



EPD Impact on Existing Building Stock: Energy certification of office buildings

EUROPROSPER

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For the Europrosper UK Team



EUROpean PRogramme for Occupant Satisfaction, Productivity and Environmental Rating of buildings



See www.europrosper.org

Europrosper objectives



- To develop energy certification procedures for existing office buildings compliant with the requirements of the EPD.....
which both deliver the objectives of the Directive (ie help to meet Kyoto targets) and are acceptable to the Property Industry.
- To put explicit emphasis on understanding the actual performance of buildings in use
- To develop a framework which suits both new, empty and occupied buildings, allowing design values to be reviewed in use
- To provide an approach with the potential to suit a wide range of building types

Europrosper approach

1. Review existing benchmarking/certification methods in each country and on the web



2. Develop Certification methods

- Building on existing methods
- Consulting with Industry Steering Groups

3. Develop training material

- Distance learning and web based tools
- Face to face training/examination days



4. Dissemination and exploitation

- Plan administration centres
- Report on extending methods to other building types



State of Art Review

Country	Name of scheme	Type of scheme	Grading method
Experience with national certification schemes			
Denmark	ELO	Mandatory audit & certification for buildings > 1,500 m²	By statistical distribution of peers
Finland	Energy Audit Programme (EAP)	Incentivised audits	N/A
US	Energy Star	Voluntary web scheme	By statistical distribution of peers
Australia	Australian Building Greenhouse Rating (ABGR)	Voluntary web scheme	Against benchmarks for a typical office building
Experience with national benchmarking schemes			
UK	ECONs 19 and 78 TM22	Voluntary 'official' rating; benchmarks for end uses	Against benchmarks for 4 iconic office buildings
Norway	Key Numbers	Voluntary 'official' rating by end use analysis	Against benchmarks for a typical office building

← IEQ



Europrosper Certification Strategy:

A common framework, across EU, for all non-domestic building types at any stage of life-cycle



Building life-cycle stage	Energy history?	Method	Certificate status	Subject of grading
New	NO	Calculate using design data	Theoretical	Asset only
Refurb	NO			
Empty	MAYBE	↓ ????? ↑	↓ ????? ↑	↓ ????? ↑
Occupied	YES	Use measured data from meters	Reality	Asset + Management



EPD text agreed at 2nd Reading by European Parliament 10 October 2002



3 Key issues for building certification:

1. Energy rating
2. Energy saving advice
3. Internal comfort conditions





Energy rating



Recital 16

“.....To the extent possible, the certificate should describe the actual energy performance situation of the building and may be revised accordingly.....”





Article 2: Definition of energy performance of a building



“the amount of energy actually consumed or estimated to meet the different needs associated with a standardised use of the building, which may include inter alia heating, hot water heating, cooling, ventilation and lighting.”





