




# LABELLING & LOG BOOKS

**Phil Jones**

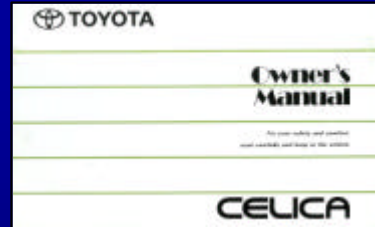
*Building Energy Solutions  
- On behalf of Action Energy*

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 <p>The Building Regulations 2000</p> <p><b>Conservation of fuel and power</b></p>	<ul style="list-style-type: none"><li>• New buildings</li><li>• Major refurbishments</li><li>• When replacing controlled services</li></ul>
<p><b>L2</b></p> <p>APPROVED DOCUMENT</p>	<p><b><i>“Better information leads to better buildings”</i></b></p>
<p>L2 Conservation of fuel and power in buildings other than dwellings</p>	
<p>Coming into effect 1 April 2002</p> <p>The Stationery Office</p> <p><b>2002 EDITION</b></p>	

## WHAT IS A BUILDING LOG BOOK?

Analogous to car owners handbook



Where are the instructions??



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## WHAT IS A BUILDING LOG BOOK?

- Summary of building
- Single reference point
- Source of information/training
- Dynamic document

For recording building alterations, maintenance and energy performance

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## Building log book toolkit



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Incorporating:  
CIBSE TM31: *Building log books*  
and standard templates

## CIBSE TM31

- How to develop log books
- Authors toolkit
- Lays down an industry standard
- Dti support



## THE TOOLKIT

### Printed Publications

Technical Memorandum  
TM 31  
Building Log Books - a guide and template

Building log book  
SMALL BUSINESS TEMPLATE

### Associated Disc

Building log book  
MAIN TEMPLATE

Building log book  
SMALL BUSINESS TEMPLATE

Building log book  
EXAMPLE 1  
Large air-conditioned office

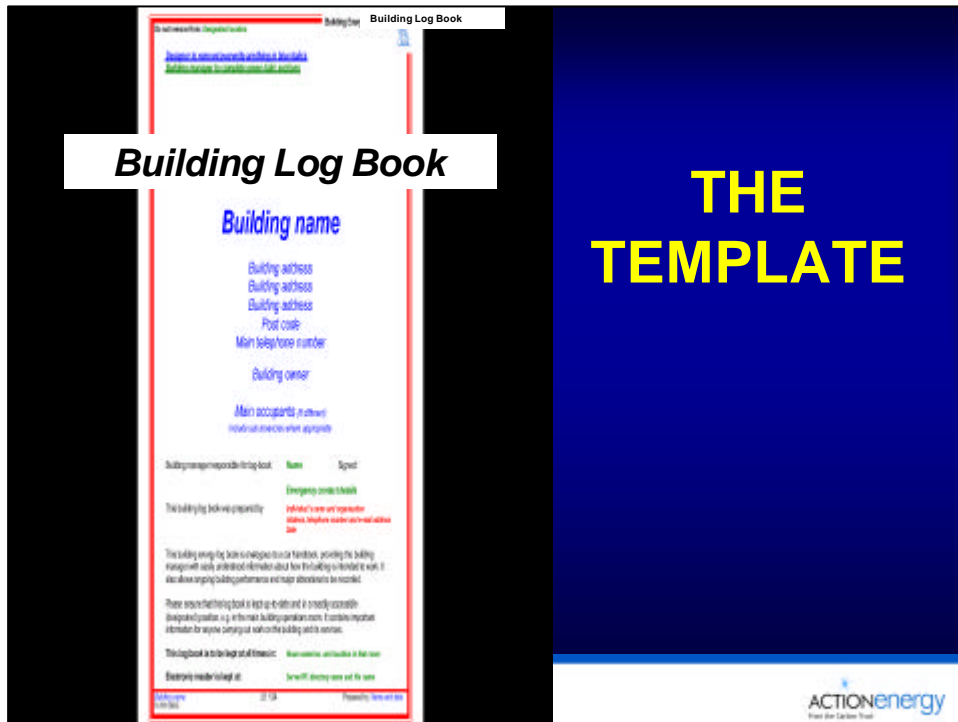
Building log book  
EXAMPLE 2  
Small naturally ventilated school

