Low-carbon buildings: All dressed up and nowhere to go?

**Bill Bordass and Adrian Leaman** 

www.usablebuildings.co.uk

## Structure of the talk

- 1. Context
- 2. Background
- 1. Where are we now?
- 2. Where next?

## CONTEXT

# Vision 2000: *our crystal ball in the 90s:* **Paradox, Transition and Consequences**

REFERENCE: A Learnan (ed) Buildings in the Age of Paradox, Institute of Advanced Architectural Studies, York, UK (1996).

# Vision 2000: *our crystal ball in the 90s:* **Paradox, Transition and Consequences**

- Undertaken for a UK utility in 1993-94.
- Examined social, economic and technical trends affecting building electricity use in 20 years' time.
- Suggested that we were in an Age of Paradox, where the economy and our buildings were not taking proper account of the world in which they would find themselves.

4

# Vision 2000: *our crystal ball in the 90s:* **Paradox, Transition and Consequences**

- Undertaken for a UK utility in 1993-94.
- Examined social, economic and technical trends affecting building electricity use in 20 years' time.
- Suggested that we were in an Age of Paradox, where the economy and our buildings were not taking proper account of the world in which they would find themselves.
- Predicted a *Period of Transition*, which arrived more slowly than expected, but we now seem to be in; towards
- an *Age of Consequences,* in which decisions would be much more strongly influenced by downstream effects.
- Convergence between business efficiency and sustainability, as are both are ultimately about waste avoidance.

## Paradox and transition: adapting to changing constraints over time



SOURCE: A Leaman, Chapter 1 of J Worthington (ed) Reinventing the Workplace, 5, Butterworth (1997, 2004). Figure 1.

## Paradox and transition: adapting to changing constraints over time



SOURCE: A Leaman, Chapter 1 of J Worthington (ed) Reinventing the Workplace, 5, Butterworth (1997, 2004). Figure 1.

REFERENCE: W Bordass, Paper to National Power - ESTA seminar series (1996).

- Simple, robust, adaptable buildings to suit many purposes, with good passive design and mixed mode services.
- Complex, more highly serviced buildings would also be required, but should be kept to a necessary minimum. Scope for major improvements in their efficiency.

- Simple, robust, adaptable buildings to suit many purposes, with good passive design and mixed mode services.
- Complex, more highly serviced buildings would also be required, but should be kept to a necessary minimum. Scope for major improvements in their efficiency.
- Better design for usability, manageability and responsiveness; and seek to minimise downside risks.
- FMs much better informed and more involved in design.
- More understanding of performance in use by designers, builders and government, to focus efforts better.

- Simple, robust, adaptable buildings to suit many purposes, with good passive design and mixed mode services.
- Complex, more highly serviced buildings would also be required, but should be kept to a necessary minimum. Scope for major improvements in their efficiency.
- Better design for usability, manageability and responsiveness; and seek to minimise downside risks.
- FMs much better informed and more involved in design.
- More understanding of performance in use by designers, builders and government, to focus efforts better.
- Major opportunities for improving controls.
- Large reductions in energy demands and other resource and environmental impacts. Effective waste avoidance.

7

- Collapse of research by fuel industries.
- Denial of non-domestic funds to Energy Saving Trust by the gas regulator, applying Chicago School principles.

- Collapse of research by fuel industries.
- Denial of non-domestic funds to Energy Saving Trust by the gas regulator, applying Chicago School principles.
- Privatisation of the Building Research Establishment.
- Dismembering of the Department of the Environment.
- Government policy on *Rethinking Construction* taking little account of the importance of building performance.

- Collapse of research by fuel industries.
- Denial of non-domestic funds to Energy Saving Trust by the gas regulator, applying Chicago School principles.
- Privatisation of the Building Research Establishment.
- Dismembering of the Department of the Environment.
- Government policy on *Rethinking Construction* taking little account of the importance of building performance.
- Ending of Partners in Innovation research funding.
- Little interest in the technical infrastructure by the Carbon Trust, which replaced the EST vacuum in non-domestic.

