CIBSE LOW CARBON CONSULTANTS REGISTER – SESSION 8
ENERGY CERTIFICATION

I – Prophets energy services 03012013
ENERGY CERTIFICATION
“The purpose of providing an EPC during the sale or letting process is to enable potential buyers, tenants or building occupiers to consider energy performance of a building as part of their investment.”

Market transformation:

Highly successful in the white goods market and the food market
Leveraging the importance of carbon and energy performance: do you buy an A-rated fridge because it saves you £18 a year??
Market Transformation

% of buildings

0% 10% 20% 30% 40%

Energy Label Category

A++ A+ A B C D E F G

Statistics Courtesy of BRE

Continual innovation encouraged
Revision of ‘Typical’ Benchmarking
‘Unhealthy’ building stock

3 Years after Labelling Introduced
15-20 Years after Labelling Introduced
Market Transformation

Potential energy savings

% of buildings

0% 10% 20% 30% 40%

A++ A+ A B C D E F G

Continual innovation encouraged

Revision of ‘Typical’ Benchmarking

‘Unhealthy’ building stock

15-20 Years after Labelling Introduced

3 Years after Labelling Introduced

% of buildings

A++ A+ A B C D E F G

38% 28% 15% 15% 15% 15% 15% 15%

CIBSE
Analysis if achieved ratings

Data courtesy of Faber Maunsell, sample size 200 buildings
WHAT IS AN ENERGY PERFORMANCE CERTIFICATE?
CLG Guide to energy performance certificates for the construction, sale, and let of non-dwellings (July 2008)

www.communities.gov.uk/publications/planningandbuilding/guidancenondwellings
• The EPC’s purpose is to indicate how energy efficient a building is.
• The certificate will provide an energy rating of the building from A to G, where A is very efficient and G is the least efficient. The better the rating, the more energy-efficient the building is, and the lower the fuel bills are likely to be.
• The energy performance of the building is shown as a Carbon Dioxide (CO2) based index.
• Each energy rating is based on the characteristics of the building itself and its services (such as heating and lighting). Hence this type of rating is known as an asset rating.

• The asset ratings will reflect considerations including the age and condition of the building.

• It is accompanied by a recommendation report, which provides
  – recommendations on using the building more effectively,
  – cost effective improvements to the building and
  – other more expensive improvements which could enhance the building’s energy performance.
### 3. Recommendations

The following sections list recommendations selected by the energy assessor for the improvement of the energy performance of the building. The recommendations are listed under four headings: short payback, medium payback, long payback, and other measures.

#### Short Payback

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacing heating boiler plant with high efficiency</td>
<td>HIGH</td>
</tr>
<tr>
<td>Replacing T8 lamps with retrofit T5 conversion kit</td>
<td>HIGH</td>
</tr>
<tr>
<td>High frequency ballasts for fluorescent tubes</td>
<td>LOW</td>
</tr>
<tr>
<td>Number of fittings required</td>
<td>LOW</td>
</tr>
<tr>
<td>Control to heating system</td>
<td>LOW</td>
</tr>
<tr>
<td>Start/stop to the heating system</td>
<td>LOW</td>
</tr>
</tbody>
</table>

#### Medium Payback

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacing existing heating system with a new, more efficient one</td>
<td>HIGH</td>
</tr>
<tr>
<td>Insulating external walls</td>
<td>HIGH</td>
</tr>
<tr>
<td>Installing solar panels</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

#### Long Payback

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using energy-efficient light bulbs</td>
<td>LOW</td>
</tr>
<tr>
<td>Replacing old appliances with new, energy-efficient models</td>
<td>LOW</td>
</tr>
<tr>
<td>Installing a heat recovery system</td>
<td>LOW</td>
</tr>
</tbody>
</table>

#### Other Measures

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspect and seal all air leaks greater than 10%</td>
<td>HIGH</td>
</tr>
<tr>
<td>Upgrade insulation</td>
<td>W</td>
</tr>
<tr>
<td>Replace old windows</td>
<td>W</td>
</tr>
<tr>
<td>Replace old doors</td>
<td>W</td>
</tr>
</tbody>
</table>
WHAT IS A DISPLAY ENERGY CERTIFICATE?
CLG Guide to display energy certificates for public buildings

www.communities.gov.uk/publications/planningandbuilding/guidancenondwellings
• The DEC’s purpose is to indicate how energy efficiently a building is operate.
• The certificate will provide an operational rating of the building from A to G, where A is very efficient and G is the least efficient.
• The performance of the building is shown as a Carbon Dioxide (CO2) based index.
Display Energy Certificate