Building log book  
EXAMPLE 3  
Very small micro business office

GPG 348 - Building Log Books - a user's guide

GIL 65 - Metering new non-domestic buildings





## KEY FEATURES

- Facilities manager takes ownership
- Blue & green 'fill-in' text
- Encourages diagrams and tables
- Indications of page lengths
- Distinctive border
- Written style to come from examples
- Relevant certificates in appendix

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## Golden Rules (Authors)

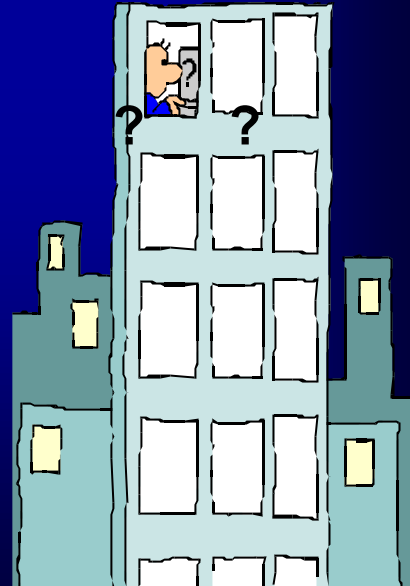
- Include log book in clients brief and fee structure
- Appoint a single person responsible for production
  - e.g. Lead building services designer
- Start the process early
- Use the distinctive CIBSE style so it is easily recognisable
- Keep the contents list close to the template to retain a common recognisable structure
- Make it easy to read and understand, use diagrams
- 20 to 50 pages at handover
  - (5 to 10 for small businesses < 200m<sup>2</sup>)

## BENEFITS TO DESIGNERS

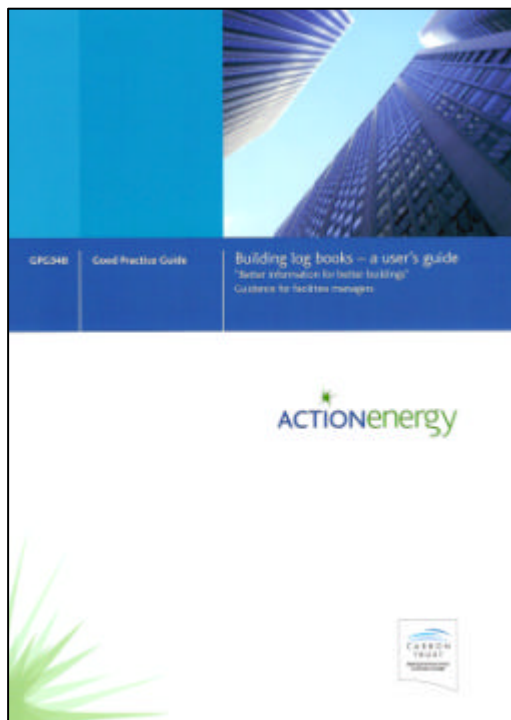
- Sets out the design criteria
- Gets the design philosophy across
- Leads into O&Ms, drawings etc.
- Protects against building misuse
- Insurance policy against.....
  - ....“my building isn’t working”
  - ....”my building consumes more”
- Ensures a better handover

## ENSURE COMPLETE HANDOVER

*Log books help ensure that building services are properly commissioned and handed over to the FM*



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## Good Practice Guide 348 - a user's guide

- Aimed at FMs
- Examples of how to log energy
- Action Energy publication

[www.actionenergy.org.uk](http://www.actionenergy.org.uk)

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# FM RESPONSIBILITIES

1. Ensure it is up to date at handover
2. Keep it up to date on a day-to-day & annual basis
  - including any changes to the building fabric, services, operation or management
3. Ensure that all those working in the building are aware of information contained in the log book
4. Keep the log book in its designated location
5. Ensure that building maintenance and energy performance is logged

