

Allies + Morrison
14 November 2023

POST-OCCUPANCY EVALUATION: FROM POST-MORTEM TO LIFE SUPPORT

Bill Bordass and Adrian Leaman

www.usablebuildings.co.uk

Outline

1. Some background.
 2. Where Adrian and I have come from
 3. How to change the system - Leverage points
 4. What is A+M doing?
 5. What else might A+M need to do?
 6. Opportunities and pitfalls
 7. Techniques and resources
-

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?

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

When natural ventilation was all the rage, a novel form of mechanical ventilation was quietly slipping into Britain: the Swedish Termodeck system. One of the first buildings to use Termodeck and other Swedish detailing was an academic facility at the University of East Anglia. How has it fared?

BY THE PROBE TEAM

PROBE

14: Elizabeth Fry Building



LETTER TO ARCHITECTS' JOURNAL

The good performers don't necessarily impress the judges

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).*
- 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 *(easier now, but needs to be sustained).*

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

The first false dawn: What went wrong?

In 1972:

The seminal book *Building Performance* was published by BPRU, the Building Performance Research Unit at Strathclyde University.

The very same year:

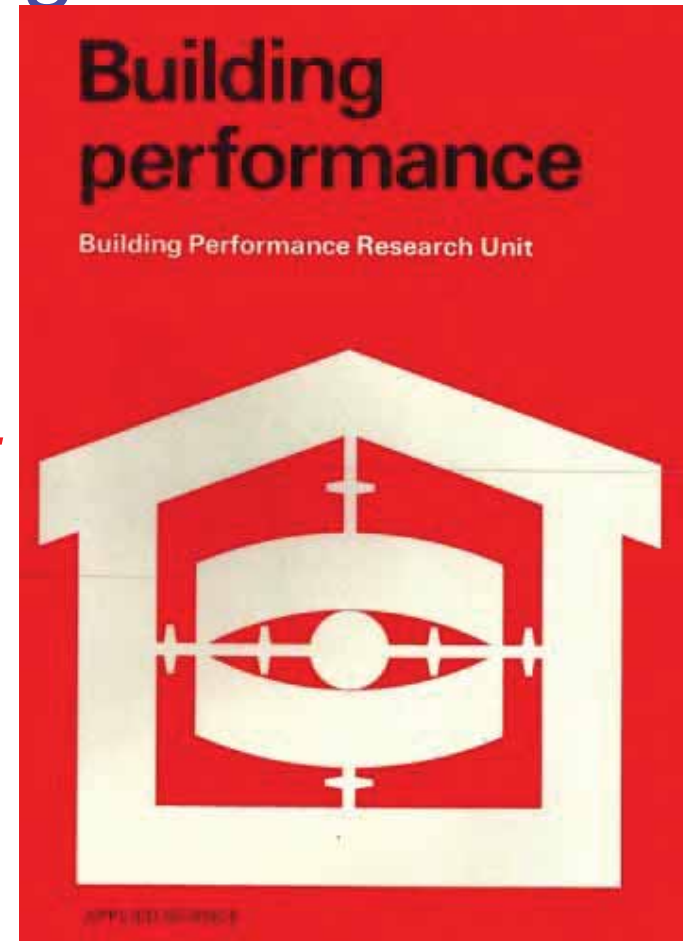
RIBA took Plan of Work STAGE M – Feedback out of its publication *Architect's Appointment*.

REPORTEDLY BECAUSE:

- *Difficult to define what should be done.*
- *Clients wouldn't pay for it.*
- *RIBA did not want to create the impression architects would do it for nothing.*
- *Concerns about legal and insurance implications.*

FEEDBACK ALSO WITHERED IN ACADEME:

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



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

- 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.
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What put us on the track (1989)?

December 1989

BEST PRACTICE PROGRAMME

Good Practice Case Study

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.

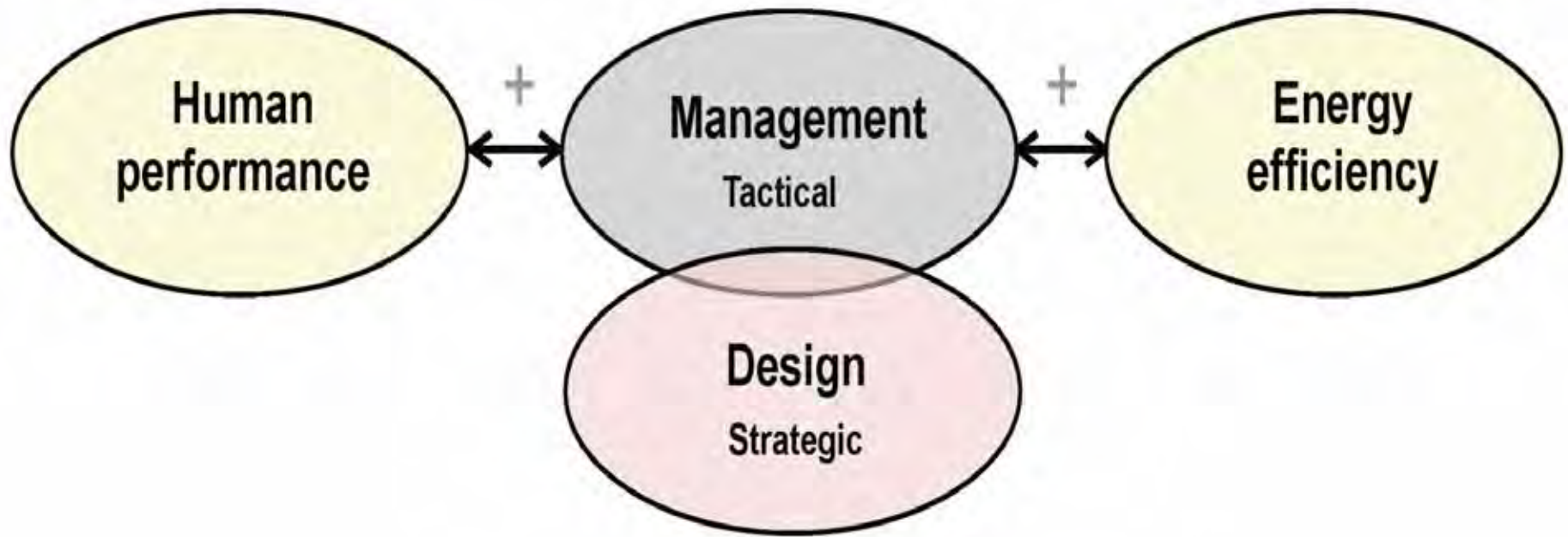
ENERGY

EFFICIENCY IN

OFFICES

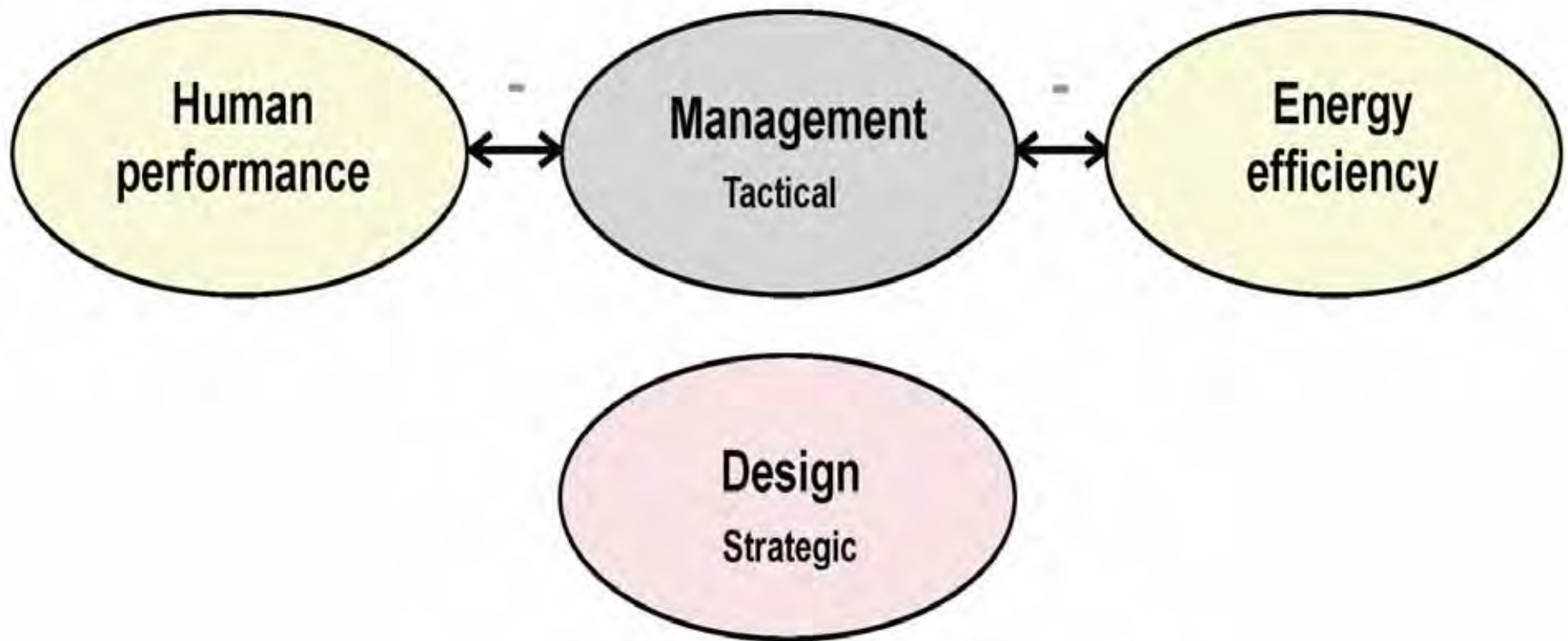
Where good things happened ...

