University College Dublin
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Time to get real about building performance in use

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the **USABLE BUILDINGS TRUST**
www.usablebuildings.co.uk

Outline

1. Building professionals, building performance evaluation and the challenges of sustainability.

2. Why do many new buildings not perform as they are supposed to?

3. Changing our ways: A focus on outcomes, with Soft Landings.

1

Building professionals, building performance evaluation, and the challenges of sustainability

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?

The role of the building professional needs re-defining

- There's a big job to do, *in making new and existing buildings more sustainable.*
- We're short of money:
  we can't afford to spend it on the wrong things.
- Current procurement systems are not fit for purpose:
  we need to do things very differently.
- We can't change everything tomorrow …
  but we can change our attitudes to what we do.
- It's not a question of whether we can afford to do it:
  We can't afford not to !
- WHEN DO WE START?
  TODAY. *We can't wait until 2050!*

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

SOURCES: S Hill, Edge debate, New Professionalism, 20 Feb 2013, M Bull, London Review of Books, 3-6, 24 May 2012

Changing the way we do things

- 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?

- Changing attitudes to the nature of the job.
- 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 Professionals
follow design intent through into reality

- They understand what is needed — *strategic briefing*
- Are clear what they want, and communicate it plainly — *strategic design*
- Are ambitious, but realistic — *question all assumptions, understand users*

- Follow things right through — *e.g. using **Soft Landings** procedures*
- Review what they do — *manage expectations, undertake reality checks*
- Make others aware of what they are after — *specify: what, why and how*
- Check that things will work — *technical feasibility, usability and manageability*

- Get things done well, with attention to detail — *communicate, train, inspect*
- Finish them off — *commission, operational readiness, handover, dialogue*
- Help the users to understand and take ownership — *provide aftercare support*

- Review performance in use — *including **post-occupancy evaluation***
- Work with occupiers to make things better — *monitoring, review and fine tuning*
- Anticipate and spot unintended consequences — *revenge effects*
- Learn from it all — ***and share their experiences***

THEY KEEP THINGS AS SIMPLE AS PRACTICABLE AND DO THEM BETTER

What put us on the track (1989) ?

December 1989

BEST PRACTICE PROGRAMME

Good Practice Case Study 1

Low cost major refurbishment
Policy Studies Institute
100 Park Village East, London NW1

- New atrium avoids the need for air-conditioning.
- New, smaller double-glazed windows improve thermal performance.
- Good daylight gives low lighting costs.
- Air quality sensors regulate fresh air intake.
- Solar energy collection from atrium exhaust air.

The Project

The Policy Studies Institute (PSI) is an independent policy research organisation concerned with economic and social studies and the workings of political institutions. Their research work benefits from a cellular office environment, with extensive support facilities including a conference suite which is regularly rented-out.

ENERGY EFFICIENCY IN OFFICES

What put us on the track (1991) ?

May 1991

BEST PRACTICE PROGRAMME

21

Good Practice Case Study

ENERGY EFFICIENCY IN OFFICES

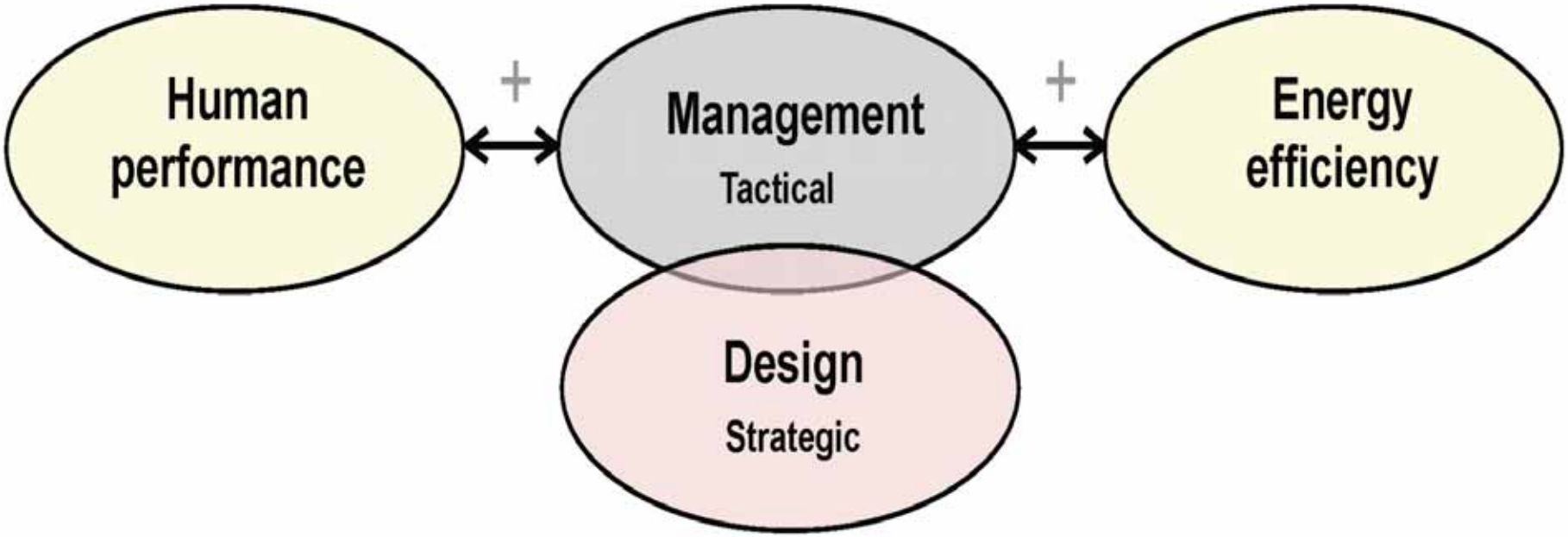
One Bridewell Street, Bristol

A new high quality air conditioned office with low energy costs

- Low fan energy consumption for an air conditioned office.
- High frequency lighting with effective central and local control.
- Naturally lit corner atrium.
- Effective energy management aided by electronic BEMS.

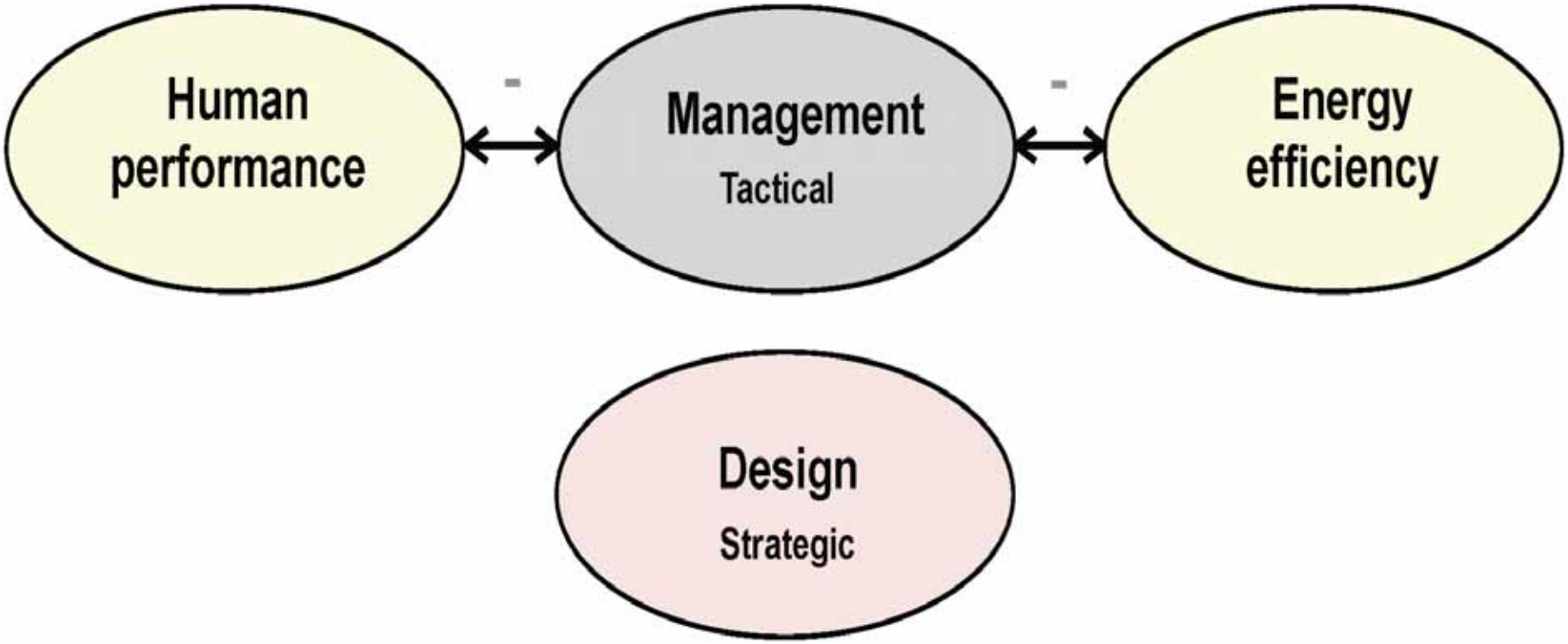
Arthur Young initially occupied the first and second floors, with tenants on the top three floors. Their merger with Ernst & Whinney in October 1989 confirmed the flexibility of the building, with their occupancy first increasing from 115 to 165 and subsequently expanding onto part of the third and all the fourth floor.

Where good things happened …
associations of low energy with happy occupants



DESIGN FOR USABILITY AND MANAGEABILTY: In the better-performing buildings, there tended was better understanding of user requirements during procurement, and better follow-through to good management in use. *One could nearly always name the individual or individuals responsible for championing the building in use and driving the virtuous circles.*

… and where they didn't
no positive associations



Without this understanding and commitment - linking design to use and management – performance in use could be disappointing, in terms of energy, occupant satisfaction, and often both. *Need to bring out the leaders.*

What put us on the track (1997) ?