Not a legal requirement



# TAKING RESPONSIBILITY

Do not remove from: Building operations room 1/17

Building Log Book

**Building Energy Log Book**  
**Vermont Court**

*Watson Square  
London  
E14M 8BR  
020 8123 4567*

*Building owner: Davies properties plc*

*Main occupants: London traders Ltd*

Facilities manager responsible for log-book: D Smith  
Wetherby House  
Pentham  
Essex  
09876 54321

Signed: D Smith

The Facilities Manager signs the log book at initial handover or when taking over from a predecessor



# KEEPING COPIES

This building log book was prepared by *P G Jones*  
*Building Energy Solutions*  
*12 Asquith House*  
*Dunymans Road*  
*Banstead*  
*Surrey KT18 5UF*

Version No 1: 27.5.03

This building energy log book is analogous to a car handbook, providing the building manager with easily understood information about how the building is intended to also allows ongoing building 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: Building operations room 1/17

Electronic master is kept at: Main server: C:/building/building log book

Vermont Court

Log Book 1/34

Prepared

**LOCATION**  
 This log book is to be kept at all times in: Room name/No & designated location in that room.

**ELECTRONIC MASTER**  
 An electronic master is kept at: Server/PC, directory name & file name."



# UPDATING THE LOG BOOK

## 1 Annual review and updates to the log book

The log book should be reviewed annually as part of the organisation's quality assurance system and an entry should be made for each review. Where the log book has been updated then the changed pages should be recorded.

Review year	Description of annual log book review and updates made	Pages updated or added	Building manager's signature	Date
	No significant changes to design made in run up to handover	N/A	b.Smith	10.5.03
	Fan in AHU 2 replaced in defects liability period due to under performance	24a	b.Smith	15.9.03
	Annual review of energy performance carried out	28a	b.Smith	30.5.04
	Annual review of maintenance carried out	30a	b.Smith	20.5.04
	Variable speed drive added to domestic hot water circulation loop as an energy saving measure	17a	b.Smith	15.7.04
	New sub meter installed on kitchen extract fans to log energy use	29a	b.Smith	10.8.04
	Main heating pumps upgraded to improve water flow and distribution of heat	17b	b.Smith	20.8.04

The facilities manager must approve any changes made to the log book

Any changes to the log book must be logged including annual reviews of energy and maintenance

Updated pages must have a new separate number to show a progressive history





## 7 Summary of areas and occupancy

(Not more than one page of text plus one simple plan per floor)

### Occupancy and activities

Level	NIA (m2)	Occupancy type	Floor space factor (persons/m <sup>2</sup> )	Population sum
Basement	0			
Lower Ground	0			
Ground	2,800	Office	12	233
First	2,699	Dealer	7	270
Second	2,843	Office	12	237
Third	2,750	Office	12	229
Fourth	2,750	Office	12	229
Fifth	2,501	Office	12	208
Sixth	1,341	Office	12	112
Seventh	1,059	Office	12	88
Eighth	0			
<b>Sum</b>	<b>18,742</b>			<b>1,607</b>

The total number of occupants in the building is 1607 (based on core hours of use)

Main occupied areas	Weekday hours	Saturday hours	Sunday hours	Total hours/week	Flextime (Yes/No?)	Late working sometimes (Yes/No?)	No. of occupants
Dealing Floor	07.00-21.00	09.00-12.00	None	73	Yes	Yes	270
General offices	08.00-18.00	None	None	50	Yes	Yes	1300
Restaurant catering staff	09.00-15.00	None	None	45	No	No	7

### Floor areas

The total floor area of the building is 27,531 m<sup>2</sup> (based on gross floor area)

