Benchmarking and labelling workshop
New Delhi, 14 July 2010

Benchmarking energy use in public and commercial buildings

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Structure of this talk

1. What's benchmarking for?
2. Principles and complications
3. Short history of benchmarking in the UK
4. The EPBD - energy labelling with the European *Energy Performance of Buildings Directive*
5. The adoption of the EPBD in England & Wales
6. What has been learned?
7. Where next?

WHAT'S BENCHMARKING FOR?

What's benchmarking for?

- Make energy and carbon performance of buildings visible and actionable, *both for designs, and especially in use.*
- Achieve rapid early reductions in fuel and electricity use *(it is the cumulative emissions that count)* + peak loads. **We need to save real, not virtual, energy and carbon.**
- Build momentum to a decarbonised economy; **AND**

- ***Motivate ALL the players concerned.***
- *Seize the opportunity points, and focus on what works.*
- *Exploit synergies and multiplier effects to get big benefits*
- *Minimise bureaucracy and transaction costs.*
- *Seek to avoid unintended consequences, and spending scarce resources on doing the wrong things;* ***and so …***
- ***Provide consistent technical underpinnings.***

A benchmark is …
a point of reference for measurement

THE RANGE OF USES INCLUDES:

• Comparing with typical examples	*where do we fit?*
• Comparing with best practice	*are we doing well?*
• Setting a challenge	*can we do better?*
• Setting targets	*we plan to achieve …*
• Avoiding exaggeration	*are our targets realistic?*
• Follow-through reality checks	*is the design drifting off?*
• Providing feedback	*did we meet our goals?*
• Providing insights	*if not, why not, what can we learn?*

IT IS NOT an end in itself, e.g. "meeting the benchmark"
BUT a means of developing understanding
and motivating improvement.

Who should benchmarking motivate?

- Clients: state requirements and aspirations.
- Designers: establish anticipated performance.
- Specifiers: clarify requirements.
- Builders and installers: achieve and confirm compliance.
- Vendors: use predicted and actual performance as a sales aid.
- Purchasers: establish quality of space on offer.
- New occupiers: identify fitout/alteration needs.
- Tenants: negotiations with landlords.
- Occupiers: set FM performance standards.
- FMs: review achievements, plan improvements.
- Local managers: motivate improvements, report upstream.
- General managers and regulators: review stock.
- Consultants and specialists: review against reference data.
- Government: maximise added value from the process, make effective use of data collected, design effective policy measures.

And most of all to get things done.

The name of the game is constant improvement!

PRINCIPLES AND COMPLICATIONS

Three different approaches to reporting and benchmarking

TOP-DOWN

Work down from annual fuel consumption
the main focus of this presentation

BOTTOM-UP

Work up from the components of energy use
important for designers and energy specialists

GRADUATED RESPONSE

Jump down into detail where appropriate
permits exception reporting

Ideally, reconcile between top-down and bottom-up, to connect inputs with outcomes

Reporting and benchmarking needs to occur at two levels, at least

ENERGY IMPORTED TO THE SITE *(and associated emissions)*

- *The fuel and energy commodities the building has to buy in.*
- *Complies with national policy drivers.*
- *Gives the headline CO_2 indicator in EPCs and DECs.*

BUILDING ENERGY USE *(BEU),* *with onsite renewables added*

- *To gauge the building's efficiency, whatever the supply mix.*
- *To maintain comparability with existing benchmarks.*
- *To charge on to occupiers.*
- *So poor buildings can't hide under low-carbon supplies.*

The two are identical where there are no onsite renewables

Make buildings efficient in use, **THEN** consider low-carbon supplies

Scope for massive improvement

if you use the multiplier effect. For example:

BE LEAN - Halve the demand

Review standards, reduce losses, avoid waste.

times

BE MEAN - Double the efficiency

Buy efficient equipment, use it efficiently, avoid system losses, tune it all up.

times

BE GREEN - Halve the carbon in the supplies

With on-and off-site measures

equals

You're down to one-eighth of the CO_2

BUT YOU NEED TO TAKE ALL THE STEPS!

Reporting and benchmarking

it used to be relatively simple …

1. Define the boundary of the premises.
2. Collect annual energy use data by fuel.
3. Identify the building type and floor area *(confirm area units).*
4. Multiply each fuel use by the appropriate CO_2 factor.
5. Calculate performance indicators:
   - Electricity - *kWh/m^2 per annum.*
   - Fossil fuels - *kWh/m^2 per annum.*
   - Carbon dioxide - *kg CO_2/m^2 per annum.*
6. Adjust if necessary, *e.g. for weather and occupancy.*
7. Review against appropriate reference data, e.g.
   - Published benchmarks, *e.g. consumption guides.*
   - Performance in previous years.
   - Peer review versus comparable buildings.
   - Savings targets.

Reporting and benchmarking

but it has been getting much more complicated

NEW TECHNIQUES AND TECHNOLOGIES

- New technologies, *e.g. heat pumps, CHP, community systems.*
- Onsite and offsite power generation.
- Different energy sources, *e.g. renewables, biofuels, district heating.*

ENERGY AND EMISSIONS REPORTING REQUIREMENTS

- Different boundaries, *e.g. building, landlord/tenant, organisational*.
- Different interests, *e.g. technical, corporate, governmental, world.*
- National, regional, local differences, *in fuels and carbon intensities.*
- Commercial measures, *e.g. offsite, trading, offsetting.*
- Variable, and often uncertain CO_2/ emissions factors, *especially for electricity, biofuels, community systems & international comparison.*

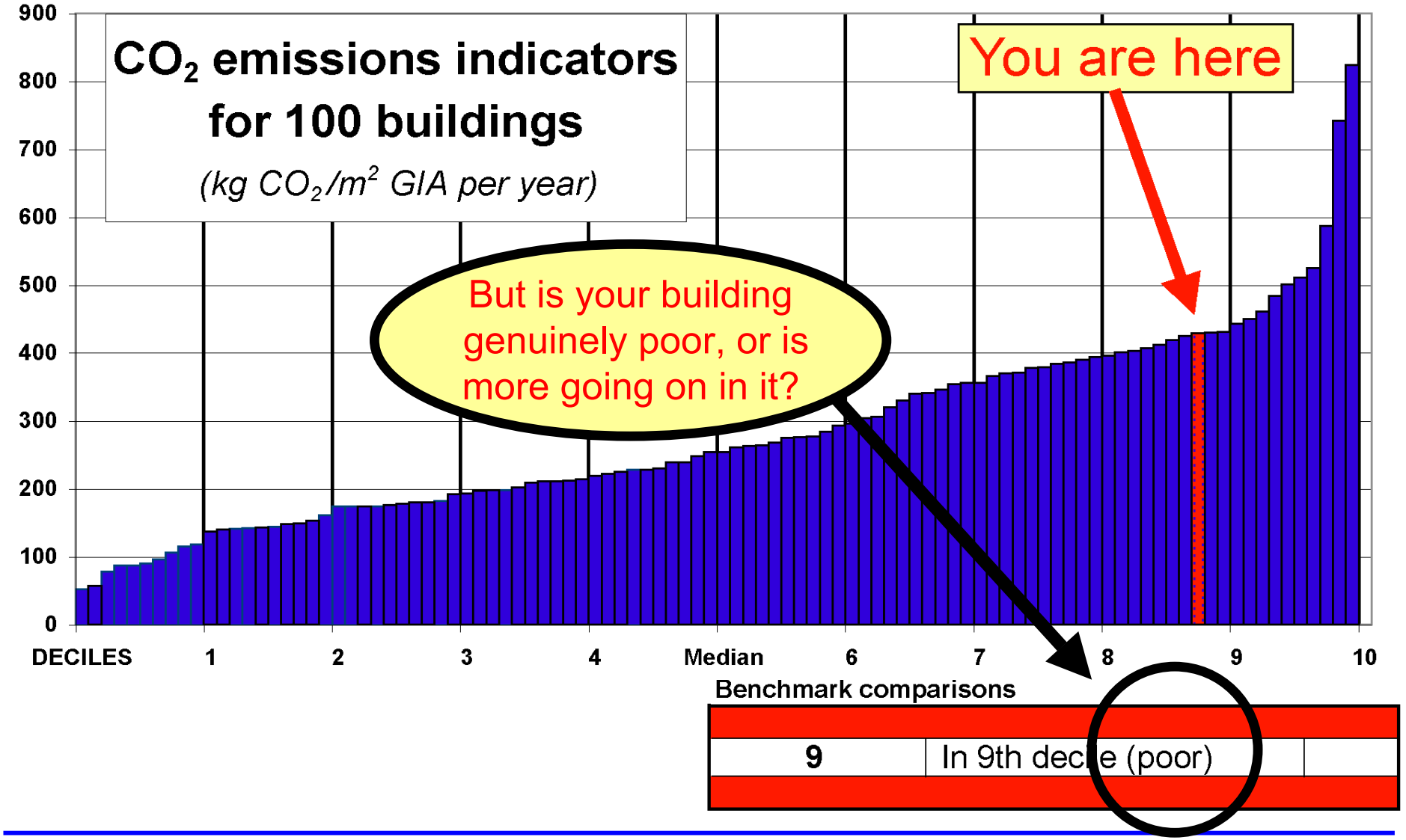
WE THEREFORE NEED TO

- Record basic information unadjusted, *e.g. energy use by fuel.*
- Permit multiple performance indicators and carbon factors, *see later.*
- **Have a core reporting format that allows "what-if" calculations.**

Reporting and benchmarking

can we interpret the results fairly?

Performance indicators
have we got a fair answer?



Reporting and benchmarking
getting into more detail if necessary

BUILDING AND ENERGY DATA QUALITY

- Missing energy data: *e.g. not all fuels, landlord or tenant data only.*
- Poor building data: *e.g. wrong type, wrong area, wrong metrics.*
- Special areas not identified, *e.g. dealing rooms, catering kitchens.*

BUILDING AND ENERGY USE INTENSITY

- High space use efficiency; *so metrics based on GIA look worse.*
- Low intensity of use, *e.g. voids,* confused with high efficiency.
- High intensity of use, *e.g. hours, densities,* or energy use in special areas *(e.g. data centres)* confused with poor building performance.
- Misuse of corrections for the above. *We need rigorous checks.*

BALANCE BETWEEN DEMAND AND SUPPLY

- Are building inefficiencies being masked by on-site generation?

OFFSITE MEASURES *(best to report separately)*

- Effect of technical measures, *e.g. offsite generation.*
- Effect of commercial measures, *e.g. trading, offsetting green tariffs.*

Getting started on top-down reporting

1. Identify the premises boundary precisely, *to suit both energy data availability and management responsibilities.*
2. Lock down the annual energy use data:
   - *Imports (and exports) across the boundary, by source.*
   - *Onsite renewable generation, where present, by source.*
3. Consider the data in context: **START SIMPLE, ADD DETAIL**
   1. **Physical**. *Start with building type.*
   2. **Operation and Use.** *Start with very simple use classifications.*
   3. **Building services and energy systems.** *Start by ignoring, or with simple descriptors - our main interest is in the outcomes.*
4. Draw conclusions, *e.g. through benchmark comparisons.*
5. Take action!