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

The good performers don't necessarily impress the judges

It was the practice, not just the product

Factors for success at the Elizabeth Fry Building, UEA

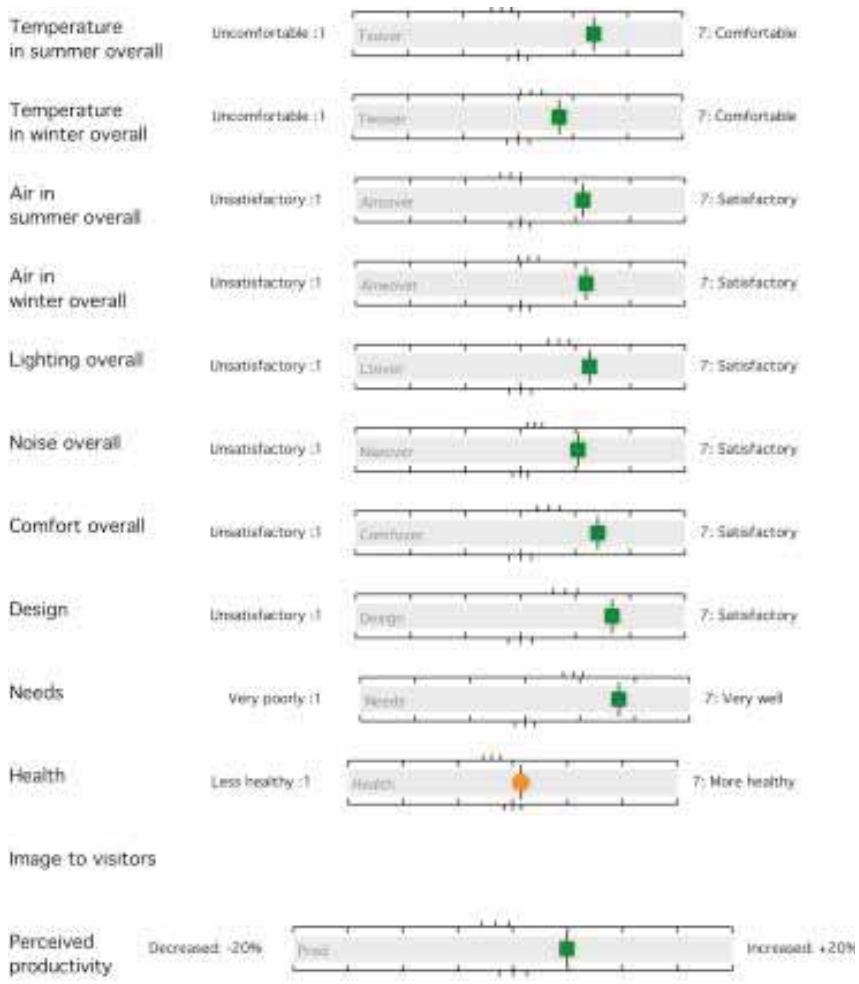
- A good client.
- A good brief.
- A good team *(worked together before on the site).*
- Specialist support *(e.g. on insulation and airtightness).*
- A good, robust design, efficiently serviced *(mostly).*
- Enough time and money *(but to a normal budget).*
- An appropriate specification *(and not too clever).*
- An 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 *(which has been largely sustained).*

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

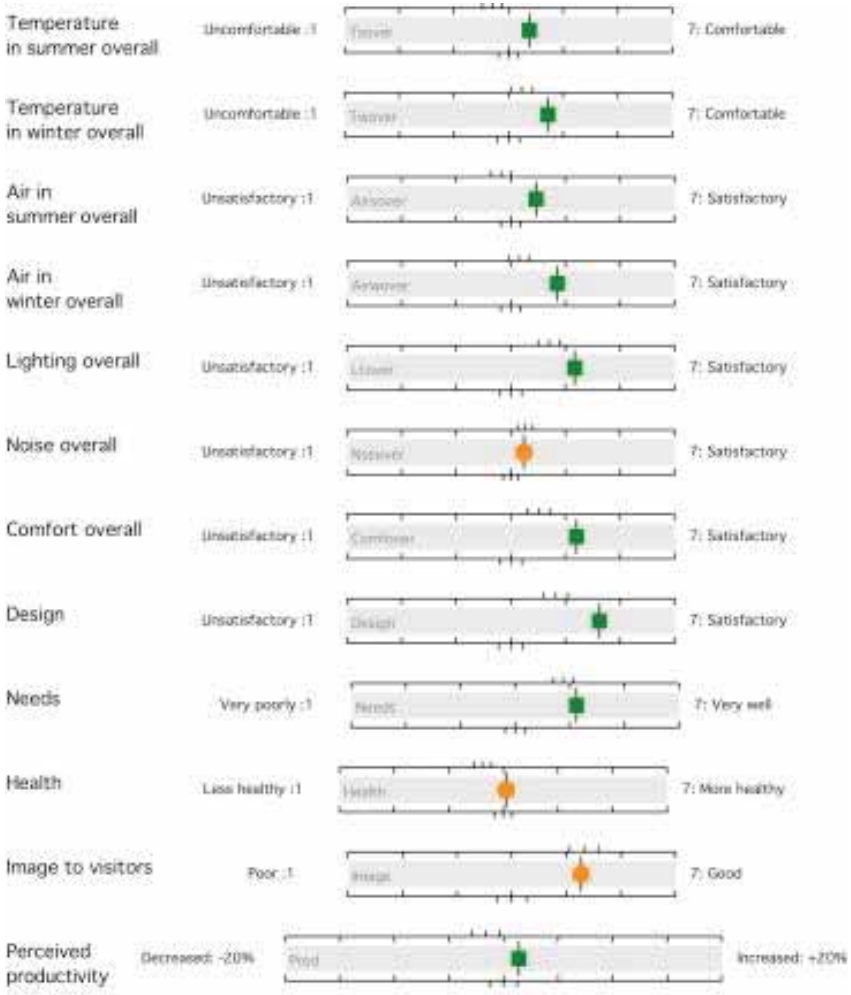
SOURCE: W Bordass et al, *Assessing building performance in use 5*, BR&I **29** (2), 144-157 (March-April 2001), Figure 6.

Elizabeth Fry Revisit - Occupant Survey

1996



2011

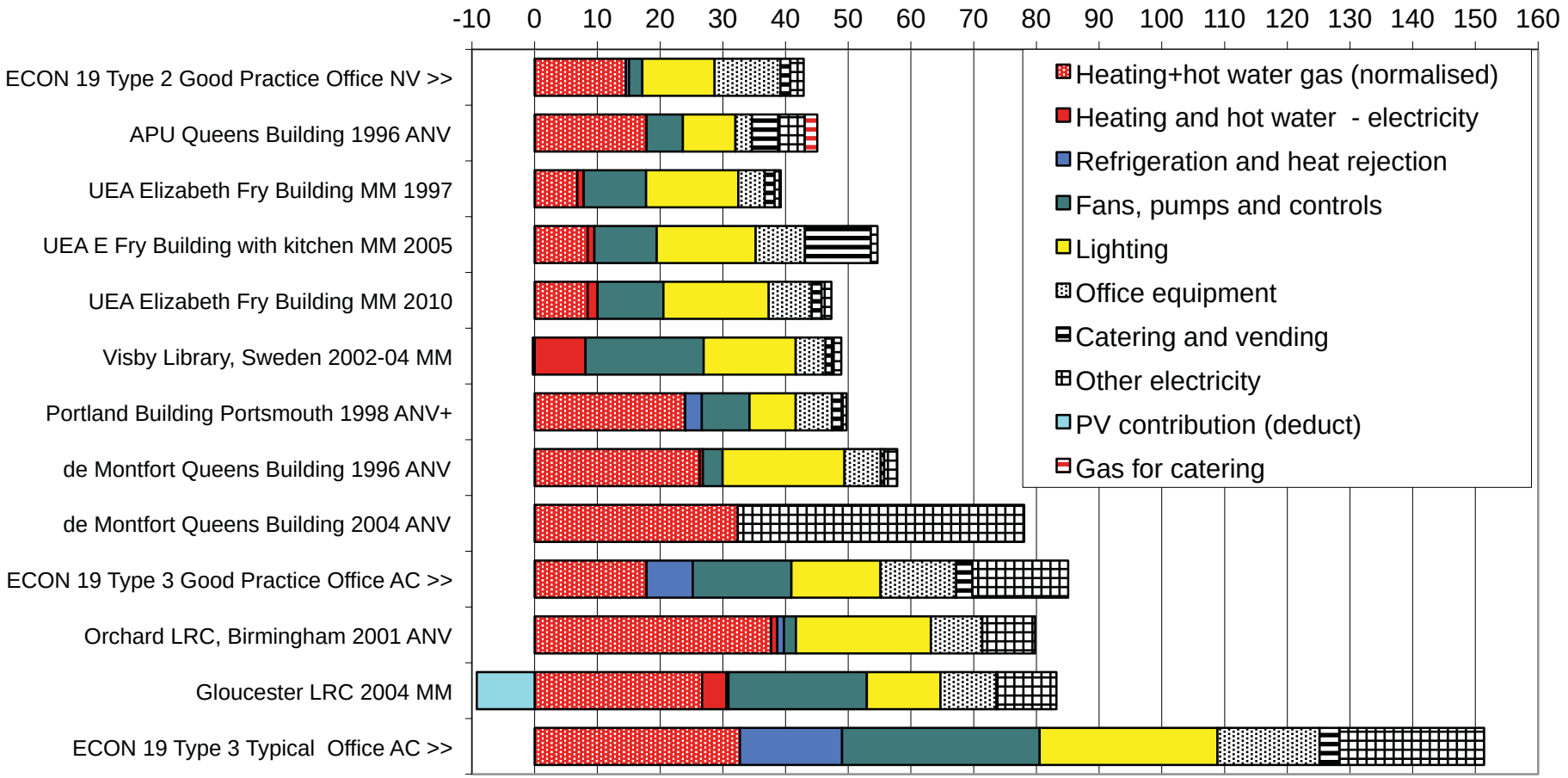


E Fry Revisit – *Pressure test Sept 2011*

E Fry Revisit – Energy Performance

Annual CO_2 emissions from university buildings

kg/m² Treated Floor Area at UK CO_2 factors of 0.184 for gas and 0.525 for electricity



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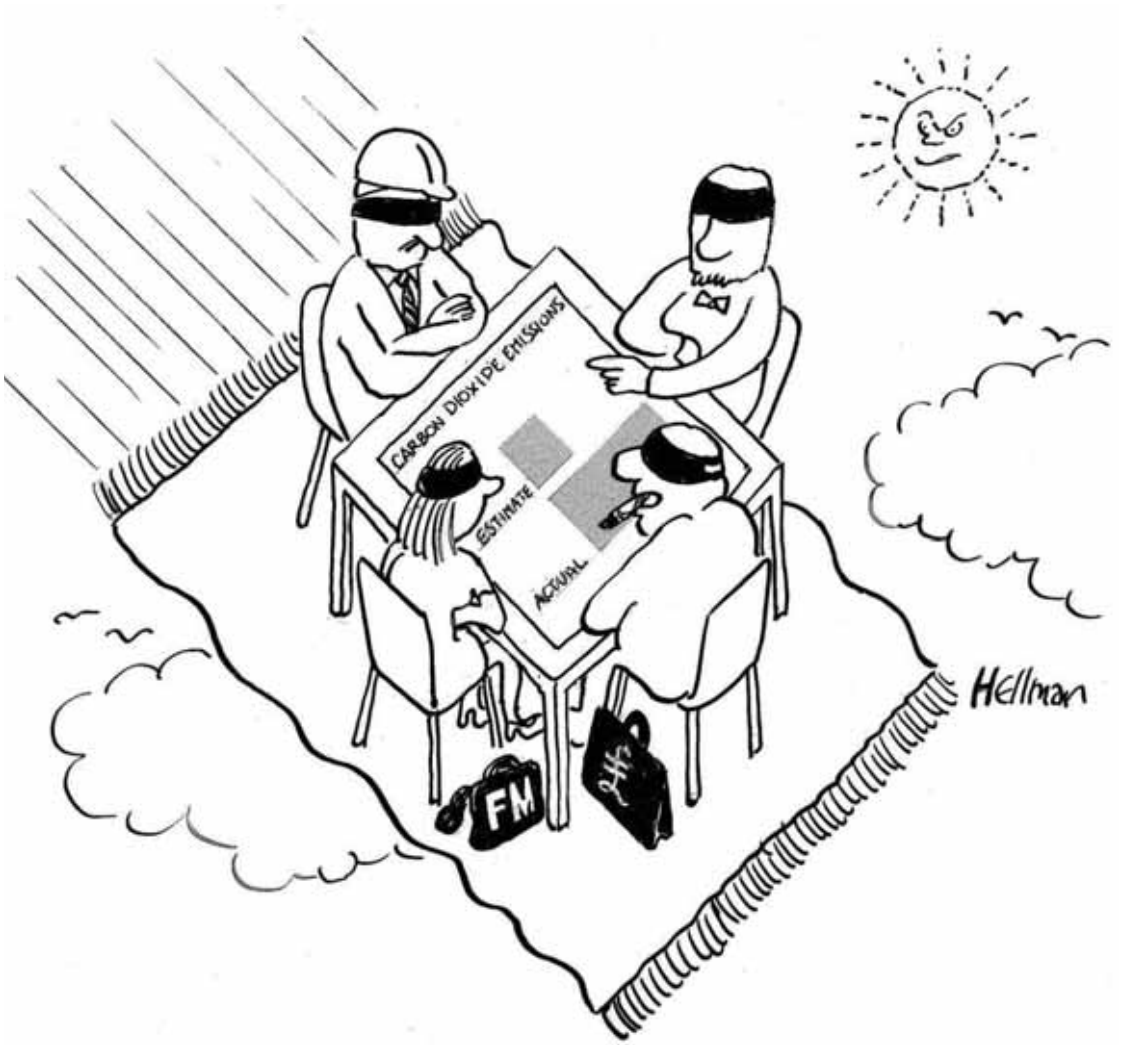
Why do many new buildings not perform as they are supposed to?

