

# Energy Certification of Non-Domestic Buildings



**FULCRUMCONSULTING**

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This briefing note provides an overview of the processes and impacts of the Energy Performance Certificates (EPCs) and Display Energy Certificates (DECs) being introduced in England and Wales in response to the EU Energy Performance of Buildings Directive (EPBD). It is intended as an informative guide to improve understanding of the legislation and its implications.

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## FURTHER INFORMATION

EPBD implementation in England and Wales;

[www.communities.gov.uk/epbd](http://www.communities.gov.uk/epbd)

EPBD implementation in Scotland;  
[www.sbsa.gov.uk](http://www.sbsa.gov.uk)

EPBD implementation in Northern Ireland;  
[www.dsdni.gov.uk](http://www.dsdni.gov.uk)

## ABOUT FULCRUM CONSULTING

Fulcrum Consulting is a leading international firm of multidisciplinary consulting engineers, delivering fully integrated design of building services, infrastructure, building design and built fabric solutions ensuring minimal environmental impact. We have developed world leading expertise over the last 25 years in low energy building design and sustainable construction.

We delight in the complex task of integrated building design needing as it does a wide and sensitive understanding of different viewpoints which must be woven into a sustainable and functioning whole. We work with design teams to assist in the understanding of the physics of sustainability and to help to use this as a design driver to deliver creative and exciting results.

Fulcrum believe engineering consultancy is a global enterprise and sustainability is a global issue. Our unique business model is based on knowledge sharing and respect for the individual and their culture.

## FULCRUMCONSULTING

62-68 Rosebery Avenue  
London EC1R 4RR  
Tel +44 (0)20 7520 1300  
Fax +44 (0)20 7520 1355  
[www.fulcrumfirst.com](http://www.fulcrumfirst.com)

BRISTOL | EDINBURGH | LONDON  
MADRID | HONG KONG

Fulcrum First Ltd  
Incorporated in England and Wales  
Registered Number 03401753

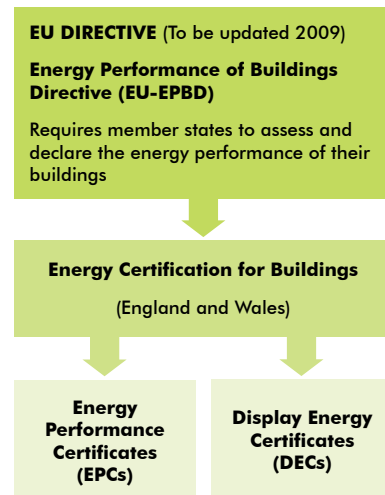


## Background

The EPBD became law across Europe in 2003. In England and Wales it was first implemented through the 2006 revision of the Building Regulations Part L. The second phase of implementation involves the application of the provisions under Article 7, Energy Performance Certificates; Article 8 Inspection of Boilers; and Article 9 Inspection of Air Conditioning Systems. A building is defined in the directive as;

“A roofed construction having walls, for which energy is used to condition the indoor climate; a building may refer to the building as a whole or parts thereof that have been designed or altered to be used separately”.

This briefing note concentrates on the response to article 7, Energy Performance Certificates.



## Timeline For Implementation

<b>6th April 2008</b>	EPCs required for the construction, sale or rent of buildings other than dwellings with a floor area over 10,000 m <sup>2</sup>
<b>1st July 2008</b>	EPCs required for the construction, sale or rent of buildings other than dwellings with a floor area over 2,500 m <sup>2</sup>
<b>1st October 2008</b>	EPCs required on the construction, sale or rent of all remaining buildings other than dwellings DECs required for all public buildings > 1,000 m <sup>2</sup>
<b>4th January 2009</b>	First inspection of all existing air-conditioning systems over 250 kW must have occurred by this date*
<b>4th January 2011</b>	First inspection of all remaining air-conditioning systems over 12kW must have occurred by this date*

\* Note - a system first put into service on or after 1 January 2008 must have a first inspection within 5 years of it first being put into service. Subsequent inspections are required every 5 years.