Operational Rating

CO2 Emissions

Complexity of building

Accredited expert and scheme

Unique reference number
• Each energy rating is based on the energy consumption, building usage type, floor area and operating. Hence this type of rating is known as an operational rating.
• It is accompanied by a recommendation report, which provides
  – recommendations on using the building more effectively,
  – cost effective improvements to the building and
  – other more expensive improvements which could enhance the building’s energy performance.
3. Recommendations

The following sections list recommendations selected by the energy assessor for the improvement of the energy performance of the building. The recommendations are listed under four headings: short payback, medium payback, long payback, and other measures.

a) Short payback

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider replacing heating boiler plant with high efficiency type</td>
<td>HIGH</td>
</tr>
<tr>
<td>Consider replacing T8 lamps with retrofit T5 conversion kit. (reworded)</td>
<td>HIGH</td>
</tr>
<tr>
<td>Introduce HF (high frequency) ballast for fluorescent tubes</td>
<td>LOW</td>
</tr>
<tr>
<td>Reduced number of fittings required</td>
<td>LOW</td>
</tr>
<tr>
<td>Add time control to heating system</td>
<td>LOW</td>
</tr>
<tr>
<td>Add optimum start/stop to the heating system</td>
<td>LOW</td>
</tr>
</tbody>
</table>

b) Recommendations with a medium payback

This section lists recommendations with a payback of between 3 and 7 years:

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ductwork leakage is greater than 10%. Inspect and seal ductwork</td>
<td>HIGH</td>
</tr>
<tr>
<td>Site plan</td>
<td>NH</td>
</tr>
<tr>
<td>Water infiltration</td>
<td>W</td>
</tr>
<tr>
<td>No action necessary</td>
<td>W</td>
</tr>
</tbody>
</table>

(c) Long payback

This section lists recommendations with a payback of more than 7 years.
IMPLEMENTATION PROGRAMME
- **October 1\textsuperscript{st} 2008**  
  EPC’s required on construction, sale and rent of all non-domestic buildings, DEC required on Public buildings > 1000m\textsuperscript{2}

- **January 9\textsuperscript{th} 2013**  
  DEC required on Public buildings > 500m\textsuperscript{2}

- **January 9\textsuperscript{th} 2013**  
  EPC’s to be displayed in all buildings > 500m\textsuperscript{2}, accessed by the public and where an EPC exists (EPC shall not be commissioned for this purpose)

- **July 9\textsuperscript{th} 2015**  
  DEC required on Public buildings > 250m\textsuperscript{2}

- **July 9\textsuperscript{th} 2015**  
  EPC’s to be displayed in all buildings > 250m\textsuperscript{2}, accessed by the public and where an EPC exists (EPC shall not be commissioned for this purpose)
RESPONSIBILITY FOR ENERGY PERFORMANCE CERTIFICATES
• The EPC regulations require that a certificate is provided to the building owner (or prospective occupier for sale/let) indicating the energy performance Rating & Grade

  – There is no minimum standard or level for the Rating or Grade

  – The certificate is required at completion-of-construction and at sale/let (and after certain very specific types of modifications of the building)
• It is the responsibility of the person carrying out the construction or modification to provide an EPC
  – When a building being constructed is physically complete
  – If a building is modified to have more or less parts than it originally had AND the modification includes the provision or extension of fixed services for heating, air conditioning or mechanical ventilation (i.e. those services that condition the indoor climate for the benefits of the occupants)
• A valid EPC and recommendation report must be made available free of charge by the seller or landlord to a prospective buyer or tenant when non-dwellings are sold or let.