Crash test observations in the motor industry

Crash test observations in the building industry



SOURCE: by Louis Hellman for cover of W Bordass, *Flying Blind,* Association for the Conservation of Energy, London, (2001).

What the industry 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

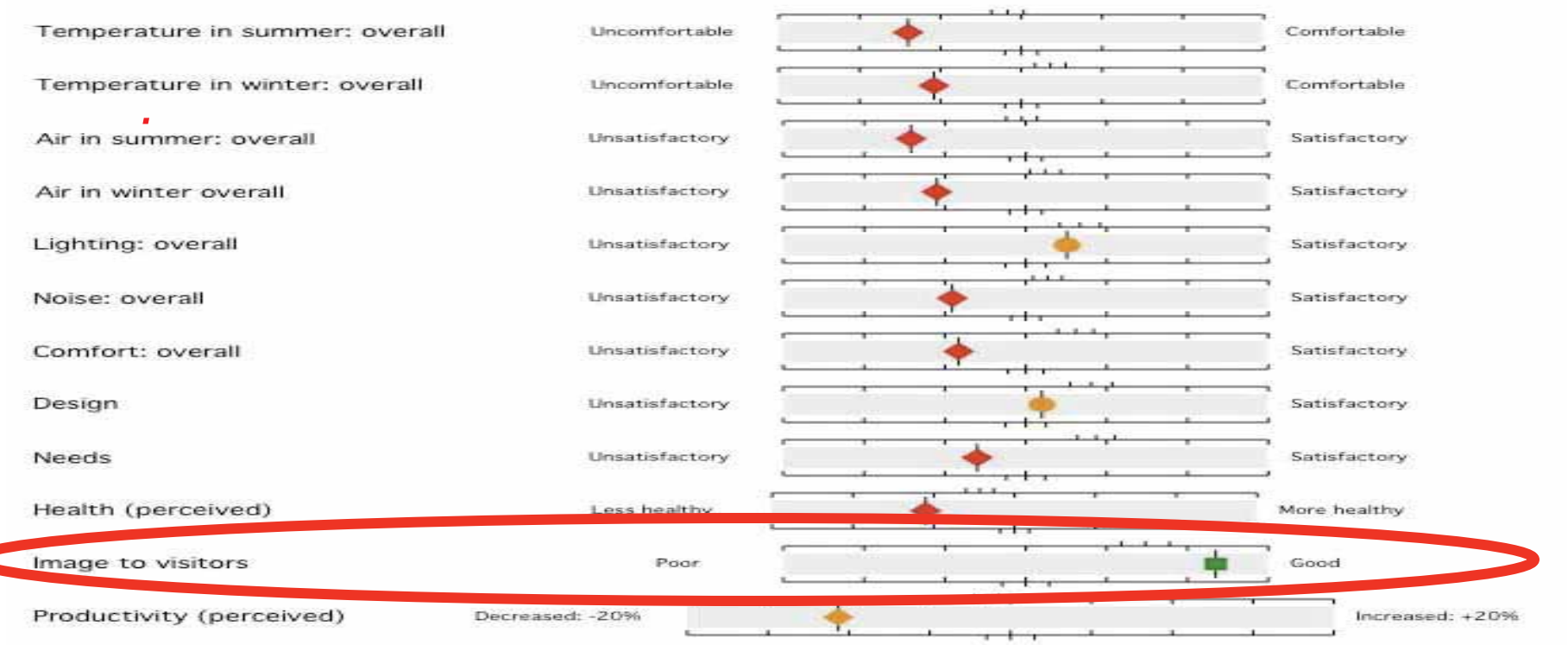
"unlike medicine, the professions in construction
have not developed a tradition of practice-based user research …
Plentiful data about design performance are out there, in the field …
Our shame is that we don't make anything like enough use of it"
FRANK DUFFY Building Research & Information, 2008

"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

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

SOURCE: BUS Method survey of a building services engineering award-winning Academy school in South East England, 2009

What do we tend to find *when we review performance of recent buildings?*

- They often perform much less well than anticipated, *especially for energy (notably electricity) use, carbon, and occupant satisfaction.*
- Unmanageable complication is the enemy of good performance. *So why are we making buildings more complicated and difficult to manage in the name of sustainability? Prevention is better than cure.*
- Design intent is seldom communicated well to users and managers. *Designers and builders tend to go away at handover.*
- Buildings are seldom tuned-up properly, and controls are a mess. *So now we have more things to do, what chance do we have?*
- Good environmental performance + occupant satisfaction can go hand in hand, *but only where good, committed people have made it happen.*
- Modern procurement systems can make it difficult to do things properly, with enough attention to detail. *Need a new professionalism that engages routinely with outcomes, e.g. using **Soft Landings**.*

KEEP IT SIMPLE, DO IT WELL, FOLLOW IT THROUGH, TUNE IT UP, CAPTURE THE FEEDBACK

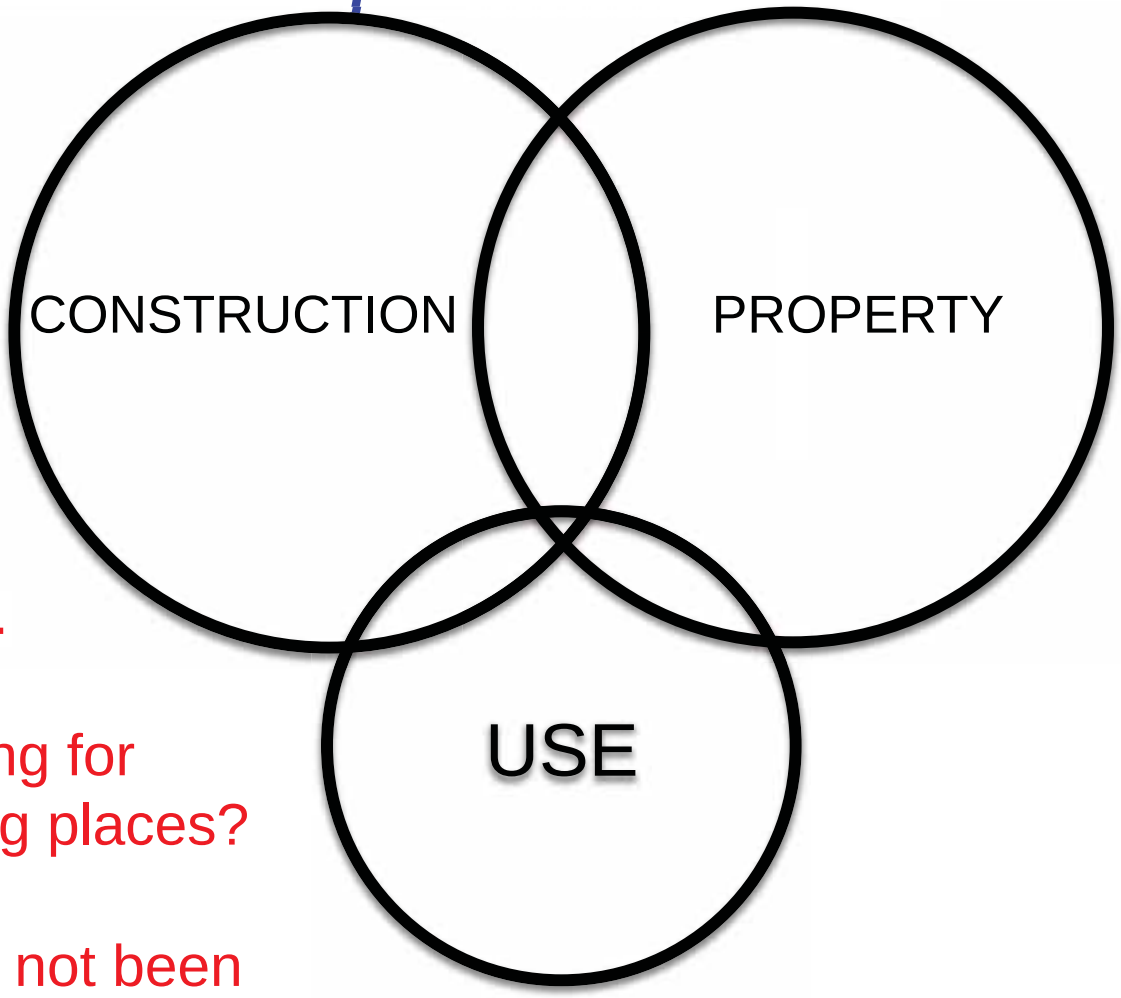
Some typical examples from recent buildings: *Poor window design, leading to overheating*


Why are these lights on
in a new university building?

And what about this?

In a new "low energy" building's kitchen

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.