## Why Are The Certificates Being Introduced?

### CLIMATE CHANGE & ENERGY SUPPLY SECURITY

- Energy consumption and CO<sub>2</sub> emissions rising globally
- Countries becoming net energy importers
- Economic and social prosperity are currently energy dependent
- Geo-politics of energy supply are fragile

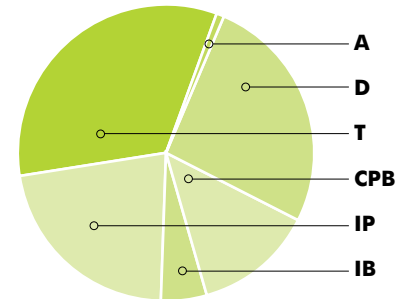
### SIGNIFICANCE OF BUILDINGS IN CLIMATE CHANGE MITIGATION

- ~45% of total energy footprint
- Only 1-2% of building stock is new-build p.a.
- Average refurbishment cycle is ~15 yrs
- 2050: 60% of buildings are already built; of those 40% pre-date Part L 1985

### DRIVER FOR INDUSTRY IMPROVEMENT

- Design side through Building Regulations Part L etc
- Operation side through commissioning, energy management, O&M manuals, refurbishments, etc

UK TOTAL EMISSIONS 2003 (560MT CO<sub>2</sub>)



1% Agriculture

26% Domestic

33% Transport

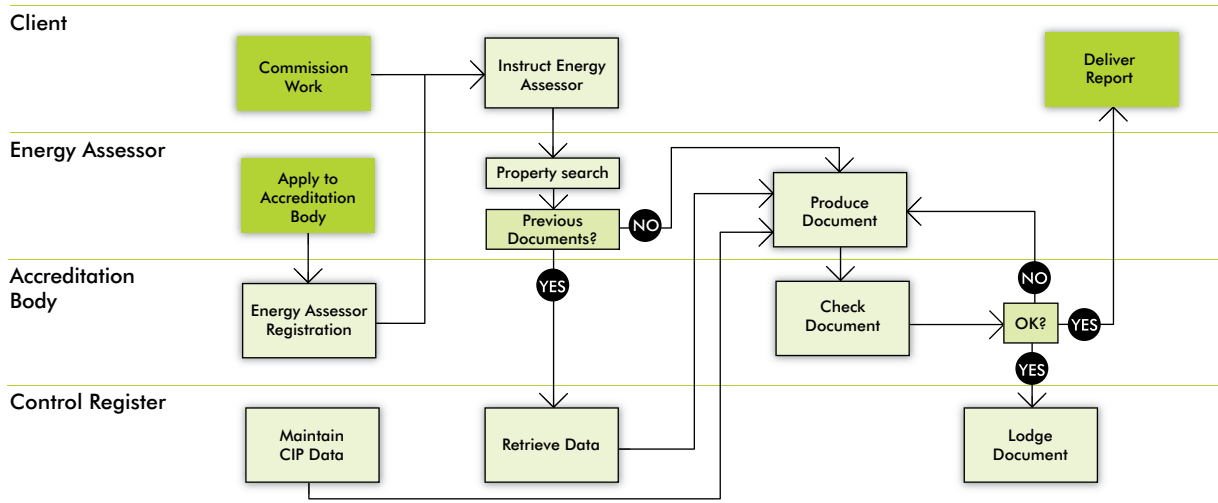
13% Commercial and Public Buildings

22% Industrial Processes

5% Industrial Buildings

## Carrying Out Certification

The process from commissioning to obtaining a certificate involves several steps and different bodies. All certificates must be issued by a certified, registered assessor. The following diagram outlines these steps;



Note: CIP: Central Information Point (provides weather data etc. For DEC energy calculations)  
 Central Register operated by Landmark Information Group Ltd records all EPC/DEC reports and advisory reports for future reference. It is unclear at present what the access requirements to this database will be.

## Energy Performance Certificates

Asset rating required for all buildings on construction, sale or rent.