Drilling Down: the Graduated Response

Start simple, add detail as necessary

IF THE BASIC PERFORMANCE BENCHMARK DOESN'T FIT WELL

- *review building and operational context and categorisation*
- *investigate exceptions*
- *review building Type classification*
- *check data quality and calculations.*

WHAT TYPE OF EXCEPTIONS?

- *Special areas or energy uses - preferably sub-metered.*
- *High occupancy hours and densities - careful checks required.*
- *Unusual building services and energy systems, onsite renewables.*

CONSIDER SCOPE FOR DIFFERENT METRICS, e.g.

- *Floor area metric (to suit sector practice etc., e.g. Lettable Area in rented buildings).*
- *Supplementary performance indicators (e.g. per Full Time Equivalent person).*
- *CO_2 factors (e.g. for unusual fuel supplies, or if a load profile is very different)*

Different reporting protocols also use different metrics - **need for transparency.**

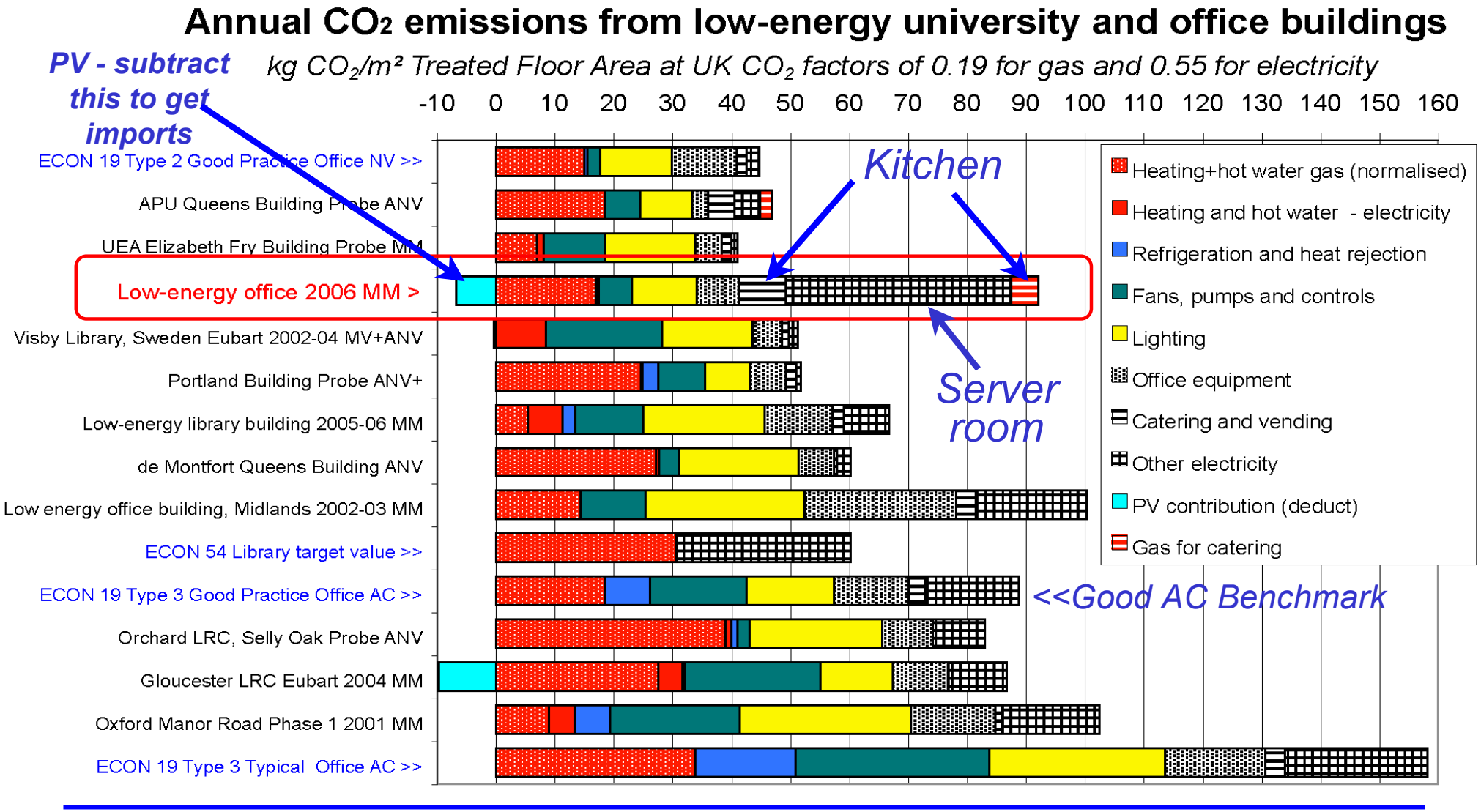
DRILL DOWN TO MORE TECHNICAL DETAIL IF NECESSARY

(CIBSE TM22, Europrosper and www.eplabel.org, demonstrate some ways).

Why specials need considering

What are the relevant emissions of the office in red?

92 kgCO_2/m^2, or 34 (85 or 27 deducting the PV); or … ?



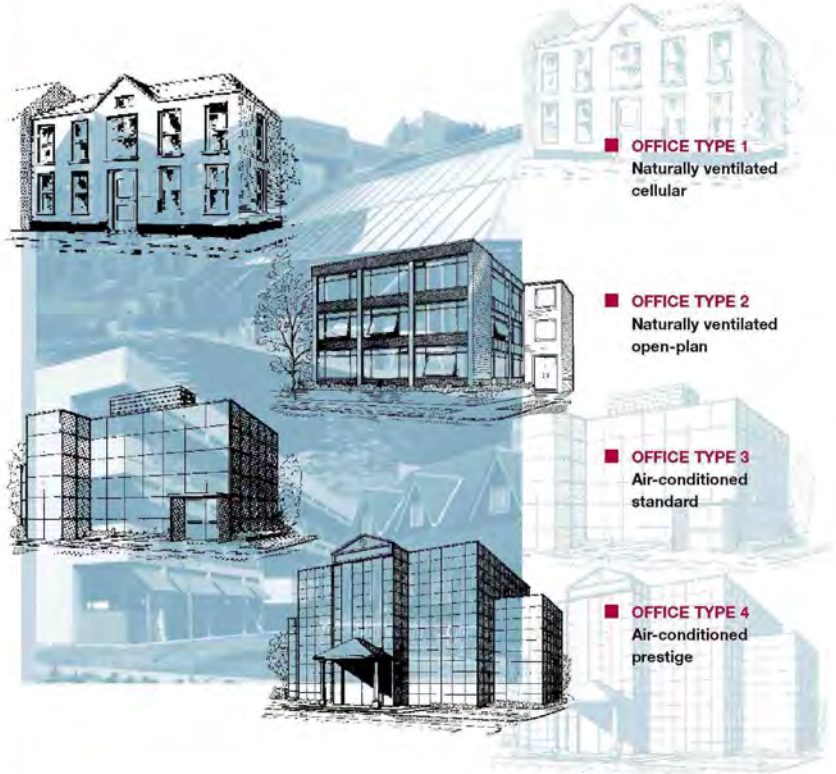
A SHORT HISTORY OF ENERGY BENCHMARKING IN THE UK

Energy benchmarking of public and commercial buildings in the UK

- **1940s and 50s.** Ministry of Fuel and Power encourages fuel efficiency. Its guidelines and publications are aimed largely at industry.
- **1960s.** Some building-related data collected by the Building Research Station, the fuel industries and other bodies, but of limited interest.
- **1970s.** Oil crisis leads to establishment of a Department of Energy. Normalised Performance Indicators published *(based on total delivered energy),* in "Yellow Booklets". Detailed monitoring by the fuel industries.
- **1980s.** Statistics collected to revise Yellow Booklets *(postal survey)* and for other purposes. Move to separate benchmarking of fuel and electricity.
- **1990s.** Fuel industries now privatised. *Energy Efficiency Best Practice programme* includes Energy Consumption Guides. CIBSE TM22 published.
- **Early 2000s.** Energy Consumption Guides go from Government to Carbon Trust and are not kept up to date. Government neglects in-house statistics.
- **2006-date.** Implementation of energy certificates, *displayed in public buildings.* New systems developed for building energy certification. Increasing interest by private sector organisations. Reviews now underway.

Energy Consumption Guide Example

Energy use in offices



- **OFFICE TYPE 1** Naturally ventilated cellular
- **OFFICE TYPE 2** Naturally ventilated open-plan
- **OFFICE TYPE 3** Air-conditioned standard
- **OFFICE TYPE 4** Air-conditioned prestige

BEST PRACTICE PROGRAMME

ENERGY EFFICIENCY

Figures 1 to 3 show annual energy use indices (EUIs), energy cost indices (ECIs) and CO_2 emission indices (CEIs). CEIs are quoted in terms of kilograms of carbon dioxide per square metre treated area ($kgCO_2/m^2$) emitted annually. The data used to construct these graphs is in Appendix B.

In figures 2 and 3 the segments of the graphs for heating and hot water are a smaller percentage of the whole than in figure 1, because a kWh unit of gas is less expensive and incurs fewer CO_2 emissions compared with a unit of electricity which would commonly be consumed for the other energy uses. This puts a strong emphasis on the need for electrically heated buildings to be particularly efficient. Such buildings should be compared with the CO_2 benchmarks rather than delivered energy.

It might be thought that the relative costs of gas and electricity are similar to the relative CO_2 emissions, and superficially figures 2 and 3 appear alike. However, larger buildings – particularly those with large computer rooms operating continuously – usually pay less per unit of electricity than smaller offices with low voltage supplies and less uniform load profiles. Consequently, the difference between large and small buildings is smaller in cost terms than it is in CO_2.