associations of low energy with happy occupants



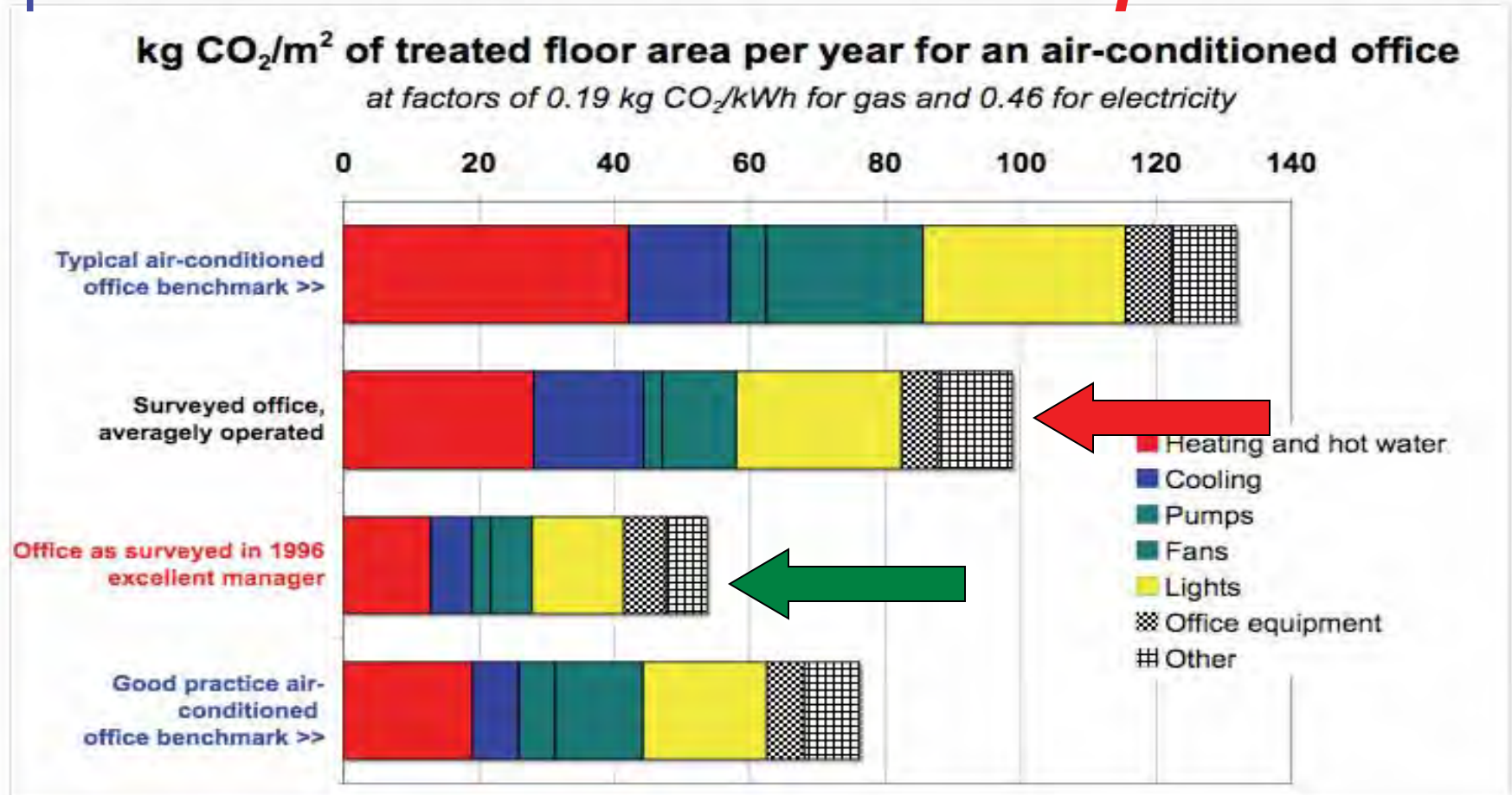
DESIGN FOR USABILITY AND MANAGEABILITY: In the better-performing buildings, there tended to be better understanding of user requirements during procurement, and better follow-through to good management in use. *One could nearly always name the individual or individuals responsible for championing the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

Control and management have a big effect on performance in use ... *but tune-ups are rare*



In 2000, the excellent office and energy manager was replaced by an outsourced FM company, and the annual energy use nearly doubled.

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.**



POE as real-world research *(after Robson, 1993)*

Solving problems **NOT** Just gaining knowledge
Predicting effects **NOT** Just finding causes
Robust results, actionable factors **NOT** Only statistical relationships
Developing & testing services **NOT** Developing & testing theories
Field **NOT** Laboratory
Outside organisation **NOT** Research institution
Strict time and cost constraints **NOT** R&D environment
Researchers with wide-ranging skills **NOT** Highly specific skills
Multiple methods **NOT** Single method
Oriented to client **NOT** Oriented to academic peers
Viewed as dubious by some academics **NOT** High academic prestige

Large samples are not needed, if you understand the context.

*Case studies of individual buildings tell stories
and establish hypotheses that can be tested elsewhere.*

Technology - management interactions:

Strategic conclusions from the Probe studies of public and commercial buildings in use (1999)

		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

Technology - management interactions:

Strategic conclusions from the Probe studies of public and commercial buildings in use (1999)

		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.

Big danger,
especially for
public
buildings

Simple Smart
Sense and
Science
Type B

Some post – Probe activities

Moving up the food chain

2002 Usable Buildings charity established.

2002-08 Making energy performance visible with Display Energy Certificates and Landlord's Energy Statements for rented buildings – *Poor government and CT support.*

2002-05 Feedback for construction clients and the industry – *clients had little interest and felt the industry should do it, but how can it? Everybody can benefit but nobody wants to pay.*

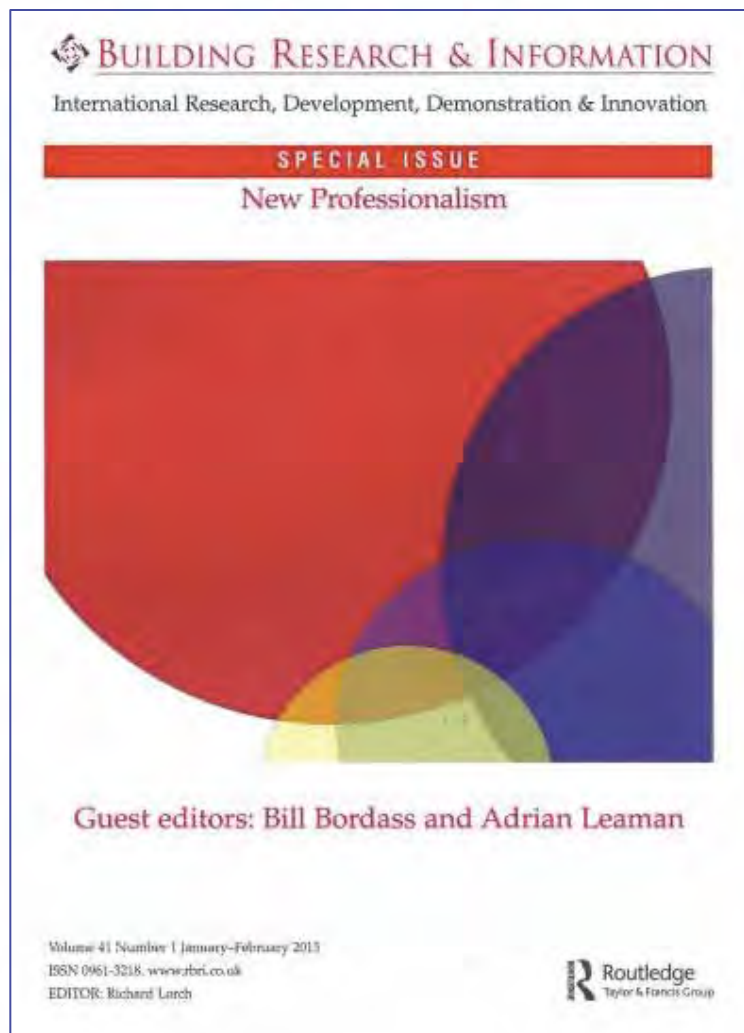
2000-09 Changing procurement with Soft Landings – *Some effect, now incorporated in RIBA's Plan for Use (2021).*

2009-15 New Professionalism (with the Edge) – *Towards a more collaborative and outcome-driven culture.*

2012-18 Design for Performance (Now NABERS UK) – *Towards buildings that meet their professed design intent.*

New Professionalism: getting started

Principles anyone can adopt tomorrow



PROVISIONAL LIST DEVELOPED WITH THE EDGE ***ETHICS AND CONDUCT:***

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.