• This information should be provided at the earliest opportunity and no later than:
  – when any written information about the building is provided in response to a request for information received from the prospective buyer or tenant; or
  – when a property is marketed for sale or rent (for a property under construction this can be the indicative design EPC)
• At the time of offer for **sale** it is the responsibility of the seller to provide an EPC

• At the time of offer for **let** it is the responsibility of the prospective landlord to provide an EPC

• It is the duty of every person with an interest in, or in occupation of the building to co-operate with any seller or prospective landlord as far as is necessary to enable them to comply with any duty under the Regulations to make available an EPC, and allow access to any energy assessor they appoint.
• Certain transactions would **not** amount to a sale or let to a new owner or tenant and would therefore not require an EPC. Examples would include:
  – lease renewals or extensions
  – compulsory purchase orders
  – lease surrenders.

• There may be other types of transaction that it might be argued do not require an EPC but this will depend on the individual circumstances of any case. For example
  – not-for-value transactions
• The Regulations state “An EPC should be provided free of charge to prospective buyers or tenants”, BUT
• A landlord may organise an EPC for the whole building and may be able to recover the cost of producing a certificate via the service charges.
  – However, this will depend on how the lease is drafted. The Code of Practice on Service Charges (published by RICS) may provide further guidance: www.servicechargecode.co.uk
• An EPC does not have to be made available if:
  – the seller has reasonable grounds to believe that the prospective buyer or tenant is unlikely to have sufficient funds to purchase the building or is not genuinely interested in buying or renting the building; or
  – the seller or tenant is unlikely to be prepared to sell the building to the prospective buyer (although this does not authorise unlawful discrimination).
Detailed thoroughly in CLG Guide section 4.2

Example 1
Detailed thoroughly in CLG Guide section 4.2

Example 2

1 EPC for Unit 1 covering office + rest of the unit space.
No EPC required for Unit 2
1 EPC is required for Unit 3, which would reflect the conditioned space and exclude the unconditioned space.
Gather information
Site Survey
Zoning and Calculation
Registration (Lodgement)
The information that will be required to produce an EPC includes:

– the individual spaces or zones in use within the building, and their dimensions (either as verified from plans or as measured). This information is most readily provided by building plans
– the activities conducted within the zones. Examples of zones include retail space, office space, kitchens, storage etc
– the heating and ventilation services for each zone (including type of system, metering, controls, fuel used etc.)
– the lighting and controls used for each zone
– the construction of the fabric of the building and thermal efficiency of the materials used: roof, floors, walls and glazing.
• The energy assessor will need to understand the internal layout of the building and for what purposes it is designed to be used. This is to understand the energy demands of each individual space (zone) in accordance with its designed use.

• If there are no plans for a building, the energy assessor will need to survey the building and gather the appropriate information.

• If you have up-to-date information and plans for your building this process will be less time-consuming.

• The energy assessor is responsible for ensuring the information used in the energy calculations is accurate and, even where detailed plans are available, may need to validate this information by making a site inspection.
Zone's name = Z0/01
• The energy performance of non-dwelling is shown as a CO2 based index.
• The CO2 based rating a building receives depends on the energy used for space heating, water heating, ventilation and lighting, less any energy generated from energy generation technology installed in the building (such as solar water heating).
• The lower the number (on a scale of 0-150+), the lower the typical CO2 emissions.
• The rating is adjusted for the total useful floor area of a building so it is independent of size for a given type of building.
• The building emission rates, rating and grading are calculated by the approved SBEM or DSM software using the building information on dimensions, activities, construction and servicing provided by the assessor.
• The **EPC Rating** is defined as $50 \times \text{BER/SER}$
  – The Building Emissions Rating is the same for EPC as for Part L
  – The Standard Energy Rating SER is the Reference Emissions Rating less 23.5% (reduced as for naturally ventilated Part L target TER)
  – The EPC Reference Emissions Rating building differs from the Part L Notional building by having specified services: Gas heating with seasonal comfort cooling (above ~27°C compared with ~22°C for air conditioning)

• **A simple linear grading scale is used**

• Also calculated and charted are: the Part L TER, and a Typical emissions rating $= \frac{(2 \times \text{Notional Building})}{0.75}$ which is approx $= 2006 \text{ TER} \times 2$
• The recommendation report that is included with an EPC will help to improve the energy rating of a building.