KEY

- Heating and hot water
- Cooling
- Fans, pumps, controls
- Humidification
- Lighting
- Office equipment
- Catering, gas
- Catering, electricity
- Other electricity
- Computer room (where appropriate)

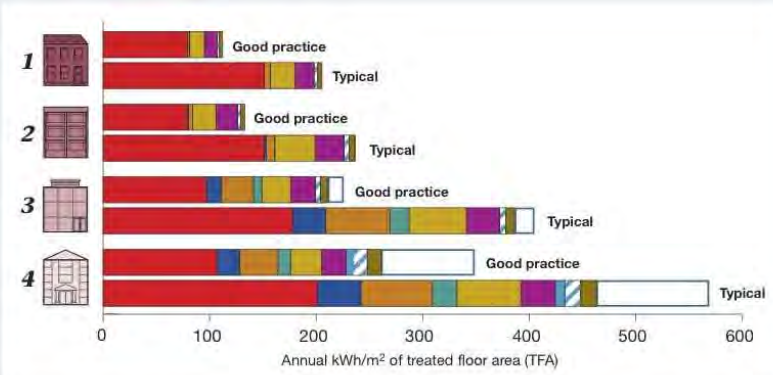


Figure 1 Energy use indices (EUIs) for good practice *and* typical *examples of the four office types*

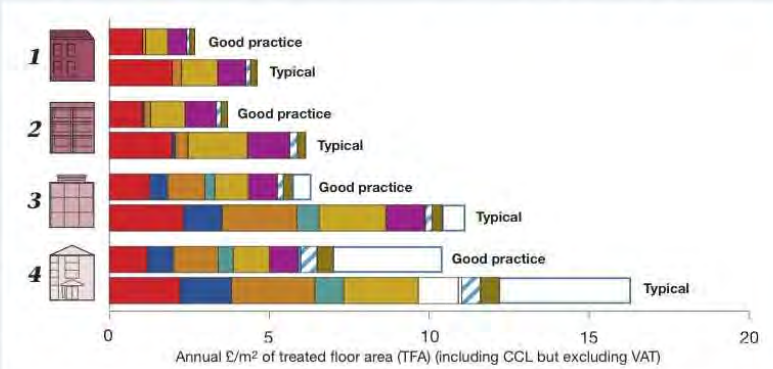


Figure 2 Energy cost indices (ECIs) for good practice *and* typical *examples of the four office types*

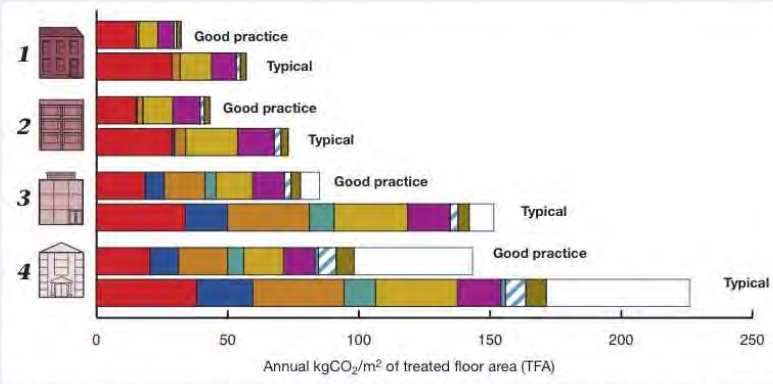
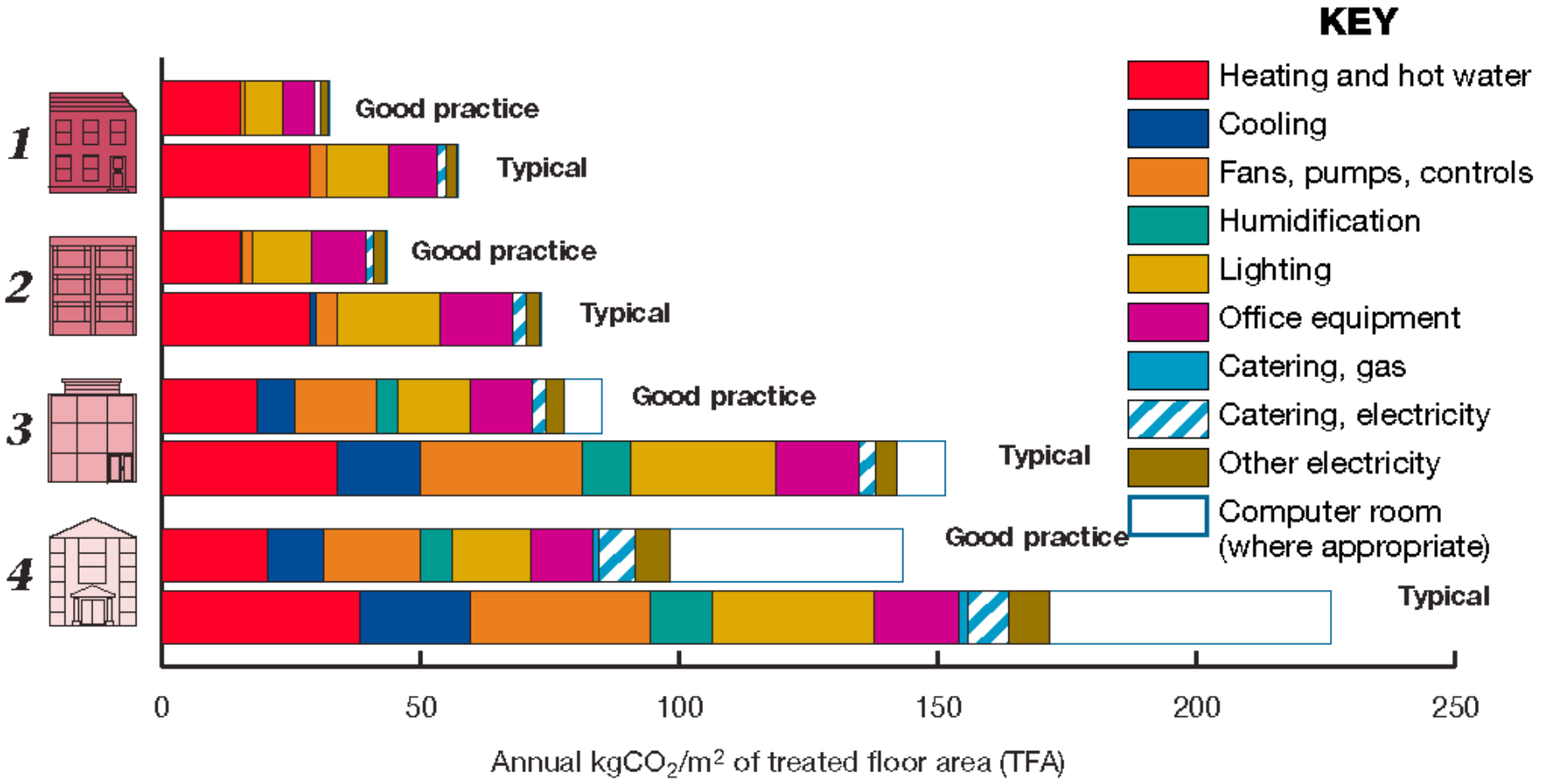


Figure 3 Carbon dioxide emission indices (CEIs) for good practice *and* typical *examples of the four office types*

Sector cohorts can be widely separated

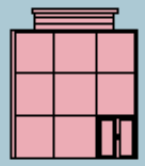
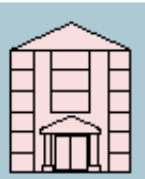


Good of its kind may be very different from good absolutely

e.g SUVs versus mopeds as personal transport

SOURCE: Energy Consumption Guide 19, Energy Use in Offices (2003 edition). *Downloadable from www,carbontrust.org.uk*

Guide 19 includes some component benchmarks too

EQUIPMENT BENCHMARKS								
	1 		2 		3 		4 	
	Good practice	*Typical*	*Good practice*	*Typical*	*Good practice*	*Typical*	*Good practice*	*Typical*
a W/m²	10	12	12	14	14	16	15	18
b hrs/yr	2000	2500	2500	3000	2750	3250	3000	3500
c percentage of treated floor area	60%	60%	65%	65%	60%	60%	50%	50%
EUI kWh/m²/yr	12	18	20	27	23	31	23	32

THE EUROPEAN ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE, the EPBD

What Member States had to do under the EPBD

- Develop a methodology for calculating the *integrated energy performance* of buildings. ***This was the prime focus initially for most policymakers.***
- Set energy performance targets and minimum standards for most buildings.
- For larger buildings (over 1000 m^2), consider feasibility of renewables, district heating and Combined Heat & Power.
- **Require Energy Performance Certificates (EPCs)** at the point of construction, sale or letting; with recommendations for improvement of energy efficiency, *to make energy use levels visible.*
- **Require public display of energy certificates** in public buildings frequently visited by the public, with over 1000 m^2 total usable internal floor area (TUFA). *Called Display Energy Certificates, **DEC**s in the UK.*
- **Certificates accompanied by Advisory Reports**, with recommendations for cost-effective improvements.
- Set requirements for inspections of boilers *(over 20 kW output)* and air-conditioning systems *(over 12 kW output).*

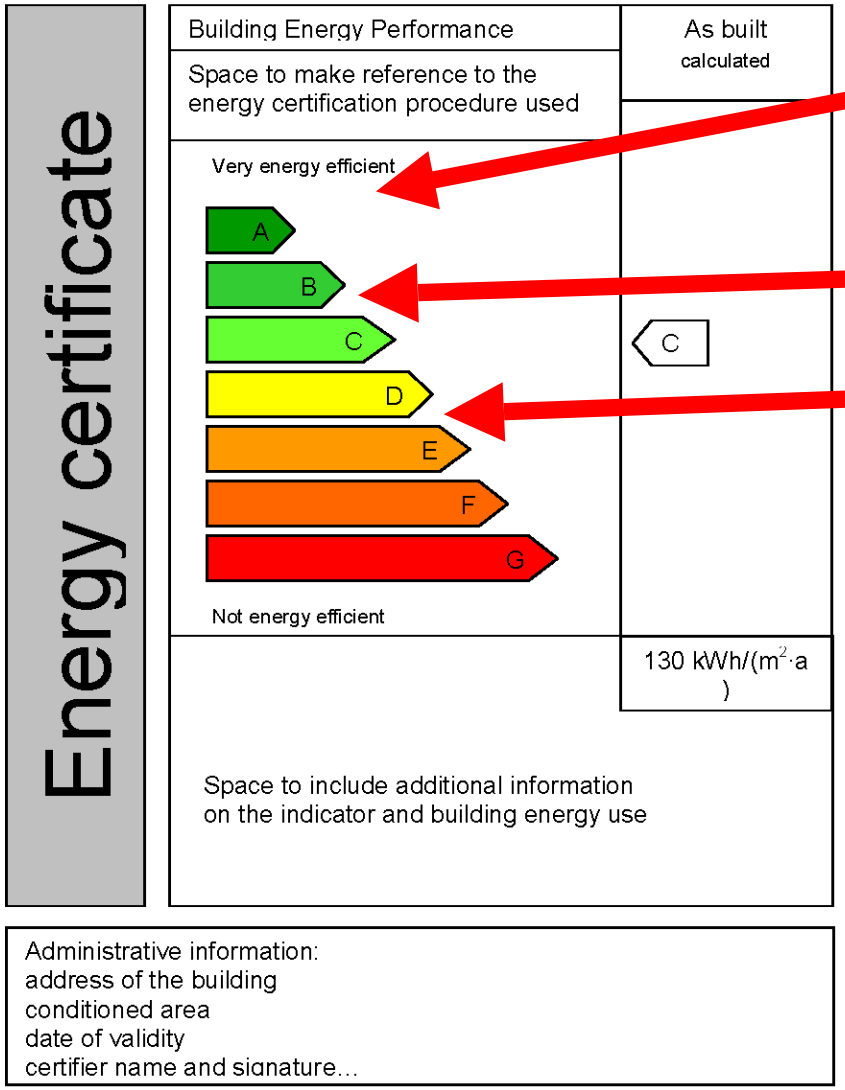
Energy Performance Certificates (EPCs) based on calculations

- Decided that EPCs **for construction, sale or let** should be based on calculated performance of fixed services under standard conditions, not on actual consumption. *(the **Standard Calculated Rating**, or **Asset Rating**).*
- ***Why?*** This was felt to be the fairest basis for buyer choice between new, empty and operating buildings - though the calculations are hardly perfect. - *Need better reporting to relate expectations to outcomes in detail.*
- Some countries also take actual consumption into account, especially if they had pre-existing systems.
- Calculation for labelling is similar to that used for building regulations *(the initial focus by most),* but often with different reference values *(e.g. in England and Wales the reference value has a default building services specification).*

Display Energy Certificates (DECs)
initially for certain public buildings only

- Member States could choose whether to use:
  - An ***Asset Rating (AR),*** or ***Calculated Energy Rating*** based on theoretical calculation.
  - An ***Operational Rating (OR)*** - also called a ***Measured Energy Rating*** - based on total measured annual energy use.
- Different countries have made different choices. Most decided to use *Asset Ratings,* but in some (e.g. Denmark), the process does take some account of operational performance.
- Some countries, including England & Wales, have chosen *Operational Ratings.* Others, like Germany, combine the two.
- The DECs need to include the Energy Performance Indicator and reference benchmarks, both for typical (e.g. stock median) buildings and for ones to current regulations.
- The benchmarks will need updating from time to time. CEN recommends intervals of not less than 5 years.
  In the UK, we are reviewing them at the moment.