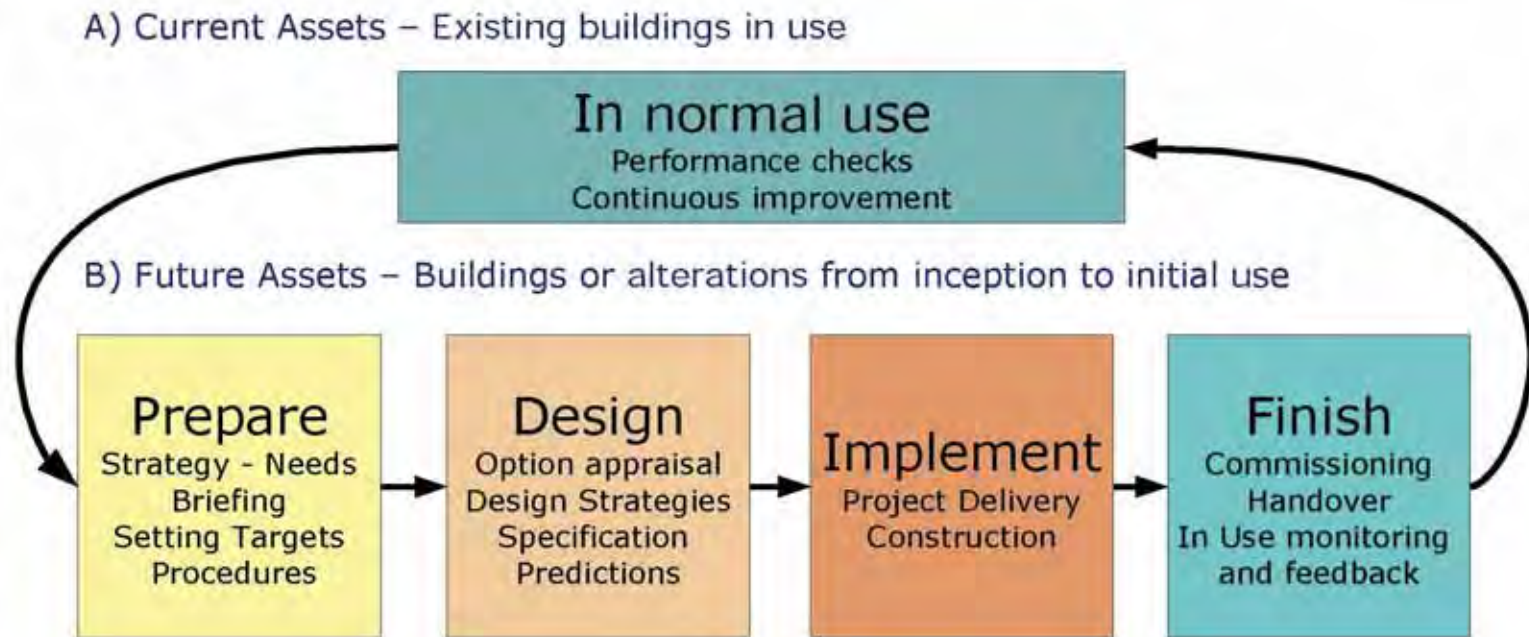
ENGAGEMENT WITH OUTCOMES:

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.

POE, from post-mortem to life support: *Making follow-through, POE and Feedback routine*



You can use POE at any stage in the life cycle of a building or project

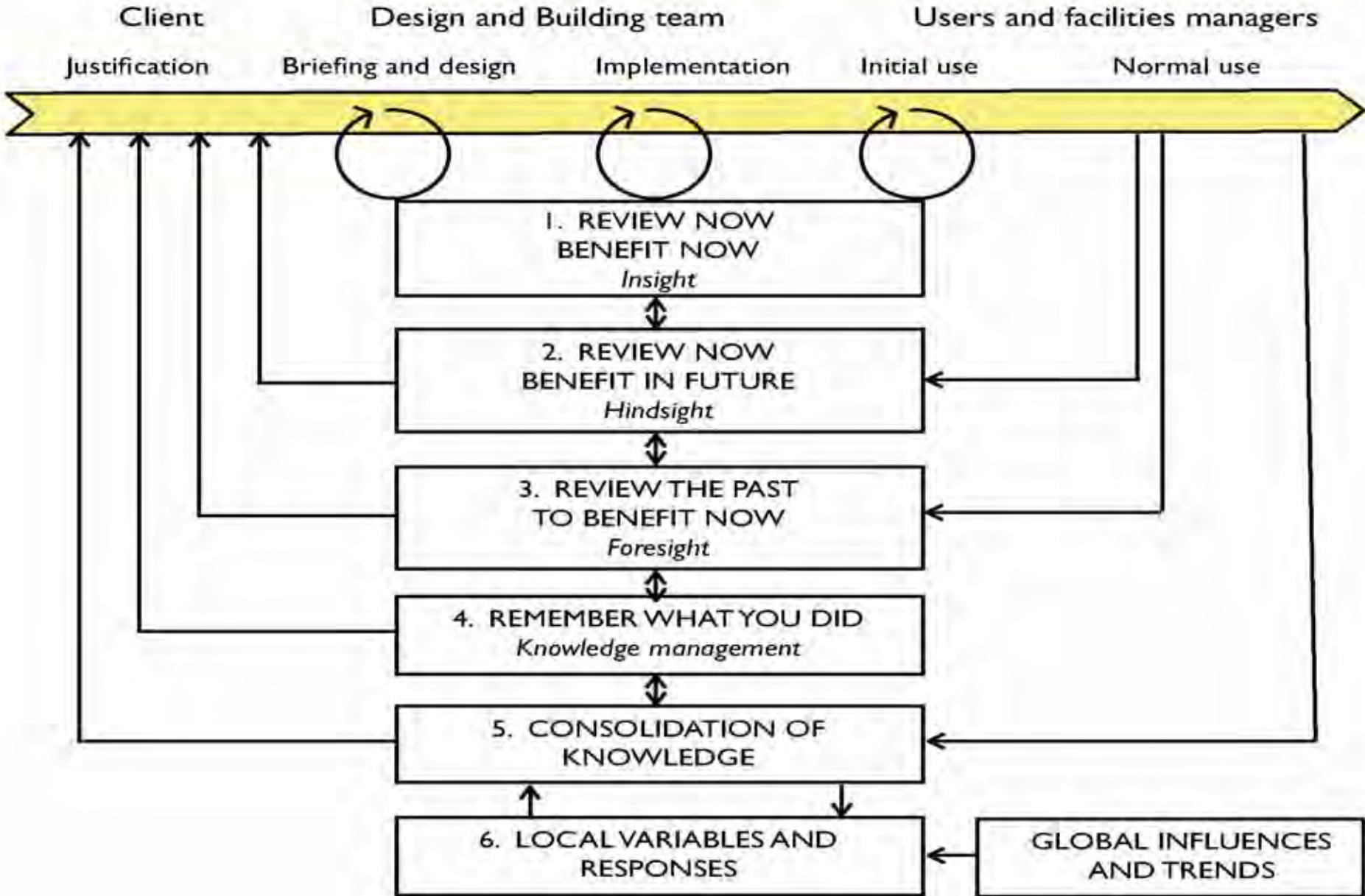
HINDSIGHT: After you've completed a project (*learning and fine tuning*)

FORESIGHT: Before you do something new (*existing situation + analogues*)

INSIGHT: During a project (*reality checking, managing expectations*).

*We need to bring all this together, and reinforce the **Finish** stage*

Linking all the feedback loops



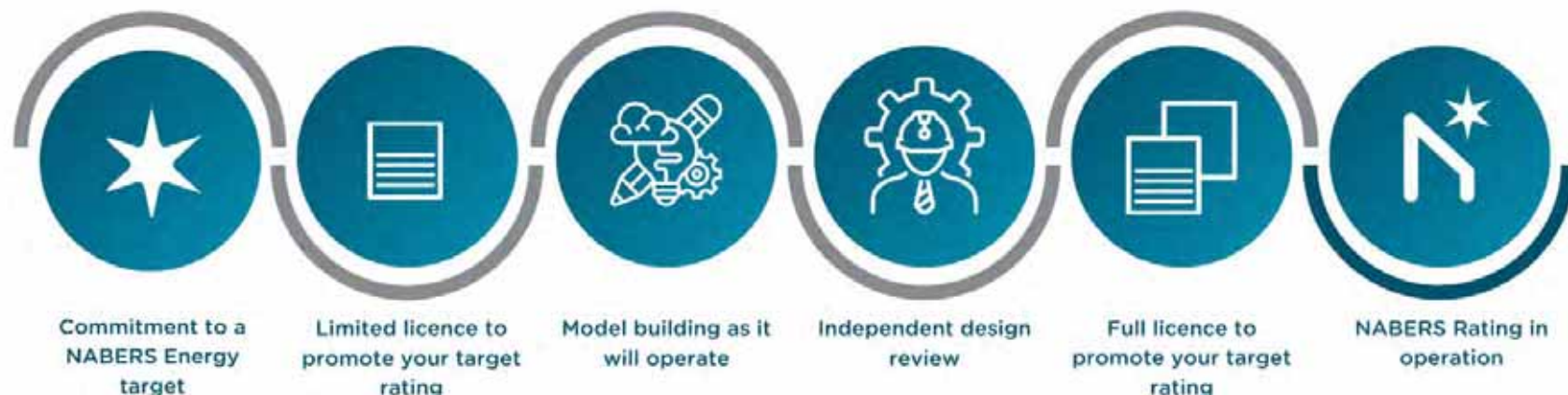
THE FUTURE: Stop diverging from good intentions, converge to better outcomes

THE INGREDIENTS

- New professionalism, so *designers engage properly with the consequences of their actions.*
 - Outcome-driven procurement processes, assisted by *Plan for Use* and *Soft Landings*.
 - Cradle to grave benchmarking, *so the numbers get better understood.*
 - Follow-through, feedback and data sharing: *own your problems, don't hide them.*
-

Design for Performance CAs - *Commitment Agreements*, as developed by NABERS in Australia

- Developer signs up to provide guaranteed in-use energy performance for the “Base Building” – *the landlord’s areas and services*.
- All new members of the design, construction and management team sign up to a *Commitment Agreement*.
- Modelling *includes assessment of controls and “off-axis” scenarios*.
- Design and Model reviewed by *independent assessors*.
- Metering systems allow *outcomes* to be reviewed.
- The completed building is *fine-tuned* as necessary.
- Results are *benchmarked and reported*.