- Collapse of research by fuel industries.
- Denial of non-domestic funds to Energy Saving Trust by the gas regulator, applying Chicago School principles.
- Privatisation of the Building Research Establishment.
- Dismembering of the Department of the Environment.
- Government policy on *Rethinking Construction* taking little account of the importance of building performance.
- Ending of Partners in Innovation research funding.
- Little interest in the technical infrastructure by the Carbon Trust, which replaced the EST vacuum in non-domestic.
- Outsourcing of technical skills by government, leading to less well-informed and coordinated policymaking.

- Collapse of research by fuel industries.
- Denial of non-domestic funds to Energy Saving Trust by the gas regulator, applying Chicago School principles.
- Privatisation of the Building Research Establishment.
- Dismembering of the Department of the Environment.
- Government policy on *Rethinking Construction* taking little account of the importance of building performance.
- Ending of Partners in Innovation research funding.
- Little interest in the technical infrastructure by the Carbon Trust, which replaced the EST vacuum in non-domestic.
- Outsourcing of technical skills by government, leading to less well-informed and coordinated policymaking.
- Sustainability turned into bureaucratic tick-boxes.



# For most construction professionals ... building performance in use is another country

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

*"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* 

## "Clients are the crash-test dummies of the design world"... SAM CASSELS, Architecture+Design Scotland



# 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).

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

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



SOURCE: see discussion in S Curwell et al, Green Building Challenge in the UK, Building Research+Information 27(4/5) 286 (1999).

## Credibility gaps: Occupant satisfaction Occupant survey, award-winning school, UK, 2009



SOURCE: Unpublished occupant survey of an award-winning school 2009. Courtesy of Building Use Studies Ltd.

## Credibility gaps: Occupant satisfaction Occupant survey, award-winning school, UK, 2009



#### What impresses the judges may not impress the users!

SOURCE: Unpublished occupant survey of an award-winning school 2009. Courtesy of Building Use Studies Ltd.

Not enough feedback A systemic problem for the industry

"Designers seldom get feedback and only notice problems when asked to investigate a failure." A BLYTH, CRISP Commission 00/02

Post-occupancy evaluation is not a very good name for the activity "It's what happens after we're gone" ... FACILITIES MANAGER Being wise after the event: remote, late, academic, threatening "We look silly and our PI insurers don't like it" ... DESIGNER Some see it as expensive, indigestible, and of questionable value *Newcomers can ignore established techniques and try to do too much.* **Who owns feedback?** Everybody benefits but nobody wants to pay "Designers should pay, they and their next clients benefit" ... CLIENT What we hear we think we know already *"It's deja vu all over again"* ... YOGI BERRA This cannot go on!

15



#### 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.



#### 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.



#### 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 complexity, once mostly confined to deep air conditioned buildings, was migrating into green buildings.



#### 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 complexity, once mostly confined to deep air conditioned buildings, was 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





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?



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

## 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
- Specialist support

(worked together before on the site). (e.g. on insulation and airtightness).
### 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
- Enough time and money
- An appropriate specification
- An interested contractor

(but to a normal budget).

(and not too clever).

(mostly).

(with a traditional contract).

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

## 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
- An interested contractor *(with a traditional contract).*
- Well-built *(attention to detail, but still room for improvement).*

(and not too clever).

- 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).

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

## 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
- Specialist support (e.g. on insulation and airtightness).
- A good, robust design, efficiently serviced
- Enough time and money
- An appropriate specification
- An interested contractor
- 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).

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

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

(worked together before on the site).

- (but to a normal budget).
  - (and not too clever).

(mostly).

(with a traditional contract).

## Because government was tuning out, we set up a charity to help close the feedback loop



... from the Usable Buildings Trust Password Publications Events One-liners Probe Incubator Portfolio Quick intro Donations Latest Books Leader Links Contact us



Usable Buildings is a free resource for practitioners, managers, building owners, developers, students and anyone else who wants to make buildings more suitable for the people who use them, less damaging to the natural environment and a better long-term investment. Usable Buildings is run by the Usable Buildings Trust.

#### The Usable Buildings Trust (UBT) is

an independent charity, registered in the United Kingdom. UBT promotes better buildings through the more effective use of feedback on how they actually work. It spreads the results through its website, user groups, collaborative working and input to postgraduate courses. UBT is also a home for approaches which are not quite ready for widespread application and an incubator for their development. Aims Background

Donations: We welcome donations. Please use the Donations and Gift Aid form on the Sponsorship section of our <u>Brochure</u>. Thank you.