Post-occupancy evaluation 1950-75: *Gestation*

- The term appears to have originated in evaluation of US Military facilities, mirroring their post-operational review debriefings.
- **1963**. RIBA *Plan of Work* included STAGE M - Feedback. *Inserted by (Sir) Andrew Derbyshire, who did operational research during the War.*
- **Mid-1960s.** Seminal work by Sim van der Rijn on the *(initially poor)* performance of new student dorms at the University of California, Berkeley. *Not called POE, but an early systematic approach at assessing performance from the user point of view.*
- **1968.** *Building Performance Research Unit* established at the University of Strathclyde. Pioneered the systems approach on schools, working with the Ministry of Education, professional practices and the Architects' Journal.
- **1969.** EDRA, the *Environmental Design Research Association,* was founded in the USA. *This still continues.*
- **1972.** Strathclyde's groundbreaking book *Building Performance* published.
- **1972.** RIBA withdraws STAGE M - Feedback from *Architects' Appointment.*
- **1975.** First known appearance[1] of the term POE by H McLaughlin on investigations of hospitals (AIA Journal, January 1975).

1. According to W Preiser, *Building Performance Assessment: from POE to BPE* Architectural Science Review, May 2005

Post-occupancy evaluation 1975-2000: *Ups and downs*

- **Building Performance Evaluation develops as an academic discipline** e.g. at the Universities of Berkeley, Strathclyde, Pittsburgh, Cincinnati, and Wellington NZ, but with limited direct connections with professional practice and publication, at least after the first flourishes, and then until fairly recently, *e.g. at Berkeley and Oxford Brookes.*
- **EDRA.** Strong on academic links and environmental psychology. Less well linked to mainstream practice.
- **Energy performance.** Strong driver in the oil crisis period 1973-83. Lost its leverage in the 1980s, when prices dropped and Chicago School free market ideologies took over government. Demonstration projects with expensive monitoring were not always good value; and bad news was often buried. Concern re-emerged in the 1990s with the growing importance of CO_2, but with limited interest in in-use performance.
- **Multiple perspectives.** Increasing interest in combining human factors with technical and environmental performance issues, starting in the late 1980s.
- **Some publication in professional journals,** e.g. the Probe series 1995-2002, see later slides. Typically three published studies per year including technical review, energy survey, occupant questionnaire … *We were on the Probe team.*
- UK government focus moved to Rethinking Construction, at the expense of building performance in use. POE swept away by procurement performance indicators. Probe and other funding ceased in 2002. *We set up the Usable Buildings Trust charity.*
- Recent re-awakening, e.g. with the UK's Technology Strategy Board *Building Performance Evaluation* programme and wider awareness of performance gaps.

SEE W Bordass and Adrian Leaman, *Building Performance in the UK: So many false dawns,* to be published in late 2014

Probe POEs 1995-2002: *What they found*

in a review of the first sixteen studies in 1999

Good buildings, but recurrent problems:

- Interfaces between work packages.
- Control systems, management + user interfaces, system and management responsiveness.
- Handover processes, with insufficient preparation and little follow-through into occupancy.
- User dissatisfaction with environment, noise, and unwanted interruptions.
- Energy use often much higher that anticipated.
- Unmanageable complication, once mostly confined to deep air conditioned buildings, was worryingly migrating into “green” buildings.

Some of the lessons:

Design intent needs to be clear.

Essential features are often absent.

Keep it simple and do it well.

Take account of unintended consequences.

Manage expectations to avoid credibility gaps between expectations and outcomes.

SOURCE: Published in a Special Issue of *Building Research & Information*, **29** (2), 179-174 (March-April 2001).

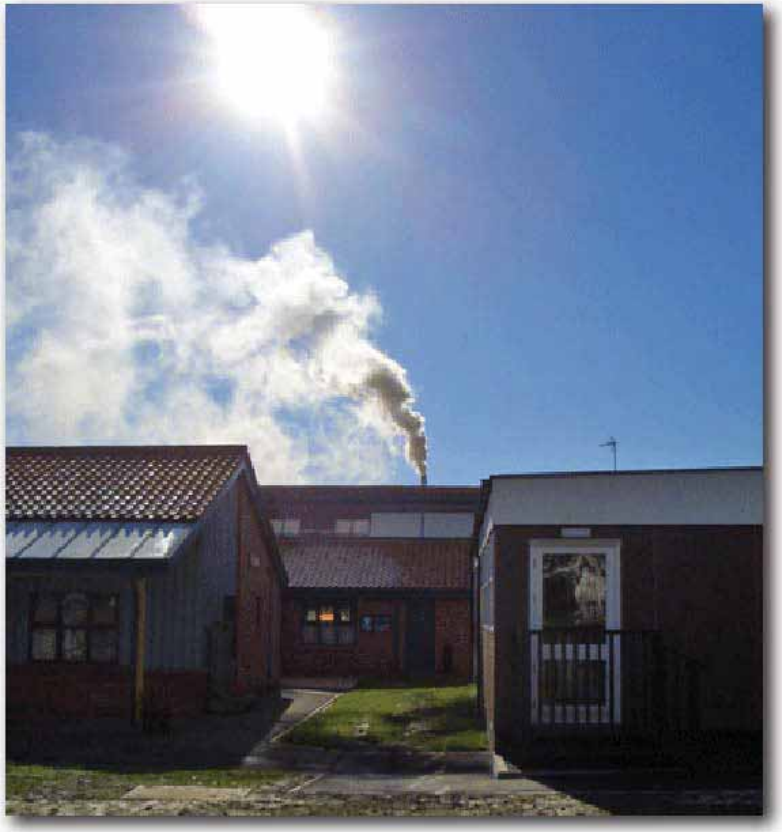

Pay careful
attention to detail

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



Technology - management interactions:
Strategic conclusions from the Probe studies of public and commercial buildings in use

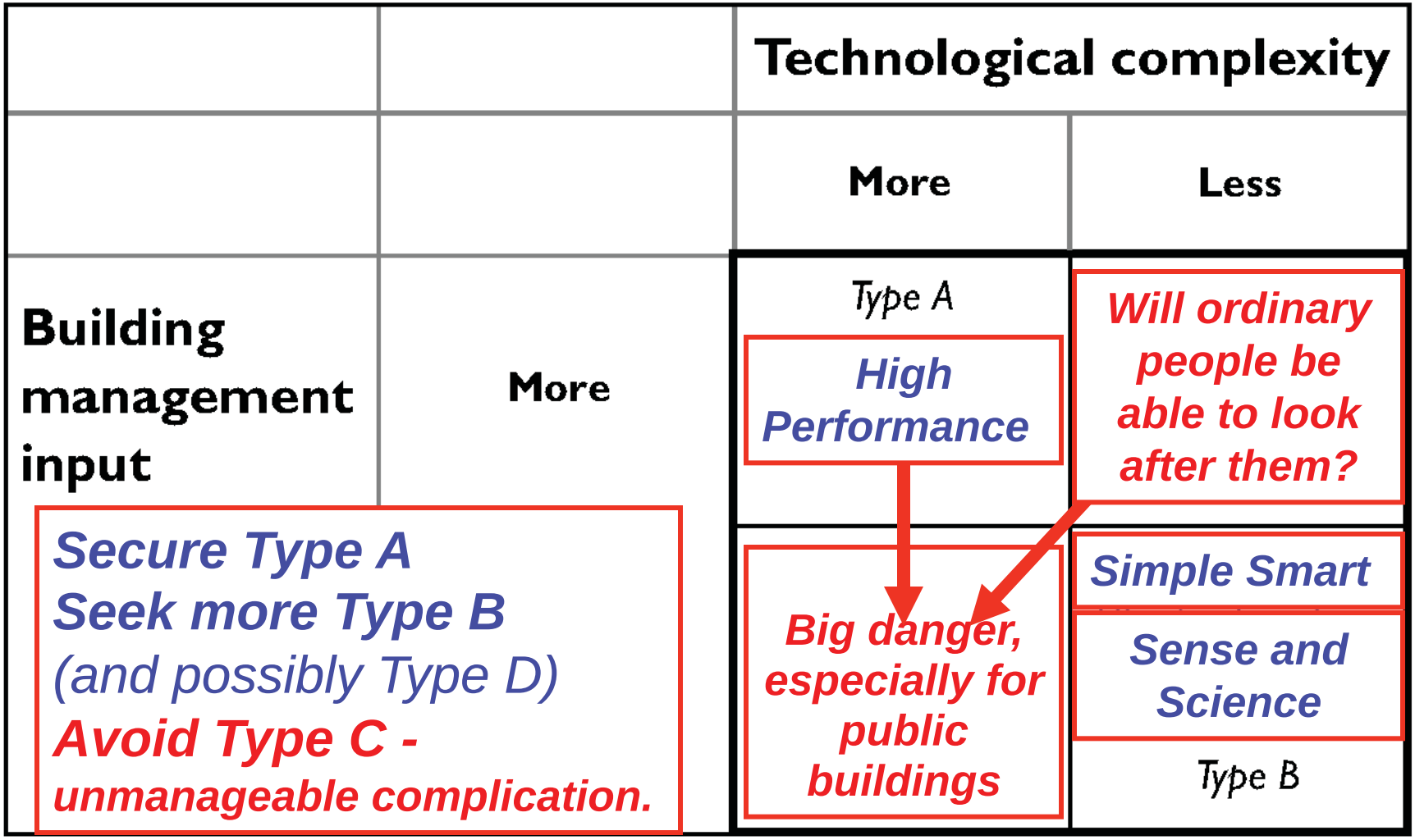


Diagram first appeared in: *Probe 19: Designer Feedback,* Building Services, the CIBSE Journal, page E21 (March 1999).

UK dwellings have now caught the nondomestic disease of unmanageable complication

SIGMA HOUSE, BRE *(illustrated)*

- Extensive feedback from occupants, including comfort, ergonomics, space.
- Complicated, confusing and unreliable technologies and renewables.
- Energy use much more than anticipated.