ARB – Architects Registration Board

Sustainability Competence Requirements 2021

A. ETHICS AND PROFESSIONALISM:

SA1. Climate science; SA2. Resilience, mitigation, adaptation;

SA3. Sustainable regenerative solutions and ethical sourcing;

SA4. Maintain knowledge of key legislation; **SA5. Share building performance data.**

B. SUSTAINABLE DESIGN PRINCIPLES:

SB1. Relationships between buildings, settlements, communities, climate. Design LZC;

SB2. Social sustainability and value; SB3. Biodiversity, access to green infrastructure;

SB4. • Retrofit and Fabric First • Passive Design • Daylight • Renewables • LCA and LCC

• WLC and Low embodied carbon design • Water cycle, demand, supply, and reduction.

C. ENVIRONMENTAL AND BUILDING PHYSICS.

SC1. Temperature, humidity, sound & light; SC2. Comfort, IAQ & energy; SC3. Calculate

operational and embodied energy and carbon **SC4. Do POE/BPE and understand gaps.**

D. CONSTRUCTION TECHNOLOGY.

SD1. Embodied carbon: resource & **performance** implications; SD2. Airtightness, thermal integrity; **SD3. Performance of energy systems**; SD4. Circular economy principles.

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SOFT LANDINGS APPENDIX

Slides if wanted on the day

Achieving projects that work better in use: *Soft Landings* antecedent to *RIBA Plan for Use*

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.

Soft Landings 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.*

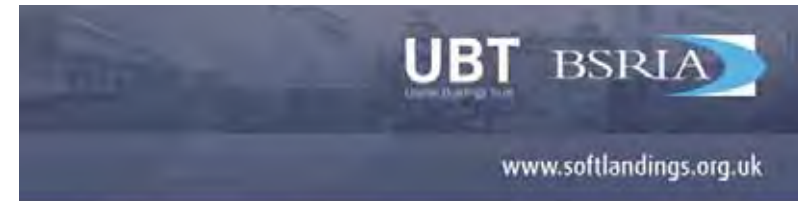
It is primarily about a change in attitude.

It needs champions to take it forward - The new professionals: YOU!

Soft Landings: *converging onto good outcomes*

The Five Stages in the Framework (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.



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



Soft Landings: providing the “golden thread”

Key findings from its application 2009-2022

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**.

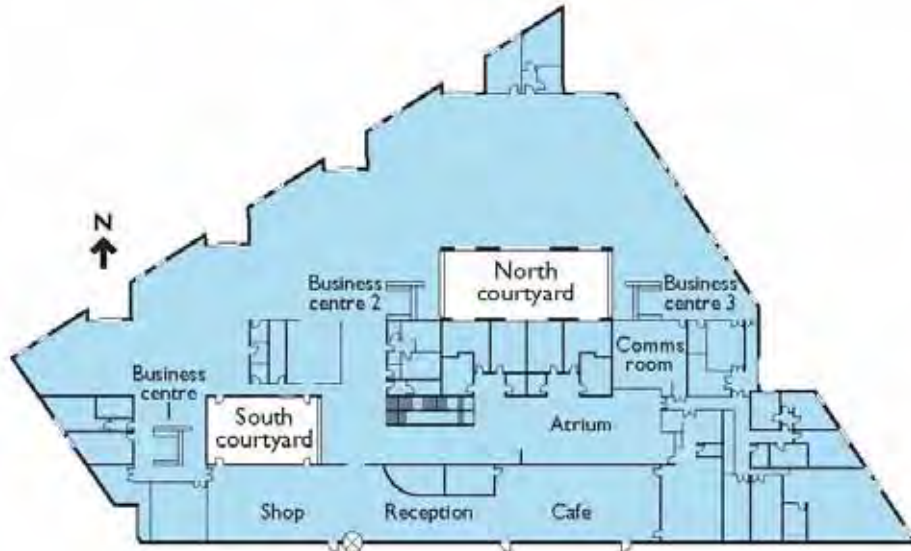
Needs **funding outside the building contract**.



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



Pioneer 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). Completed 2006.

Design intent to reality: *if expectations are not constantly reviewed, credibility gaps will open up*

DESIGN ESTIMATES NOT SET CLEARLY OR REALISTICALLY:

- Little or no transparency between design estimates and in-use outcomes.
- Not everything is counted: *only normal “regulated” services in typical spaces.*
- Estimates are too optimistic, e.g. *no night loads, perfect control.*
- A policy concentration on carbon has drawn a veil over underlying energy performance.

SLIPPAGE DURING DESIGN AND CONSTRUCTION:

- Design does not get into areas of critical detail, or understand the users.
- Changes to design and client requirements, *vandal “Value Engineering”.*
- Changes during construction and commissioning: *negotiations, substitutions, build quality, systems, deployment of controls, delays.*

SLIPPAGE AFTER COMPLETION:

- No follow-through, initial aftercare, fine-tuning, monitoring, or feedback.
- Fitout changes and clashes.
- Spilt responsibilities: *developer/owner, landlord/manager/tenant, outsourcing. Principal/agent problems. Procurement of controls and FM services.*
- Unintended consequences and revenge effects, *technical and management shortcomings, controls problems, poor user interfaces, default to ON.*

DESIGN INTENT NEEDS MANAGING THROUGH THE PROCESS AND ON INTO USE

Managing expectations with Soft Landings: *Sustainability matrix approach used by the Heelis team*

Sustainability Matrix: Offices

Feilden Clegg Bradley Architects LLP ©

Operational Energy Consumption and CO² Emissions

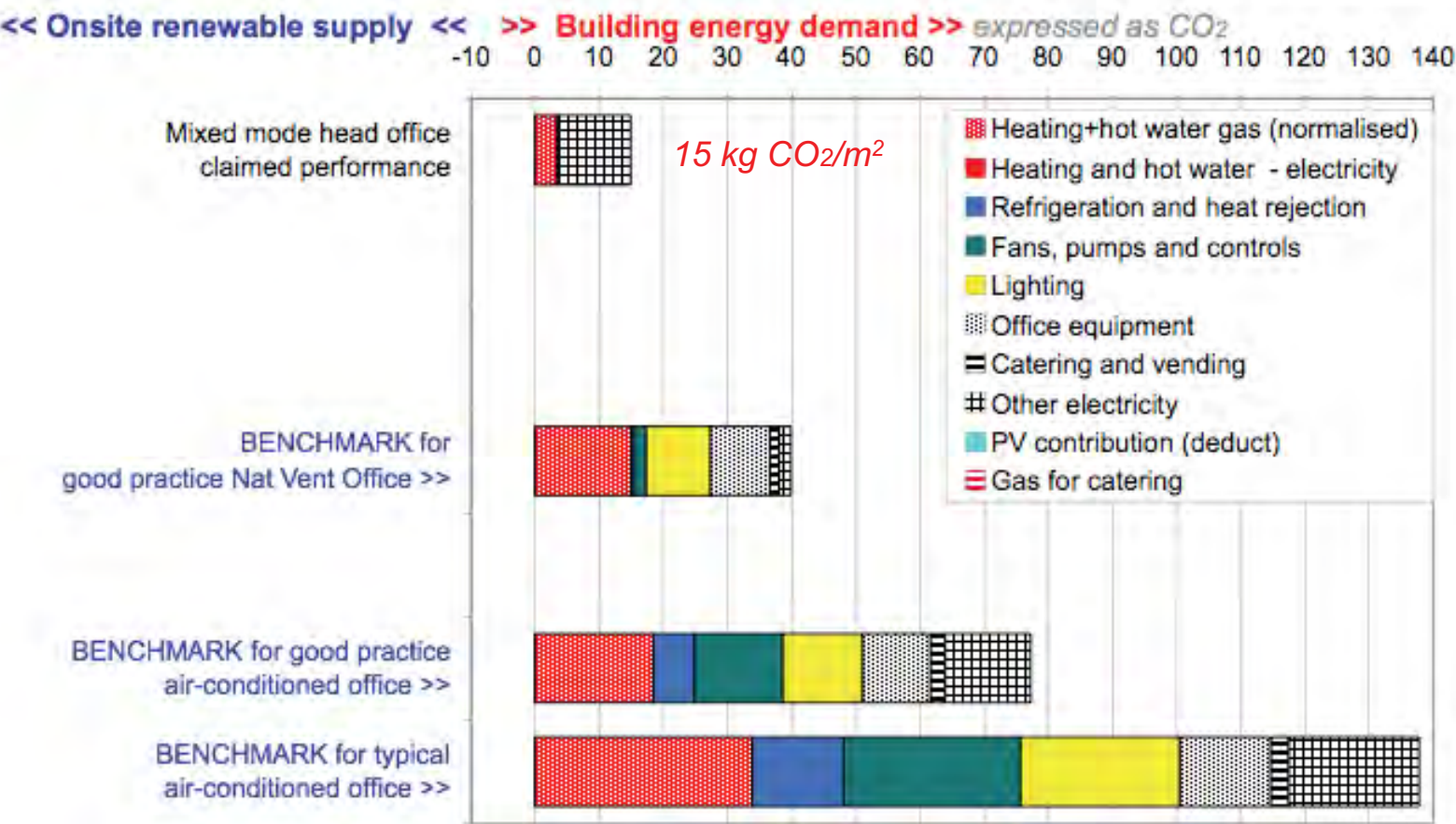
	1. GOOD PRACTICE	2. BEST PRACTICE	3. INNOVATIVE	4. PIONEERING	NOTES
1. CO ² Emission Target	40kgCO ₂ /m ² /yr	30kgCO ₂ /m ² /yr	15kgCO ₂ /m ² /yr	"Carbon neutral" 0kgCO ₂ /m	Industry standard EEO targets
2. Heating Load Target	79kWhr/m ² /yr	47kWhr/m ² /yr	30kWhr/m ² /yr	20kWhr/m ² /yr	Industry standard EEO targets
3. Electrical Load Target	54kWhr/m ² /yr	43kWhr/m ² /yr	35kWhr/m ² /yr	25kWhr/m ² /yr	Industry standard EEO targets
4. U Values:					
Wall	0.35	0.25	0.2	0.1	good practice=current
Average Window	2.2	1.8	1.4	0.9	building regulations
Roof	0.2	0.18	0.15	0.1	pioneering=Bedzed values
Ground Floor	0.25	0.22	0.2	0.1	
5. Airtightness	<10m ³ /hr/m ²	<8m ³ /hr/m ²	<5m ³ /hr/m ²	<3m ³ /hr/m ²	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 solar water heating, up to 65% for PV installation.
8. Daylighting	"Reasonable" to BS8206 part 2. A 2% daylight factor.	80% office space daylight to meet criteria of BS8206: part 2	100% of office space daylight 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