• The recommendations only include those improvements that are appropriate [broadly*] for the building that has been assessed. [*Since no detailed technical or cost-effectiveness evaluation is required to be carried out]
• For each recommendation indicative paybacks are noted. The recommendations are provided in four categories those:
  – with a short term payback – less than three years
  – with a medium term payback – between three and seven years
  – with a long term payback – greater than seven years; and
  – other recommendations (based on the energy assessor’s knowledge)
- Local authorities (usually by their Trading Standards Officers) are responsible for enforcing the requirement to have an EPC on sale or let of a building.
- Failure to provide an EPC when required by the Regulations means you may be liable to a civil penalty charge notice.
- Trading Standards Officers may act on complaints or undertake investigations.
  - They may request you to provide them with a copy of your EPC and recommendation report.
  - If asked, you must provide this information within seven days of the request or be liable to a penalty charge notice.
- A copy of an EPC can be requested at any time up to six months after the last day for compliance with the obligation to make it available.
Enforcement for existing buildings

– Penalty charge notice for any breach
– EPC’s for non-dwellings will be dependant on rateable value (max 12.5% or £5,000)
  • Set at £750 if the value cannot be calculated
– For DEC’s failure to display £500, failure to obtain an advisory report, £1,000

EPCs on construction via Building Control Procedures

– Regulations state that a Local Authority is unable to issue a completion certificate unless an EPC is produced
• An EPC must be properly recorded in the central register with a unique reference number.

• During an assessment, the authenticity of an energy assessor can be checked:
  – with the online national register at www.ndepcregister.com
  – with the assessor’s accrediting body, which the assessor must identify.

• The person commissioning the EPC must receive a copy of the certificate which records the reference number and the accreditation body. This allows them to:
  – Access the register using the unique reference number
  – Find and check the validity of the certificate
  – Contact the accreditation body concerning issues such as authenticity of the certificate and accreditation status of the assessor.
Welcome to the Non-Domestic Energy Performance Certificate Register

From 6th April 2008, all non-domestic buildings on construction, sale and rent will require a Non-Domestic Energy Performance Certificate (NDEPC) and a Recommendation Report (RR). This information will help owners and occupiers make their building more energy efficient and allow potential buyers and tenants to compare the energy performance of different buildings.

By October 2008, all larger public buildings will require an annual Display Energy Certificate (DEC) highlighting their energy performance. This is to be displayed prominently in a place visible to the public. These buildings will also require an Advisory Report (AR) providing recommendations for energy improvements each seven years.

This website will allow you to:

- **Find an Energy Assessor**
  
  Click here to check that an individual is accredited, or to find an accredited person to undertake one of the following certificates and reports:
  
  - Energy Performance Certificate (EPC)
  - Recommendation Report (RR)
  - Display Energy Certificate (DEC)
  - Advisory Report (AR)

- **Retrieve Certificates and Reports**
  
  Click here to retrieve one of the below certificates or reports:
  
  - Energy Performance Certificate (EPC)
  - Recommendation Report (RR)

Accessibility | Site Map | Information | Site Policy

The information in an EPC is provided to the relevant person (usually the landlord or owner of the building) by the energy assessor.

Access to the EPC in the register is via the report reference number on the certificate.

Anyone in possession of the report reference number can access the EPC.

A seller or prospective landlord or those acting on their behalf may disclose the EPC or information from it to other parties.

The Regulations, however, protect the EPC and the underlying information from unauthorised disclosure to a third party e.g. by a company using the EPC without permission to market their products.

Inappropriate use of that information is liable on conviction to a fine.
The EPC, recommendation report and any information derived from them can only be disclosed in the following situations:

- by an owner or tenant, or those acting on their behalf for the purposes of assisting prospective buyers or tenants make decisions on whether to buy or rent your building
- to accreditation schemes in fulfilling their accreditation functions
- to enforcement bodies as part of their duties in enforcing the new Regulations
- to the Secretary of State for monitoring the application, compliance and enforcement of the new Regulations and for statistical or research purposes
- in complying with obligations under the Regulations or under the law relating to Home Information Packs
- for the purposes of preventing or detecting crime, apprehending or prosecuting offenders, establishing, exercising or defending legal rights or complying with a court order.
For complaints...