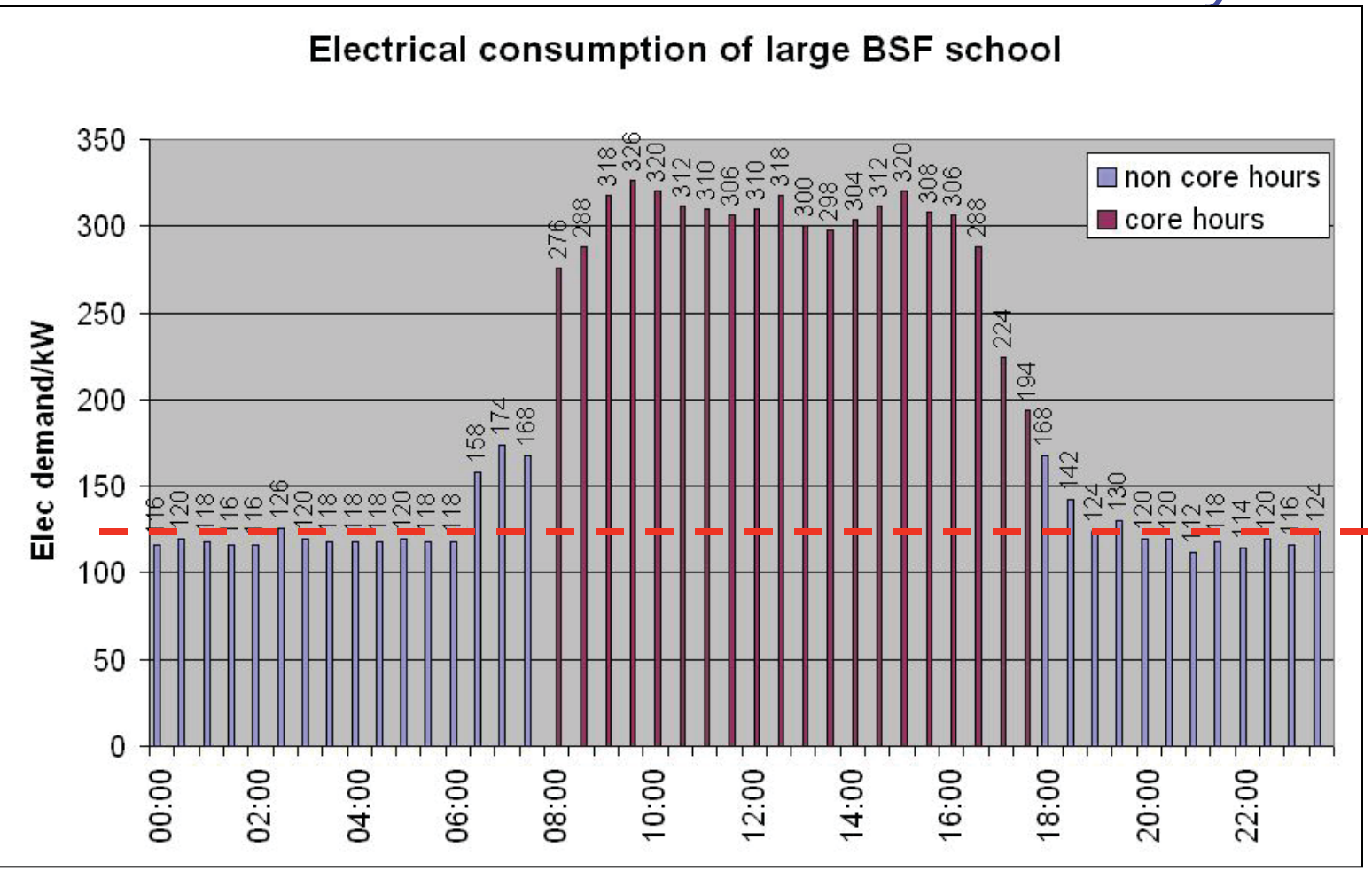
ELMSWELL, ORWELL

- Two-thirds of residents could not programme their thermostats.
- MVHR was present, but 95% of people opened windows in winter.
- Design air change was 0.5 to 1 ac/h. One open window could provide 17 ac/h!

SORCE: Sigma monitoring by Oxford Brookes University, Elmswell by Buro Happold in KTP with Bristol University.

The electrical tail can often wag the dog

kWh/half hour in a BSF secondary school



120 kW baseload: ca. 7 W/m² or 45 kWh/m² p.a.

Equivalent to 60% of all lighting or 1000 PCs including screens. printers etc.

Breakdown of annual electricity use: **44% used between 0800-1800 on term time days**

56% (~£75,000) of electricity used at other times: 14% term weekends, 26% term nights, 16% holidays

SOURCE: Buro Happold (October 2009)

So are these an expensive distraction
when we can't yet get the basics right reliably?

3

Changing our ways: a focus on outcomes, with Soft Landings

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 …?

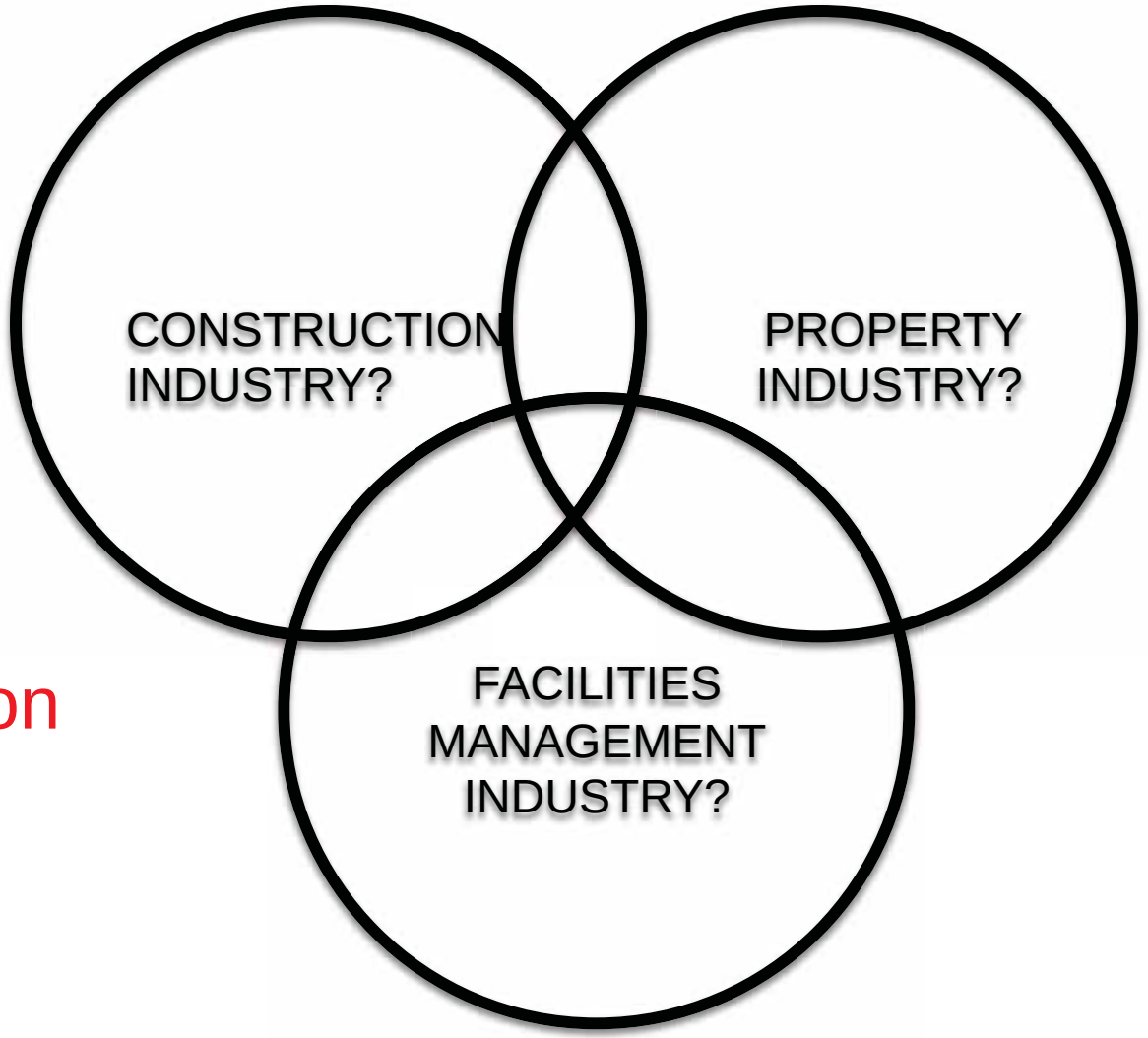
Why are we doing things the long way round?

Why is actual performance the hole in the middle?

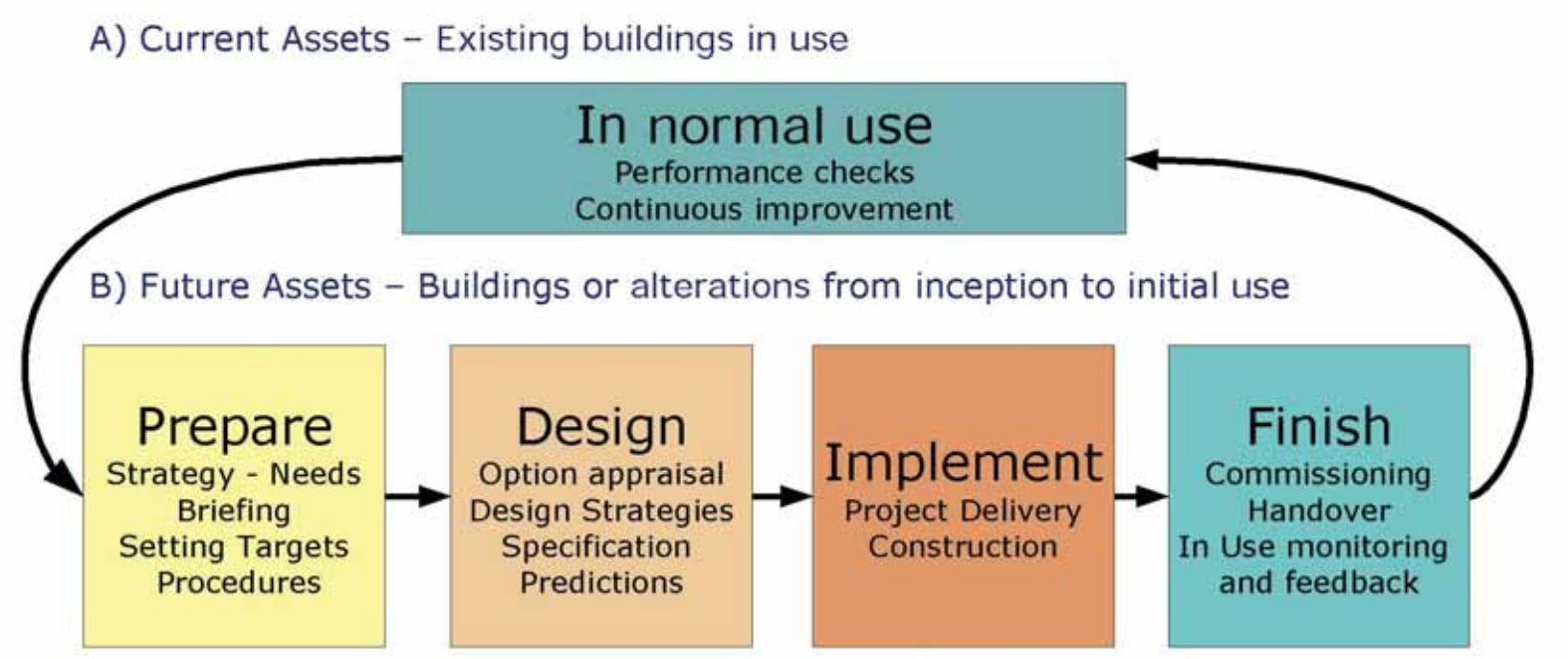
Which industry and market is really responsible for building performance?

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

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



THE FUTURE: *Closing the loop, making follow-through and feedback routine*



You can use feedback at any stage in the life cycle of a building or project
HINDSIGHT: After you've completed a project *(learning and fine tuning)*
FORESIGHT: Before you do something new *(existing situation + analogues)*
INSIGHT: At any time *(reality checking, managing expectations).*

Good processes need to bring it all together, and reinforce the ***Finish*** *stage*

SOURCE of hindsight-foresight-insight classification: D Bartholomew, *Building on Knowledge,* Wiley-Blackwell (2008).