Who we are and what we do: <u>Trustees' Report</u> summarises activities and plans. <u>What Do We</u> <u>Do?</u>

Website: Our website is text-based and designed primarily to deliver pdf files. Website set-up. Latest posted : The Building Services Brief of the Future | 89 Culford Road | Surpassing Expectations | Human Factors: the bottom line | Soft Landings | The Great Escape |

Basics: POE and Feedback: Getting Started | Probe 9 | A Guide to Feedback and Post-Occupancy Evaluation |

Full Latest list Live (real-time) monitoring [Please send in more examples!]

Latest one liners: "Who are you going to believe? Me, or your own eyes?" Groucho Marx | "If the choice is between cooking alive and wasting money unnecessarily I would rather waste some money, because long before we cook we are going to kill each other if we don't deal with climate change." George Soros | "The paradox of public transport is the better it does its job the less 'efficient' it may be." Tony Judt | "I got rid of the Ferrari: it was bad for my hamstrings." Ryan Giggs More

Hosting : We host the Feedback Portfolio: Techniques and the Probe archive.

Support : We support Soft Landings.

Searching : Most of the material available here is in pdf files, about two-thirds of which are password protected. If you wish to search within files that are not password protected use the Google search syntax: "filetype:pdf site:www.usablebuildings.co.uk search term". Example: for articles on health type in the Google search area: "filetype:pdf site:www.usablebuildings.co.uk health" <u>Show example</u>

Thursday, March 18

### www.usablebuildings.co.uk

## WHERE ARE WE NOW?

For more information, including the Probe studies from CIBSE Journal, and Soft Landings, go to www.usablebuildings.co.uk

- 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.

- 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?

- 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.*

For more information, including the Probe studies from CIBSE Journal, and Soft Landings, go to www.usablebuildings.co.uk

- 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

For more information, including the Probe studies from CIBSE Journal, and Soft Landings, go to www.usablebuildings.co.uk

Why are these lights on in a new university building?

# 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



		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		

		Technological complexity				
		More	Less			
Building management input	More	Type AType DHigh PerformanceRare, not replicable				
	Less	Risky with performance penalties Type C	Effective, but often small-scale Type B			

		Technological complexity			
		More	Less		
Building management	More	Type A High Performance	Less Type D Rare, not replicable? Simple Smart Effective, but often small-scale Type B		
input	Less	Risky with performance penalties	Simple Smart Effective, but often small-scale		
		Туре С	Туре В		

		Technological complexity			
		More	Less		
Building management input	More	Type A High Performance	Type D Rare, not replicable?		
		Risky with	Simple Smart		
	Less	penalties	Sense and Science		
		Туре С	Туре В		

		Technological complexity				
		More	Less			
Building management input	More	Type A High Porformanco	Will ordinary people be able to look			
		Performance	Will ordinary people be able to look after them? Simple Smart Sense and Science			
		Less Risky with performance penalties	Simple Smart			
	Less		Sense and Science			
		Туре С	Туре В			

		Technological complexity				
		More	Less			
Building management input	More	Type AWill ordinHigh Performancepeopleable to log after the				
	Less	Risky with performance penalties Type C	Simple Smart Sense and Science Type B			

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

		Techn	Technological complexity			
		Ma	ore	Less		
Building management input	More	Typ Hi Perfor	e A igh mance	Will ordinary people be able to look after them?		
Secure Type A Seek more Type B (and possibly Type D) Avoid Type C - unmanageable complication.				Simple Smart		
		Big d espe	anger, cially ublic	Sense and Science		
		buildings		Туре В		

## Probe conclusions: Less can DO more

Architect Rab Bennetts and Usable Buildings consultant Bill Bordass put forward a modest proposal for sustainable design



# **'Keep it simple and do it well'**

SOURCE: R Bennetts and W Bordass, Building Magazine Sustainability Supplement 8-11 (28 Sep 2007)

#### Annual CO<sub>2</sub> emissions from low-energy university and office buildings

kg CO2/m<sup>2</sup> Treated Floor Area at UK CO2 factors of 0.19 for gas and 0.55 for electricity



#### Annual CO<sub>2</sub> emissions from low-energy university and office buildings

kg CO2/m2 Treated Floor Area at UK CO2 factors of 0.19 for gas and 0.55 for electricity