- regarding the availability and validity of an EPC for sale [or letting] of a marketed building, contact your local Trading Standards Officers.
- regarding the availability and validity of EPC’s produced by the builder when construction work is completed, contact Building Control at the relevant local authority.
- regarding the quality and accuracy of the EPC and the recommendation report, contact the accreditation body of the energy assessor
- regarding the energy assessor or the energy assessment, contact the energy assessor in the first instance and if the matter is not resolved, contact the accreditation body

• If it is suspected that an EPC is subject to fraud, then the matter should be referred to the police.
The Need for Guidance

Guidance document for EPC Assessment develop by CLG to promote consistency and improve standards

Issue 1.0 – June 2010
Issue 2.0 – January 2011
Issue 3.0 – December 2011
Issue 4.0 – November 2012

The conventions supersede all previous guidance and should be used by ALL assessors. The guidance is also used by the accreditation schemes as part of their QA process
Guidance currently covers:

- Assessment Level
- Use of Defaults
- Air Permeability
- SBEM Weather Location
- Planning Use Class
- Project Database
- Power Factor
- Geometry
- HVAC
- Lighting
- Building Measurement
- Ventilation Rates

Further guidance to be released in due course
<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>Refer to flowchart</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use of Defaults</strong></td>
<td>The energy assessor shall only use the default values within the Software Tool in the absence of any conventions identified within this document or more specific information on the building. Where a default value is selected the assessor must provide evidence detailing why the default value has been selected to enable their Accreditation Scheme to verify appropriate use of default values during Quality Assurance processes. Use of default values should be avoided where possible.</td>
</tr>
</tbody>
</table>
| Air permeability | The SBEM default value of 25 m³/hr m² for all existing buildings shall be amended as follows:-  
|                 | • Less than 10 m³/hr m² – only with an accredited air pressure test result  
|                 | • 10 m³/hr m² – buildings > 500 m² built to 2002 Building Regulations  
|                 | • 15 m³/hr m² – buildings <= 500 m² built to 2002 Building Regulations and buildings built to 1995 Building Regulations  
|                 | • 25 m³/hr m² – buildings built to Building Regulations pre 1995  
|                 | • 35 m³/hr m² – to be considered where buildings are pre 1995 regulations and where suitable evidence of high permeability exists, e.g. single skin metal clad structure within Planning Use Class B2 – B8 with large roller shutter doors and poor constructional details etc. |
| LTHW boiler efficiencies | The following hierarchy should be followed to establish suitable values for the ‘Effective Heat Generating Seasonal Efficiency’ for all boilers.  
1. Use ECA product list part load values at 30% and 100%* - these should be used to calculate the seasonal efficiency as per the Non Domestic Building Services Compliance Guide (NDBSCG).  
2. Use ECA product list full load value* (when part load values are not given)  
3. Use current SEDBUK values where available.  
4. Use either manufacturer’s information* or ‘boiler plate*’ information or information from manufacturer’s technical helpdesk*. Where a gross efficiency value is established for a non condensing boiler then a deduction of 5% should be made to it to convert it to an appropriate seasonal efficiency.  
5. Use SAP tables (up to 70kW output).  
6. Use suitable SBEM default; it is essential for the site notes to provide evidence as to why the above methods were not used to obtain a more accurate value, i.e. by providing evidence of failed attempts.  
In addition to any boiler efficiency values established from the above the relevant heating credits should be added by following the guidance in the NDBSCG.  
*Net efficiencies/values must be converted to gross efficiencies as per the NDBSCG. |
| Estimating Local Mechanical Exhaust rates in existing buildings | Where it is not possible to obtain details of the fan performance from the Fan nameplate or Building Logbook, O & M manual etc during the Site Survey, an approximation of the air flow rate in l s\(^{-1}\) m\(^{-2}\) (often written as l/s/m\(^2\) in SBEM) can be established by using an appropriate ventilation rate from the attached table (Local Mechanical Exhaust and Ventilation Rates) and converting this to l s\(^{-1}\) m\(^{-2}\).

It is not acceptable to use an arbitrary value such as 5 l s\(^{-1}\) m\(^{-2}\) or a software applied default for extraction rates where the mechanical extraction rate is unknown. |
| Estimating the Specific Fan Power (SFP) in existing buildings | Where the fan power motor can be established from the fan nameplate or Building Logbook, O & M manual etc during the site survey the established power will be used to calculate the SFP.

If the power rating of a fan is known in horsepower then it shall be converted using the approximation of 1 horsepower = 746 Watts.