### METHODOLOGY

$$\text{Asset rating} = \frac{\text{Building Emissions Rating (kgCO}_2\text{/m}^2\text{)}}{\text{Notional Building Rating (kgCO}_2\text{/m}^2\text{)}}$$

- Typically ~200 data inputs
- Uses updated data required for Part L compliance
- Sites: Disaggregate site energy to individual buildings by area
- Uses same software as used for Planning application compliance check, (e.g. iSBEM, IES, TAS, Hevacomp) but may be required much earlier in the design process to understand design implications on rating.
- Produces PDF report, valid for 10 years

### REQUIREMENTS

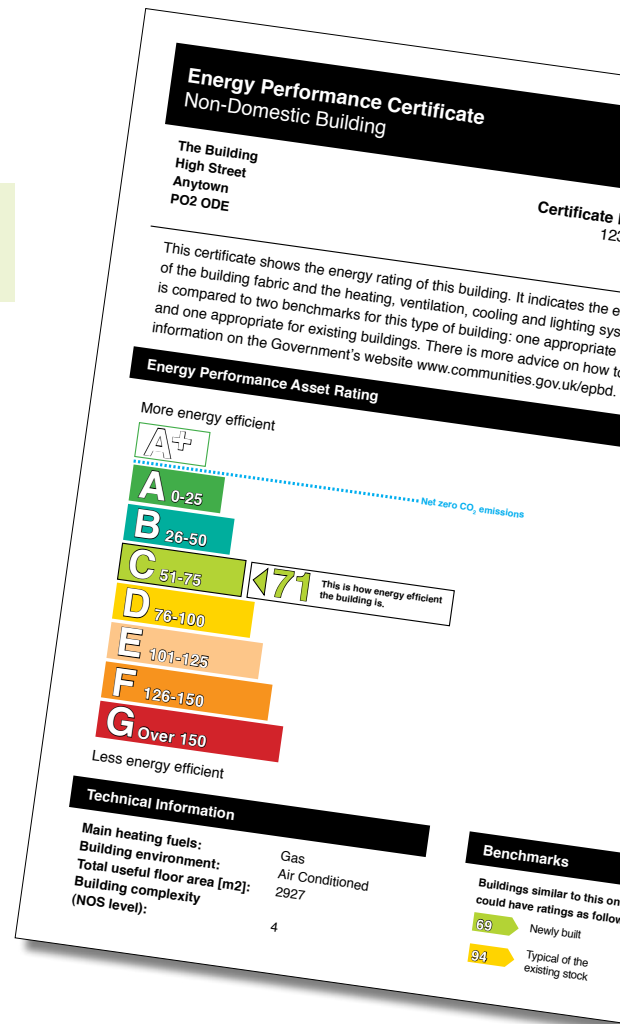
Defining the boundaries of an EPC assessment are very complex.

- Legal requirement on completion (as Part L): intended to encourage predicted energy assessment at design stage
- Shell and Core: Initial EPC for base build to reflect what is being offered to the market. Fit out incorporating primary plant will be "on construction" so revised EPC required for that part as designed for separate use
- Large Extensions: EPC only if "new building" under EPBD definition
- Offices: 1 EPC covering all floor area even if let floor-by-floor, unless services are provided on a floor-by-floor basis
- Retail: 1 EPC per unit if independent shells opening onto street; or, 1 for whole retail area if shop units share services with mall

### NEW AND EXISTING BUILDS

The processes for certifying new and existing buildings differ significantly due to the information available to the assessor;

New Builds	Existing Builds
Information should be readily available	Need to survey building/track-down data
Easily verifiable	Drawings, log books etc may be missing
Part L 2006 = B/C rating	Complications of multi-lets across floors
	Current stock = D/E rating