Managing expectations: an example

1: the design claim, as published

Annual CO₂ emissions of energy use in a low-energy office building

kgCO₂/m² Treated Internal Floor Area at UK ECON 19 CO₂ factors of 0.19 for gas and 0.46 for electricity

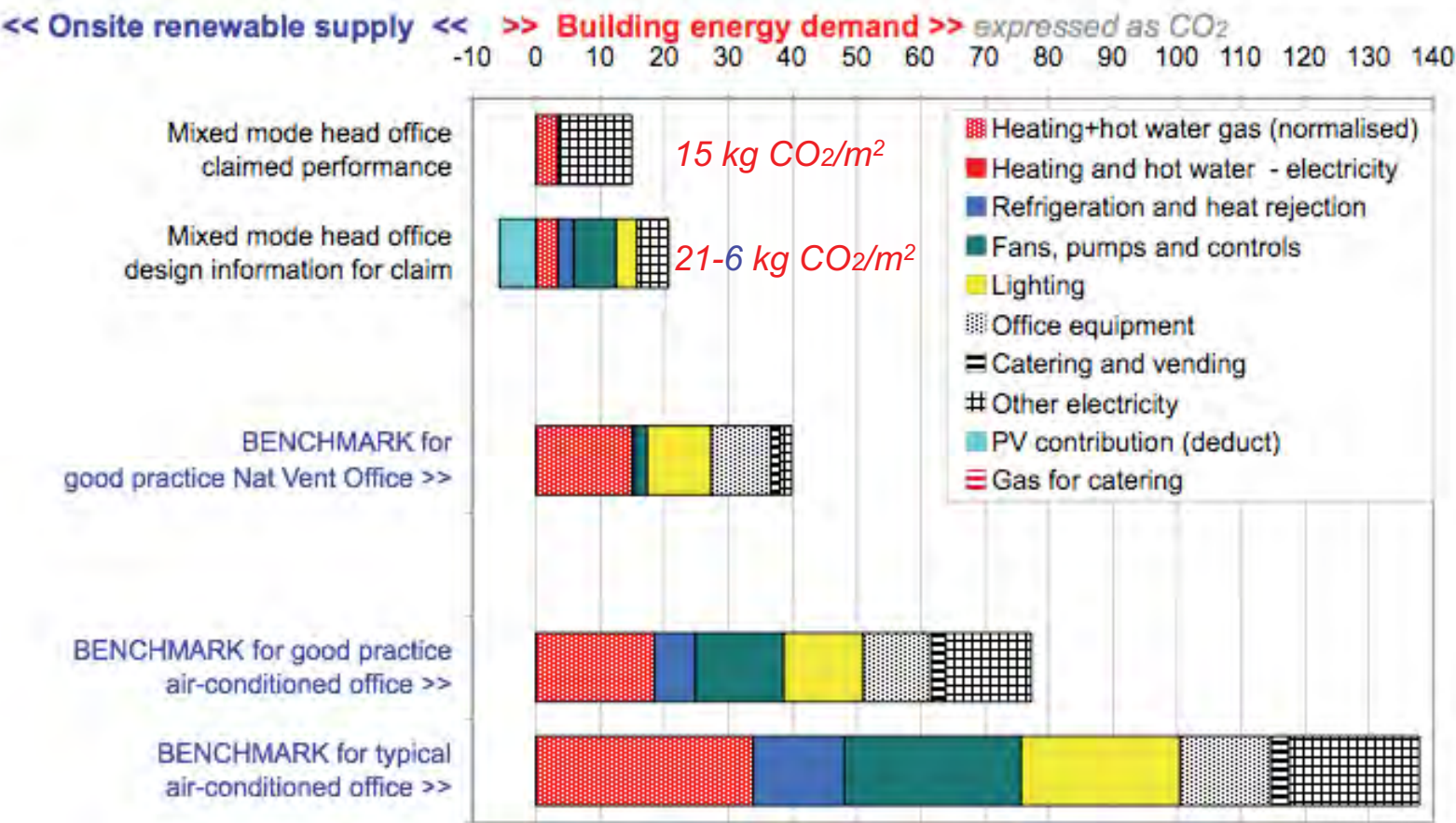


Managing expectations: an example

2: the basis for the design claim

Annual CO₂ emissions of energy use in a low-energy office building

kgCO₂/m² Treated Internal Floor Area at UK ECON 19 CO₂ factors of 0.19 for gas and 0.46 for electricity

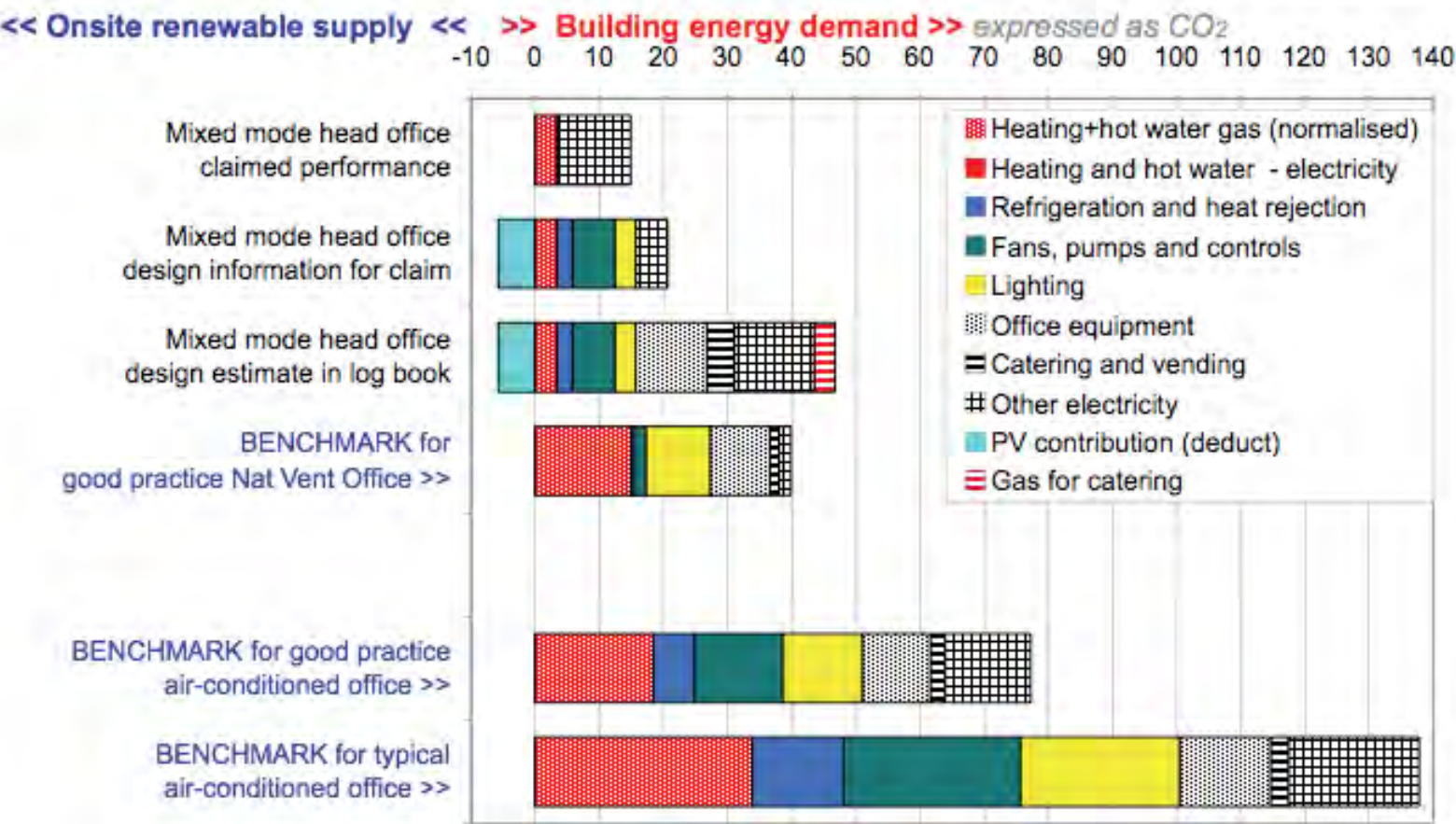


Managing expectations: an example

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

Annual CO₂ emissions of energy use in a low-energy office building

kgCO₂/m² Treated Internal Floor Area at UK ECON 19 CO₂ factors of 0.19 for gas and 0.46 for electricity