Area type	% of total area by servicing system						Total %	Total area (m <sup>2</sup> )
	Untreated (%)	Naturally ventilated (%)	Mechanically ventilated (%)	Mixed mode (%)	Heating and cooling only (%)	Full air conditioning with humidity control (%)		
Basement	9.36%		4.11%				13.47%	3,706
Lower Ground	0.53%		5.62%				6.15%	1,693
Ground	1.15%		6.35%			4.19%	11.69%	3,218
First	0.80%		0.83%			9.64%	11.27%	3,103
Second	0.85%		0.80%	0.38%		9.84%	11.87%	3,268
Third	0.82%		0.84%			9.82%	11.48%	3,161
Fourth	0.81%		0.84%			9.83%	11.48%	3,161
Fifth	0.82%		0.86%			8.78%	10.44%	2,874
Sixth	1.48%		0.84%			3.50%	5.80%	1,542
Seventh	0.44%		0.48%			3.50%	4.42%	1,217
Eighth	1.81%		0.34%			0.00%	2.15%	592
<b>Total %</b>	<b>18.85%</b>		<b>21.71%</b>	<b>0.38%</b>		<b>59.08%</b>	<b>100%</b>	
<b>Total area (m<sup>2</sup>)</b>	<b>5,190</b>		<b>5,977</b>	<b>105</b>		<b>16,265</b>		<b>27,531</b>

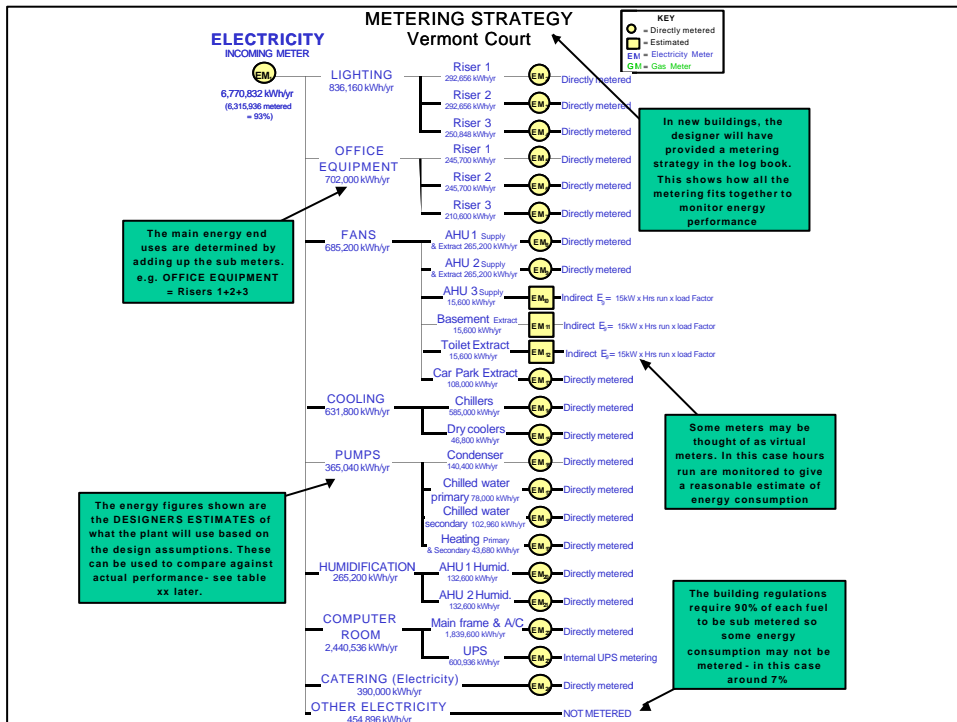
# 11 Metering, monitoring and targeting strategy

(Not more than three pages)

## Metering schedule

The following provides a list of meters and design estimates of the likely end use consumptions. See Action Energy General Information Leaflet GIL 65: *Metering energy use in new non-domestic buildings*, for an example, including how to arrive at a good metering schedule. A copy is provided on the CD-ROM associated with CIBSE TM31 and printed copies are available from ([www.actionenergy.org.uk](http://www.actionenergy.org.uk)). CIBSE TM22 also provides a means of assessing energy use in buildings.