The Rainbow Scale
as proposed in CEN standard 15217



- Zero net energy *(or zero net carbon etc.)*
- Current regulations ***Rr***
- Stock median ***Rs***

For DECs, the UK has adopted a simpler linear scale using a ***Benchmark Ratio = 100 *EP/Rs***

where ***EP*** *= Energy Performance (kg CO_2/m^2 in the UK) calibrated in equal intervals, so A = 0 to 25, B = 25 to 50, etc.. The Ratio is reported for your building and the regulation level.*

ADOPTION *("transposition")* OF THE EPBD IN ENGLAND & WALES

CIBSE's benchmarking strategy *proposed to the British Government*

- Unite *top-down* market practicalities and *bottom-up* technical insights
- Seek transparent reporting of contributions of building/management performance, energy purchased, and on- and off-site generation
- Stimulate rapid improvement in understanding and in actual energy/ CO_2 performance by three groups working together: *building owners and managers, building professionals,* and *government,* with assistance from energy suppliers where necessary.
- Shared foundation for statutory and voluntary tracks that can complement each other *but have distinct purposes and grading systems.*

TO MEET THE STATUTORY REQUIREMENT FOR LABELLING

- Provide a simple entry level, with options to dig deeper - but only as necessary*(exception reporting)* using a *graduated response strategy.*
- Do not force people into unnecessary detail - but release strong self-motivation to dig deeper, *e.g. with the prospect of a better grade.*
- Avoid loopholes. Do not allow people to claim exceptions without strong proof, *e.g. of special energy uses and extended hours.*

Benchmarking for continuous improvement: three complementary approaches

The basic process:

- ***What have I got?*** *Get the facts straight.*
- ***What does it mean?*** *Relate them to references.*
- ***What can I do?*** *Action-orientated benchmarking.*

Start simple, but drill down into detail if necessary

Complementary forms of benchmark referencing:

- ***Statistical:***
  Where am I amongst my peers?
- ***Technical:***
  Where am I absolutely?
- ***Mandatory:***
  Where am I in relation to policy objectives? How does this link up with other requirements and incentives?

Complementary benchmarking routes
Strategy proposed for UK system

1. BENCHMARKS FOR DECs

- Simplified starter benchmarks.
- Thermal and electrical values, then converted to CO_2.
- Severe: assume low intensity of use and standard services.
- Optional corrections allowable for *specials* and high intensity use, *if rigorously verified.*
- Will evolve in the future.

2. VOLUNTARY BENCHMARKING

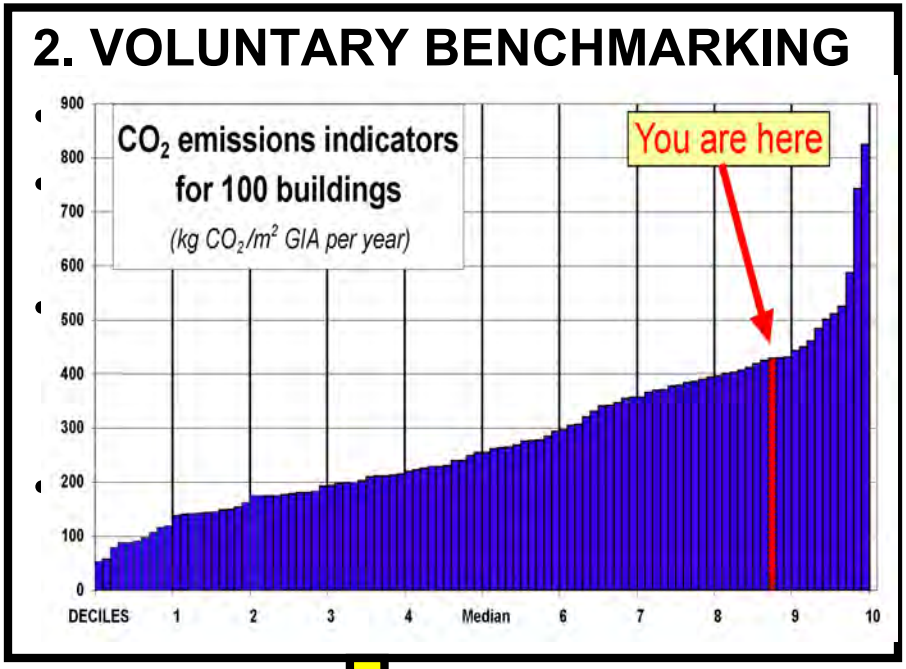
- Encouraged within sectors etc.
- Can make use of relatively poor data, e.g. sorted into rank order.
- Can take account of differences between building types, uses and systems the industry is aware of.
- Can be displayed alongside the Energy Certificate, *but must not look anything like a DEC.*

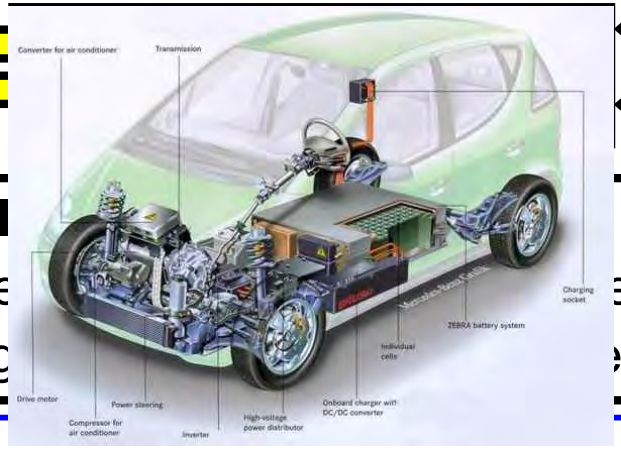
3. TECHNICAL UNDERPINNINGS

- Technical standards, technical details, technical review.
- Detailed understanding of elements of energy use. Benchmark generators.

Complementary benchmarking routes

Strategy proposed for UK system





3. TECHNICAL UNDERPI

- Technical standards, te eview.
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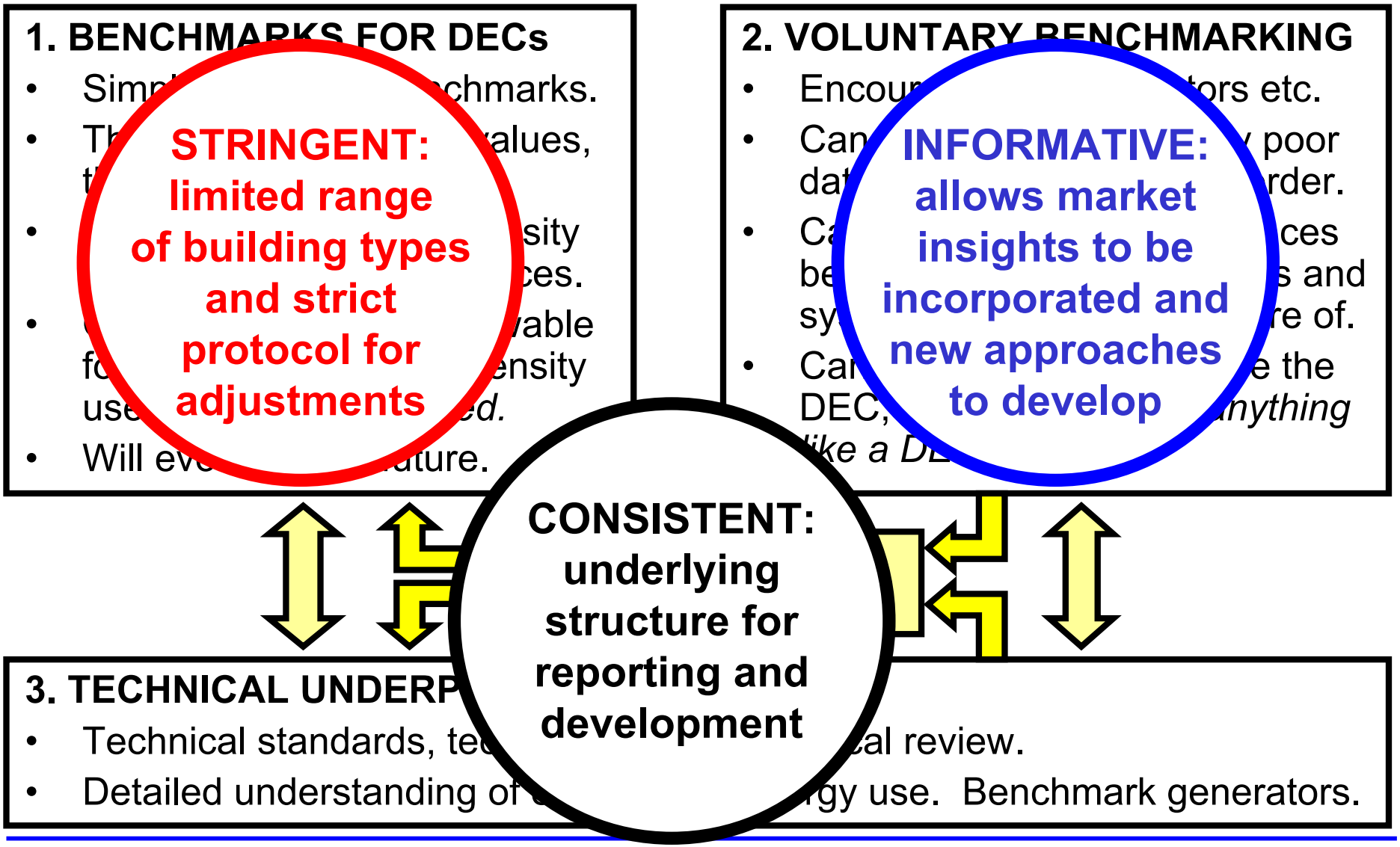
Complementary benchmarking routes

Strategy proposed for UK system



Making Performance Visible

Display Energy Certificates (DECs) in the UK

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

More energy efficient

A 0-25

B 26-50

C 51-75

D 76-100

100 would be typical

E 101-125 ◁108

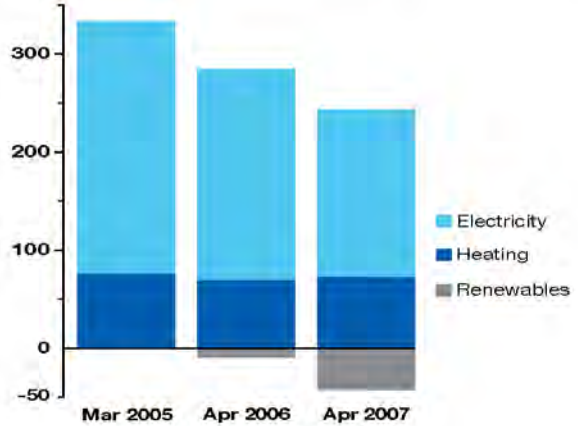
F 126-150

G Over 150

Less energy efficient

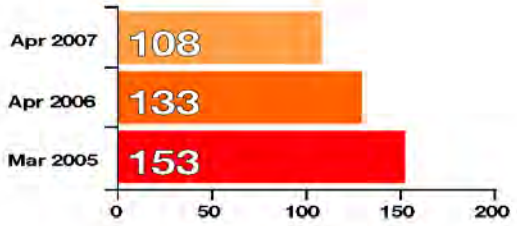
Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.



Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods



Making Performance Visible

Display Energy Certificates (DECs) in the UK

Consultation Draft > > > >

Floor area used in performance comparisons below			1000	m2 gross internal area	
Annual energy use, CO2 emissions and performance indicators	Thermal	Electrical	Units for energy data	CO2	Units for CO2 data
Total energy use in the year concerned	100,000	230,000	kWh	146.5	tonnes CO2
Special energy uses deducted (if any)	5,000	150,000	kWh	83.5	tonnes CO2
Calculated performance indicators	95	80	kWh/m2	63	kg CO2/m2
Reference performance benchmarks	160	100	kWh/m2	87	kg CO2/m2
Benchmark ratio (lower is better)	59	80	Typical=100	72	Typical=100
Operational Rating Grade (A1 is best)	C2	D1	A to G	C3	A to G
Energy from on-site renewable sources	5%	8%	%	7%	% avoided
			Asset Rating (if available)	B3	A to G

NOTE: * Thermal includes imported combustion fuels (both fossil and biomass) and heating and cooling from community systems.
* Electrical includes electricity used for all purposes, including heating and cooling.

Final Version

Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual readings.

Main heating fuel: Gas
Building Environment: Air Conditioned
Total useful floor area (m^2): 2927
Asset Rating: 92

	Heating	Electrical
Annual Energy Use (kWh/m^2/year)	126	129
Typical Energy Use (kWh/m^2/year)	120	95
Energy from renewables	0%	20%

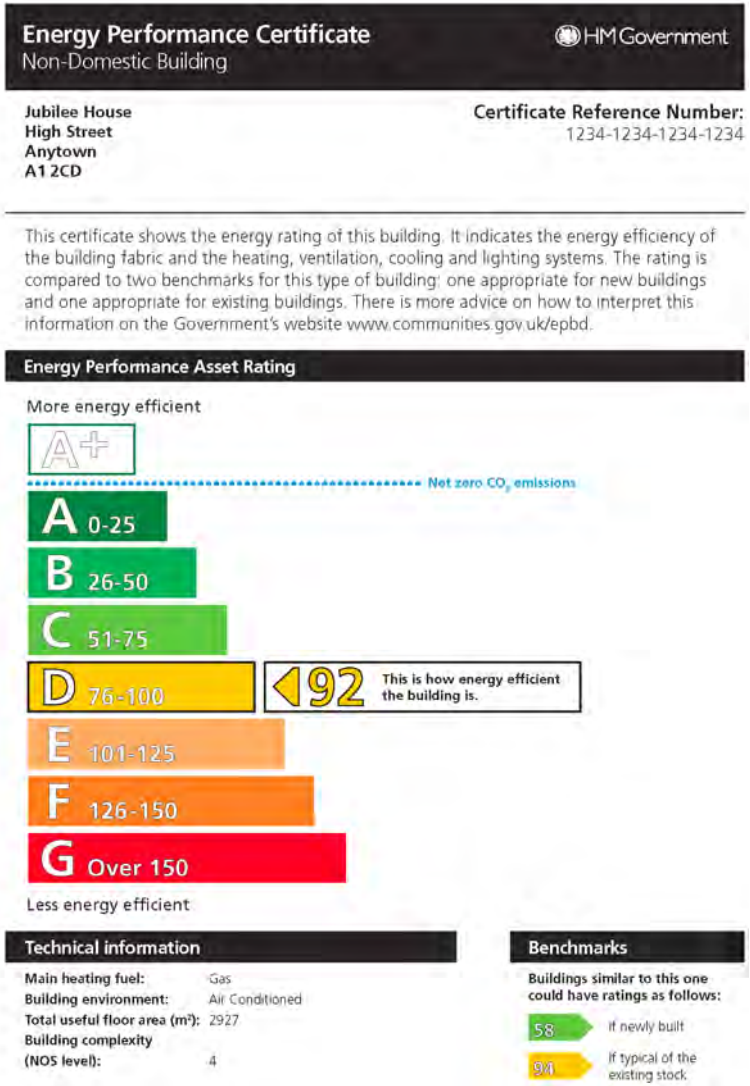
Administrative information

This a Display Energy Certificate as defined in SI2007:991 as amended.

Assessment Software: OR v1
Property Reference: 891123776612
Assessor Name: John Smith
Assessor Number: ABC12345
Accreditation Scheme: ABC Accreditation Ltd
Employer/Trading Name: EnergyWatch Ltd
Employer/Trading Address: Alpha House, New Way, Birmingham, B2 1AA
Issue Date: 12 May 2007
Nominated Date: 01 Apr 2007
Valid Until: 31 Mar 2008
Related Party Disclosure: EnergyWatch are contracted as energy managers
Recommendations for improving the energy efficiency of the building are contained in Report Reference Number 1234-1234-1234-1234

Closing the gap with energy certificates

EPC: Calculated rating
regulated energy only



Energy Performance Certificate
Non-Domestic Building

HM Government

Jubilee House
High Street
Anytown
A1 2CD

Certificate Reference Number:
1234-1234-1234-1234

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Asset Rating

More energy efficient

A+ Net zero CO_2 emissions

A 0-25

B 26-50

C 51-75

D 76-100 — 92 This is how energy efficient the building is.

E 101-125

F 126-150

G Over 150

Less energy efficient

Technical information

Main heating fuel:	Gas
Building environment:	Air Conditioned
Total useful floor area (m^2):	2927
Building complexity (NOS level):	4

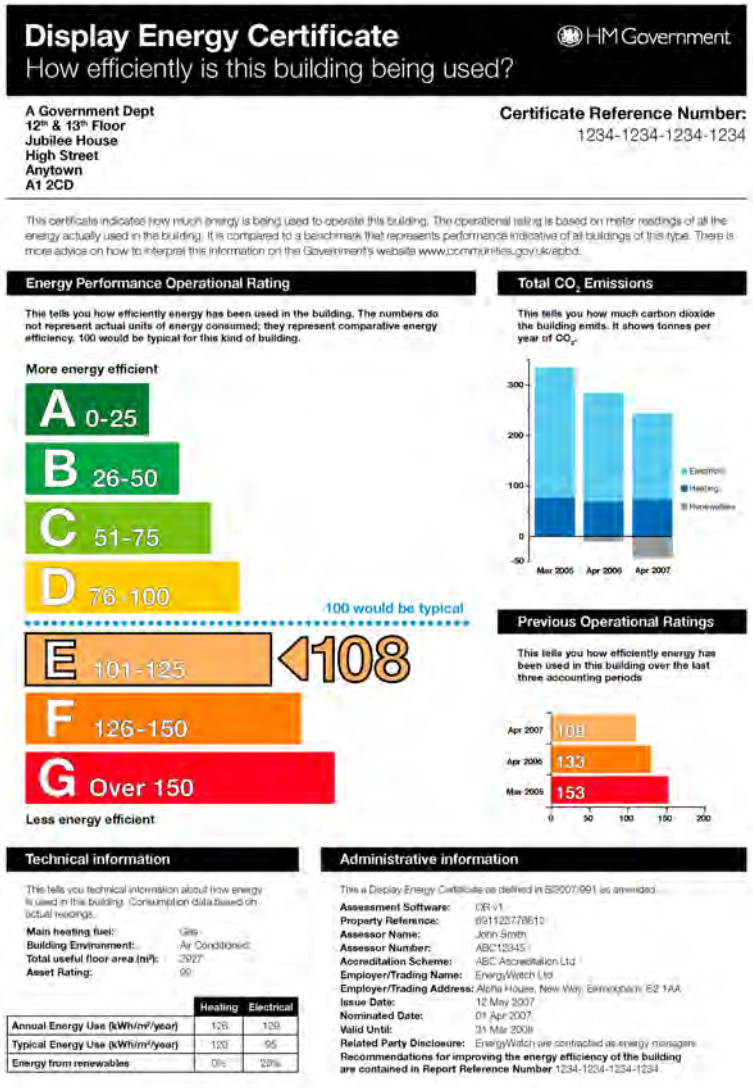
Benchmarks

Buildings similar to this one could have ratings as follows:

58 If newly built

94 If typical of the existing stock

DEC: Measured rating
that counts everything



Display Energy Certificate
How efficiently is this building being used?

HM Government

A Government Dept
12th & 13th Floor
Jubilee House
High Street
Anytown
A1 2CD

Certificate Reference Number:
1234-1234-1234-1234

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

More energy efficient

A 0-25

B 26-50

C 51-75

D 76-100

100 would be typical

E 101-125 — 108

F 126-150

G Over 150

Less energy efficient

Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.

Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods

Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual readings.