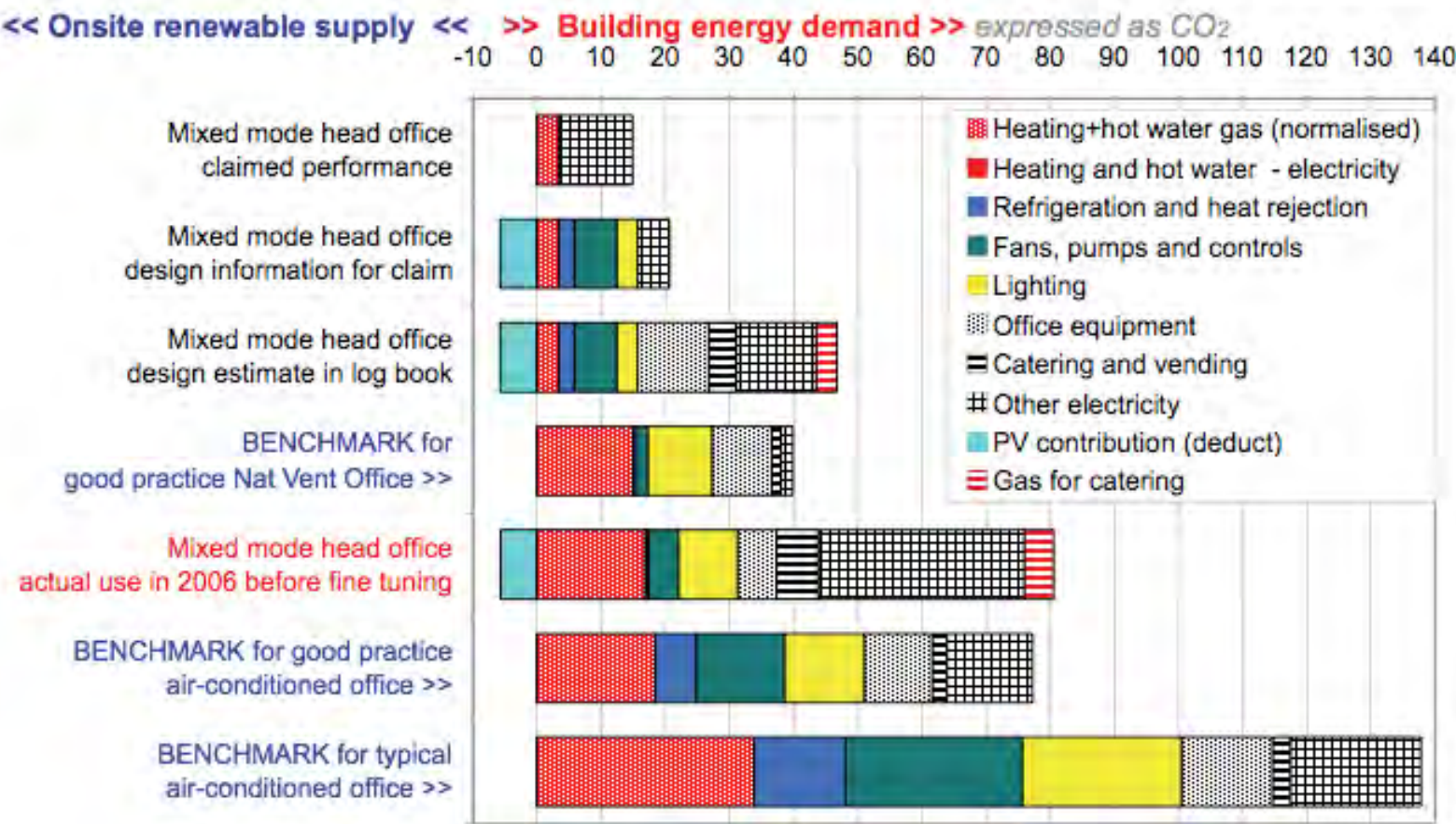


Managing expectations: an example

4: actual performance in use, before fine tuning

Annual CO₂ emissions of energy use in a low-energy office building

kgCO₂/m² Treated Internal Floor Area at UK ECON 19 CO₂ factors of 0.19 for gas and 0.46 for electricity



Managing expectations: an example

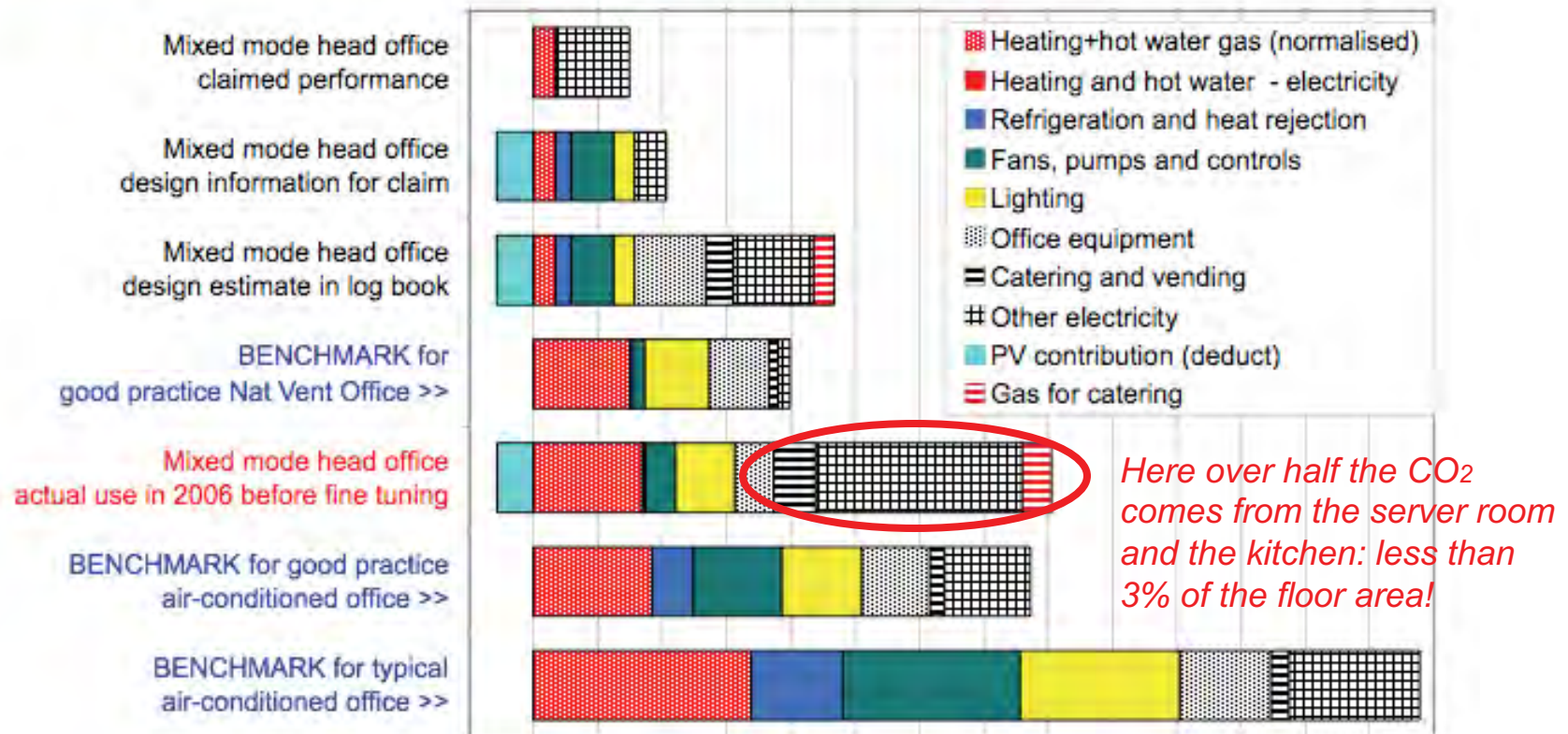
5: it's not all bad news, and the feedback is vital