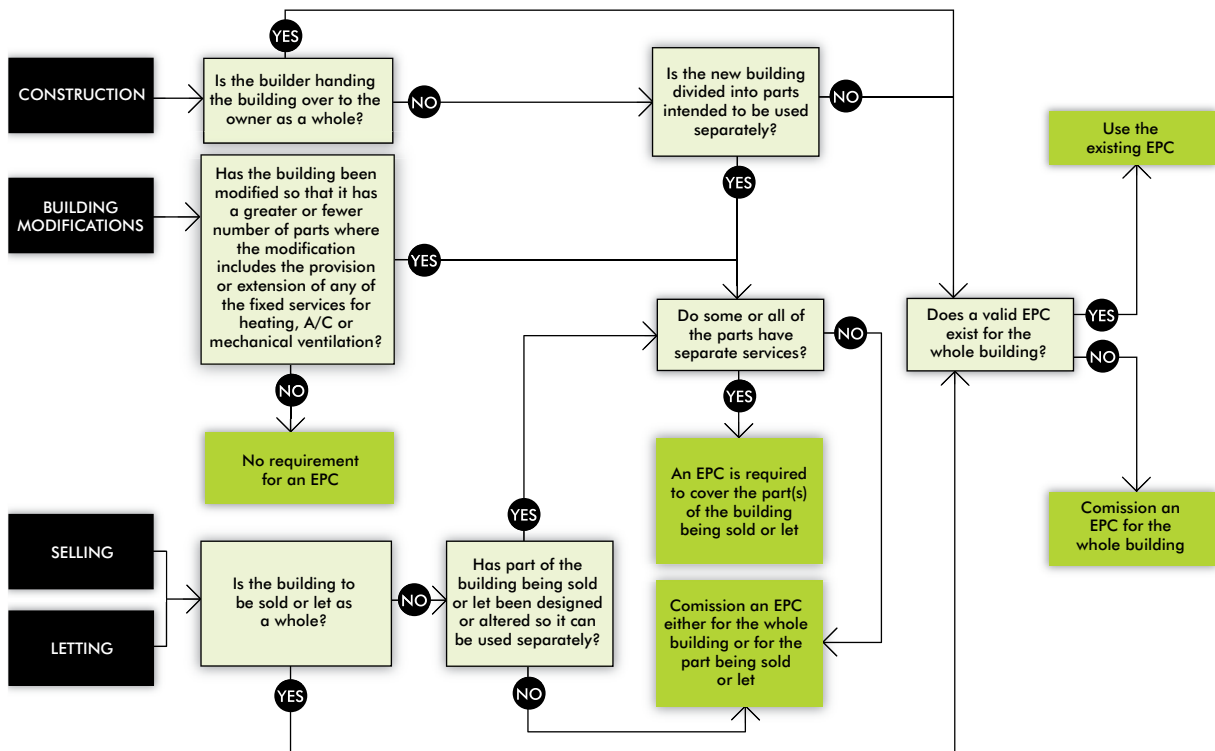
### WHAT DOES THE CERTIFICATE CONTAIN?

- Building type certified
- Asset rating:
  - As value
  - As standard graphic
- Reference values and benchmarks
- Administrative info:
  - Assessor/tool
  - Accreditation scheme
- Recommendations Report:
  - No/low cost (<3yr payback)
  - Medium (>3, <7yr payback)
  - Strategic, e.g. LZC (>7yr payback)
  - Only includes recommendations that can make a difference to SBEM result.

**LEVELS OF EPC BUILDING ASSESSOR REQUIRED**

- Level 3: Simple, existing non-dwellings - small buildings such as converted houses or doctors surgeries (using SBEM)
- Level 4: New and existing non-dwellings – e.g. small purpose built office buildings (using SBEM)
- Level 5: New and existing complex non-dwellings – e.g. large office buildings or factories (using modelling tools e.g. DSM)

**DOES YOUR BUILDING REQUIRE AN EPC?**



**NOTIONAL BUILDINGS**

The EPC rating scale is a comparison between the actual building modelled and a notional building;

- Part L compares against a reference building of the same type, i.e. Air-conditioned building against Air-conditioned building
- Reference building for EPC analysis is *always* naturally ventilated, i.e. more energy intensive buildings such as fully air-conditioned buildings compliant with building regulations will get poorer ratings (typically D)
- Database of building energy performance has been collected over last few years
- Calculation methodology used in software programmes is unlikely to be publicly available
- Engineers/assessors reliant on experience to understand potential ratings

## Display Energy Certificates

Operational rating currently required for large public buildings occupied by public authorities or institutions providing a public service to a large number of people. They are anticipated to be extended to all commercial buildings by 2010.

