maintenance, control & metering problems, especially with biomass boilers, PVs and solar heating.*

Innovate UK  
Building Performance Evaluation Programme  
**Early Findings from  
Non-Domestic Projects**



**3**

**IT COULD ALL HAVE  
BEEN VERY DIFFERENT**

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# *RIBA proposed a feedback stage 55 years ago in its **Plan of Work (1963) STAGE M***

## **PURPOSE**

*To analyse the management, construction  
and performance of the project.*

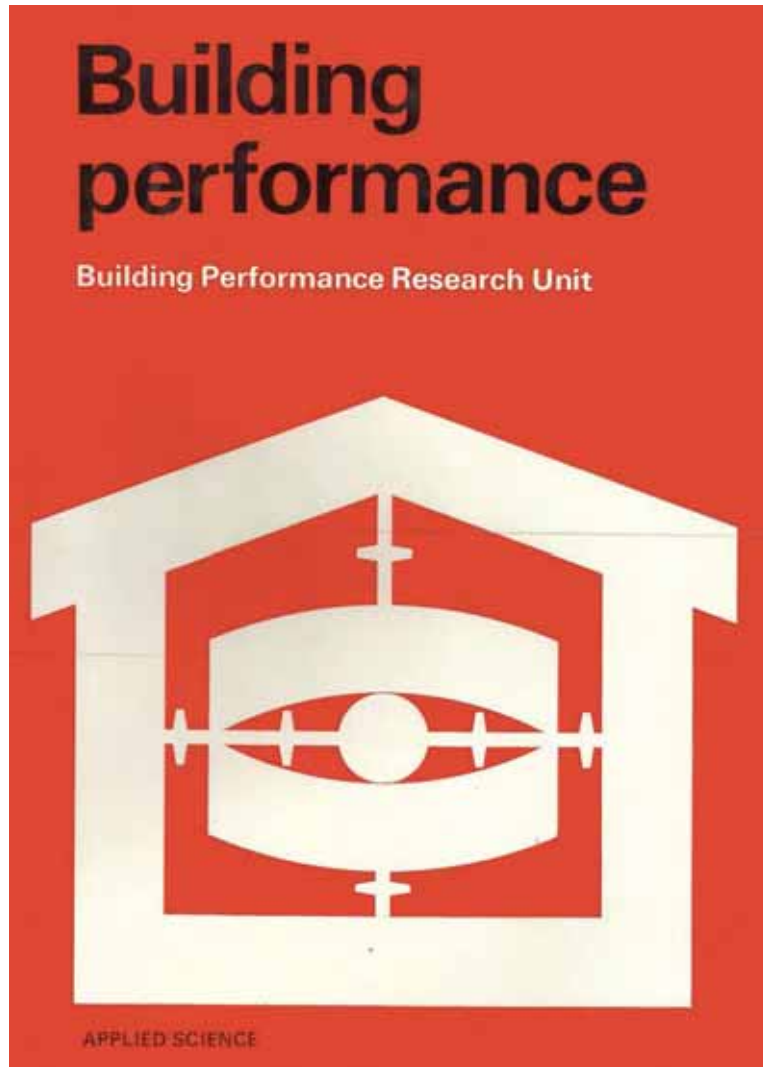
## **TASKS TO BE DONE**

*Analysis of job records.  
Inspections of completed building.  
Studies of building in use.*

## **PEOPLE DIRECTLY INVOLVED**

*Architect, engineers, QS, contractor, client.*

# Building performance evaluation started in some universities in the 1960s



Pioneers included the University of California, Berkeley and the Building Performance Research Unit at Strathclyde (BPRU).

**However**, after BPRU's seminal book in 1972, the subject failed to gather momentum, as it did not fit well with academic criteria, or get sustained client, government or industry support.

*“Unfortunately, interdisciplinary subjects have a way of escaping from any discipline whatever.” ... ERIC DREXLER*

In 1972 the RIBA removed Stage M: Feedback from its publication *Architect's Appointment*.



# the tide also turned in government ...

- Widespread disruption and disillusionment in the 1970s.
- Ascendancy of ideas about free markets, competition and choice; a *de facto* inefficient public sector, and “*no such thing as society*”.
- Professionals began to be seen as an elitist conspiracy against the public, and treated by government as just another business.
- The Rothschild Report 1972, advocated a customer-contractor relationship for government-sponsored applied research ...  
*but what happened to its idea of an intelligent government customer?*
- Outsourcing and privatisation of professional skills and in-house research from government, including Building Research Establishment.
- Dismemberment of the Department of the Environment 1997-2002.

## WHERE IS THE INSTITUTIONAL MEMORY?

Nobody else (e.g. professional institutions), has helped enough to fill this gap and provide continuity, so policy is based more on hope, predictions, & lobbies, than experience of what works and what really needs attention.

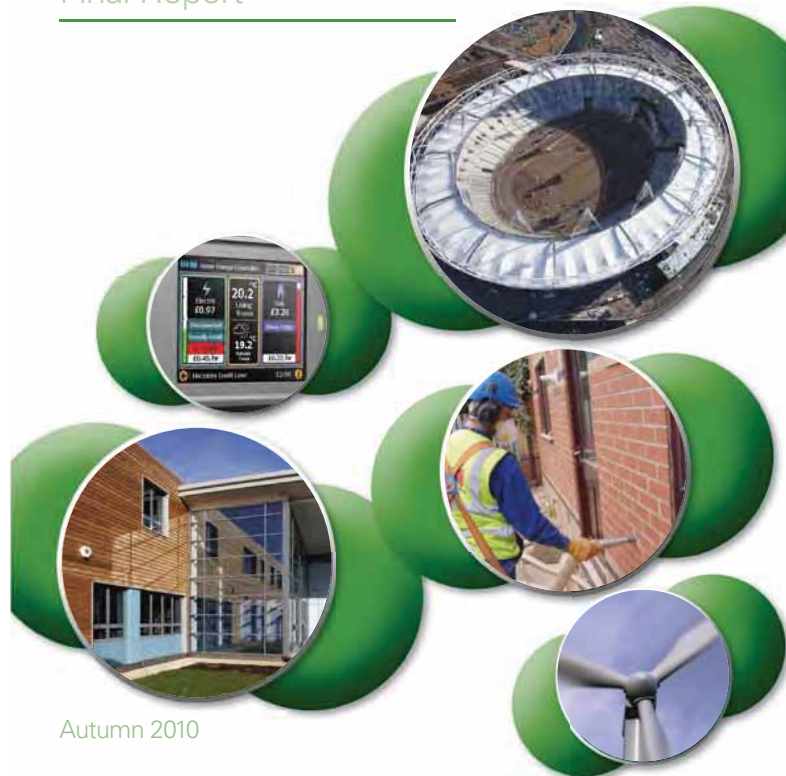
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# Government has seen the Construction Industry as responsible for in-use building performance