Main heating fuel:	Gas
Building Environment:	Air Conditioned
Total useful floor area (m^2):	2927
Asset Rating:	99

	Heating	Electrical
Annual Energy Use (kWh/m^2/year)	126	129
Typical Energy Use (kWh/m^2/year)	120	95
Energy from renewables	0%	29%

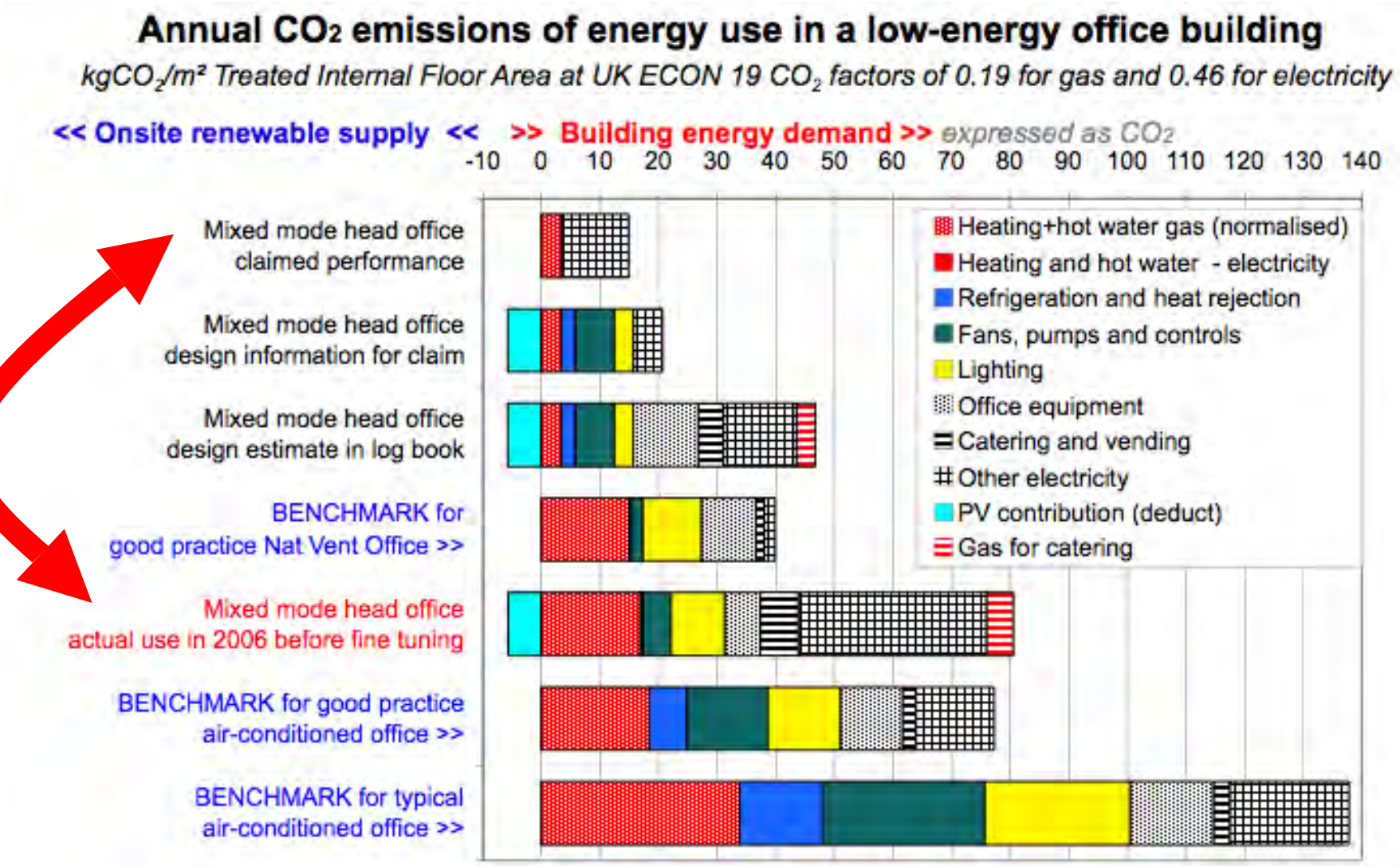
Administrative information

This a Display Energy Certificate as defined in SI2007/991 as amended.

Assessment Software:	OR v1
Property Reference:	891123778610
Assessor Name:	John Smith
Assessor Number:	ABC12345
Accreditation Scheme:	ABC Accreditation Ltd
Employer/Trading Name:	EnergyWatch Ltd
Employer/Trading Address:	Alpha House, New Way, Birmingham, B2 1AA
Issue Date:	12 May 2007
Nominated Date:	01 Apr 2007
Valid Until:	31 Mar 2008
Related Party Disclosure:	EnergyWatch are contracted as energy managers

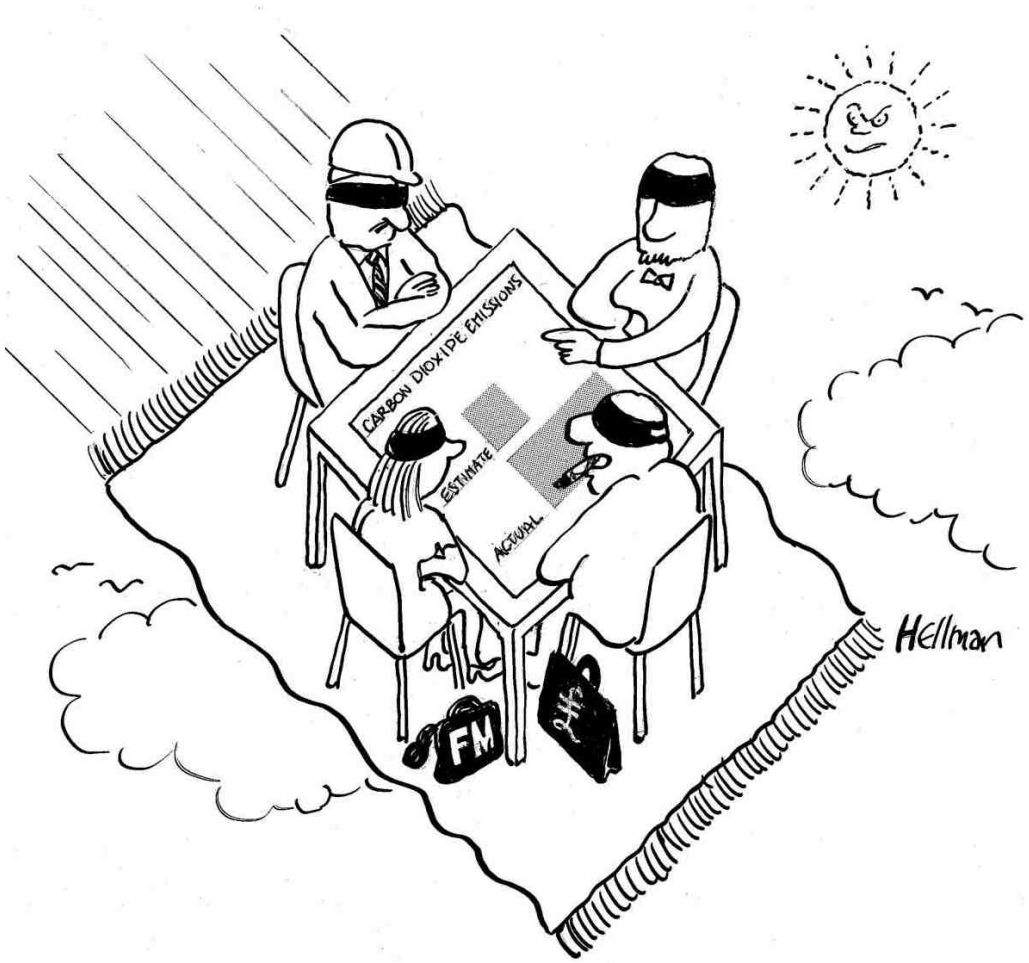
Recommendations for improving the energy efficiency of the building are contained in Report Reference Number 1234-1234-1234-1234

Design intent to reality: *Managing expectations and avoiding disappointments*



WHAT HAS BEEN LEARNED?

Display Energy Certificates can work
*by making performance visible - **a real example***



Display Energy Certificate
How efficiently is this building being used?

HM Government

Government Office for the West Midlands
Government Office for the West Midlands

5 St. Philips Place
BIRMINGHAM

B3 2PW

Certificate Reference Number:
0090-5033-0151-3990-9034

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

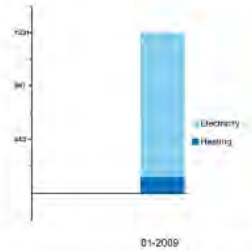
More energy efficient

A 0-25
B 26-50
C 51-75
D 76-100
100 would be typical
E 101-125
F 126-150
G Over 150 ◀ 231

Less energy efficient

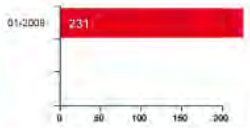
Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.



Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods



Technical information

This tells you technical information about how energy is used in this building. Consumption data based on Estimated

Main heating fuel: Natural Gas
Building Environment: Air Conditioning
Total useful floor area (m^2): 7530
Asset Rating: 0

	Heating	Electrical
Annual Energy Use (kWh/m^2/year)	98	288
Typical Energy Use (kWh/m^2/year)	95	125
Energy from renewables	0%	0%

Administrative information

This is a Display Energy Certificate as defined in SI 2007/991 as amended.

Assessment Software: ORCALC V1-05-02
Property Reference: 535339930000
Assessor Name: Daniel Brennand
Assessor Number: QUID200749
Accreditation Scheme: Quidos Limited
Employer/Trading Name: Quidos
Employer/Trading Address: 18 Argyle Street
Issue Date: 19-01-2009
Nominated Date: 01-01-2009
Valid Until: 31-12-2009
Related Party Disclosure: n/a

Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report

NOTE: *The electricity and heating fuel benchmarks on the printed DEC are transposed.*