Total estimated incoming fuel			Electricity: 7,677,227 kWh/yr Gas: 3,783,810 kWh/yr					
Energy			Meters	Method	Meter location			
Type of incoming energy	Main end-use	Subtotal end-use consumption (kWh/yr)	Meter no./code	End use area/s, plant/room or tertiary to be measured	Measurement method and calculation where appropriate	Estimated consumption through each meter (kWh/yr)	List of meters	Location
ELECTRICITY	MAIN INCOMING		EM1		Directly metered			
	LIGHTING	1,075,685	EM2	Lighting riser 1	Directly metered	344,710	Electricity meter	Basement floor 1
			EM3	Lighting riser 2	Directly metered	397,746	Electricity meter	Basement floor 2
			EM4	Lighting riser 3	Directly metered	343,229	Electricity meter	Basement floor 3
SMALL POWER		828,180	EM5	Small power riser 1	Directly metered	273,270	Electricity meter	Basement floor 1
			EM6	Small power riser 2	Directly metered	336,597	Electricity meter	Basement floor 2
			EM7	Small power riser 3	Directly metered	248,430	Electricity meter	Basement floor 3
FANS		734,580	EM8	AHU1 Supply & extract fans	Directly metered	335,490	Electricity meter	Basement AHU plant room
			EM9	AHU2 Supply & extract fans	Directly metered	309,435	Electricity meter	Basement AHU plant room
			EM10	AHU3 Supply fan	Indirect	19,654	Hours rate	Basement AHU plant room
			EM11	Basement extract fans	Indirect	16,984	Hours rate	Car park plant room
			EM12	Toilet extract fan	Indirect	22,055	Hours rate	Hotel plant room



### Metering energy use in new non-domestic buildings

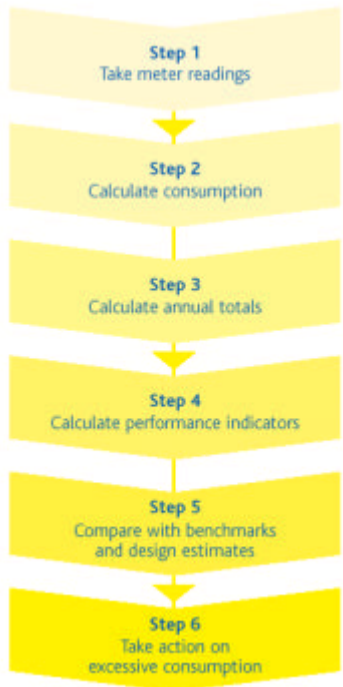
A guide to help designers meet Part L2 of the Building Regulations

Develop a metering strategy that can:

- optimise cost, practicality and savings
- improve operators' understanding of their buildings
- save 5-10% of energy in 1 year



BEST PRACTICE PROGRAMME



**LOGGING OVERALL ENERGY PERFORMANCE**  
**- a step by step approach**

# LOGGING OVERALL ENERGY PERFORMANCE

Log the annual consumption in kWh

Multiply by CO<sub>2</sub> factor  
This shows how many kilograms of CO<sub>2</sub> are emitted when one kWh of each fuel is used

Divide by floor area


Compare with benchmarks  
Actual performance indicators versus those estimated by the designers versus good practice benchmarks, where available

Building energy performance for period from Jan 2001 to Jan 2002  
Based on a gross floor area of 2,000m<sup>2</sup>

Fuel	KWh	CO <sub>2</sub> ratio kg CO <sub>2</sub> /kWh	kg CO <sub>2</sub>	Actual kg CO <sub>2</sub> /m <sup>2</sup>	Design estimates kg CO <sub>2</sub> /m <sup>2</sup>	Good practice benchmark kg CO <sub>2</sub> /m <sup>2</sup>
	(A)	(B)	(C)	(D)	(E)	(F)
Electricity	369,240	0.43*	158,773	79.4	61.2	55.3
Gas	1,103,960	0.19	209,752	104.9	89.0	85.7
<b>Total</b>				<b>184.3</b>	<b>150.2</b>	<b>141</b>


Keep electricity and fossil fuel separate as it helps identify where the energy problems might lie. In this case, electricity is 30% above the designers estimates, possibly indicating excessive consumption by lighting or small power