Low Carbon Construction  
Innovation & Growth Team

Final Report



Autumn 2010

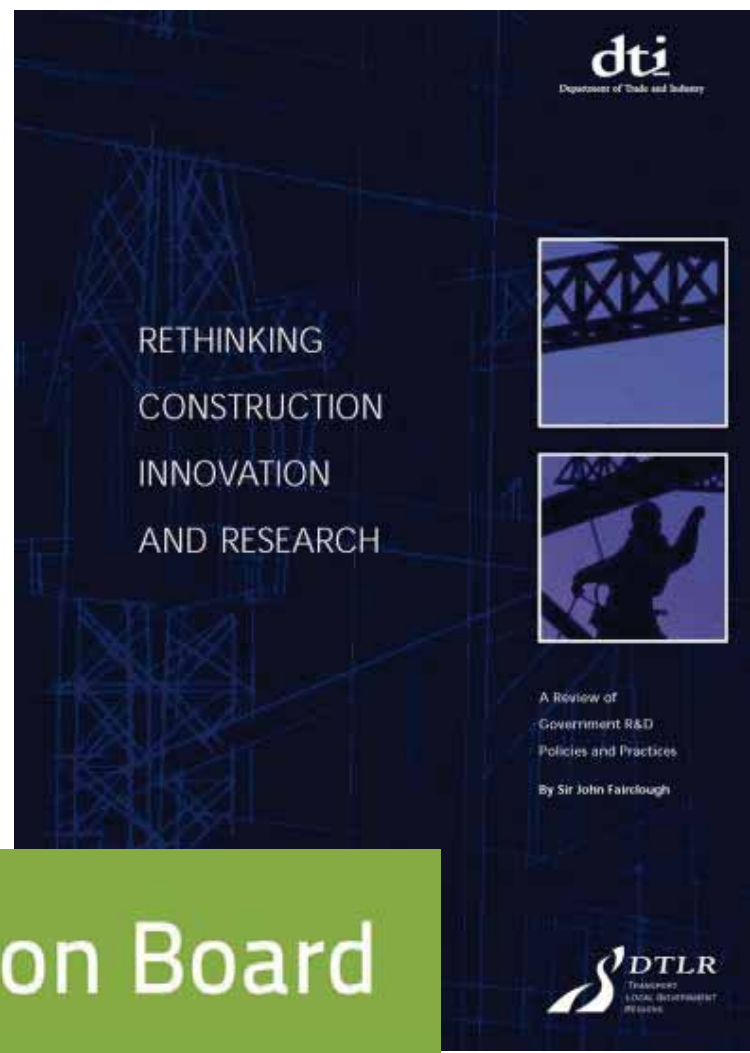
## Government Construction Strategy

May 2011

Buildings policy has also tended to focus on construction, *not performance in use ...*



REPORT OF THE CONSTRUCTION TASK FORCE



The Green Construction Board

Have we become too concerned with markets and trading, not long-term public interest?

*“Market fundamentalism has taken root in the machinery of government”*

JOHN ASHTON, former UK Climate Spokesman (2013)

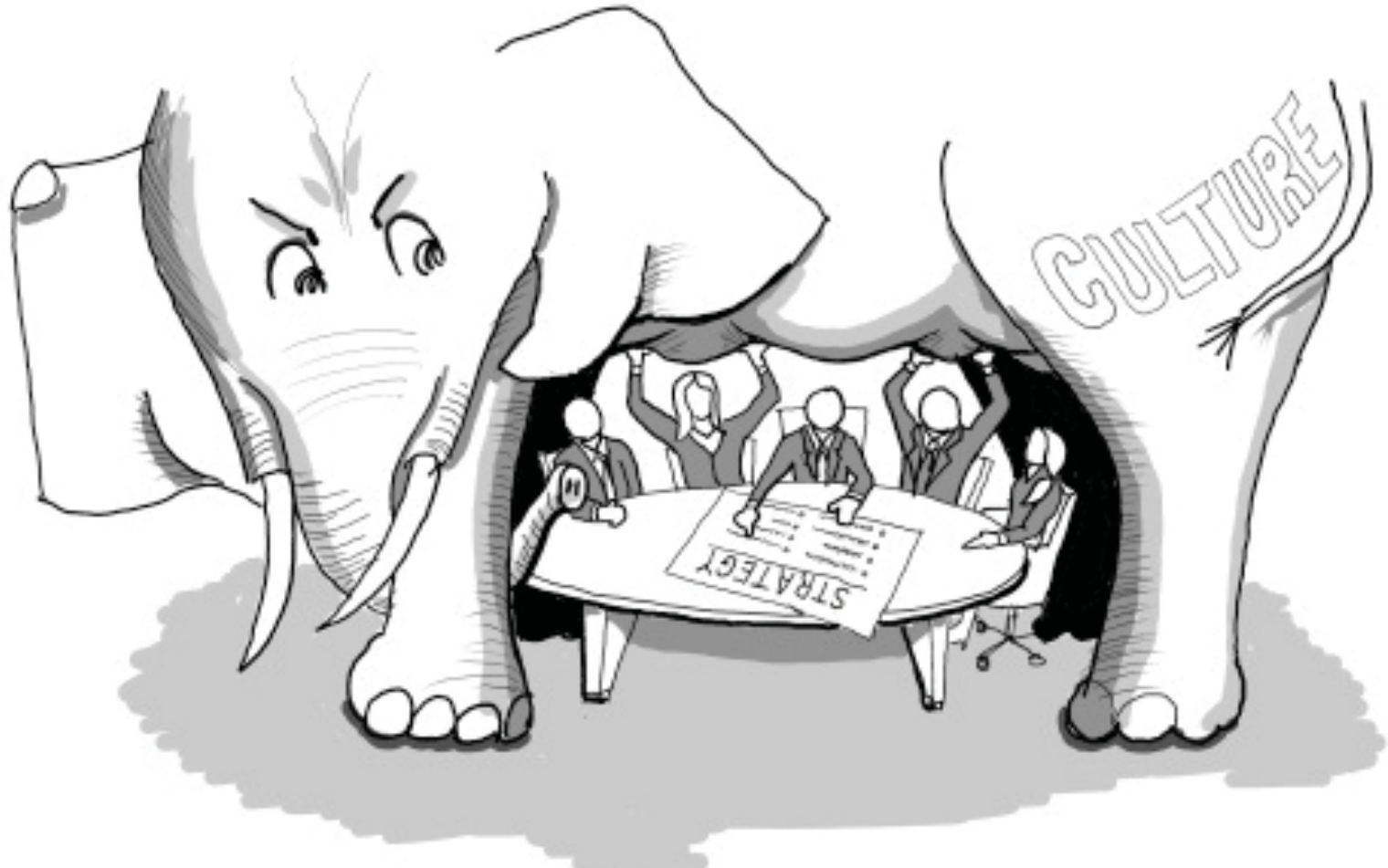
**How do we maintain the chain of progress?**

