

Building Performance Evaluation: Why does it matter?

Demonstrating improving performance

For owners/Occupiers

- Staff retention and recruitment
- Carbon Reduction Commitment
- DEC's
- Social responsibility reporting
- Future links to e.g. Business rating system?
- Asset value retention
- Justification for capital investment

Demonstrating improving performance

For supply chain business improvement

- Client satisfaction scores
- EPC/DEC convergence
- Output-driven specifications
- Short-cut to product development and demonstration
- Fasttrack staff improvement programme

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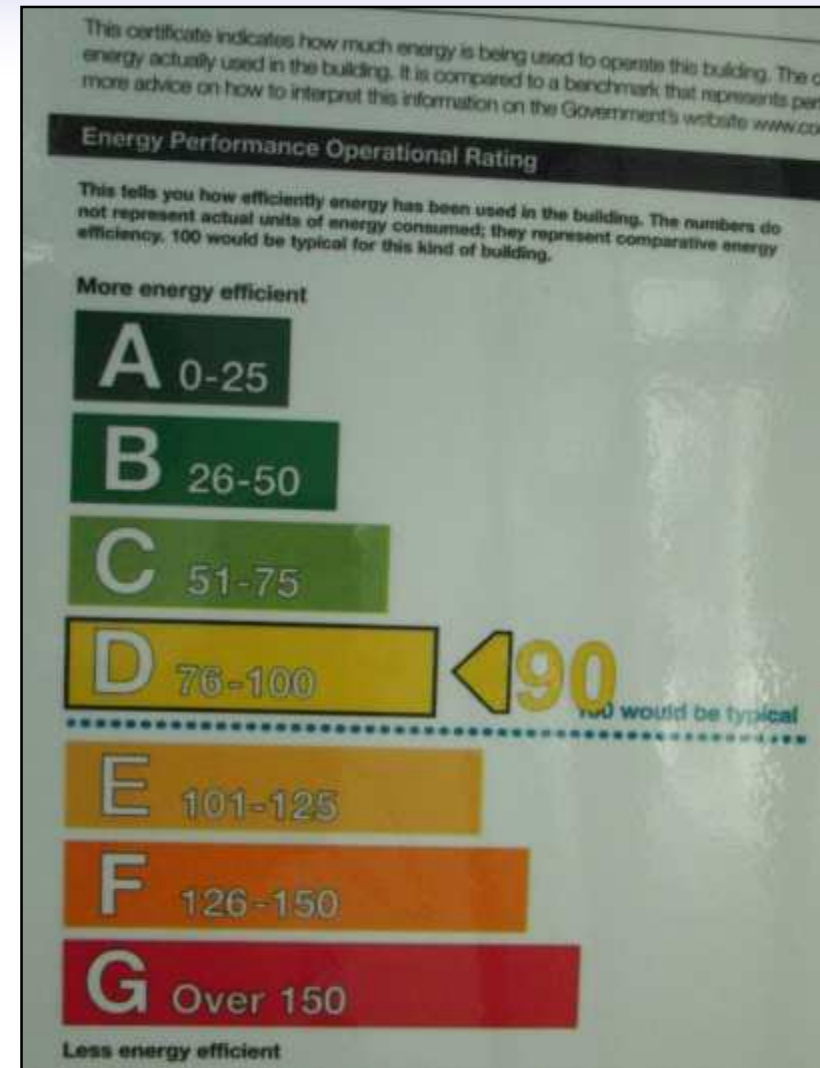
Technology Strategy Board assigned BPE Assessor

What is Building Performance Evaluation?

- Evaluation of a building in use
- 3 Areas:
- Forensic Walkthrough – inspection of building's operation, and whether there are any emerging problems or wasteful operational practices
- Energy Survey – breakdown of energy use in building by type of consumption e.g. heating, air conditioning, lighting etc.
- Assessment of occupant satisfaction – survey and interviews of building users

1. Forensic Walkthrough

- Recent Survey
- Building Headlines:
 - EPC Asset Rating 'A'
 - BREEAM 'Excellent'
 - 60% CO2 less over Part L
 - County Design and Sustainability Award
 - RIBA Award



Forensic Walkthrough



- What is wrong with this picture?
- Lights could not be turned off

- Cafeteria is run by an outside company – no real idea of energy consumption
- Server room is ‘nice and cold’ – is it too cold?
- 3rd Floor too hot, whilst floor void freezing – AHU is overworking as thermostat is stating space is hot



More Lighting On



- Presence detection and daylight linking technology
- Are light levels set correctly?