Energy rating by CO2 indicator



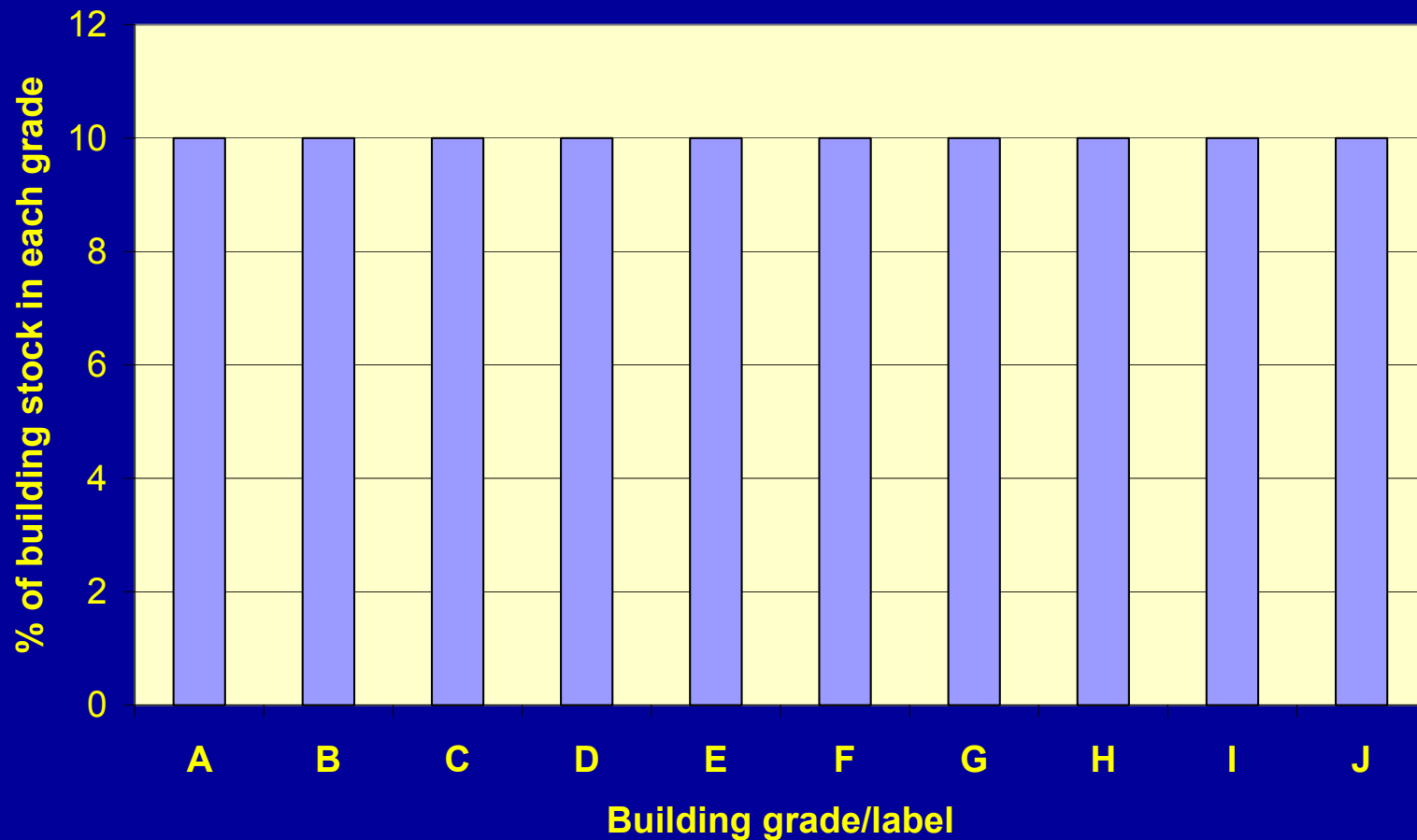
Article 3

“The energy performance of a building shall be expressed in a transparent manner and may include a CO₂ emission indicator”



Absolute Grading

say by equal deciles of CO2 emissions
as in ELO (Denmark) and Energy Star (US)