*Where are the disinterested professionals?*

*Where is the public domain infrastructure for improving building performance in use?*



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



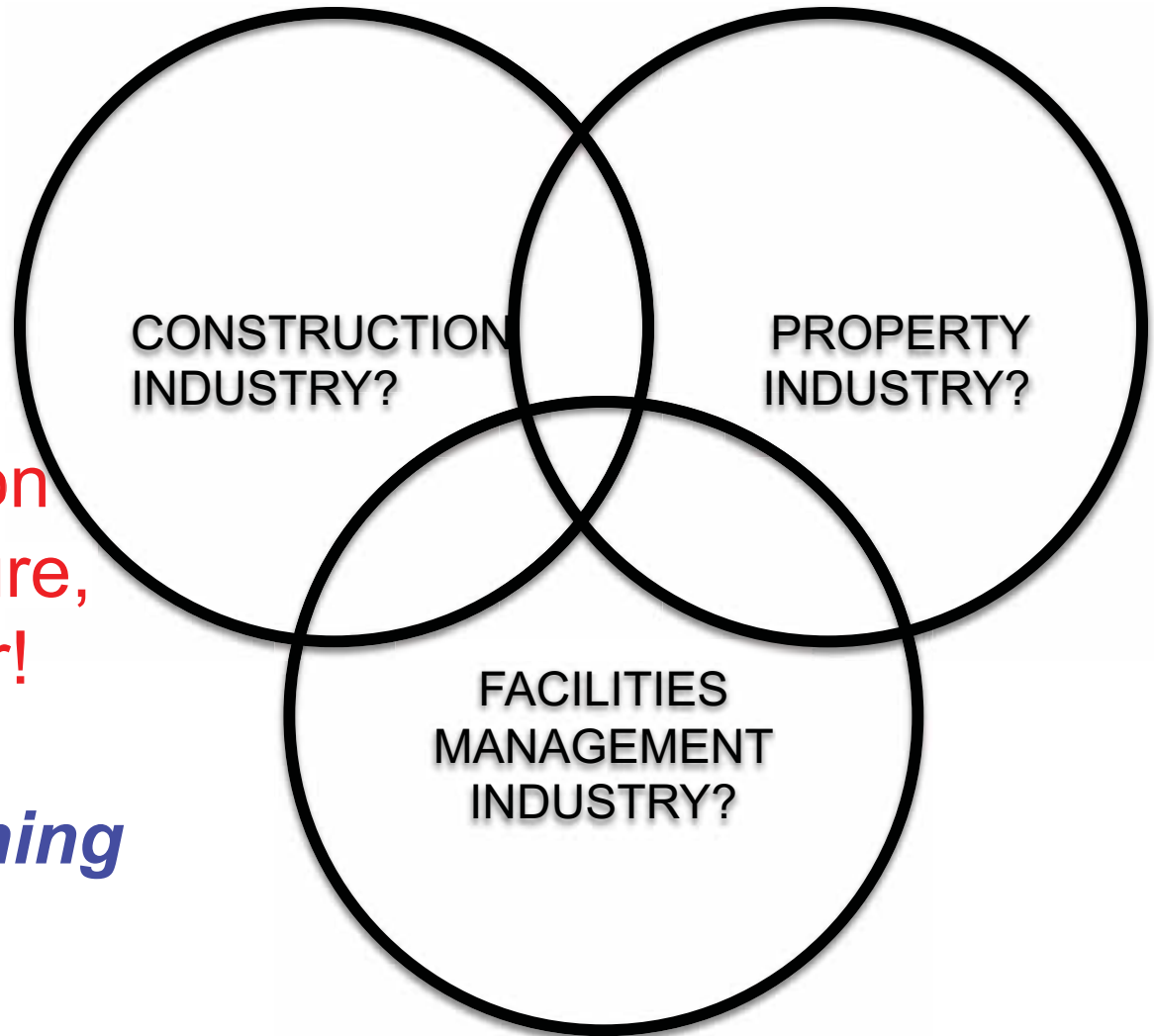
**WE HAVE A SYSTEMIC PROBLEM: Blindness to performance in use**  
*It's not just the construction industry, it's the way we all go about things*

# Which industry and market is really responsible for building performance?

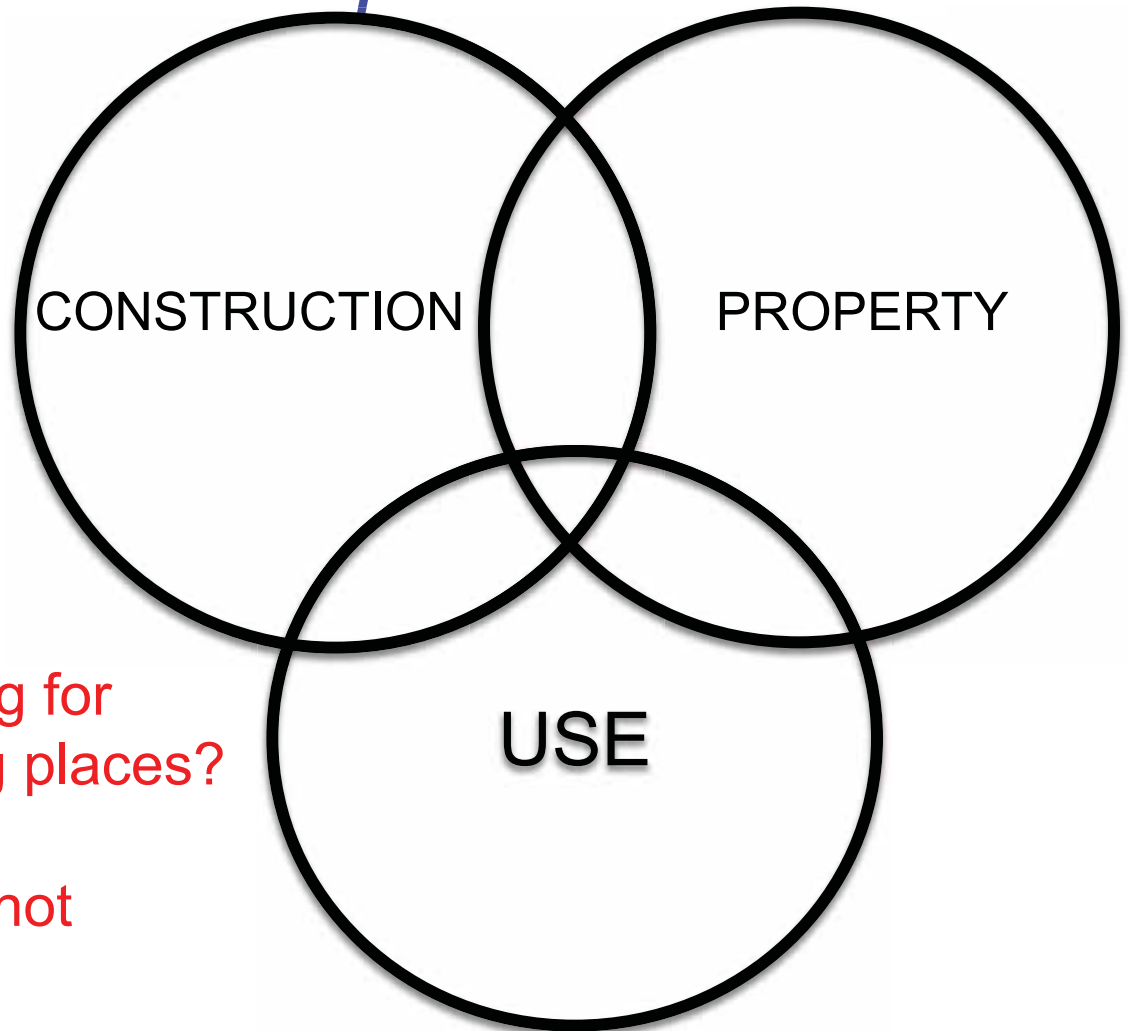
None of these:  
it's much more  
complicated  
than that.