Where the power rating of the fan is not established then the SBEM defaults will have to be used. |
In the absence of design data the assessor must calculate the extract rate from the table of published ACH

### Local Mechanical Exhaust and Ventilation Rates

<table>
<thead>
<tr>
<th>Room or Building</th>
<th>Air Changes per Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly Rooms</td>
<td>10</td>
</tr>
<tr>
<td>Bakeries</td>
<td>30</td>
</tr>
<tr>
<td>Banks/Building Societies</td>
<td>6</td>
</tr>
<tr>
<td>Bathroom (non domestic) without Shower</td>
<td>8</td>
</tr>
<tr>
<td>Bathroom (non domestic) with Shower</td>
<td>20</td>
</tr>
<tr>
<td>Bathroom (domestic)</td>
<td>10</td>
</tr>
<tr>
<td>Bedrooms</td>
<td>4</td>
</tr>
<tr>
<td>Boiler Rooms</td>
<td>30</td>
</tr>
<tr>
<td>Cafés and Coffee Bars</td>
<td>15</td>
</tr>
<tr>
<td>Canteens</td>
<td>12</td>
</tr>
<tr>
<td>Cellars</td>
<td>10</td>
</tr>
<tr>
<td>Cinemas and Theatres</td>
<td>10</td>
</tr>
<tr>
<td>Club / Games Rooms</td>
<td>10</td>
</tr>
<tr>
<td>Compressor Rooms</td>
<td>20</td>
</tr>
<tr>
<td>Conference Rooms</td>
<td>10</td>
</tr>
<tr>
<td>Dairies</td>
<td>10</td>
</tr>
<tr>
<td>Night Club / Disco</td>
<td>20</td>
</tr>
</tbody>
</table>
| Lighting options in SBEM | If a building’s original lighting design is available, and there is no discrepancy between that and the observed lighting within the building, the wattage and lux values, from that design, should be entered using the ‘Full lighting design carried out’ option in SBEM. If complimentary values are not available (i.e. both values from the same lighting design) the lighting design(s) must not be used.

If the circuit wattage and lux levels can be accurately recorded by the assessor (see Use of Lux Level Meters 7.02) the option for ‘Full lighting design carried out’ should also be used and the appropriate values entered. Wattage and lux values must not be entered separately nor is it acceptable to input assumed wattage or lux values from BSRIA publications or other reference documents or to accept or use a software suggested default value.

If the circuit wattage and lux values cannot be ascertained by either of the above methods it may be possible to use the ‘Lighting chosen but calculation not carried out’ option where the lumens per circuit wattage must be entered, calculated in line with building regulations guidance. This may not be possible for all zone activity selections. The evidence of how the values for lamp lumens and circuit wattage must be provided in the site notes.

If none of the above options are applicable the ‘Lighting parameters not available’ option should be chosen and the appropriate lamp type for the zone should be selected. For zones with a mixture of lamp types please see ‘Mixed lighting in a zone 7.03’ |
BUILDING COMPLEXITY LEVEL
The following procedure is to be applied to all buildings and/or parts of buildings within a particular energy assessment exercise.

Are any of the following features present to ANY DEGREE in the building?
- a) Ventilation with enhanced thermal coupling to structure
- b) Automatic blind control
- c) Atria

If yes, a Level 5 assessment is therefore required.

If no, proceed to:

Are any of the following features present to ANY DEGREE in the building?
- a) Night ventilation strategy
- b) Demand controlled ventilation

If yes, a Level 4 assessment is therefore required.

If no, proceed to:

Are any of the following HVAC supply/distribution types present to ANY DEGREE within the building?
- a) Medium temperature hot water (MTHW)
- b) High temperature hot water (HTHW)
- c) Steam Distribution

If yes, a Level 4 assessment is therefore required.

If no, the procedure is complete.
Complexity Level Flowchart

Are any of the following air conditioning system types present to ANY DEGREE within the building?

a) Variable air volume
   b) VAV - Dual act.
   c) VAV - indoor packaged cabinet.
   d) Fan coil systems - 2,3 or 4 pipe and changeover or non-changeover
   e) Induction systems
   f) Constant volume systems (CAV) - fixed or variable fresh air rate
   g) Multizone (hot deck/cold deck) systems
   h) Constant volume systems - terminal reheat
   i) Constant volume systems - dual act.
   j) Chilled ceilings or passive chilled beams plus displacement ventilation
   k) Active chilled beams
   l) Water loop heat pump systems e.g. Verastemp

Yes => A Level 4 assessment is therefore required
No

Is there an air-conditioning system present that incorporates centralised air supply as an integral component?