Back of house areas:

- Timers set to 2 hours
- Occupants worried about walking into spaces
- Some occupants had switches installed to override automatic system



Biomass Boilers



- **Not** in operation (lead boiler)
- Accident during maintenance
- Difficult to clean
- Problems with woodchip conveyor
- Expensive to service
- More trouble than its worth?
- **Is design team thinking of end-users or design credits?**

Building Management System



- Difficult to use
- Reports how mechanical system should be optimised
 - Status of equipment incorrectly, status of biomass boiler off not reported correctly
- Requires outside BMS systems engineer to adjust
- How useful as a reporting or monitoring tool?

Important to Talk to Facility Managers



- Facility Manager didn't know location of sub-meters
- If not measuring, how review and act?

- County Council receives bill – don't see it
 - Vested interest?
- Bad handover – A Building User Manual was produced as part of handover, FM not aware of document
 - Gap between delivery team and users



2. Energy Surveys



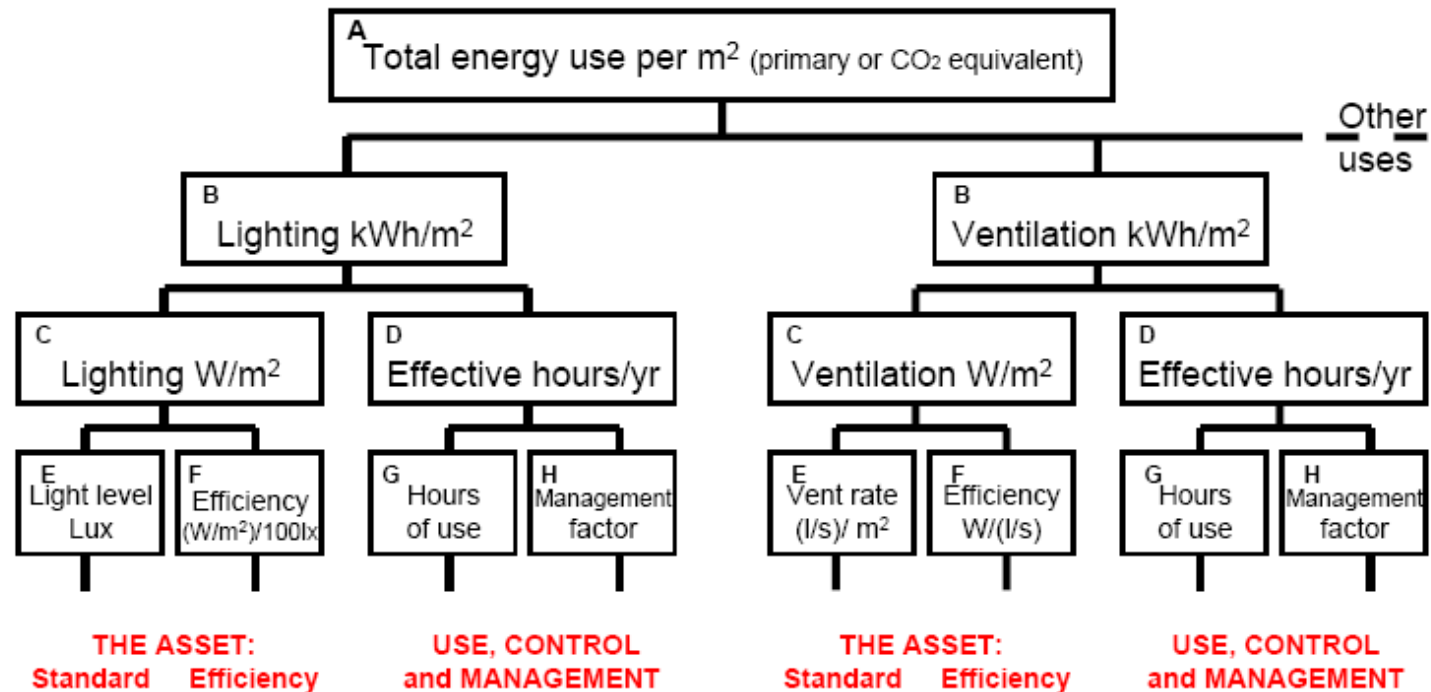
CIBSE TM22:
Energy assessment and reporting method