### METHODOLOGY

$$\text{Operational rating} = \frac{\text{Annual Building Emissions Rating (kgCO}_2\text{/m}^2\text{)}}{\text{Typical Building Rating (kgCO}_2\text{/m}^2\text{)}}$$

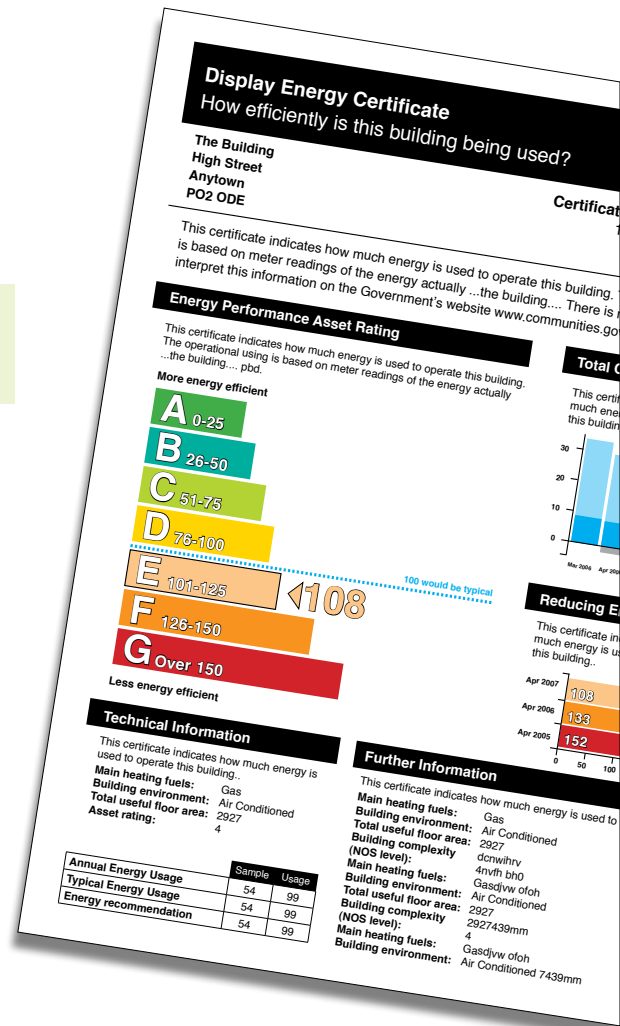
- Data inputs required from data collection and/or site survey
- Methodology is simpler than EPC methodology as based on actual metered energy use
- Data collection from:
  - Utility bills (utility estimates acceptable in initial period, customer readings are not)
  - Non-metered fuels: Oil, propane, coal, biogas
  - Landlord, district heating/cooling provider
  - Fuel measurement period to match assessment period/date +/- 31 days
- Site energy-usage to be disaggregated to individual buildings by floor area
- DEC rating attained by comparison against notional typical building of the same type
- Certificate is valid for one year, advisory reports valid for 7 years

### ADVISORY REPORT OPTIONS

The standard advisory report will contain a selection of generic improvements automatically filtered from a generic list included in software programme, based on the data inputs. Only interventions capable of achieving a discernable difference in the SBEM rating will be included in the report; this may mean that multiple, smaller interventions that could achieve cost-effective carbon savings when applied together are missed. The automated advisory report can be supplemented by additional, professional advice from assessors if desirable to the client.

### IMPROVING A DEC - INDICATIVE OPTIONS FOR ADVISORY REPORT

No Cost	Low Cost	High Cost
Energy policy with defined responsibilities	Controls	Replacement/updating
Good Housekeeping	Set Points	More controls
Operational Practices	Scheduling	Renewable approaches
Involve staff	Maintenance	Monitoring and targeting



### WHAT DOES THE CERTIFICATE CONTAIN?

- **A3 poster (to be displayed publicly)**
- **Building type**
- **Current rating: value shown against standard graphic**
- **Ratings/progress over last 3 years**
- **Administrative information as per EPCs**
- **Reference to Advisory Report**
- **Reference to report containing additional technical details**

## Comparing EPCs And DECs

EPCs and DECs are inherently different documents albeit trying to communicate similar information.