An air-conditioned office, refurbished 2004, occupied by government

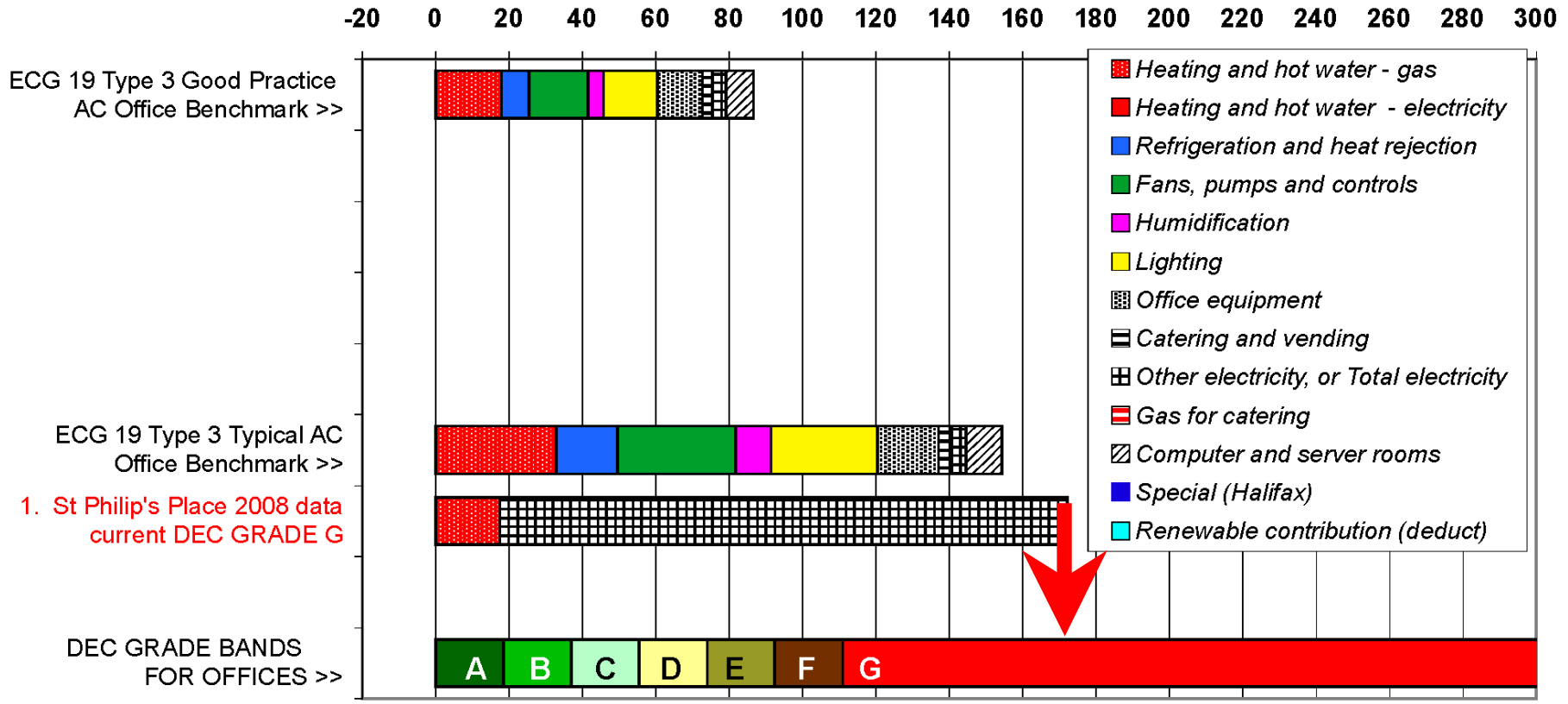
The first (2008) DEC in context

with DEC scale and ECG 19 benchmarks

5 ST PHILIP'S PLACE OFFICES:

Annual CO_2 emissions, DEC Grades and benchmarks from Energy Consumption Guide 19 for a "Type 3" air-conditioned office

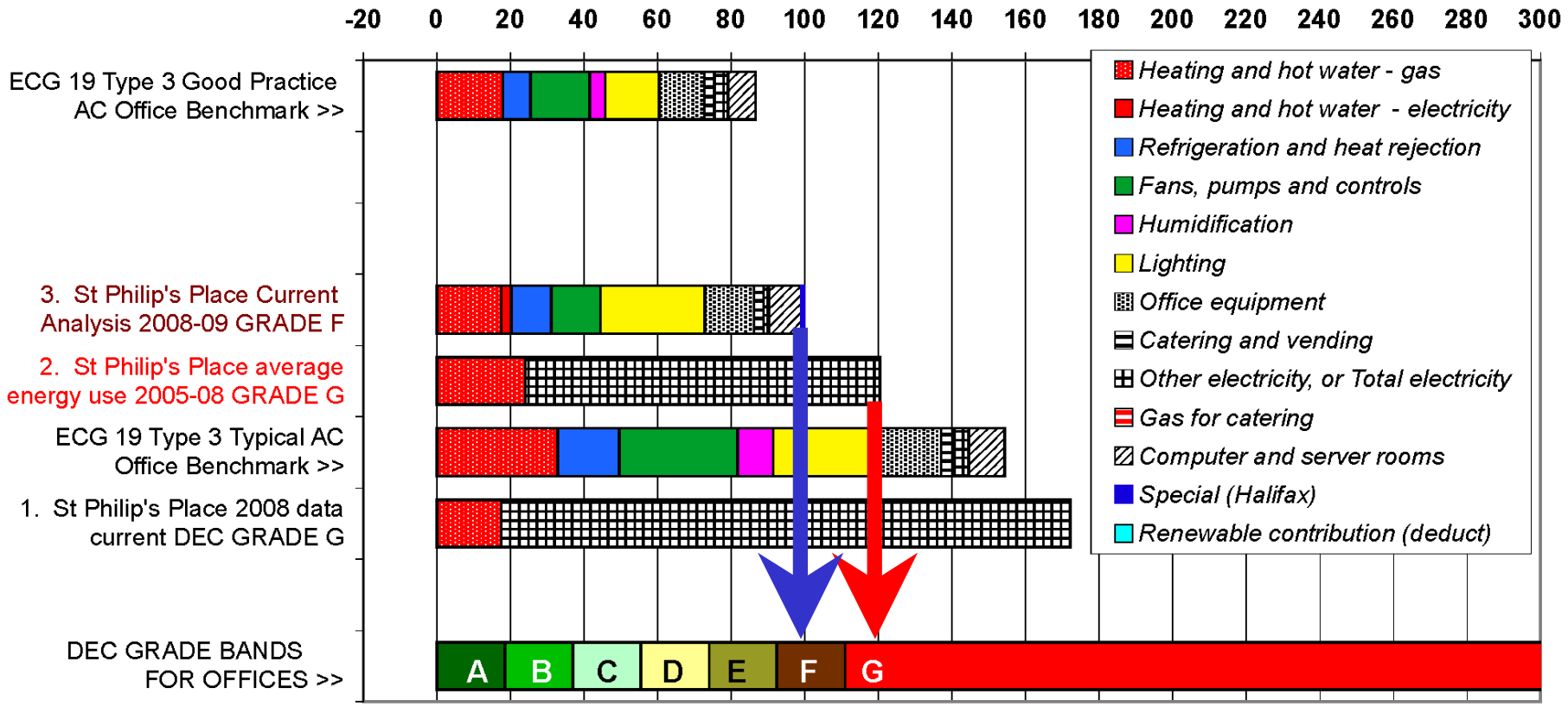
kg/m² Treated Floor Area at Defra 2008 CO_2 factors of 0.185 for gas and 0.537 for electricity



Revised energy use in context

Major reductions in 2008-09, compared with 2005-08

2008 DEC with metering error corrected after TM22 survey
Situation in 2009 after a Carbon Trust report and management efforts by the occupier and their FM contractor.



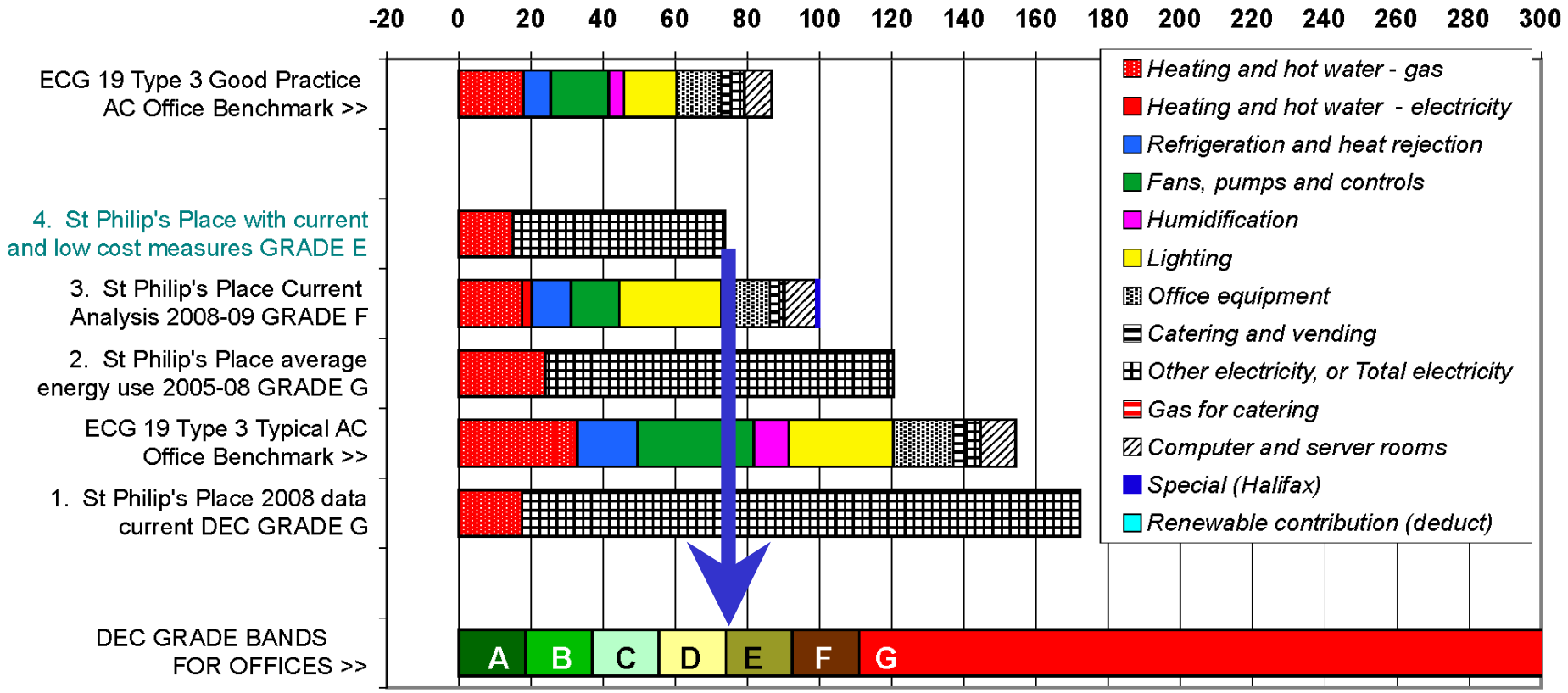
Where it might be possible to go

with planned improvements and attention to BMS

5 ST PHILIP'S PLACE OFFICES:

Annual CO_2 emissions, DEC Grades and benchmarks from Energy Consumption Guide 19 for a "Type 3" air-conditioned office

kg/m² Treated Floor Area at Defra 2008 CO_2 factors of 0.185 for gas and 0.537 for electricity