Energy Performance Certificate



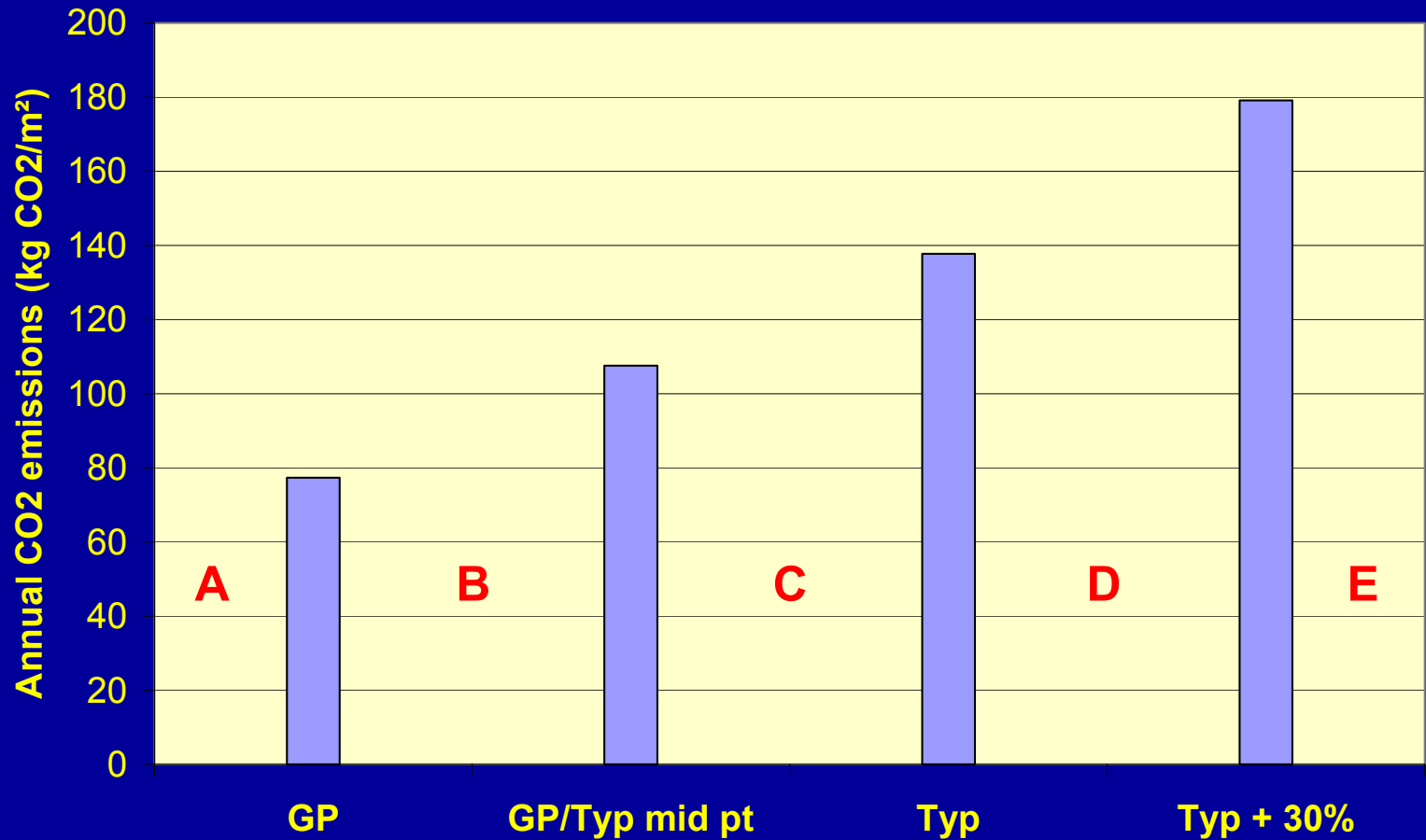
Article 7.2

- Certificate must compare energy performance with reference values such as benchmarks