Energy Performance Certificates (EPCs)	Display Energy Certificates (DECs)*
<i>Q: How much energy is this building estimated to use compared to others?</i>	<i>Q: How much energy is this building using, and how efficiently compared to others?</i>
Asset rating required for all buildings when they are constructed, sold or rented  “When a building being constructed is physically complete, it is the responsibility of the person carrying out the construction to give an EPC and recommendations report to the owner of the building and to notify Building Control that this has been done. Building Control will not issue a certificate of completion until they are satisfied this has been done.”  This also applies to modifications.	Operational rating required for large public buildings occupied by public authorities or institutions providing a public service to a large number of people  Obtaining a certificate is the responsibility of the building owner
To inform the purchaser / prospective tenant	To inform the occupier (and the public)
Is this building POTENTIALLY better than an alternative in energy performance terms?	Is this building being operated as EFFICIENTLY as it could be?
Assessment based on calculated performance for DEFINED usage pattern	Assessment based on measurement of ACTUAL energy consumption
Rates efficiency of building fabric and fixed building services only	Rates efficiency of ALL energy uses
How does this building compare with a new building?	How does my energy demand compare to a typical building in my sector?  Is my energy performance improving?
What are the most cost effective improvements that could be made?	What are the most cost effective improvements that could be made?

\* Anticipated to be extended to all commercial buildings by 2010

## Market Impact And Response

The market is still to be fully tested and so the implications are difficult to judge at present. It will take some time after implementation for the market to adjust itself and settle before the true impacts are fully understood. It is intended that the certificates will break the construction industry’s inherent “cycle of blame” against providing energy efficient buildings by incentivising demand from occupiers and investors and therefore creating opportunities for constructors and developers.



### HOW BIG IS THE MARKET?

The CLG Regulatory Impact Assessment in March 2007 estimated that approximately 1.5m commercial buildings would require EPC certification for sale or rent and that 200,000 EPC certificates could be required in 2008 alone. Some industry estimates put this figure closer to 300,000 and suggest that up to 10,000 assessors will be required to provide EPCs and DEC's for all residential and non-residential buildings.

### EXISTING BUILDINGS

For existing buildings there is likely to be a large focus on improving energy efficiency through more effective building management. The role of dedicated energy managers looks likely to expand and the idea of 'building performance' is likely to reach beyond focussing primarily on user comfort to encompass energy efficiency, O&M Manuals and maintaining or improving certificate ratings. Minor improvements in the building services and metering strategies are likely to be the first step for most people, in part to ensure that accurate measurements of energy consumption can be taken. The larger property investors are already carrying out portfolio reviews and risk assessments for all properties to determine the priority, and level of improvements required to each building with some higher-risk buildings possibly being sold-off.

### NEW BUILDINGS

For new buildings, energy efficient design of fabric and building services may receive a much higher focus as developers wish to achieve a high rating to secure higher rental yields and return on investment. With the operation of the building forming a greater part of the business case for development, there may be a shift towards whole-life-costing models to capture this value and risk. The market for post-completion continuous performance management is also set to grow in importance and value as property owners seek to maximise building returns across their lifetime. Within the top tiers (A-B), it will be difficult to differentiate buildings as Part L compliance is roughly equivalent to a B/C rating. Therefore, for new builds, there may not be the drive for energy efficient buildings that otherwise might have been expected. Also, current Part L compliance calculations do not currently recognise the full potential of innovative energy efficient design methods (such as Termodeck) and are not capable of incorporating the full energy savings from these systems into their calculations and resultant EPC ratings. However the benefit of these systems should be reflected in the DEC.

### GREEN LEASES

Property consultants have been discussing the emergence of a two-tier rental market where more energy efficient properties, i.e. those in the A-B bands, may command higher rents. However; what is not clear is if the higher rated buildings will command higher rents than present levels, or whether inefficient buildings will have their rental rates reduced relative to current rates.



Source: Sustainable Construction Group, 2000

### WHAT IS THE MARKET SAYING?

***"The certificates for the first time, allow the prospective tenant or investor to make an objective comparison between buildings based on energy performance"***

**GVA Grimley**

***"The market remains unprepared for the implementation of energy performance certificates and unconvinced of a business case for upgrading stock"***

**Oxford Brookes University & King Sturge LLP**

***"There is no evidence to suggest that more energy efficient buildings will command higher rents, but there is an expectation amongst investors that energy inefficiency will lead to 'price chipping' during rental negotiations"***

**Miles Keeping, Partner – King Sturge**

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Published by Fulcrum First Limited  
7 April 2008