-10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160



Typical in-use Benchmark for a standard air conditioned (AC) office ^^^

#### Annual CO<sub>2</sub> emissions from low-energy university and office buildings

kg CO2/m2 Treated Floor Area at UK CO2 factors of 0.19 for gas and 0.55 for electricity

-10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160



Typical in-use Benchmark for a standard air conditioned (AC) office ^^^

#### Annual CO<sub>2</sub> emissions from low-energy university and office buildings

kg CO2/m2 Treated Floor Area at UK CO2 factors of 0.19 for gas and 0.55 for electricity

-10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160



Typical in-use Benchmark for a standard air conditioned (AC) office ^^^



Typical in-use Benchmark for a standard air conditioned (AC) office ^^^

SOURCE: Visby and Gloucester data from: Eubart - Intelligent Buildings, Final technical brochure (2004), figure 5.

28

Annual CO<sub>2</sub> emissions from low-energy schoool and university buildings



Annual CO<sub>2</sub> emissions from low-energy schoool and university buildings



# <sup>30</sup>Is requiring these an expensive distraction when we can't yet get the basics right reliably?



#### Annual CO<sub>2</sub> emissions from low-energy schoool and university buildings



Annual CO<sub>2</sub> emissions from low-energy schoool and university buildings

-10	0	10	20	30	AD AD	50 FL or	60 70 80 90 100 perational target 27 kg/m
Riedberg Passivhaus School (if UK mains gas+electricity, 2008)			Riedberg	estimate	d breakdo	wn using	g Jan-Sept 2009 submeter data
PASSIVHAUS GUIDELINE MAXIMUM (if UK mains gas+electricity)	1000						
Bradley Stoke Community School Bristol extrapolated (2005-06)	1000						Heating+hot water gas (normalised)
CIBSE Guide F Good Practice Secondary (1990s) BENCHMARK >>	1000						Heating and hot water - electricity
Riverhead Infants Sevenoaks (2004-05)							
ECON 19 Type 2 Good Practice Office NV BENCHMARK >>	1000						Refrigeration and heat rejection
City Academy 3 (2005-06)	1000						Fans, pumps and controls
APU Queens Building (1996)	1(1)))					30	
UEA Elizabeth Fry Building (1997)					823		
Birchensale Middle School, Worcestershire, (prelim 2005)	(0)(0)						I Office equipment
CIBSE Guide F Typical Secondary (1990s) BENCHMARK >>	100000						
CIBSE TM46 median for school DEC (2008) BENCHMARK >>	5(5(5))					Ħ	E Catering and vending
John Cabot City Technology College Bristol (1997)	0(0)0(0		ininininini m				Other electricity, or all electricity
Kingsmead Primary, Cheshire, (prelim 2005)							BV contribution (deduct)
City Academy 4 (2005-2006)	(sing)						- P V contribution (deddot)
Visby Library, Sweden MV+ANV (2002-04)							Gas for catering
Portland Building Portsmouth University ANV+ (1998)	50000			000000			
de Montfort Queens Building ANV (1997)	10100						8
St Francis of Assisi Secondary, Liverpool, (extrapolated 2005-06)	10100						
ECON 19 Type 3 Good Practice Office AC BENCHMARK >>	1000						
City Academy 1 (2005-06)	11111						
City Academy 5 (2005-06)	1000			(Constant)		-	
Orchard Learning Resource Centre, Birmingham University (1999)	6(8(8)8					-	
Gloucester LRC MM (2004)							
City Academy 2 (2005-06)							

#### Annual CO<sub>2</sub> emissions from low-energy schoool and university buildings



The electrical tail can often wag the dog kWh/half hour in a BSF secondary school

## The electrical tail can often wag the dog kWh/half hour in a BSF secondary school

Electrical consumption of large BSF school



32

## The electrical tail can often wag the dog kWh/half hour in a BSF secondary school

Electrical consumption of large BSF school



120 kW baseload: ca. 7 W/m<sup>2</sup> or 45 kWh/m<sup>2</sup> p.a. Equivalent to 60% of all lighting or 1000 PCs including screens. printers etc.
## The electrical tail can often wag the dog kWh/half hour in a BSF secondary school