The lack of traction  
is not market failure,  
but category error!

*We need something  
more ...*



There needs to be more shared territory,  
*with much more emphasis on use*



Do policymakers  
really understand this ...

or have they been looking for  
the answers in the wrong places?

Performance in use has not  
been well represented in  
industry and policy measures.

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# A glimmer of hope: Stage M is back! *as Stage 7 in the RIBA Plan of Work 2013*

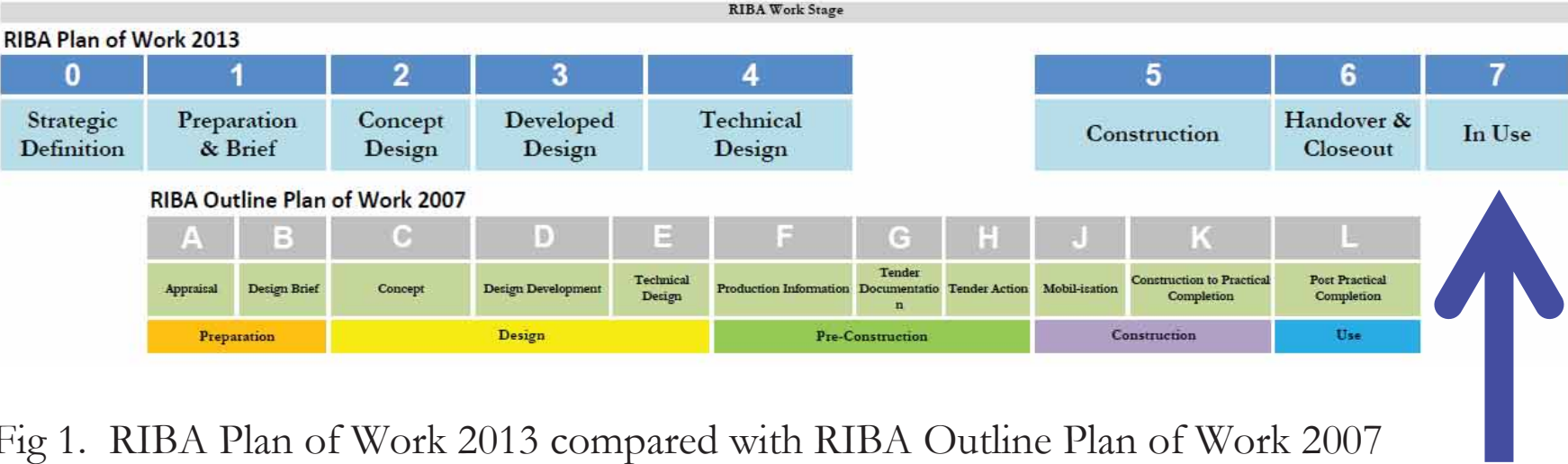


Fig 1. RIBA Plan of Work 2013 compared with RIBA Outline Plan of Work 2007

*But Stage 7 was poorly fleshed-out  
and very much honoured in the breach.*

*With luck the RIBA 2020 Plan of Work and  
Sustainability supplement will correct this.*



# 4

**WHAT CAN WE  
DO NOW?**



# ***“The house is on fire”***

... GRETA THUNBERG

- We must save energy and carbon in a hurry  
*embodied not just operational ...* and remember.
- this is a but a small – *but essential* - part of what we need to do to improve the environment.
- We need more thinking and less stuff; and
- to make much better use of what we already have.

***Much of what we have got used to,  
we're not necessarily entitled to.***

---

If you wanted to improve building performance in use, *what would you do ...*

**A. Focus on building performance in use?**

**OR**


**B. Do lots of other things and hope that performance will improve ...?**



**Why are have we been barking up the wrong tree?**

*Why is actual performance not the proper target?*

---



We need to save real energy and carbon  
not virtual energy and carbon!

NATURE CAN'T BE FOOLED ... *Richard Feynman*

*Buncefield oil depot fire Hemel Hempstead, 11 December 2005. Global CO2 emissions equal nearly 2000 of these, constantly burning, every day.*

