User Guide to the Calculation Tool for Display Energy Certificates (DEC) for Public Buildings.

February 2013

Contents

Summary

This user guide describes the calculation tool for the calculation of a display energy certificate (DEC). This is the Irish official procedure for calculating and assessing the energy performance within public buildings.

The procedure consists of step by step calculations within a series of individual spreadsheet modules set out in the form of an Excel workbook. The individual spreadsheet modules contain equations or algorithms representing the relationships between various factors which contribute to annual energy performance benchmarks and correction factors for the operational building energy rating within the building.

The calculation framework draws heavily on the calculation procedures and tabulated data of the UK methodology for Display Energy Certificates through the cooperation of the UK Authorities (Department of Communities and Local Government).

The procedure and software will be used to generate DEC labels as required under the EPBD.

This provision will apply to the following:

- On or after 9 January 2013, a public body shall, in relation to a large building occupied by it, secure and display a valid DEC.
- On or after 9 January 2013, the owner, or an agent acting on behalf of such owner, of a large building shall secure and display a valid DEC.

Where a “large building” means a building other than a dwelling which—

(*a*) is occupied by a public body and

(I) has a total useful floor area in excess of—

(A) 500 m^2 on or after 9 January 2013 and up to and including 8 July 2015, or

(B) 250 m^2 on or after 9 July 2015, and

(II) is frequently visited by the public, or

(*b*) has a total useful floor area in excess of 500 m^2 on or after 9 January 2013 and is frequently visited by the public;

Section 1

Introduction

The calculation is based on the operational energy use within the building taking into account a range of factors that are used to normalize the energy consumption. The operational energy use is compared to Benchmarks for similar Building Categories/ Types.

Prior to carrying out the assessment, the energy assessor needs to ensure that adequate data is available. Section 4 Collecting data for the Assessment from the "Methodology for the production of Display Energy Certificates" outlines the data required and the method for obtaining the data.

- Building Category
- Location of Building (Building Name, Address)
- Basic Technical Characteristics of the building
- Separable Energy uses if any
- Total Useful Floor Area of the building (and how it has been obtained) or other allowed area metric including Total Useful Floor Area attributable to each benchmark category and to separable energy use (where exists)
- Recorded hours of occupancy
- Energy consumption (meter readings or suppliers estimates) and measurement period
- Results of previous DEC assessments, where they exist.

Section 2

Calculation Procedure and Conventions

For carrying out energy assessments, the method of calculating the energy performance is set out in the form of an **Excel workbook** called **'Workbook_DEC.xls'**. The procedure consists of step by step calculations within a series of individual spreadsheets or modules within the workbook. These individual spreadsheets contain equations or algorithms representing the relationships between various factors which contribute to the normalization of annual energy performance of the building and establishing Benchmarks for the building.

A calculation using this workbook should work sequentially through the individual spreadsheets as follows, leading ultimately to the display of results in the 'Results' worksheet:

Spreadsheet	**Main User entry actions** *Highlighted in Yellow on the Spreadsheet*
Building Inputs	Enter Administrative Details of Project Enter Technical Details of Building Enter Building Area Enter Closet Weather Location Enter Type Data and Energy Consumption Enter Measurement Period Enter Number of Building Types Enter previous DERs
Main Building Type	Enter Building Category Enter Area of Building Category Enter hours of occupancy Enter Separable Energy use if any Enter Floor Area associated with Separable Energy
Building Type 2 (*Only completed if there is more than 1 building type)*	Enter Building Category Enter Area of Building Category Enter hours of occupancy

	Enter Separable Energy use if any Enter Floor Area associated with Separable Energy
Building Type 3 (*Only completed if there is more than 2 building type)*	Enter Building Category Enter Area of Building Category Enter hours of occupancy Enter Separable Energy use if any Enter Floor Area associated with Separable Energy
Building Type 4 (*Only completed if there is more than 3 building type)*	Enter Building Category Enter Area of Building Category Enter hours of occupancy Enter Separable Energy use if any Enter Floor Area associated with Separable Energy
Building Type 5 (*Only completed if there is more than 4 building type)*	Enter Building Category Enter Area of Building Category Enter hours of occupancy Enter Separable Energy use if any Enter Floor Area associated with Separable Energy