Electrical consumption of large BSF school



120 kW baseload: ca. 7 W/m<sup>2</sup> or 45 kWh/m<sup>2</sup> 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)



# THE FUTURE: What the industry needs to do: *Tune into outcomes ... and fast!*

- Clients and government are getting more interested in performance. We need to set realistic expectations and manage them through the design and production process, and into use.
- Sustainability requires much more focus on achieved performance. And for energy not just of the regulated items designers currently regard as being their responsibility - this misses many opportunities.
- Government is asking us to jump through many hoops we need to understand what really adds value and what needs to be improved. For the planet's sake, we can't afford to invest in the wrong things. We need to get the results not tick more and more boxes!
- Things are changing fast, so we need rapid feedback on how well things are actually working. We must learn as much as possible from our own experiences, and share them with others.
  We no longer have the time to rely on somebody else doing it for us.
- To understand **how** things happened, **we need stories**, **not just data**.

- Engage people if not, there may well be unintended consequences.
- Reduce demand *prevention is better than cure!*
- Increase efficiency of the services that meet the demand.
- Avoid waste << where to start in existing buildings.
- Decarbonise supplies but low-carbon energy is a scarce resource not to be squandered: be sure to get the demand down first.
- Get results by doing things simply, cheaply ... and well!
- Make use of Opportunity Points, e.g. when purchasing, maintaining, refurbishing.

- Engage people *if not, there may well be unintended consequences.*
- Reduce demand *prevention is better than cure!*
- Increase efficiency of the services that meet the demand.
- Avoid waste << where to start in existing buildings.
- Decarbonise supplies but low-carbon energy is a scarce resource not to be squandered: be sure to get the demand down first.
- Get results by doing things simply, cheaply ... and well!
- Make use of Opportunity Points, e.g. when purchasing, maintaining, refurbishing.

#### IT'S NOT JUST ABOUT HEATING AND INSULATION

- Electricity dominates the carbon footprint of many non-domestic buildings.
- And accounts for nearly 40% in gas-heated domestic ones.
- There is lots of scope for imagination.

- Engage people if not, there may well be unintended consequences.
- Reduce demand *prevention is better than cure!*
- Increase efficiency of the services that meet the demand.
- Avoid waste << where to start in existing buildings.
- Decarbonise supplies but low-carbon energy is a scarce resource not to be squandered: be sure to get the demand down first.
- Get results by doing things simply, cheaply ... and well!
- Make use of Opportunity Points, e.g. when purchasing, maintaining, refurbishing.

#### IT'S NOT JUST ABOUT HEATING AND INSULATION

- Electricity dominates the carbon footprint of many non-domestic buildings.
- And accounts for nearly 40% in gas-heated domestic ones.
- There is lots of scope for imagination.

#### **BIG SAVINGS ARE POSSIBLE USING THE MULTIPLIER EFFECT**, e.g:

- Halve the demand X
- Double the efficiency X
- Halve the carbon in the supplies ... AND

#### You are down to one-eighth of the carbon.

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

- Building performance evaluation must become a routine part of project delivery.
- It needs to 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.*
- "Hand over and walk away" procedures do not suit complex modern buildings, which also need tuning up.
- The whole process has to change if we are to make the built environment genuinely more sustainable.
- We need a new professionalism that engages directly with outcomes.



#### the SOFT LANDINGS FRAMEWORK

for better briefing, design, handover and building performance in-use



**BSRIA BG 4/2009** 

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

# **THE FUTURE:** New professionals follow through design intent into reality

They understand what is needed strategic briefing Are clear what they want, and communicate it plainly strategic design ٠ Are ambitious, but realistic question all assumptions, understand users ٠ Follow things right through e.g. using **Soft Landings** procedures ٠ Review what they do *manage expectations, undertake reality checks* Are clear what they are after specify: what, why and how ٠ Check that things will work *technical feasibility, usability and manageability* Get things done well communicate, train, inspect Finish them off commission, operational readiness, handover, dialogue Help the users to understand and take ownership *provide aftercare support* including post-occupancy evaluation Review performance in use Work with occupiers to make things better *monitoring*, review and fine tuning ٠ Anticipate and spot unintended consequences revenge effects Learn from it all and share their experiences **KEEP THINGS SIMPLE AND DO THEM WELL** Only get complicated when and where you really need to.

## www.usablebuildings.co.uk