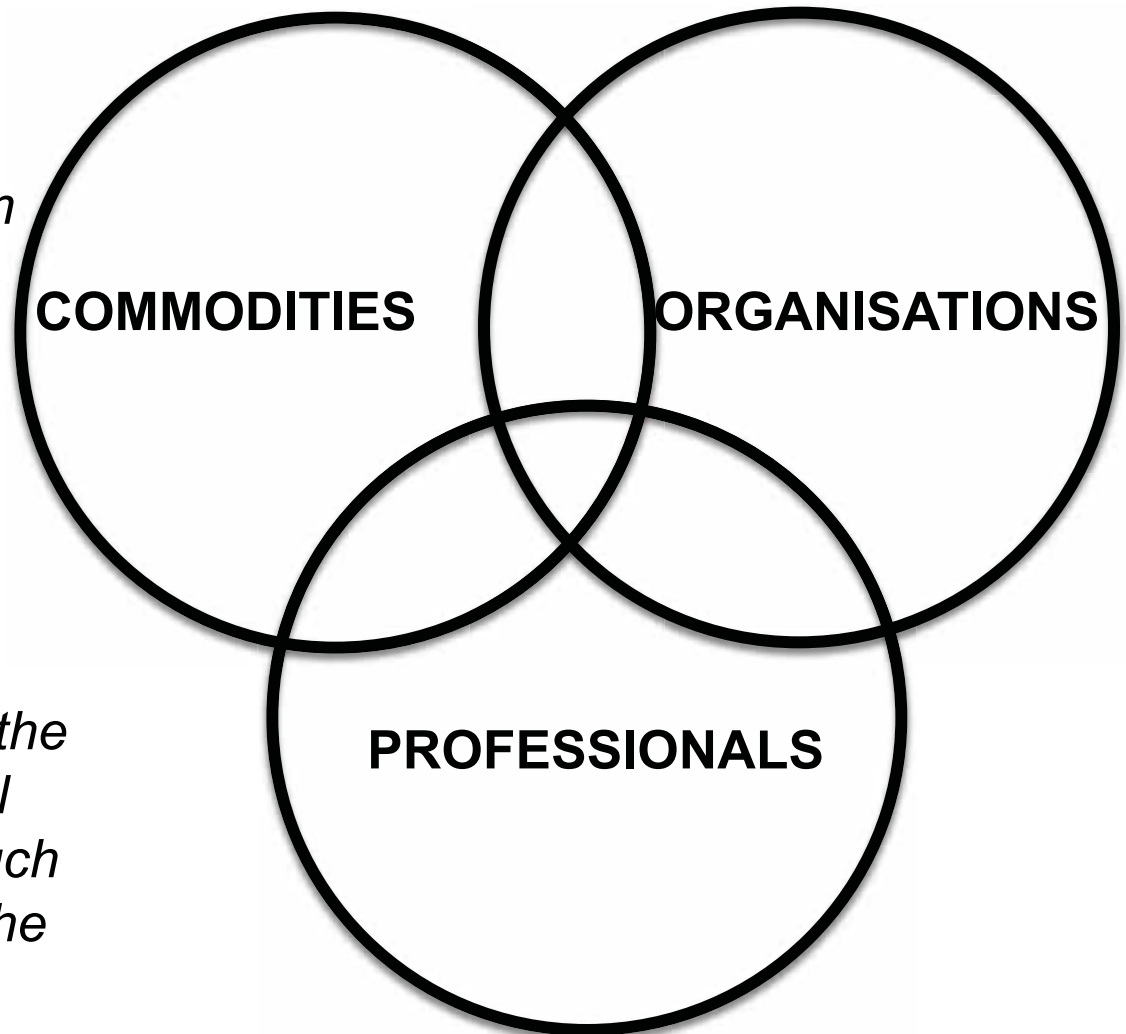
# How societies structure expertise

*“At present, professionalism seems to hold its own.”*

*“It has stayed ahead of commodification ... but may ultimately lose out to organisations ...”*

*“new hiring patterns... and the loose form of organisational professionalism point to much weaker control of work by the professions themselves.”*

**ABBOTT (1988)**





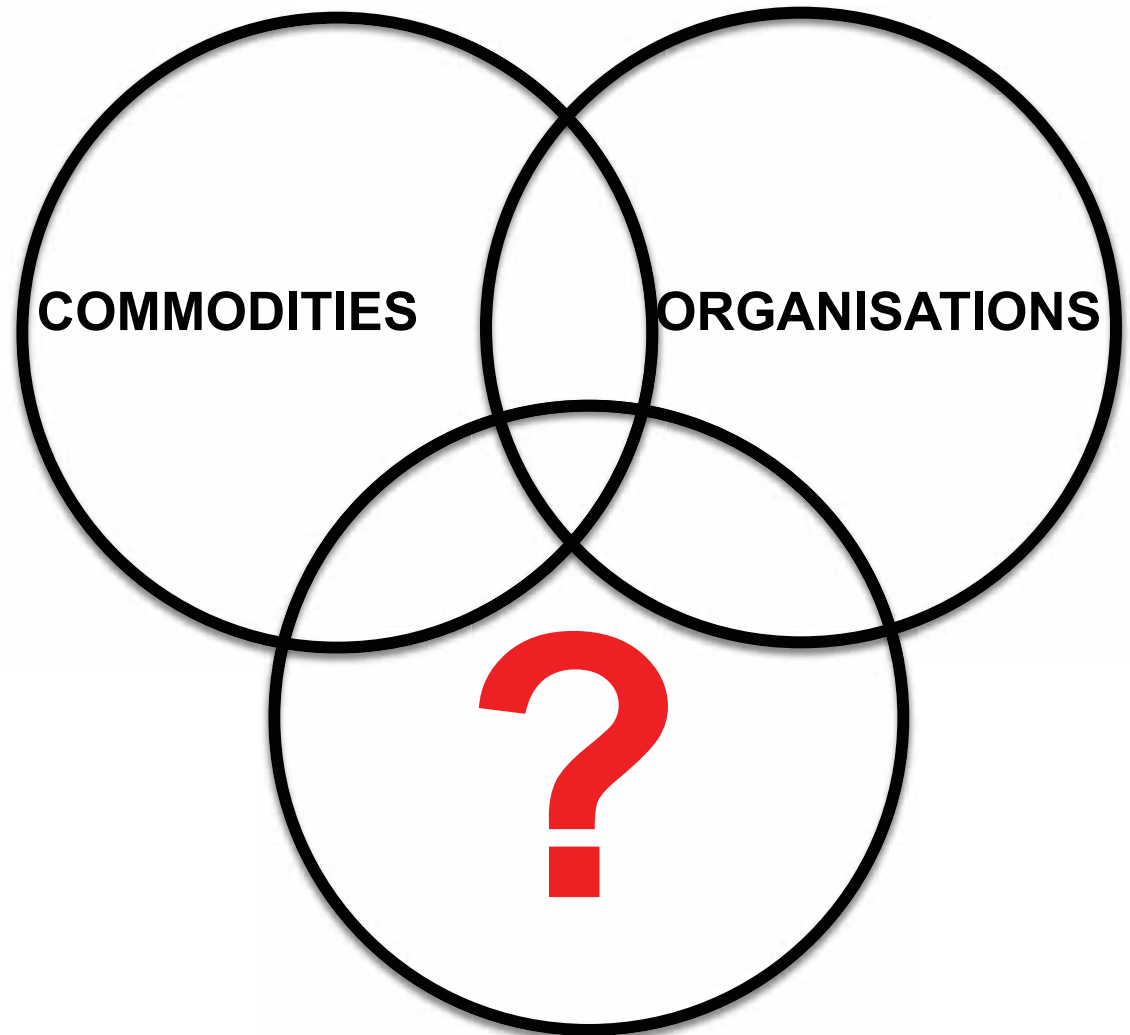
## Where we now seem to be in the UK



*But do the regulators understand what they are doing? With so much outsourced, where are the vision, the integration the public interest, and the “intelligent customer”?*

---

And with our current government ...



# Sustainability raises complex moral and ethical dilemmas

- Work ‘after us’ and for ‘the other’.
- Intergenerational equity.
- Deferred impacts over long periods.
- Differential geographical and social impacts.
- High levels of uncertainty and unpredictability.