How can we get all this to happen?
Soft Landings *may be able to help*

It augments the duties of the design and building team, *(and of client representatives),* especially:

- During the critical briefing stage.
- With closer forecasting of building performance.
- With greater involvement with users before and after handover, and on-site presence during settling-in; and
- including monitoring and review for the first 3 years of use.

It can:

- *Be used on any project, in any country, with any procurement route.*
- *Provide a fast track to raising building performance.*
- *Help to provide more customer focus for the industry.*
- *Improve client relationships and user satisfaction.*
- *Build recognition that some debugging is to be expected.*

It is primarily about a change in attitude.
It needs champions to take it forward - The new professionals.

Building performance evaluation: *From post-mortem to life support*

- Assists a **New professionalism** that engages directly with outcomes.
- "Hand over and walk away" procedures do not suit complex modern buildings, which also need tuning up.
- Building performance evaluation must become a routine part of project delivery.
- It must be closely embedded in the work of the design and building teams. *However, evaluation also needs to be undertaken with some independence.*
- Feedback experience also needs to be incorporated within the briefing, design and construction process. *It could potentially become a project management activity.*
- The whole process of creating buildings needs to change if we are to make the built environment genuinely more sustainable.

SOURCE: The *Framework* can be downloaded free from www.usablebuildings.co.uk and www.softlandings.org

Soft Landings: the Five main stages
From the Framework published in July 2009

1. Inception and Briefing
   Appropriate processes.
   Assigned responsibilities.
   Well-informed targets.
2. Design development
   and expectations management.
3. Preparation for handover
   better operational readiness.
4. Initial aftercare
   Information, troubleshooting,
   fine tuning, training.
5. Longer-term aftercare
   monitoring, review, independent
   POE, feedback and feedforward.

Soft Landings **Stage 1**:
Inception and briefing

The most important stage, because it binds the team and sets the whole style of engagement with outcomes.

- However, clients have been reluctant to pay, thinking that the industry ought to be doing it anyway.
- Modern procurement methods have often salami-sliced things, making it difficult to maintain *the golden thread* of maintaining and refining design intent throughout a project and on into use.
- *Some clients are writing it into their briefs.*
- *Some PFI teams are starting to put it into their bids.*
- *Some designers want it to be in their standard service.*
- *May become mandatory for government projects from 2016.*

FEEDBACK:
The project team should select a **Soft Landings Champion** or Champions, who can provide the leadership to help things along … **these are in effect the new professionals.**

Four aspects of briefing: *if poorly managed, don't be surprised if there are large performance gaps*

THEORY

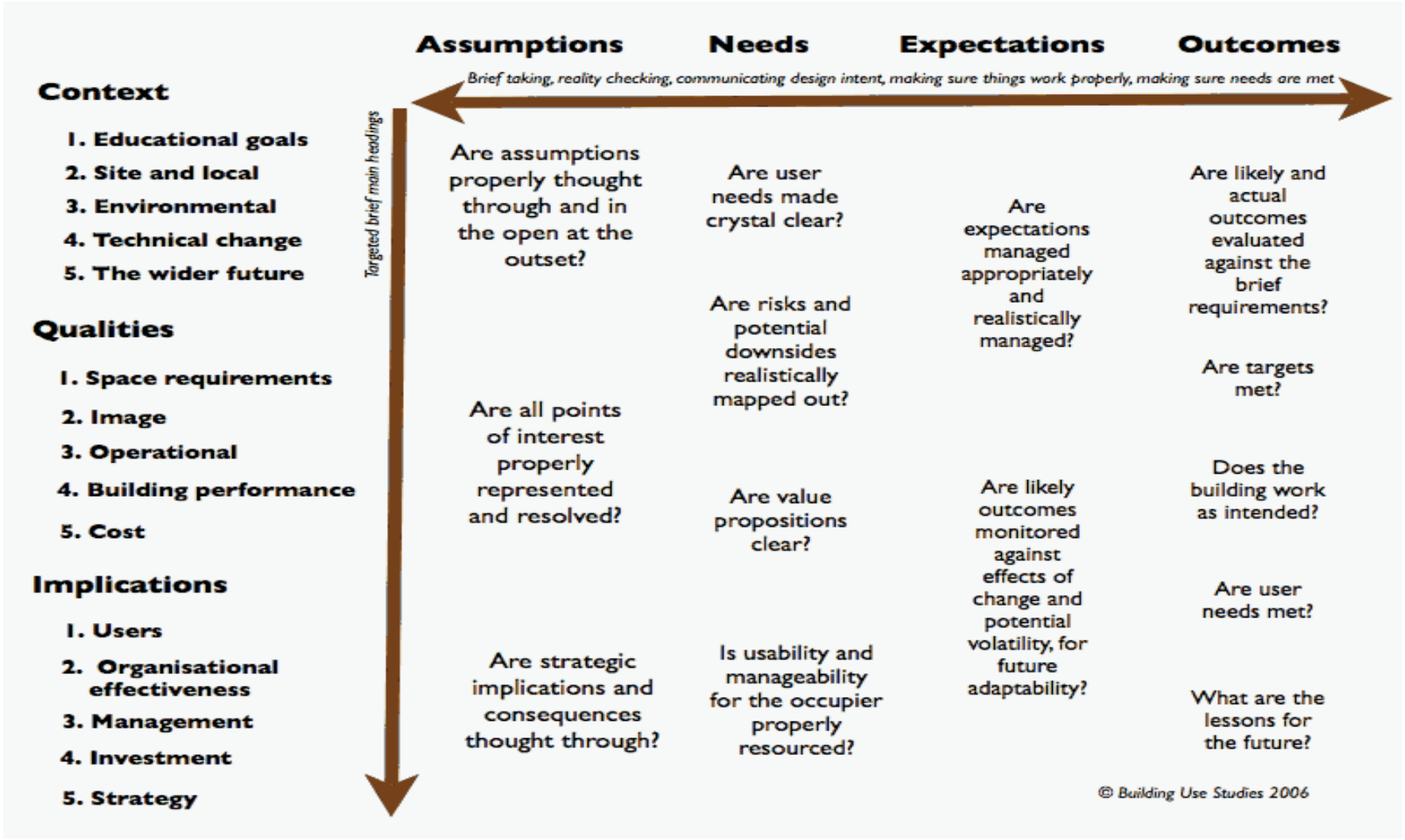
BEFORE

ASSUMPTIONS *What is being taken for granted?*	**EXPECTATIONS** *Will predictions prove robust?*
Will what is proposed meet them properly? **NEEDS**	*How will these be evaluated?* **OUTCOMES**

AFTER

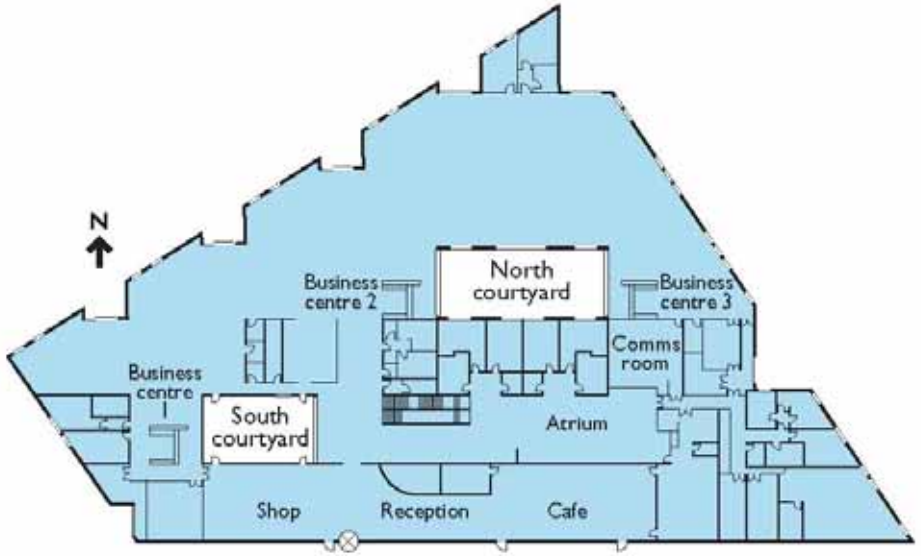
PRACTICE

Soft Landings **Stage 1**:
The briefing process can often be inadequate



SOURCE: A Leaman, *Strategic Briefing Framework,* Building Use Studies Ltd, developed for the Norwegian Building Institute (1997).

Early example by research team members: *National Trust Heelis Building, Swindon*



Scheme design by Feilden Clegg Bradley Studios (architects), Max Fordham (building services), Adams Kara Taylor (structural).

Soft Landings **Stage 2:**
Reviews during design and construction

- Set stretching but realistic expectations, *not pie-in-the-sky.*
- Manage them through the process.
- Undertake regular reviews and reality checks.
- Leave elbow room: *this is systemic improvement, not exact science.*

FEEDBACK:

- Any costs up to handover can usually be met by efficiency gains, *though there may be a learning curve to pay for.*
- Soft Landings Champion(s) can provide leadership, maintain the emphasis on outcomes, and remind project managers that it is not enough just to keep to time and budget.
- This must all be done in the sprit of learning, not blaming.

Soft Landings research team members Feilden Clegg Bradley and Max Fordham use an expectations management process, e.g. on the National Trust's Heelis building in Swindon.

Expectations Management:

Sustainability matrix approach used at Heelis

Sustainability Matrix: Offices — **Feilden Clegg Bradley** Architects LLP ©

Operational Energy Consumption and CO^2 Emissions

	1. GOOD PRACTICE	2. BEST PRACTICE	3. INNOVATIVE	4. PIONEERING	NOTES
1. CO^2 Emission Target	40kgCO^2/m²/yr	30kgCO^2/m²/yr	15kgCO^2/m²/yr	"Carbon neutral" 0kgCO^2/m	Industry standard EEO targets
2. Heating Load Target	79kWhr/m²/yr	47kWhr/m²/yr	30kWhr/m²/yr	20kWhr/m²/yr	Industry standard EEO targets
3. Electrical Load Target	54kWhr/m²/yr	43kWhr/m²/yr	35kWhr/m²/yr	25kWhr/m²/yr	Industry standard EEO targets
4. U Values: Wall Average Window Roof Ground Floor	0.35 2.2 0.2 0.25	0.25 1.8 0.18 0.22	0.2 1.4 0.15 0.2	0.1 0.9 0.1 0.1	good practice=current building regulations pioneering=Bedzed values
5. Airtightness	<10m³/hr/m²	<8m³/hr/m²	<5m³/hr/m²	<3m³/hr/m²	All measures require careful attention to details and monitoring construction.
6. Ventilation	Natural ventilation where possible. Mechanical ventilation where not.	Designed natural ventilation with automatic openers, mechanical ventilation to WCs etc.	Mechanical ventilation with heat reclaim in winter and BMS controlled natural ventilation in summer.		BMS with manual overrides preferable on all windows.
7. On Site Energy Generation		Solar domestic water heating to WCs.	Solar domestic water heating to WC cores. Cost effective PV installation using PVs to shade rooflights. Gas fired CHP installation.	Solar water heating to kitchens. Maximum PV installation using most efficient PVs. Wood/waste fired CHP.	Potential 50% grant available from DTI for wolar water heating, up to 65% for PV installation.
8. Daylighting	"Reasonable" to BS8206 part 2. A 2% daylight factor.	80% office space daylit to meet criteria of BS8206: part 2.	100% of office space daylit to BS8206 part 2		Ensure prevention of solar heat gain/glare by building form/shading systems
9. Artificial Lighting Controls	PIR detectors in WCs etc. Low energy fittings throughout.	Luminance and presence detectors throughout building. No dimming.	Luminance and presence detection at all fittings with dimming to zero and BMS override.		Personalised controls strongly recommended by Rob Jarman
10. Cooling Systems/Sources	Zero ozone depletion refrigerants in high efficiency comfort cooling/air conditioning systems.	Night time structural cooling with automatic window vents.	Evaporative cooling to rooms with high internal heat gains.	Borehole/ground water cooling to rooms with high internal heat gains.	Need to provide for areas where cooling is required and provide upgrade path for entire building.
11. Embodied Energy in Structural Materials	Steel and concrete frame engineered to minimise mass of materials.	Use of cement replacements eg GGBFS in concrete. Use recycled steel.	Timber structure in lieu of steel or concrete but retaining concrete floors. Use of recycled aggregates in structural concrete.	All timber structure with thermal mass provided using minimum amount of concrete.	NB. Rob Jarman particularly keen on use of timber for low embodied energy

REF: W Gething & W Bordass, *A rapid assessment checklist for sustainable buildings,* BR&I **34**(4), 416-426 (2006).