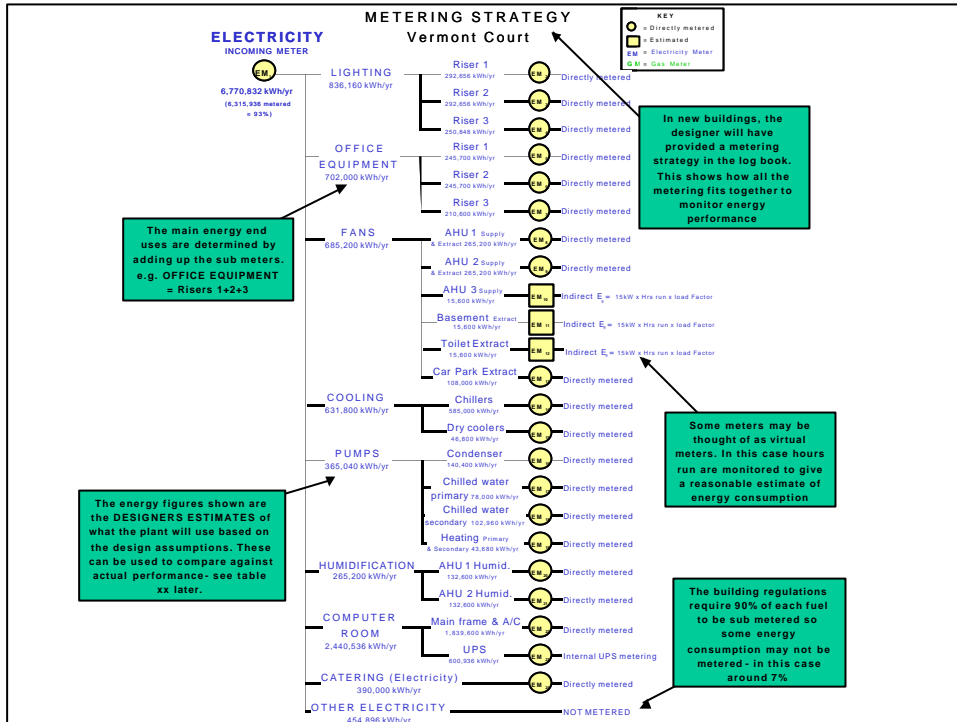
If you want one single indicator of performance then use kg CO<sub>2</sub>/m<sup>2</sup>



Appendix - Logging energy performance in more detail

## WHERE SUB- METERING IS IN PLACE





## LOGGING ENERGY PERFORMANCE IN MORE DETAIL

**STEP 1 – Take meter readings**  
Try and take readings over regular periods to allow comparisons e.g. monthly, quarterly etc.

**STEP 2 – Calculate consumptions**  
Subtract previous meter reading to get kWh consumption over that period

ELECTRICITY METER READINGS									
Year	2002	EM, Main electricity meter		EM, lighting Riser 1		EM, Lighting Riser 2		EM, Lighting Riser 3	
Date	Time	Meter Reading	Consumption (kWh)	Meter Reading	Consumption (kWh)	Meter Reading	Consumption (kWh)	Meter Reading	Consumption (kWh)
4.1.02	15:30	2665,172		226,724		373,345		132,525	
4.2.02	11:00	3,256,147	620,576	258,323	31,599	408,888	35,543	163,987	31,462
4.3.02	10:30	3,830,326	654,178	287,049	28,727	441,200	32,312	192,588	38,602
5.11.02	16:15	9,084,442	6,141,718	511,691	26,428	693,681	29,727	416,253	26,314
8.12.02	8:15	9,705,618	620,576	540,418	28,727	726,194	32,312	444,855	28,602
4.1.03	9:00	10,312,799	607,780	571,443	31,025	761,091	34,697	475,745	30,890
<b>ANNUAL TOTAL</b>			<b>7,677,227</b>		<b>344,719</b>		<b>187,746</b>		<b>343,220</b>

Electricity meter readings continued on next page

**STEP 3 – Calculate annual totals**  
Calculate the total annual consumption in kWh for each sub meter

There are 23 sub meters measuring electricity in this building, each has a unique code and name describing what is measured

Record the floor area and ensure that the benchmarks and design estimates are based on the same definition

The log book should include the designers estimates of what consumption is likely to be