**It needs vision, imagination, reflection and commitment**

*“[it] does not tempt us to be less moral than we might otherwise be; it invites us to be more moral than we could ever have imagined.”*

... MALCOLM BULL

# UBT's proposed sticky interventions:

*seeding things with potential to snowball over time*

**Cultural adaptations, not just technical “solutions”.**  
*To create virtuous circles of continuous improvement.*

## REVIEW PROFESSIONAL ETHICS AND PRACTICES

A shared vision for building-related professionals to work in the public interest and engage properly with outcomes: *NEW PROFESSIONALISM*

## MAKE IN-USE PERFORMANCE CLEARLY VISIBLE

In a way that motivates people to strive to improve it.  
*This needs a well-informed technical infrastructure to help the plethora of different systems to converge, particularly for energy and carbon.*

**CONSOLIDATE THE** knowledge domain,  
 to gain the evidence and authority to inform practice and policy

## KNOWLEDGE DOMAIN OF BUILDINGS IN USE

Develop building performance as an independent making.

# Changing professional practices

- Many construction-related institutions 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 !**

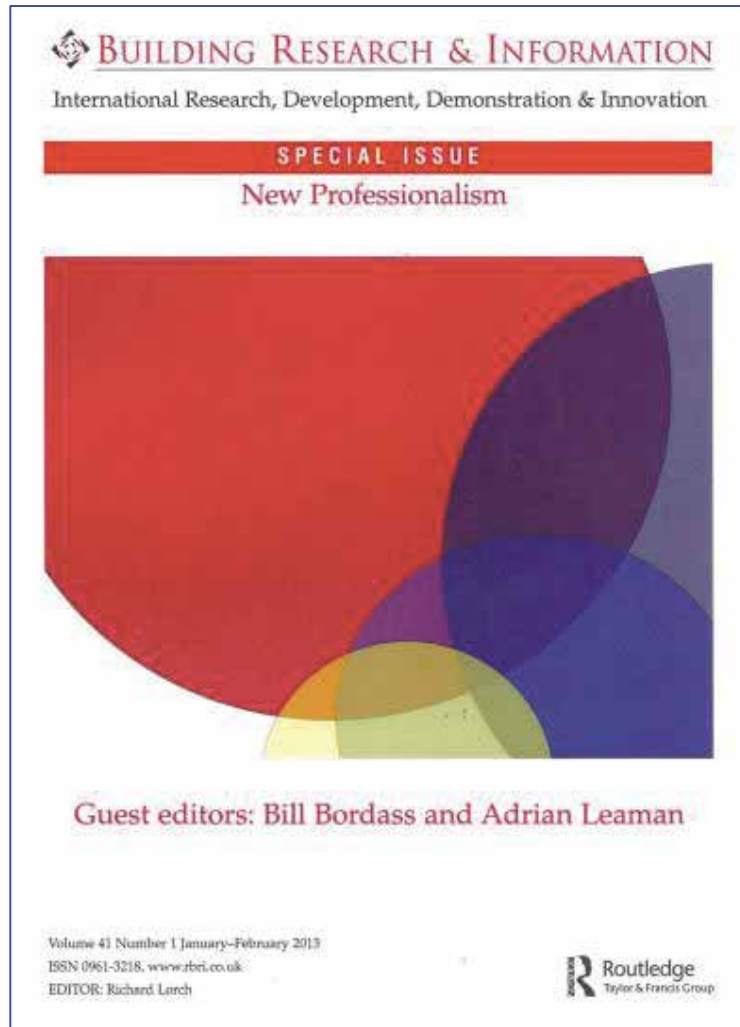
## SO HOW ABOUT?

- Re-defining perceptions of the professional's role, to follow-through properly and to engage with outcomes.
  - Closing the feedback loop – rapidly and efficiently.
  - Making much more immediate, direct and effective links between research, practice and policymaking.
-



# New Professionalism: getting started

## *Principles anyone can adopt tomorrow*



### **PROVISIONAL LIST DEVELOPED WITH THE EDGE** ***ETHICS AND PRACTICE:***

1. Be a steward of the community, its resources, and the planet. Take a broad view.
2. Do the right thing, beyond your obligation to whoever pays your fee.
3. Develop trusting relationships, with open and honest collaboration.

### ***ENGAGEMENT WITH OUTCOMES:***

4. Bridge between design, project implementation, and use. Concentrate on the outcomes.
5. Don't walk away.  
Provide follow-through and aftercare.
6. Evaluate and reflect upon the performance in use of your work. Feed back the findings.
7. Learn from your actions and admit your mistakes. Share your understanding openly.

### ***THE WIDER CONTEXT:***

8. Seek to bring together practice, industry, education, research and policymaking.
9. Challenge assumptions and standards. Be honest about what you don't know.
10. Understand contexts and constraints. Create lasting value. Keep options open for the future.

# New Professionalism: recent progress

## *Morrell report for Edge published May 2015*

The report focuses largely on the role of the institutions: **Top Down**.

**Key themes:** *Ethics, Education, Knowledge, Collaboration.*

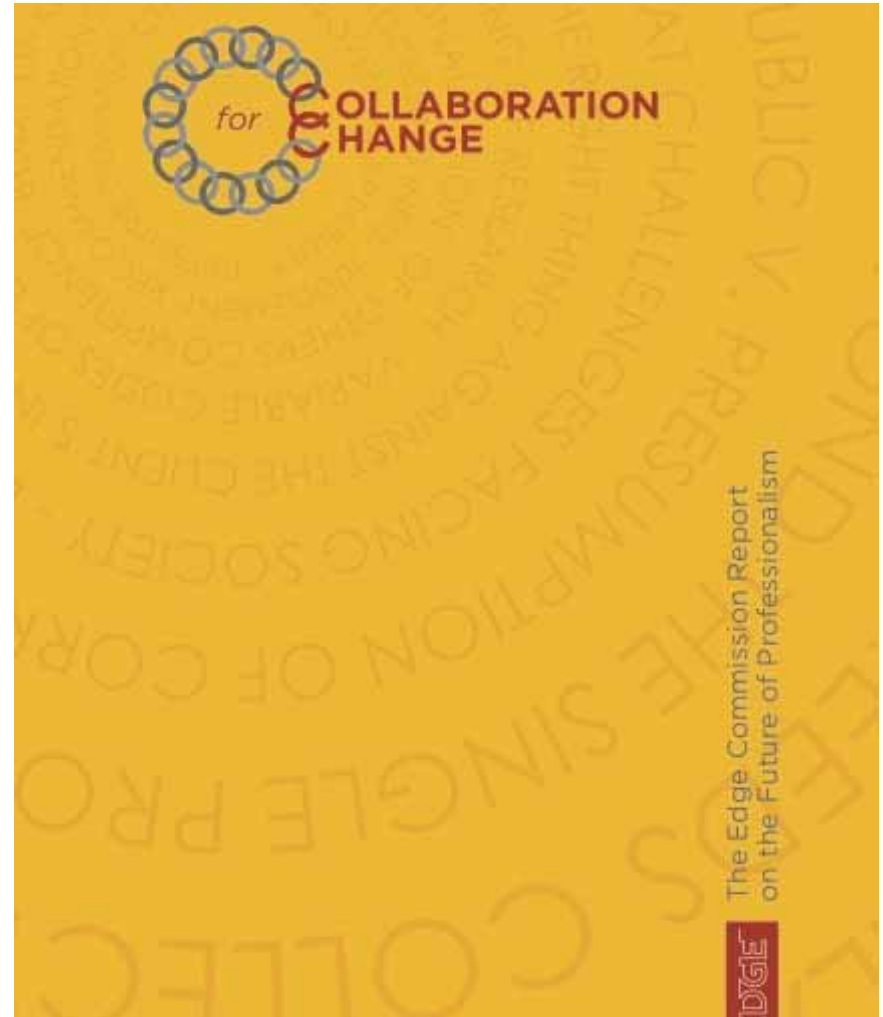
**Two complementary approaches, that can help gather momentum:**

**Bottom-up:**

The individual,  
*e.g. adopting the ten points.*

**Middle-out:**

At organisational and practice level.