Annual CO₂ emissions of energy use in a low-energy office building

kgCO₂/m² Treated Internal Floor Area at UK ECON 19 CO₂ factors of 0.19 for gas and 0.46 for electricity

<< Onsite renewable supply << >> Building energy demand >> expressed as CO₂

-10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140



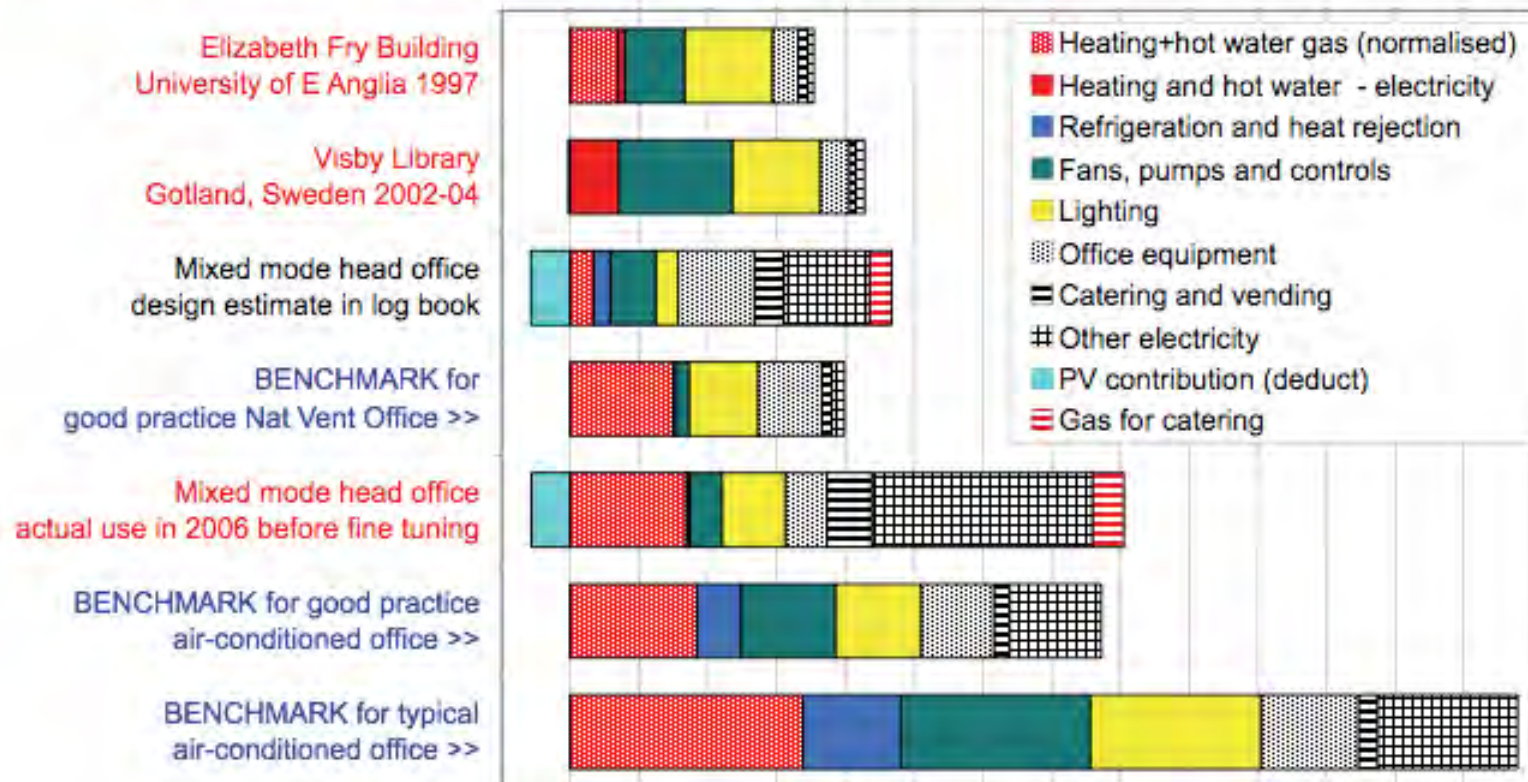
We must learn from the fine structure: 6: how it relates to two other low-energy buildings

Annual CO₂ emissions of energy use in a low-energy office building

kgCO₂/m² Treated Internal Floor Area at UK ECON 19 CO₂ factors of 0.19 for gas and 0.46 for electricity

<< Onsite renewable supply << >> Building energy demand >> expressed as CO₂

-10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140



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 run 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 Soft Landings makes it much easier for the *golden thread* to be taken through into STAGE 4: initial aftercare & fine tuning.

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

Do not remove from: Plant 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: *Plant room*

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

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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 Toolkit³². 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.

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,** *and not hide 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 SL team members do some of their own work in the building and get first hand experience of its facilities.

FEEDBACK: Contractors find it difficult to engage properly.

Aftercare priorities are different from just dealing with snags and defects.

Without aftercare, designers may never learn from unintended consequences



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

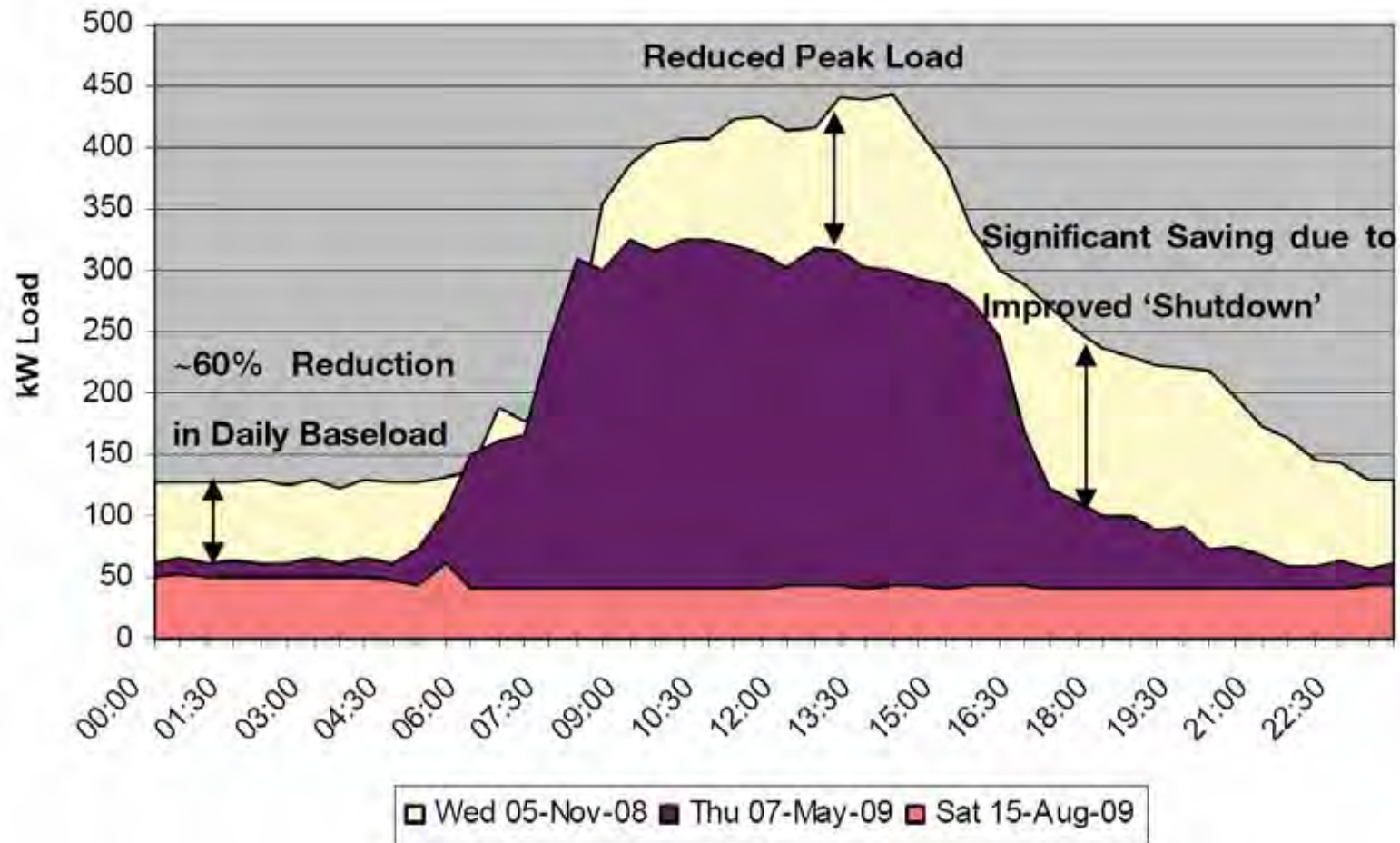
Research funded by
Technology Strategy Board



Downloadable free from www.usablebuildings.co.uk.