- Conducted at several levels:
- Quick assessments from energy bills and meter readings
- Extensive monitoring
 - Alan Gilbert will expand more on
 - Full load assessments
 - Load profile analysis
- Detailed analysis –TM22 can be used as an energy estimation tool
 - Review individual component loads
 - Find out run-times of loads
 - Build a load profile

CIBSE TM22

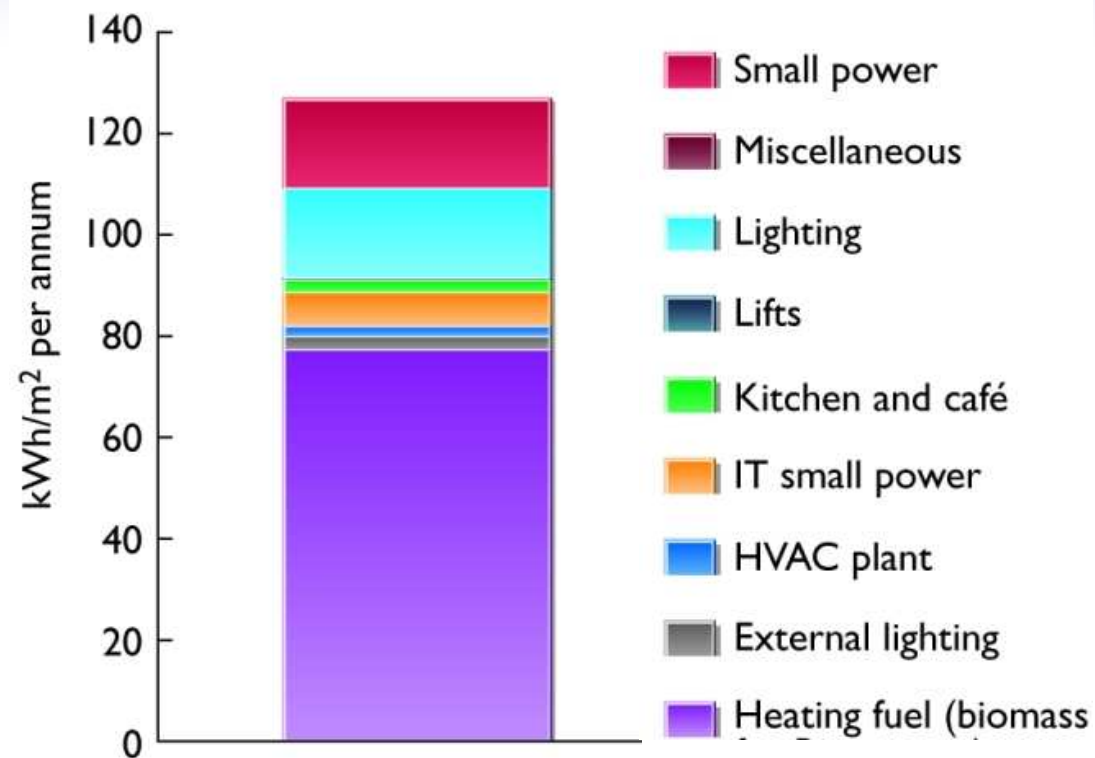
“Tree diagram” analysis of building energy consumption and service provision

Each box can be considered as a benchmark



Source: CIBSE TM 22 and J Field, J Soper, P Jones, W Bordass & P Grigg, Energy performance of occupied non-domestic buildings: assessment by analysing end-use energy consumptions, Building Services Engineering Research and Technology 18(1) 39-46 (1997).