# Getting Started: *The Four Ps*

PEOPLE – Who you use

- Leadership is key

PROCESS – What they do

- Soft Landings can help

PRODUCT – What you get

- Keep it simple and do it well

PERFORMANCE – How it works

- Need for fine tuning, reflection and feedback
-

# Soft Landings *can help to maintain the “golden thread” from design intent to reality*

**It augments the duties of the project team and client representatives), especially:**

1. During the critical briefing stage.
2. Closer forecasting & reality-checking of predicted performance during design and construction.
3. Greater involvement of users and operators, *or their proxies*, with special attention to pre-handover.
4. Aftercare, with an on-site presence during settling-in.
5. Monitoring and review for the first three years in use.

**EACH STAGE HAS A CUSTOMISABLE WORKPLAN**

**It can run alongside ANY procurement process; and**

- Create a fast track to improving performance in use.
- Provide more customer focus.
- Improve client relationships and user satisfaction.
- Build recognition that some debugging is necessary.

***BSRIA is hosting a UK industry group.***



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



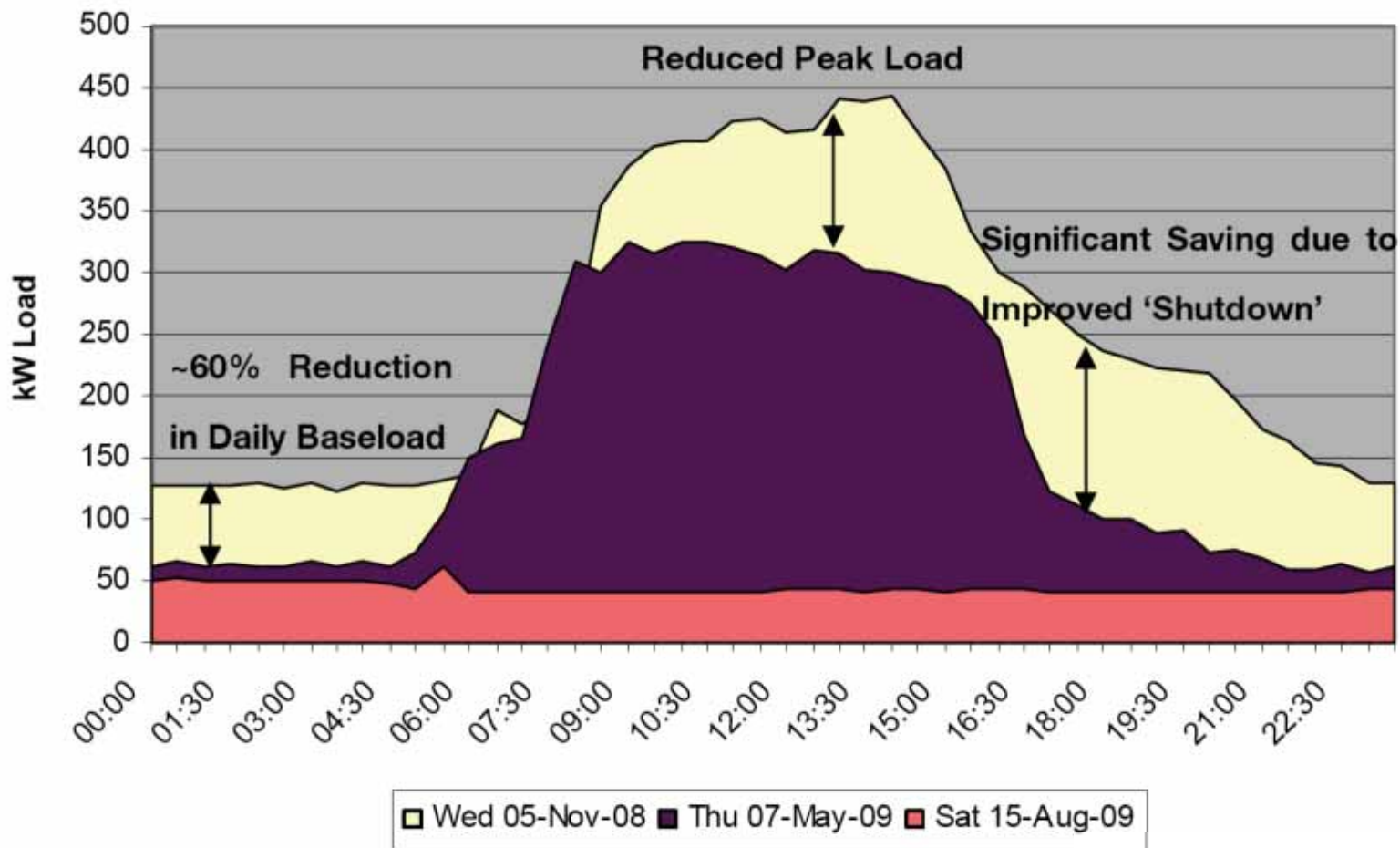
Without aftercare, designers may never learn from unintended consequences



Occupant dissatisfaction with gloomy solar film  
*After refurbishment of a university building in 2014*



# Stage 4 aftercare can pay for itself: *Intervention in a new secondary school*



*Saving over £ 50,000 p.a. in electricity bills: **avoiding default to ON** ... and occupant satisfaction will often improve too!*

SOURCE: Buro Happold Engineers, Soft Landings Trials (2009).