Yes => A Level 4 assessment is therefore required
No

Is the energy assessment being carried out for Building Regulation compliance purposes, e.g. new build?

Yes => A Level 4 assessment is therefore required
No

A Level 3 assessment can therefore be carried out
**Night Ventilation Strategy**

Can be defined as the presence of suitable systems, controls and operating strategy such that overnight ventilation (passive and/or mechanical) is used to cool down the exposed building mass and thereby offset daytime cooling demands. If no such operation and subsequent offset is possible through the *automatic* operation of systems and controls then night ventilation strategy is deemed to be not present as part of the building energy asset rating.

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**Ventilation with Enhanced Thermal Coupling to Structure**

This is a further development of the *Night Ventilation strategy* such that significant components of the building structure in addition to its ordinary surfaces are exposed to night ventilation, in order to enhance the building’s capability of offsetting daytime cooling demands. An example of this procedure is the *TermoDeck* system where night ventilation is passed through ducts in the solid floors of the building, thereby increasing the 'coolth' contained in the thermal capacity of the building structure available to offset subsequent summertime daytime cooling loads.

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**Demand Controlled Ventilation**

Is defined as supply and/or extract ventilation that is modulated to match the needs of the actual occupation level of each zone, rather than operating at a constant level defined by the activity database. Thus the energy required to adjust the condition of the supply air and that required to move the air can be reduced. The rate of ventilation would typically be controlled by presence detectors, CO₂ sensors or another device that senses the varying requirement.
**Automatic Blind Control**

In this context internal or inter-pane (but not exterior) blinds that are motorised so that the position can be modified to control solar heat gain and/or glare, controlled by automatic sensors. The control regime must also open the blinds as the heat gain and or daylight levels decrease, so that the use of these natural resources can be optimised for each zone. Note that exterior shading devices can be modelled using iSBEM in the definition of each window; however SBEM currently does not model the re-radiation effects of blinds where solar gain has entered the space before it is modulated by the shading device.

**Atrium**

In this context, a non-continuously occupied interior space within a building, often several stories high, bounded on at least one side by occupied spaces set to the conditions determined from the activity database. There may or may not be building elements (such as glazing) surrounding the atrium (although there may need to be something for smoke control in case of fire). The atrium itself is not maintained to the conditions set by the activity database for adjoining spaces. The technical purpose of the atrium can be one or more of the following :-

- providing a buffer between the thermal conditions in the adjoining spaces and the exterior, to reduce the direct impact of the exterior on those zones. In this case it should not be maintained to conditions as though it is occupied. (If it is conditioned and the features below do not apply, in this context it is not considered to be an atrium.)

- providing a means for daylight to reach the middle of deep plan spaces that would otherwise not receive it

- encouraging stack effect or other passive ventilation to draw extract air from the adjoining spaces.
MEASUREMENT CONVENTIONS
The Total useful floor area is the total area of all enclosed spaces measured to the internal face of the external walls, that is to say it is the gross floor area as measured in accordance with the guidance issued to surveyors by the RICS. In this convention:

- a. the area of sloping surfaces such as staircases, galleries, raked auditoria, and tiered terraces should be taken as their area on the plan; and

- b. areas that are not enclosed such as open floors, covered ways and balconies are excluded.
Plan view of two buildings in a terrace
- Separated by a party wall
- Building 1 has two zones

Wall types
- “Perimeter” surrounds each building (external and party walls)
- “Internal” refers to walls within each building (partitions)

Generally follow RICS definition of Gross Internal Area

Need to measure
- Inside perimeter walls
- Mid point of internal walls

Party walls are perimeter, so measure to surface, not mid point
Inside structural opening \((w \times h)\)

*Not just glass area*

Percentage glazing is as viewed from inside

i.e. percentage of wall area to full zone height

100% Glazing

Enter a wall of total area

Enter glazing with same area (or as 100%)
Generally zone height is top of slab to top of slab for ground and intermediate floors, or soffit/eaves level at roof level.

For ground and intermediate floors:
Zone height is top of floor to top of floor.

For top floors with flat roof:
Zone height is top of floor to soffit/underside of roof slab.