Follow-through aftercare often pays for itself

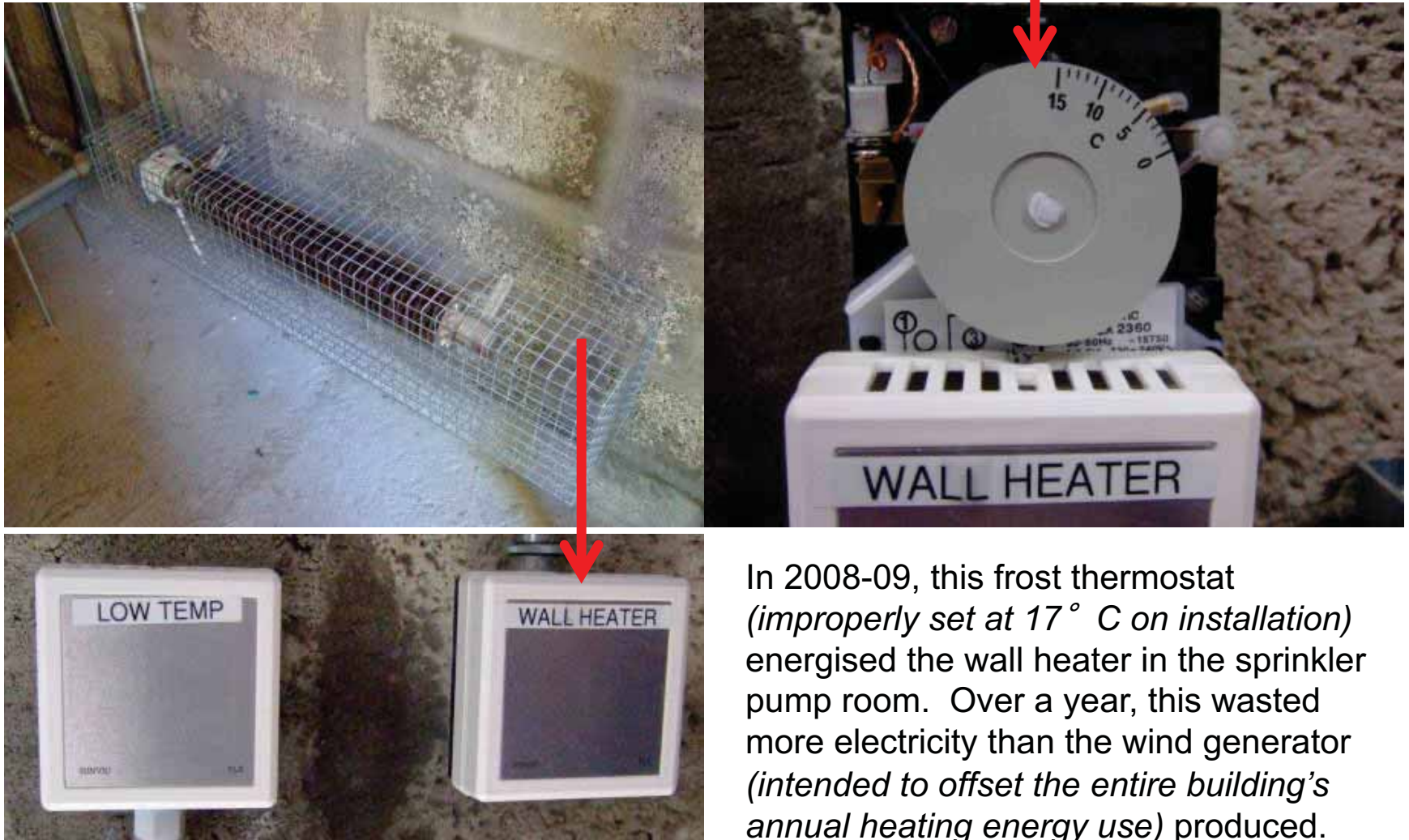
Intervention in a new secondary school



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

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*

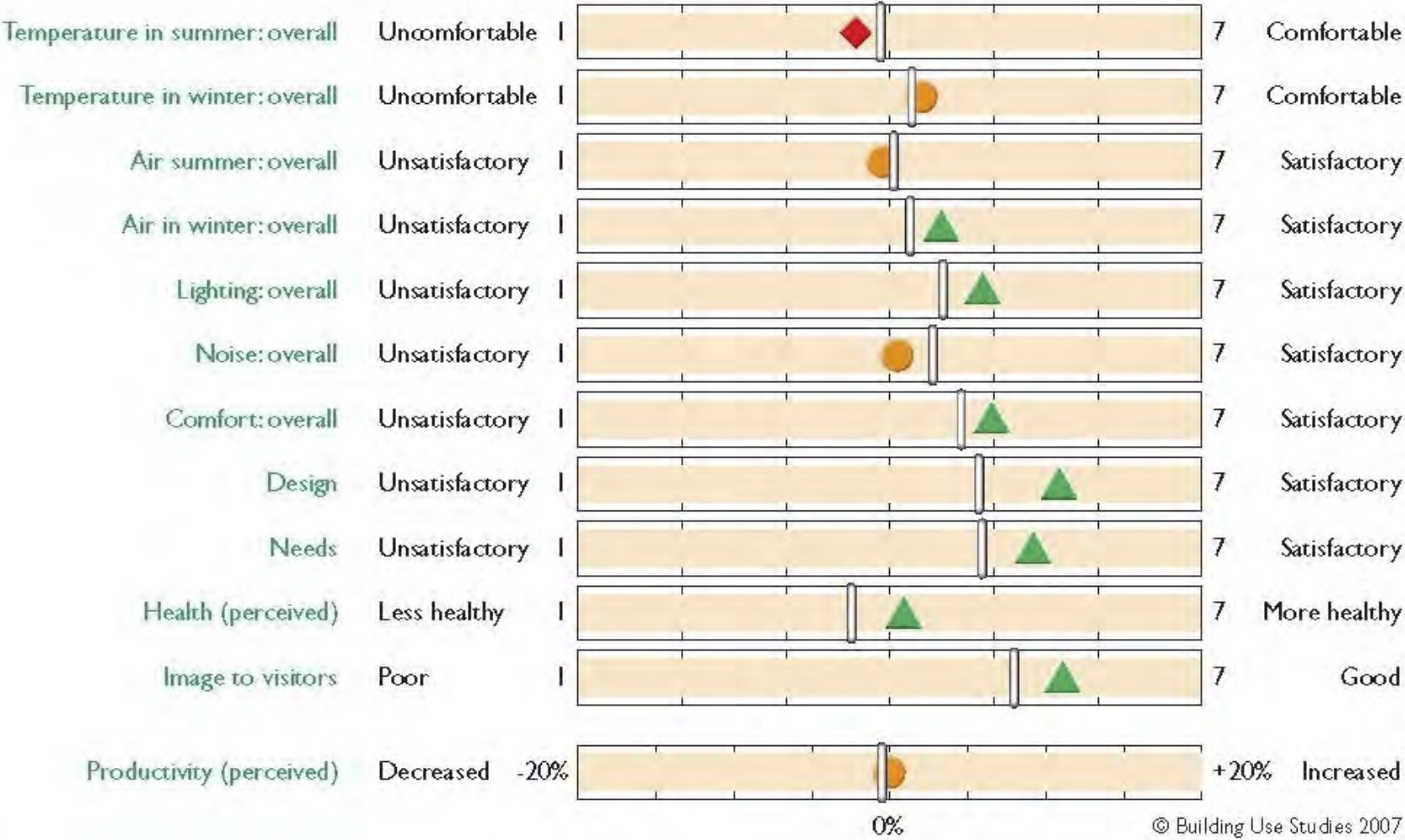
- **Extended aftercare period**, typically two or three years.
- **Occupiers must take ownership** and do most of the monitoring themselves. *They may need motivating.*
- **Independent post-occupancy evaluation (POE) can be included**, e.g. for occupant surveys, energy analysis & structured discussions. *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.

BUS questionnaire survey at Heelis



The building was subsequently tuned and satisfaction improved, then deteriorated after savings on FM, which were later restored.

SPREADING THE WORD:

Heelis designers report back in public



➡ Ba-graph-1.jpg

➡ 2007-Study.jpg

Images



Building Analysis

So, how are you doing?

November 2007

Heelis, the National Trust's HQ in Swindon, is two years old. Senior engineer at Max Fordham Guy Nevill, who helped design it, takes a look at how it's been performing

By Guy Nevill

When the National Trust decided it needed a new headquarters to bring together staff from four different sites around the country, sustainability was a big part of the brief. The new building, Heelis, has now been in use for two years, so it is a good time to review how it is performing.

The Heelis complex, which covers about 7000m² and accommodates 470 people, was designed by architect Feilden Clegg Bradley with Max Fordham as M&E consultant. The site in Swindon once formed part of Isambard Kingdom Brunel's Great Western Railway Works. The total cost was £16.73 million.

GAINING CLIENT CONFIDENCE:

Heelis FM comments in 2007

Heelis building facilities manager **Liz Adams** educated the staff on what to expect from their new home.

“We told users not to expect stable conditions. We call it a ‘layers building’ as it won’t suddenly react to changes in weather conditions, but take a while to heat up and cool down. So we remind people in September to bring in a cardigan.

“In the Autumn, when the outside temperature drops overnight, the building won’t necessarily react immediately. So out come the cardies.

“Comfort has been better in year two as the building has settled into a pattern. People are far more used to how the building’s systems work. The biggest problem is managing expectations about what the building will do in summer.

“We commissioned Max Fordham” to carry out monitoring and fine tuning in the first two years. We have a good relationship with the design team – it’s been fantastic.”

Feeding forward in phased projects:

Window control improvements at Cambridge Maths building

PHASE 1

>>>

- Difficult to understand
- Some poorly located
- Remote control problems



PHASE 2

- Improved, custom design
- Better located
- Not yet perfect



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



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!*
-

Thank you **Final Questions?**



TIPPING POINT