Grading of CO2 emissions Relative to benchmarks



Iconic offices used for UK benchmarks

1

naturally ventilated cellular



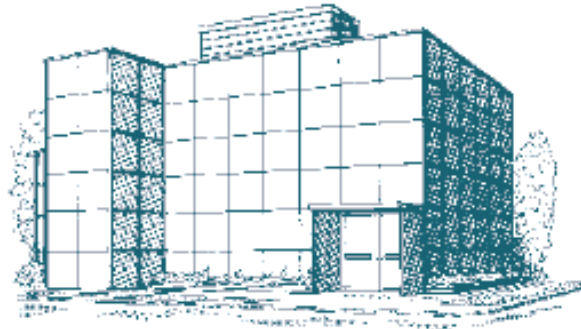
2

naturally ventilated open-plan



3

air-conditioned, standard



4

air-conditioned, prestige



End use breakdown for iconic offices

KEY

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

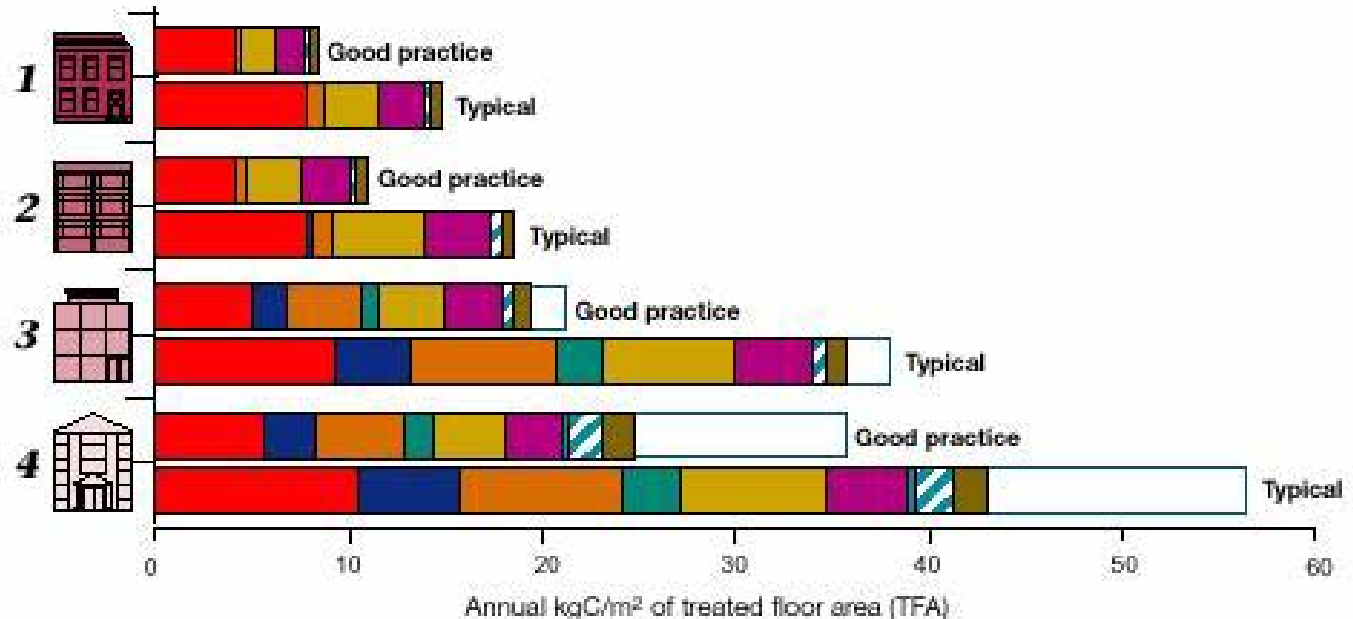


Figure 3 Carbon dioxide emission indices (CEIs) for good practice and typical examples of the four office types



Schedule of accommodation to generate a 'tailored' benchmark



Percent of NLA used by:

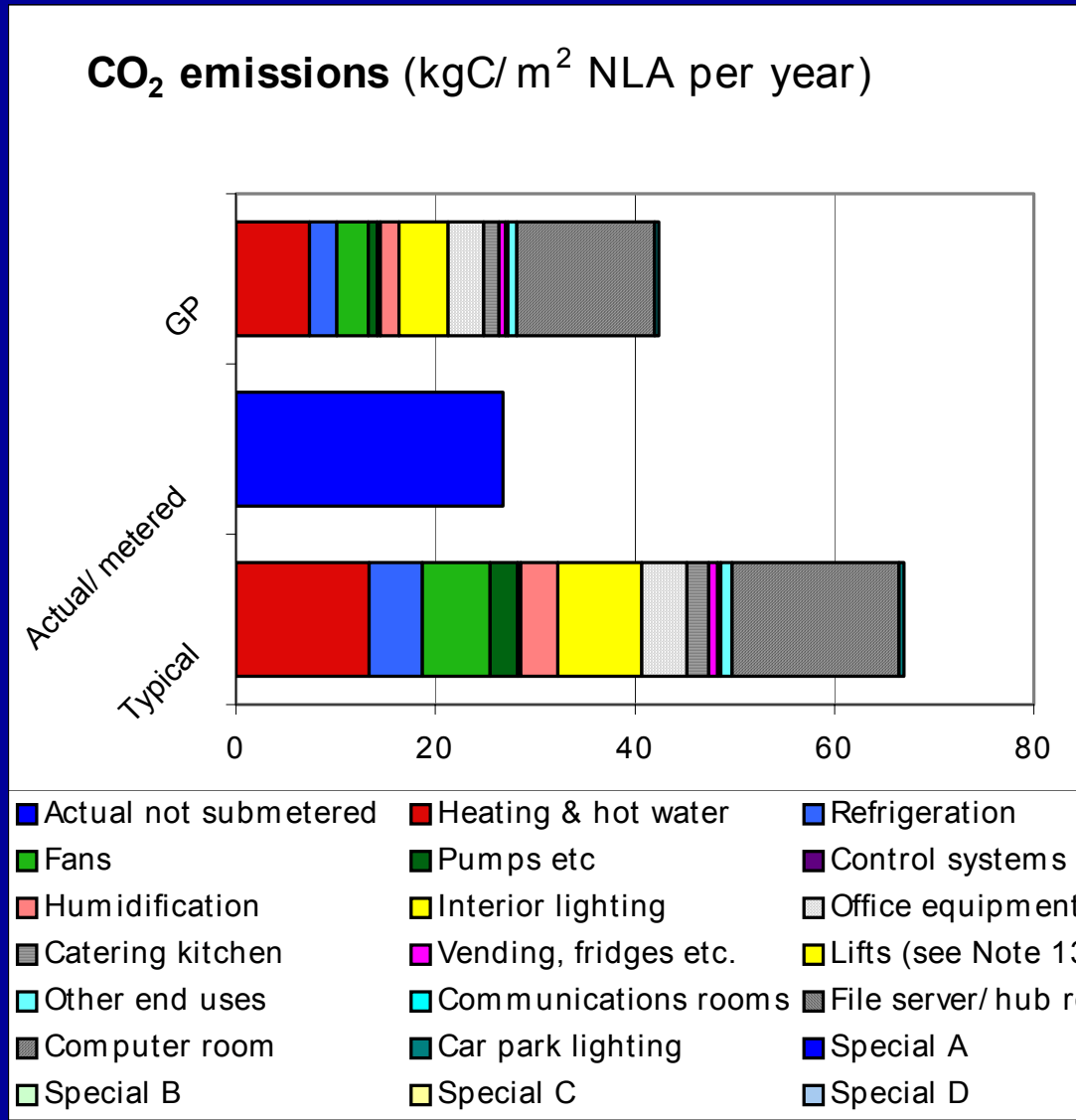
NOTE: Circ/support incl special areas at the bottom of the sheet