Soft Landings **Stage 3:** *Preparation for handover*

- **A change in concept:** Handover becomes an event within an extended *Finish* stage, not the point at which the design and building team sign off and walk away.
- **Preparation for operational readiness** includes not just the static and dynamic commissioning of the fabric and building services, but much closer engagement with the occupier's move-in and their management and maintenance team, *if they have one.*
- **Preparation for aftercare,** with representatives of the design and building team on site after handover. *The time allocation depends on the size and complexity of the project - it might be one person for half a day a week or less, or much more.*
- **If there is unfinished business,** e.g. owing to a forced early handover, then the *golden thread* is easily carried through into STAGE 4: initial aftercare and fine tuning.

FEEDBACK: Early appointment of a facilities management team is not enough, they also need to be brought into the process deliberately.

Soft Landings **Stage 3:**
Preparation for handover

Section 3: Operating and Maintenance Instructions

CRITERION 5 – PROVIDING INFORMATION

82 In accordance with Requirement L1(c), the owner of the building should be provided with sufficient information about the building, the ***fixed building services*** and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.

Building log-book

83 A way of showing compliance would be to produce information following the guidance in CIBSE TM31 Building Logbook Toolkit[32]. The information should be presented in templates as or similar to those in the TM. The information could draw on or refer to information available as part of other documentation, such as the Operation and Maintenance Manuals and the Health and Safety file required by the CDM Regulations.

84 The data used to calculate the ***TER*** and the ***BER*** should be included in the log-book.

It would also be sensible to retain an electronic copy of the input file for the energy calculation to facilitate any future analysis that may be required by the owner when altering or improving the building.

Do not remove from: *Post room*

Building Log Book

Facilities manager to complete green italic sections

Building Log Book

New Central Offices for the National Trust

Heelis
Kemble Drive
Swindon
Wilts
SN2 2NA
tel: 0870 242 6620

Building owner
National Trust

Facilities manager responsible for log-book: *Liz Adams* Signed:

Emergency contact details

This building log book was prepared by

Max Fordham LLP,
42-43 Gloucester Crescent,
Camden, London.
Tel 0207 267 5161.
email - post@maxfordham.com

Log book version: *1* Date: *02/08/2005*

This building log book is analogous to a car handbook, providing the facilities manager with easily understood information about how the building is intended to work. It also allows ongoing building energy performance and major alterations to be recorded.

Please ensure that this log book is kept up-to-date and in a readily accessible (designated) position, e.g. in the main building operations room. It contains important information for anyone carrying out work on the building and its services.

This log book is to be kept at all times in: *Post room*

Electronic version is kept at: Server/PC directory name and file name

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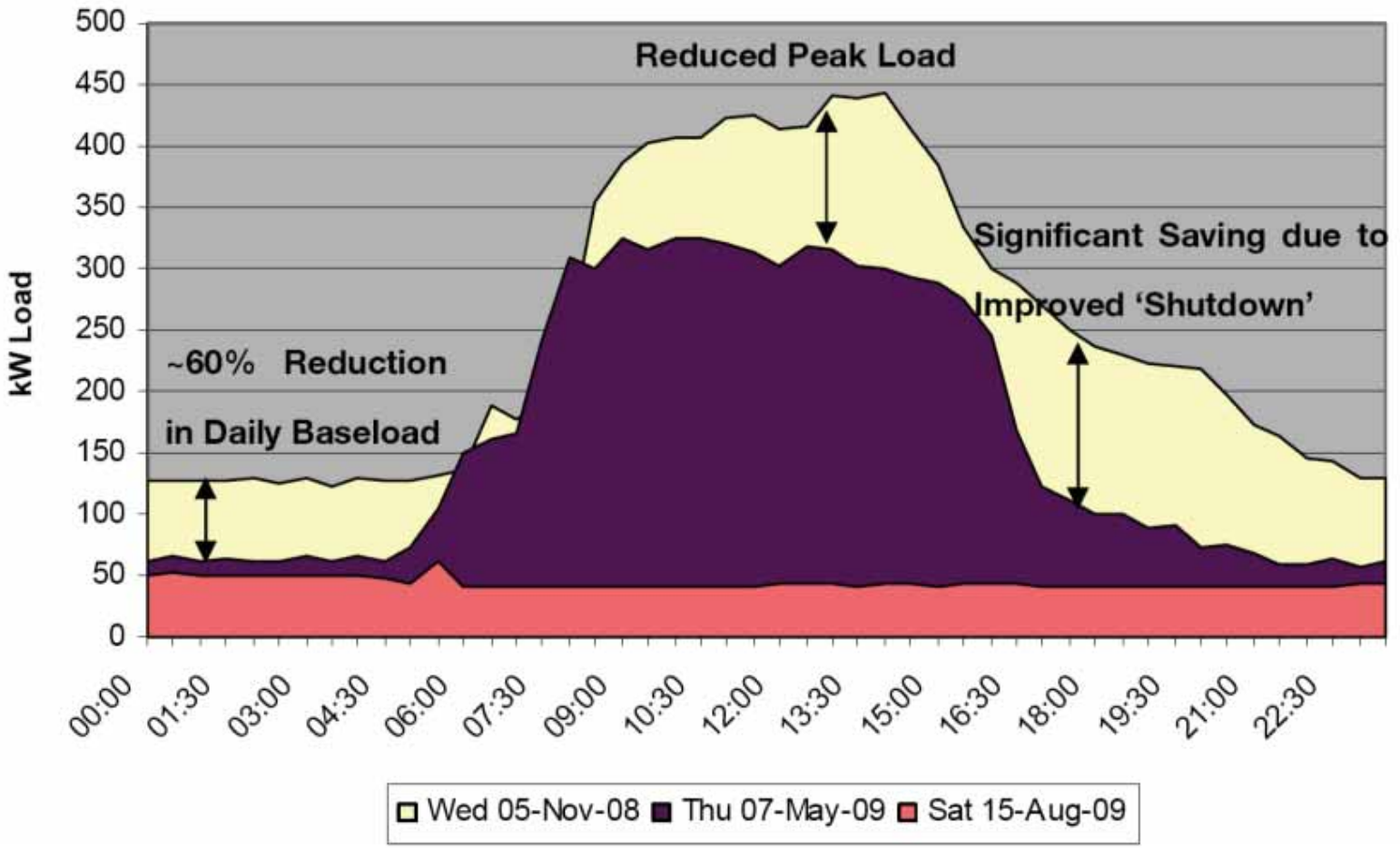
Soft Landings **Stage 4:** *Initial aftercare*

- **Design and building team members visit regularly:** *who and how many visits will depend on project.*
- **They need a home in the building where they are visible to occupants,** *not be hiding in the site hut.*
- **They explain the building to the users,** *in simple guides and in one or two introductory events.*
- **They help the management to take ownership,** *the occupier must take the initiative, not stand back.*
- **They keep people informed,** *e.g. via a newsletter on the organisation's website, e.g. alerting to any problems.*
- **Troubleshooting and fine tuning can be undertaken,** *the best insights have been where the soft landings team does some of its own work in the building and experiences its facilities.*

FEEDBACK: Will contractors engage properly? *Soft Landings priorities are very different from dealing with snags and defects.*

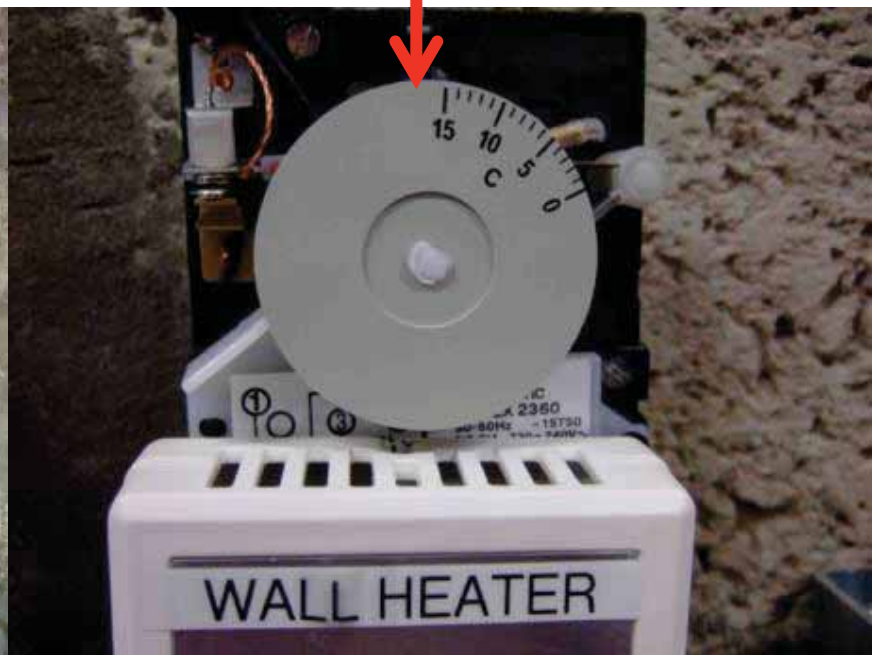
Stage 4 aftercare may pay for itself:
Intervention in a new secondary school



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).

Stages 4+5 can trap unintended consequences:
Example: sprinkler frost protection in a primary school



In 2008-09, this frost thermostat *(improperly set at 17°C on installation)* energised the wall heater in the sprinkler pump room. Over a year, this wasted more electricity than the wind generator *(intended to offset the entire building's annual heating energy use)* produced.