## Getting it right: *Robust buildings*

- Get the brief right, *based on practical insight*.
  - Get the standards right: *avoid mission creep*.
  - Get the fabric right: *passive measures*.
  - Get the services right: *gentle engineering*.
  - Get the other things right: *ICT, catering etc..*
  - Get the controls right; *and their user interfaces*.
  - Get it built right; *with a suitable procurement path*.
  - Get it finished right: *commissioning, operator and user engagement, handover, aftercare*.
  - Get it operated and used right, *information, training, monitoring and review, troubleshooting and fine tuning*.
  - Keep it up to the mark, *monitoring, feedback and continuous improvement*.
  - Don't make it too difficult and expensive to look after.
-

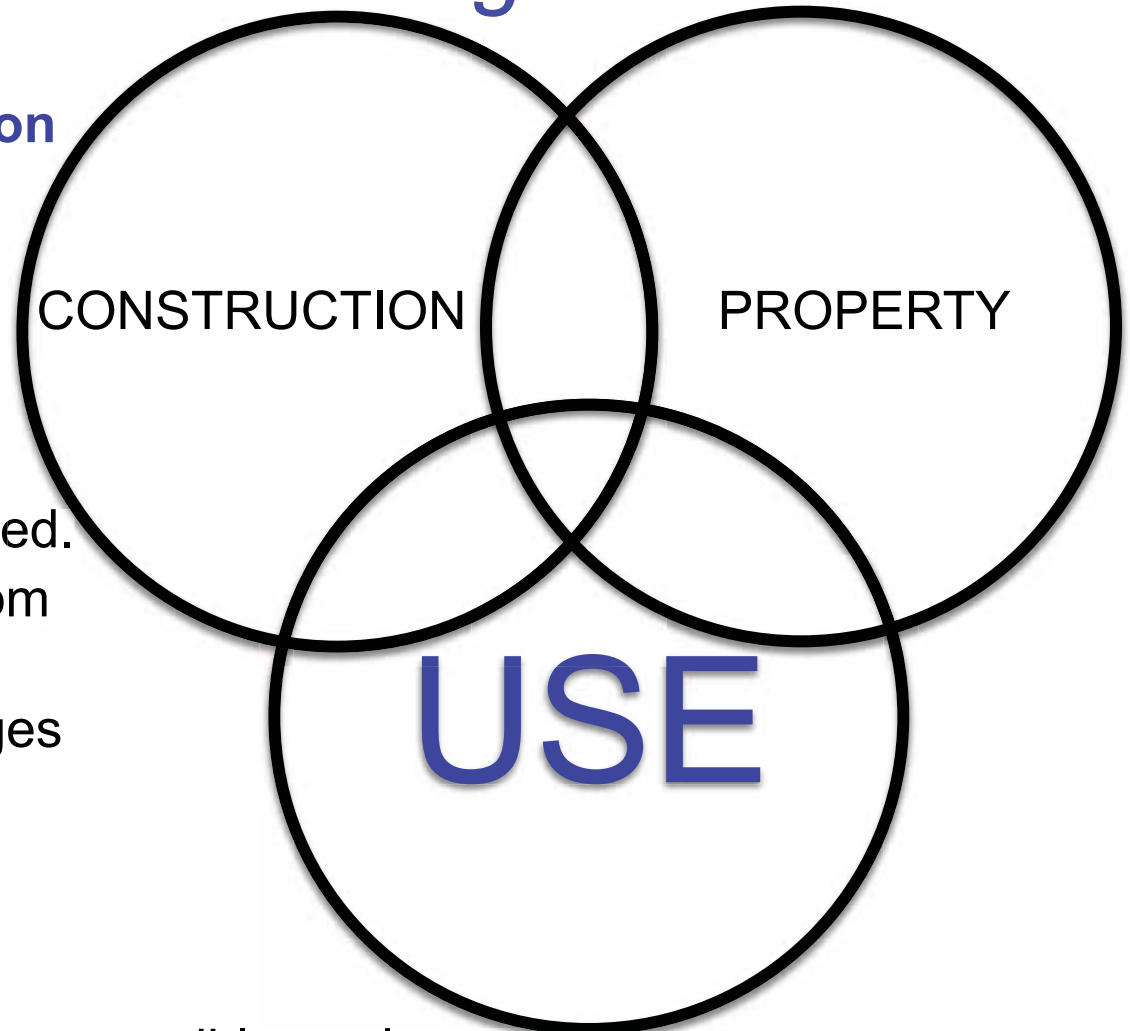
## Squeezing things down: *Gentle engineering, simple sophistication, sense and science*

- Question requirements and standards
  - Be in a position to trust the passive measures, *so you can reduce design margins.*
  - Increase efficiency, *of systems not just plant*
  - Minimise operating hours, *or if not use very low-powered “trickle charge” systems.*
  - Design for usability, manageability, *and demand responsiveness.*
  - Specify effective control and monitoring systems, *and make sure you get them, the users understand them, and you understand the users.*
  - Minimise complication
  - Monitor to avoid waste
  - Trap unintended consequences *and clashes, both in design and use.*
  - Count everything, review everything, learn and share.
  - *Avoid mission creep: more is not necessarily better*
-

# Conclusions

- If we are to meet the challenges of sustainability, the role of the building professional must change.
  - We need to be concerned not just with inputs and outputs, but in-use outcomes.
  - We need to follow-through, reflect, close the feedback loop and initiate virtuous circles.
  - This all needs leadership, *not more rules and processes*.
  - Building performance in use may need to become an independent knowledge domain, properly resourced in the public interest. *It's too important to leave to the construction industry!*
-

# So how about an independent *Institute for Building Use?*



- **Strengthens representation of BUILDING USE**
  - Public interest.
  - Independent.
  - Interdisciplinary from the start. No historic silos.
  - Authoritative, evidence based.
  - Can bring together work from many different sources.
  - Both supports and challenges the construction and property industries.
  - Connects research, practice and policymaking.
  - Institute for Fiscal Studies is a possible analogue.
-



We can make massive savings  
*if we use the multiplier effect*

**ENGAGE PEOPLE** to start with, **AND ...**

**BE LEAN - Halve the demand**

*Review standards, reduce losses, avoid waste.*

**times**

**BE MEAN - Double the efficiency**

*Buy efficient equipment, use it effectively, minimise system losses, tune it up.*

**times**

**BE GREEN - Halve the carbon in the supplies**

*With on-and off-site measures*

**equals**

*You're down to one-eighth of the CO<sub>2</sub>*

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# Moving from design for compliance to *Design for Performance*

BBP

BETTER BUILDINGS PARTNERSHIP

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 design and technology that improves predicted building performance, not on achieving direct 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



# Commitment Agreements

- Clients sign up to providing a building that performs in accordance with its design intent.
- Design and building team members are made aware that they share this commitment.
- *This has worked in Australia, for energy use by landlord's services in rented offices.*
- We're just starting a series of pioneer projects with nine UK office developers.
- The approach could be extended to more aspects of performance and more types of building.
- *Watch this space ...*

## A path to energy sufficiency ?

- Engage people – *you can't leave them out!*
  - Reduce demand – *by not having things.*
  - Increase efficiency – *of the stuff that's left.*
  - Improve controls – *make them user-friendly.*
  - And only then decarbonise supplies – *low carbon energy is not to be squandered.*
  - Avoid waste – *there is such a lot of it.*
  - **Make things simpler and do them better.**
  - Maintain a *golden thread* from design intent to use.
  - Follow through, report outcomes, share learning.
-



# Thank you      Questions?