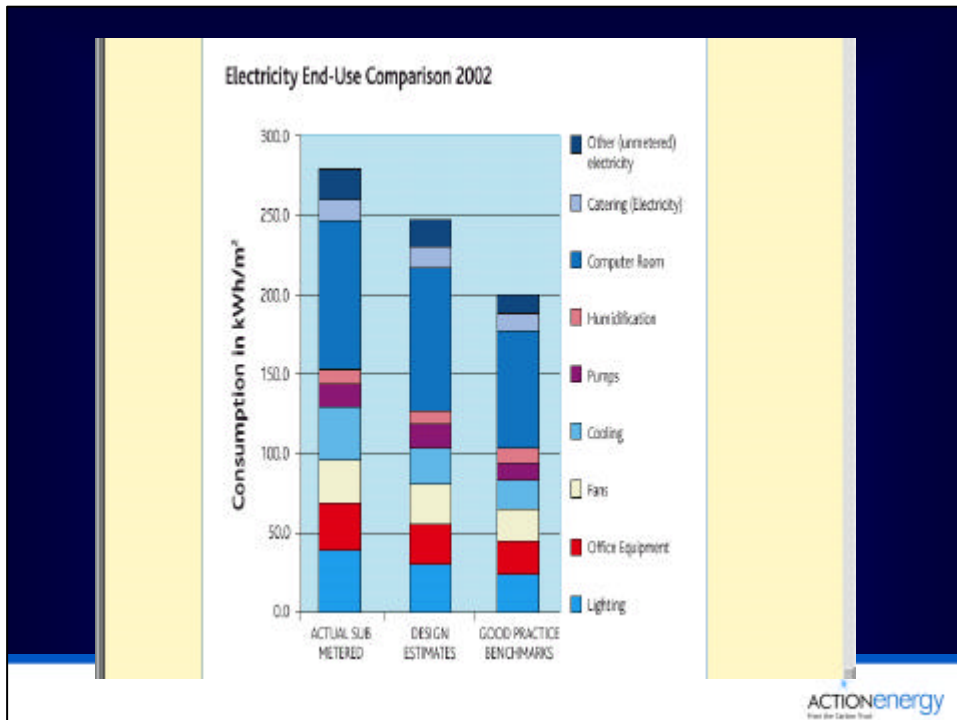
Typical and best practice benchmarks are available from Action Energy or CIBSE Guide F Energy Efficiency in Buildings

Building energy performance for period from 4.1.02 to 4.1.03		Based on gross floor area of 27,531 m <sup>2</sup>				
Fuel type	Main end use	ACTUAL INCOMING Metered consumption (kWh/yr)	ACTUAL SUB METERED Main end use energy consumption (kWh/yr)	ACTUAL SUB METERED Main end use energy consumption (kWh/m <sup>2</sup> /yr)	DESIGN ESTIMATES Main end use energy consumption (kWh/m <sup>2</sup> /yr)	BEST PRACTICE BENCHMARKS Main end use energy consumption (kWh/m <sup>2</sup> /yr)
ELECTRICITY	Lighting		1075685	39.1	30.4	24.7
	Office Equipment		828100	30.1	25.5	19.6
	Fans		734500	26.7	24.9	20.4
	Cooling		904150	32.8	22.9	17.9
	Pumps		395460	14.4	13.3	10.2
	Humidification		287300	10.4	9.6	10.2
	Computer Room		2526384	91.8	88.6	74.0
	Catering (Electricity)		420000	15.3	14.2	11.1
	TOTAL SUB METERED ELECTRICITY		7171579	260.5		
	TOTAL FROM MAIN INCOMING METER	7677227		278.9	245.9	198.9
	OTHER (UNMETERED) ELECTRICITY		505648	18.4	16.5	11.1
	Percentage unmetered		6.6%			
GAS	Space Heating		3031860	110.1	117.6	80.8
	Domestic Hot Water		464750	16.9	14.2	10.2
	Catering (Gas)		287300	10.4	9.6	6.0
	TOTAL SUB METERED GAS		3783910	137.4		
	TOTAL FROM MAIN INCOMING METER	3783910		137.4	141.4	96.9
	OTHER (UNMETERED) GAS		0	0.0	0.0	0.0
	Percentage unmetered		0.0%			