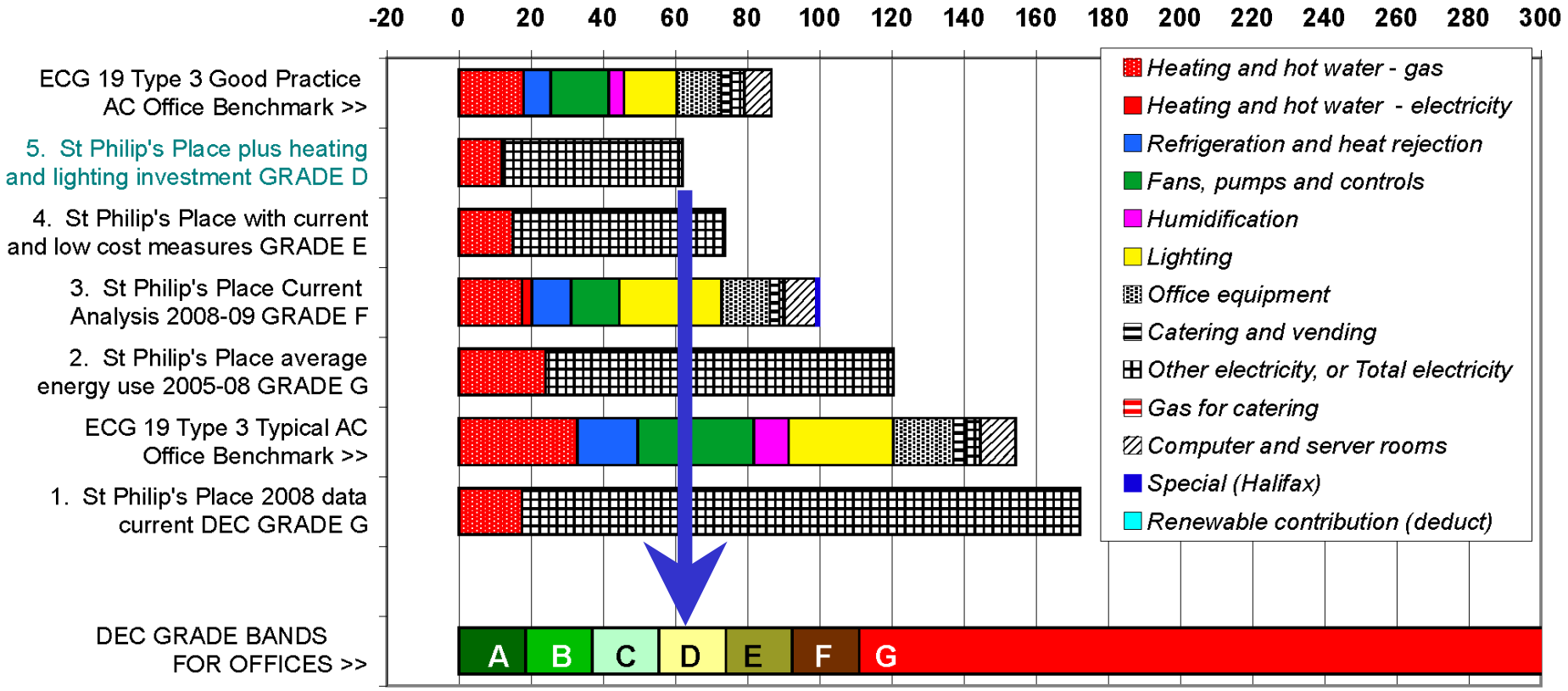
Where one might get after that

with investment in boiler plant and lighting

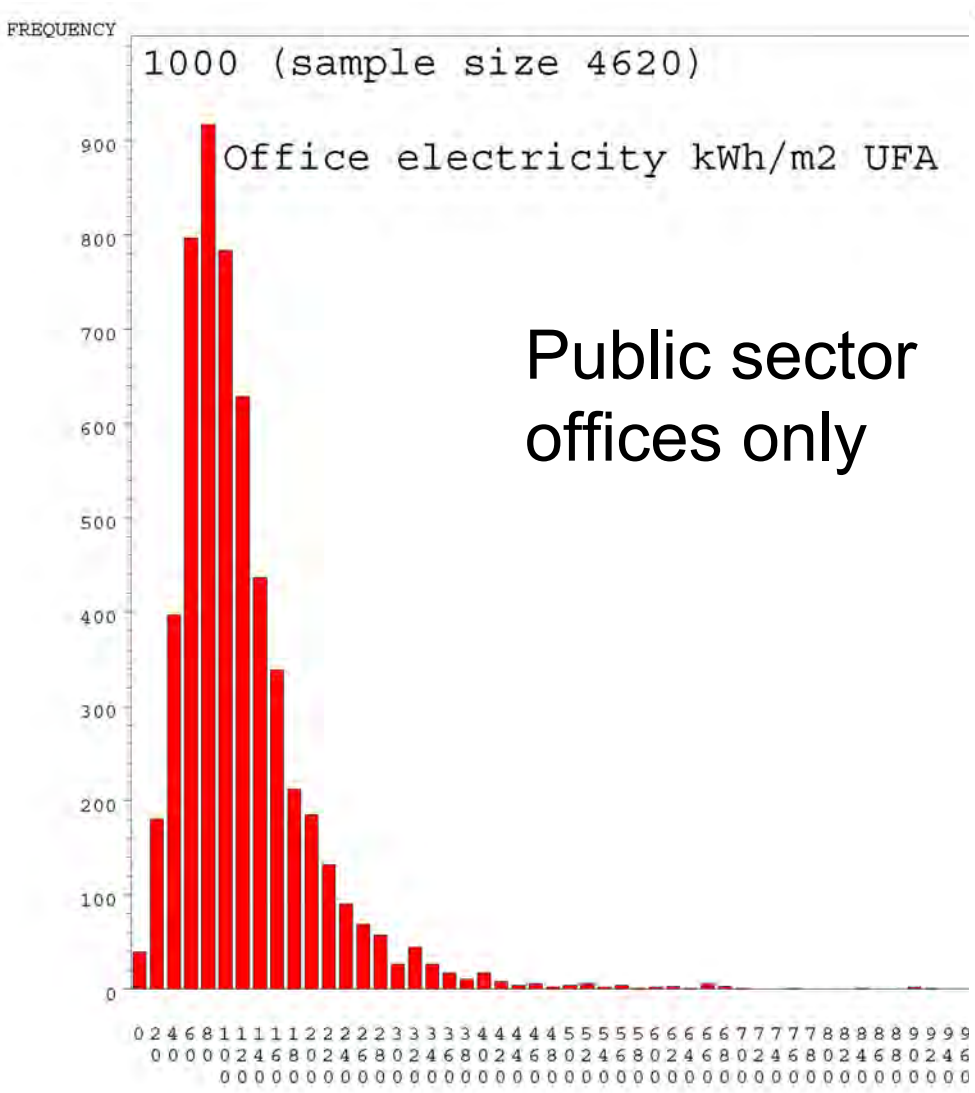
5 ST PHILIP'S PLACE OFFICES:

Annual CO_2 emissions, DEC Grades and benchmarks from Energy Consumption Guide 19 for a "Type 3" air-conditioned office

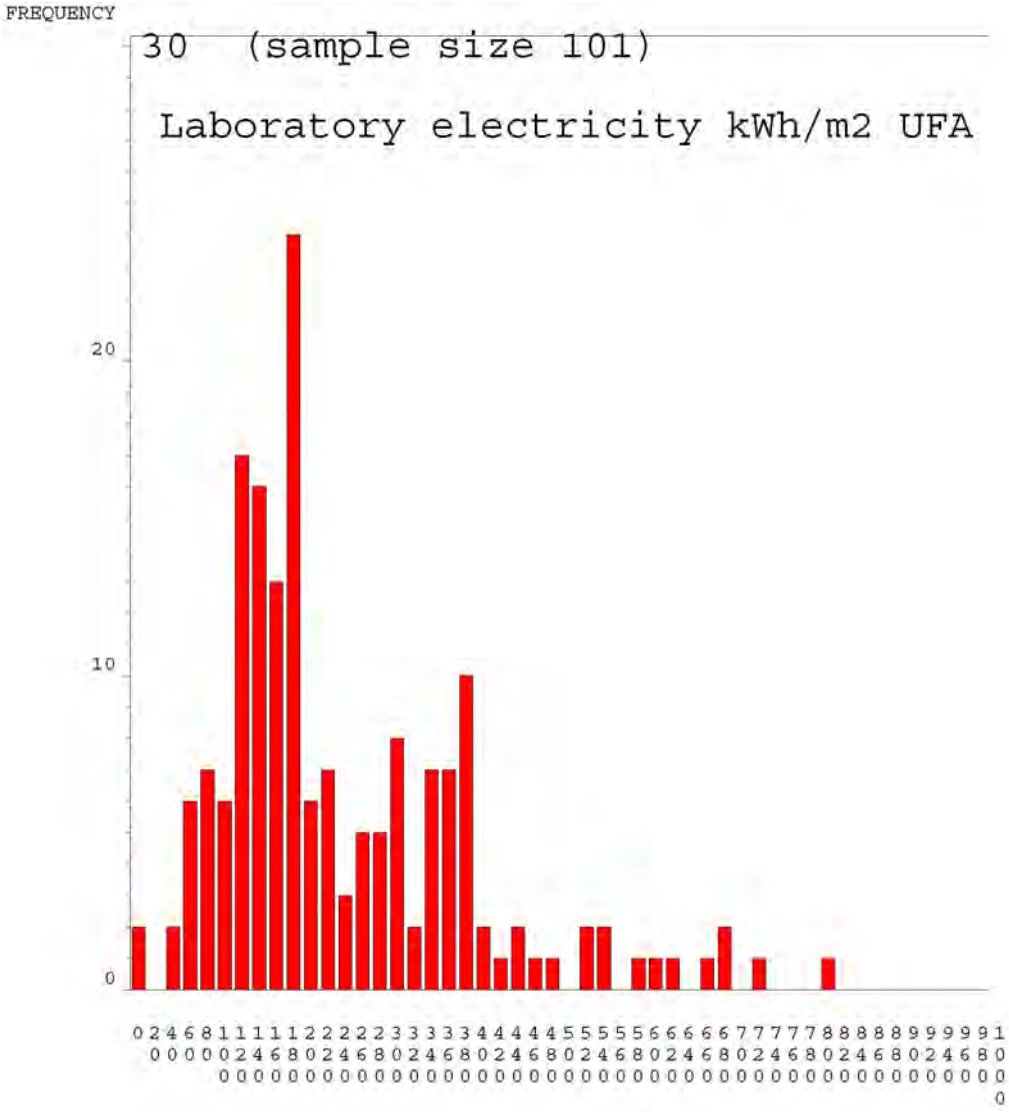
kg/m² Treated Floor Area at Defra 2008 CO_2 factors of 0.185 for gas and 0.537 for electricity



Review for CIBSE of data collected from DECs in the UK *(40,000 records)*



Public sector offices only



SOURCE: Ongoing study of Landmark database for CIBSE by University College London (H Bruhns, private communication, July 2010)

Unintended consequences of energy certification already manifest

- Certificates are too often seen as an end in themselves *(not least by government)* instead of a window onto a wider world and a platform for understanding and improvement.
- Clumsy processes with unnecessarily high transaction costs in relation to the value added.
- Poor connections with other aspects of energy policy, e.g. metering, carbon trading, incentives.
- Hobbled by probably needless fears about confidentiality.
- Gravy train for certification, accreditation and training agencies, whose business case is related to the transaction, not the outcome. *Dash to the bottom?*
- The metric can drive the outcome: the UK puts too much stress on carbon. We need multiple metrics, *e.g. electrical, thermal, source/primary energy; separation between supply and demand; identification of unusual features.*
- The definition “building” doesn’t suit complex premises.
- Poor connection to the realities of rented and multi-tenanted buildings, with multiple players and outsourced services. *We developed a Landlord’s Energy Statement to help with this. See www.les-ter.org*
- Not enough emphasis on actual performance at European Union level.

WHERE NEXT?

Some points for discussion

- Do there need to be differences between statutory and voluntary systems, or does that just confuse the market?
- Isn't getting good energy and carbon performance more a social enterprise than a technical and economic one?
- How can we encourage people to get good results by doing things better, more carefully, and in a more integrated manner?
- How do we spend money wisely, get results cost-effectively and avoid incurring unsustainable maintenance and management burdens?
- How do we stop people running off and spending money on "eco-bling" when there is so much low-hanging fruit to be harvested?
- Can we automate the routine parts of the benchmarking, potentially allowing people to spend more of their time and money on getting results? This is happening in California.
- How do we build capacity to do all this?

www.usablebuildings.co.uk