CIBSE TM22



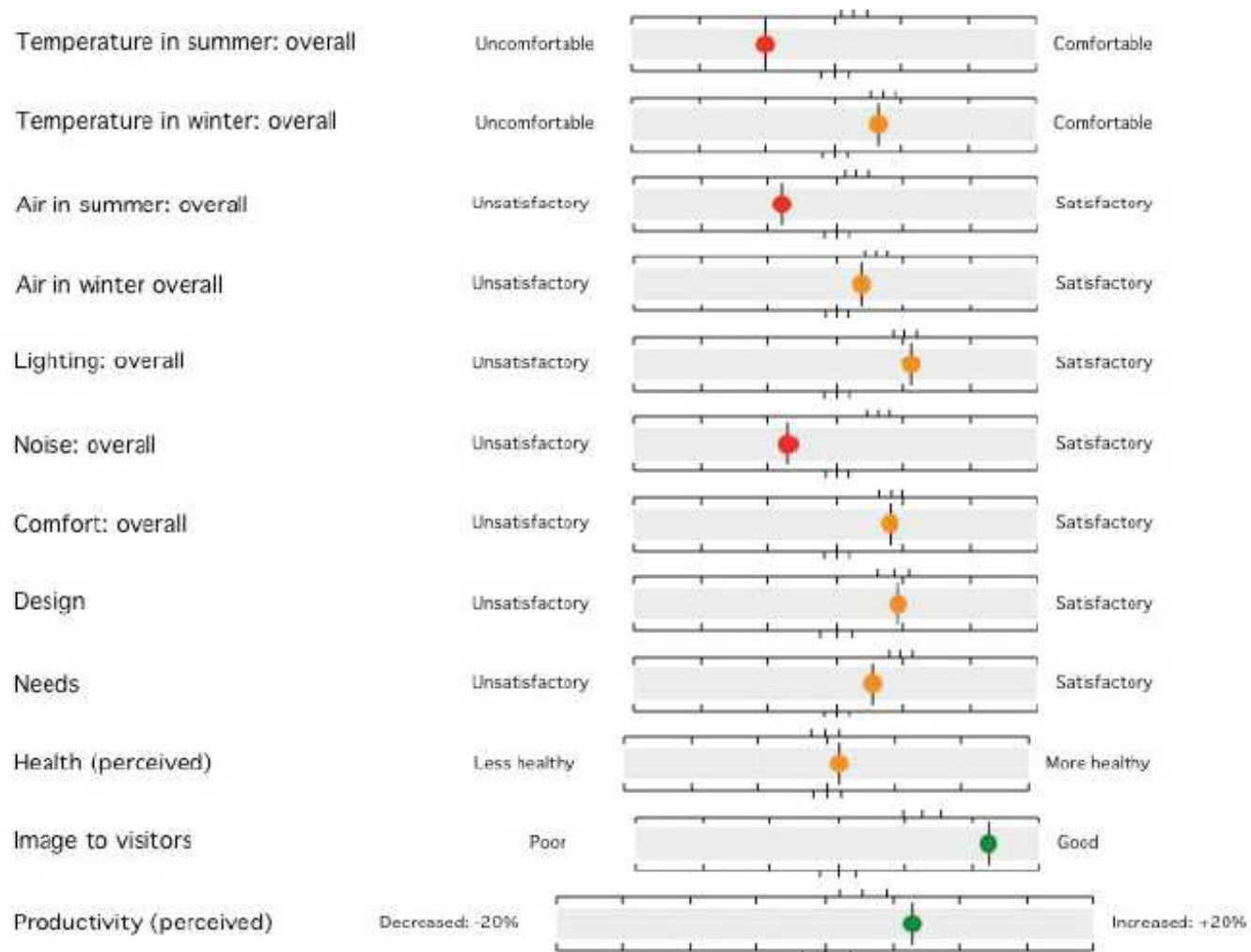
- End up with a load profile
- Able to benchmark against other buildings

3. Occupancy Satisfaction

- Collect feedback from building users about how well buildings work
- Structured interviews, surveys and questionnaires
- Building Use Studies (BUS) Methodology
 - Questionnaire based
 - Answers processed by software
 - Produces benchmarked statistics
 - Comments from Users



How Benchmarks Look



Comments from Users

From BSRIA's Occupant Survey

- Overall Comfort:
 - Heating fluctuates and is never consistent, sometimes in summer it is very hot outside but I find myself wishing I had bought a jumper to wear inside
 - More natural light and natural ventilation needed
 - Open plan – loud conversations from other end of building disruptive
- Changed behaviour due to conditions in building:
 - Get quiet sleepy and slow in the afternoon if it gets stuffy. Need to leave the desk more to chivvy myself up
 - Occasionally take reading to the café area and sometimes outside so I can concentrate and have a break from computer screen and fresh air
 - When extreme concentration is required, I prefer to work from home
- This provides unedited direct feedback

Bookend of Why?

- Look to provide better buildings
 - In use and design
- With evaluation we can make informed changes
- Make feedback routine
- To embed a culture of building performance evaluation in the construction industry
 - Without fear or suspicion
- Close the loop between design aspirations and in-use performance
 - BREEAM 'Excellent' ≠ DEC 'D' rating