Calculate the unmetered consumption. If this is greater than 10% then investigate what it could be

**STEP 5 Compare performance**  
Actual v Benchmarks v Design Estimates  
Where available  
Most of the end uses in this particular building are significantly above the designers estimates which in turn are above the benchmarks

**STEP 6 Take action on excessive consumption**



## HOW WILL IT HELP FMs ?

- Managing the building will be easier with current design philosophy always available
- Informs staff and contractors and saves time in searching for key information
- Improves understanding of building
- Provides an historical record
- Avoids random alterations that damage design intent
- Logging performance helps identify energy problems
- Should help enhance occupant satisfaction

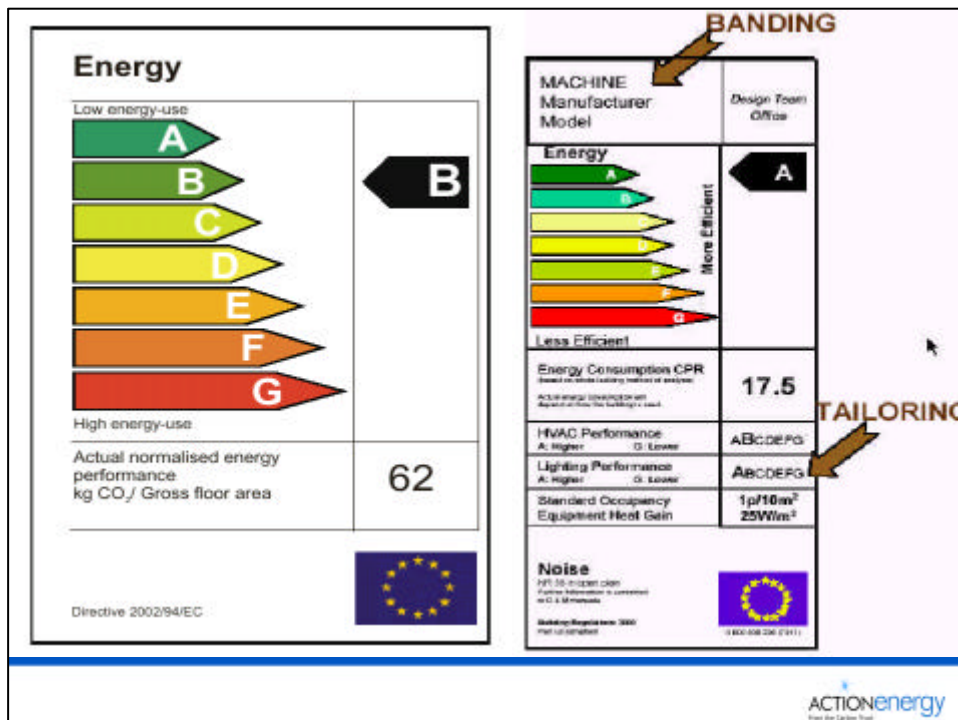
## HOPES FOR THE FUTURE

- Feedback could improve the way we design
  - Improved benchmarks
- Feed-forward could improve the way we use designs
- Could be used in ‘sea trials’ & POE
- Information could be used by developers/letting agents
- Could play a significant role in implementation of EU ‘*Energy Performance of Buildings*’ directive

# LOG BOOKS & LABELLING

Log books could.....

- hold the base information for labelling
  - e.g. Floor area & energy consumption
- hold the energy calculations & results
- hold the energy certificate
- feed data to software e.g. TM22
- hold the output from software
- build a historical record





# BENEFITS OF PROVIDING INFORMATION



- Economic benefits



- Environmental benefits



- Better building services

- Better buildings



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## Building log book toolkit



Building Energy School, London by Building Energy Partnership Ltd/ARUP

*Better Information  
leads to better  
buildings*

*Phil Jones*

*Building Energy Solutions*

*phil@build.demon.co.uk*



Incorporating:  
CIBSE TM31: *Building log books*  
and standard templates

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