Call Centre, true area
 Dealing room, true area
 Cellular offices, true area
 Open plan offices, true area
 Circ/ support (default 25% total)
 Totals
 Common parts uplift **Note 2**

	Nat vent	Air Con	MM	Total % of NLA	Calc areas sq m NLA	% of this area type well daylit	Total wkstns in area	Calc per sq m local area
		15%		15%	1485		250	5.9
		15%		15%	1485		200	7.4
		5%		5%	495	100%	30	16.5
		20%	20%	40%	3960	20%	300	13.2
		25%		25%	2475		8	309.4
	0%	80%	20%	100%	9900		788	12.6
		25%		25.0%	2475		2	1237.5



Benchmarks tailored for Schedule of accommodation



Energy saving Advice



Article 7.2

- Certificate must include advice on how to improve energy performance cost-effectively

Method ????

- ? Tick-box approach
- ? Walk-through survey
- ? Full energy survey



Internal comfort conditions



Article 4

“....These requirements shall take account of general indoor climate conditions, in order to avoid possible negative effects such as inadequate ventilation....”

Method ?????

- ? Simple yes/no question
- ? Walk-through inspection
- ? Occupant survey



How a Certificate might be produced



Level	Descriptor	Process	Applicable buildings	Surveyor Type	Process
1	Simple	Automatic	Only ECON 19 Types 1 or 2	None	Based on utility and log book data
2	Standard	Self-certification	Any with in-house expertise	In-house	Web-based with QA check
3	Standard	External assessor	Any	Grade B eg MRICS	Walk-through building survey
4	Advanced	External assessor	Mainly more complex ECON 19 Types 3 to 4	Grade A eg Ceng	Professional energy survey with end use analysis

The Europrosper Procedure



Stage	Procedure	Level 2 Process	Level 3 Process
1	Collect building and energy data, using input conventions	Done by occupier	Done by surveyor
2	Process the building and energy performance data	Auto in software	Auto in software
3	Produce energy performance results	Auto in software	Auto in software
4	Collect data on energy features and measures	Tick-box form	Walk-through survey
5	Assess improvement potential and the effect of measures	Auto in software	Energy systems analysis - Tree Diagrams
6	Provide certificate of performance and measures	Auto in software	Auto in software
7	Provide follow-up plan and monitoring structure	Auto in software	Add input from surveyor

For 'Public Buildings'



Article 7.3

- For buildings $> 1,000 \text{ m}^2$ frequented by public, energy certificate must be displayed in prominent place clearly visible to public
- Recommended and actual indoor temperatures MAY also be clearly displayed



Article 15: Transposition



Article 15.1

- Member states must comply with EPD within 3 years of it coming into force ie Jan 2006



Article 15.2

- Implementation of certification may be delayed by up to a further 3 years if a Member State lacks sufficient qualified assessors ie Jan 2009



Incentivisation



Recital 16

.....Member states should facilitate the use of incentive systems (*for their certification schemes*)”





Possible additional financial incentives for UK



- Use 'high scoring' EPD energy performance certificates to qualify the holder to receive a reduction in Stamp Duty at point of sale
- Use EPD energy performance certificates to determine Rate liability within a tiered Rates structure
- Use EPD energy performance certificates as means to determine a building's liability for Climate Change Levy



The timetable for Certification



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Ratification by €Parliament										
Europrosper	W1	W2								
Adoption by Member States										
Certs for Public buildings					Mandatory by deadline →					
Certs for Private buildings					Voluntary If incentivised		Mandatory At time of sale →			

Summary



- Common framework for any non-domestic building allowing different detailed methods
- Calculated or measured energy label to suit different stages of building life-cycle
- Measured label should include absolute grading (per m²) and grading relative to FAIR benchmark
- Methods for energy saving advice and IEQ assessment still being considered!



EuroProsper



[See www.europrosper.org](http://www.europrosper.org)