Soft Landings **Stage 5:**
Monitoring, evaluation and feedback

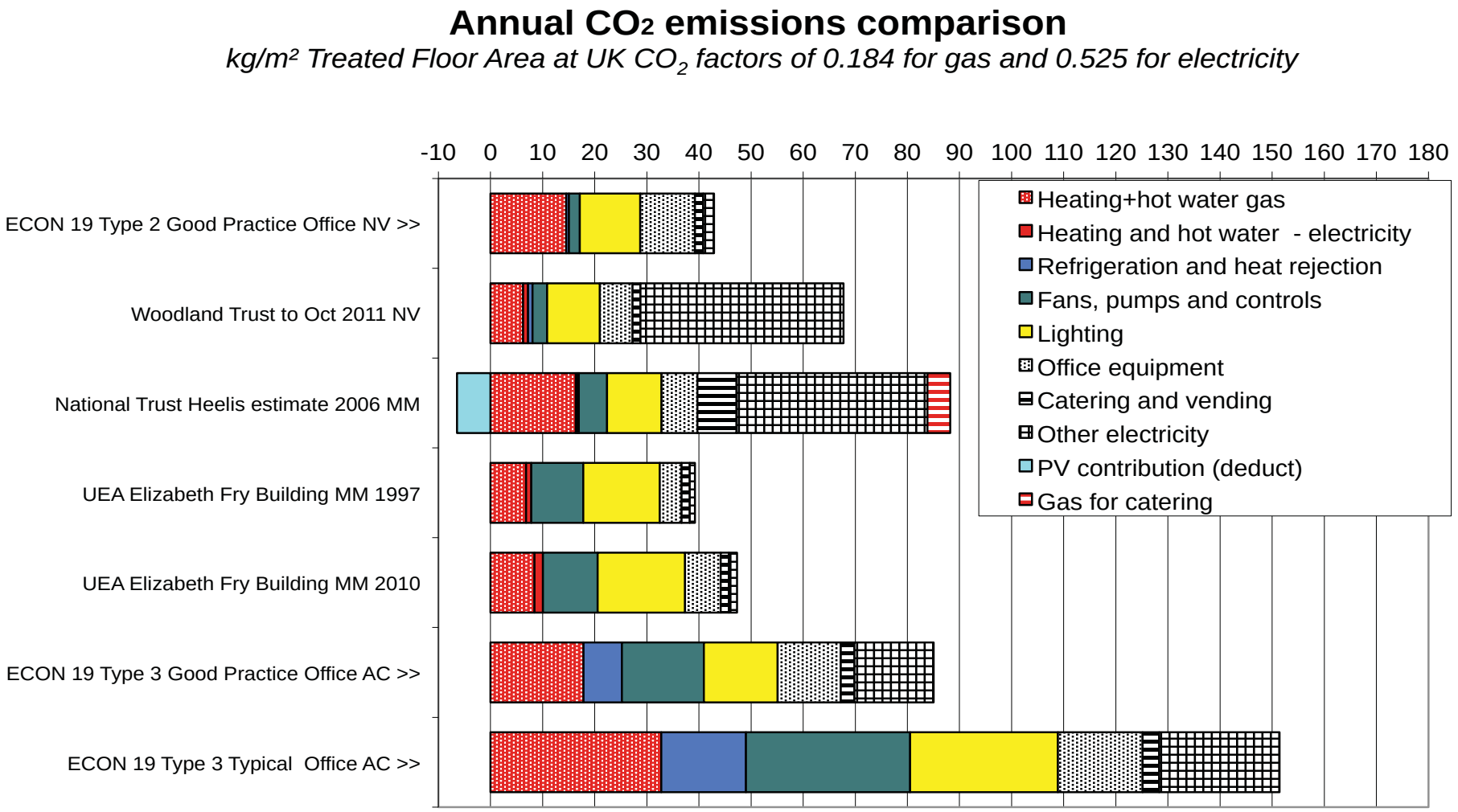
- **Extended aftercare period,** typically two or three years.
- **Occupiers must take ownership** and do most of the monitoring themselves. *They may need motivating.*
- **Independent post-occupancy evaluation can be included,** e.g. for occupant surveys, energy analysis, and structured discussions. *Independent review & benchmarking can be helpful and reassuring.*
- **The findings can be fed through rapidly,** *e.g. to fine tune the systems, refine use and operation of the building and plan upgrades.*
- **The learning can also be spread much more widely,** via the people and organisations involved, and beyond.

FEEDBACK: Often this has needed external funding.
How can we make it routine? The value that can be added is enormous.
We can't afford not to do it; and it can be done with a light touch.

Feeding forward between projects:
National Trust to Woodland Trust

ARCHITECTS: Feilden Clegg Bradley Studios, ENVIRONMENTAL ENGINEERS: Max Fordham.

Woodland and National Trust energy use
expressed as annual CO_2 emissions



National Trust evaluation funded by Feilden Clegg Bradley, Woodland Trust by the Technology Strategy Board.

Feeding forward between projects: *National Trust to Woodland Trust*

- SIMPLIFICATION OF BUILDING and SYSTEMS: Considerable potential.
- FINE TUNING IN THE FIRST YEAR OF OCCUPATION. Needs very different priorities from normal practices during the defects liability period.
- NATURAL LIGHTING: Good, but glare can come from unexpected places.
- ELECTRIC LIGHTING: Not just about desktop illuminance, but internal appearance. Needs more finesse in control and user interfaces.
- HEATING: Big success: Woodland Trust uses much less gas.
- CONTROLS AND BMS: Still in need of more attention to detail.
- WINTER VENTILATION: Natural ventilation tricky at the Woodland Trust. The background mechanical system used at Heelis may be more robust.
- SUMMER VENTILATION AND COOLING. Optimisation required at the Woodland Trust, owing to control issues and security concerns.
- WORKSTATION PLANNING: Needs flexibility. One size doesn't fit all.
- ICT SYSTEMS: In spite of major efforts at the Woodland Trust, ICT and the associated HVAC still dominates electricity use, and was very similar to that at Heelis. Specialist consultancy during design would have been rewarding.

Soft Landings:
Everybody can win

- Better communication, proper expectations management, *fewer nasty surprises.*
- More effective building readiness. *Less rework.*
- Natural route for feedback and Post-occupancy evaluation, *to improve the product and its performance in use.*
- Teams can develop reputations for customer service and performance delivery, *building relationships, retaining customers, commercial advantage.*
- Vital if we are to progress towards more sustainable, low-energy, low-carbon, well-liked buildings and refurbishments, *closing the credibility gaps.*

SO WHAT IS STOPPING US?

- *ATTITUDES: Everybody needs to be committed, starting with the client - perhaps the biggest obstacle. The "golden thread" needs to be put in place.*
- *PROCESSES: There is a learning curve to pay for (probably best from marketing budgets), and the feedback has to be managed.*
- *TECHNIQUES: Independent POE surveys cost money (but not much).*
- *CAPACITY: We need facilitators, investigators, troubleshooters and fixers.*
- *MONEY: Particularly allocation for tune-up etc. after practical completion.*
- *IMAGINATION: Often constrained by burgeoning bureaucracy!*

SOFT LANDINGS FOR SCHOOLS

Case Studies

Feedback from use of the Soft Landings Framework in new schools

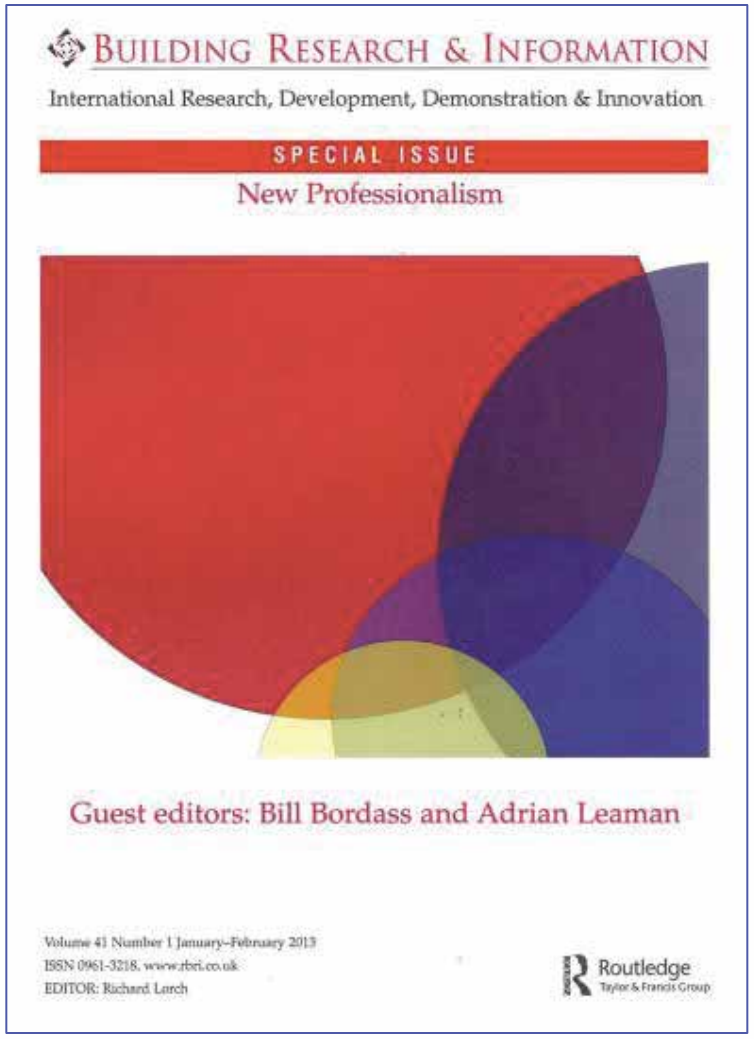
Edited by Mike Buckley, Bill Bordass and Roderic Bunn

BSRIA BG 9/2010

SOFT LANDINGS

Research funded by **Technology Strategy Board**

New Professionalism: getting started
Principles anyone can adopt tomorrow



PROVISIONAL LIST DEVELOPED WITH THE EDGE

ETHICS AND BEHAVIOUR:

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.

SOURCE: The Editorial of BR&I **41**(1), Jan-Feb 2013 can be downloaded at www.tandfonline.com/toc/rbri20/41/1

New Professionals
follow design intent through into reality

- They understand what is needed — *strategic briefing*
- Are clear what they want, and communicate it plainly — *strategic design*
- Are ambitious, but realistic — *question all assumptions, understand users*

- Follow things right through — *e.g. using **Soft Landings** procedures*
- Review what they do — *manage expectations, undertake reality checks*
- Make others aware of what they are after — *specify: what, why and how*
- Check that things will work — *technical feasibility, usability and manageability*

- Get things done well, with attention to detail — *communicate, train, inspect*
- Finish them off — *commission, operational readiness, handover, dialogue*
- Help the users to understand and take ownership — *provide aftercare support*

- Review performance in use — *including **post-occupancy evaluation***
- Work with occupiers to make things better — *monitoring, review and fine tuning*
- Anticipate and spot unintended consequences — *revenge effects*
- Learn from it all — ***and share their experiences***

THEY KEEP THINGS AS SIMPLE AS PRACTICABLE AND DO THEM BETTER

www.usablebuildings.co.uk