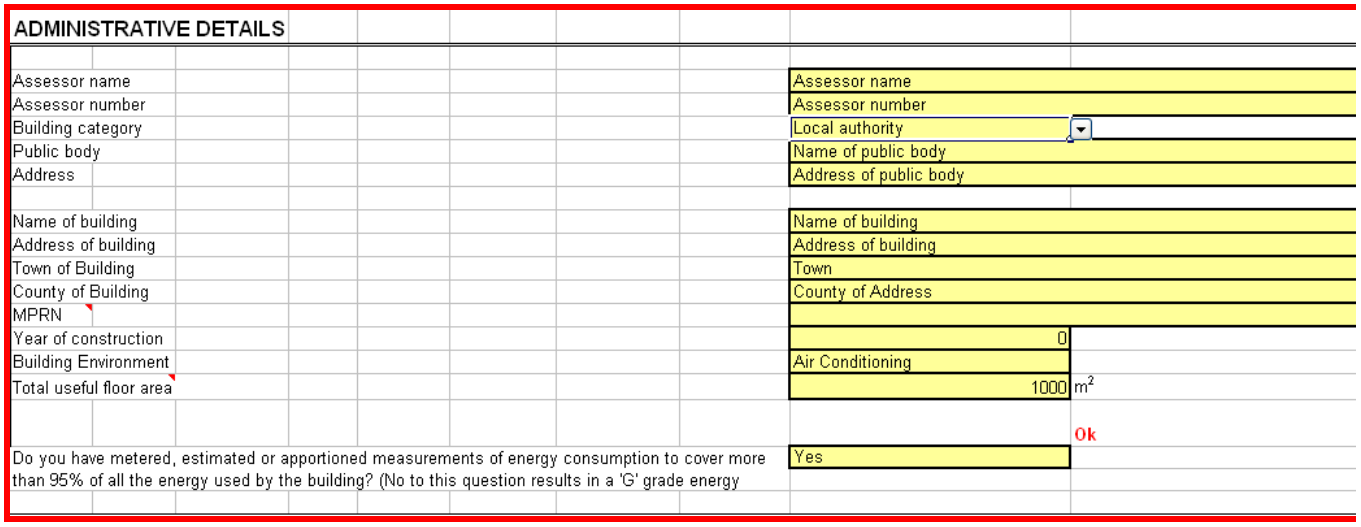
Throughout the user guide the following bullet points are used to signify the following

- Input Data Explained
- Notes in the Excel Sheet Explained

Section 3

Building Inputs

3.1 Administrative Details



ADMINISTRATIVE DETAILS		
Assessor name	Assessor name	
Assessor number	Assessor number	
Building category	Local authority	
Public body	Name of public body	
Address	Address of public body	
Name of building	Name of building	
Address of building	Address of building	
Town of Building	Town	
County of Building	County of Address	
MPRN		
Year of construction	0	
Building Environment	Air Conditioning	
Total useful floor area	1000	m^2
		Ok
Do you have metered, estimated or apportioned measurements of energy consumption to cover more than 95% of all the energy used by the building? (No to this question results in a 'G' grade energy	Yes	

Assessor Name

- Enter the Name of the Individual registered with Sustainable Energy Ireland, who is responsible for producing the Display Energy Certificate of the Building.

In order to register as an assessor, the individual must:

- Attend BER workshop for large public buildings
- Complete application form
- Sign Code of Practice

Assessor Number

- Enter the Assessor Number. This is a unique number given to an assessor once the individual has been registered with the Sustainable Energy Authority of Ireland.

Building Category

- Enter the category of the building, whether it is Private or one of the Public Building Categories.

Public Body

- Enter the Name of the Public Body (if applicable) responsible for producing the Display Energy Certificate.

Public Body Address

- Enter the Address of Public Body (if applicable) responsible for producing the Display Energy Certificate.

Name of Building

- Enter the Name of Building to which the Display Energy Certificate applies.

Address of Building

- Enter the Address of Building to which the Display Energy Certificate applies.

Town of Building

- Enter the Town where Building to which the Display Energy Certificate applies, is located.

County of Building

- Enter the County where Building to which the Display Energy Certificate applies, is located.

MPRN

- Enter the Meter Point Reference Number, this is provided for information only and is not mandatory for the production of the Display Energy Certificate.

Year of Construction

- Enter the year the main part of the building was constructed.

Building Environment

- Enter the Building Environment that applies to the majority of the building.

It is displayed on the Display Energy Certificate for information purposes but the selection of Building Environment does not impact on the Display Energy Rating.

The choices of Building Environment are as follows:

- Air Conditioning
- Heating and Natural Ventilation
- Heating and Mechanical Ventilation
- Mixed Mode with natural ventilation
- Mixed Mode with mechanical ventilation

Total Useful Floor Area

➢ Enter the Total Useful Floor Area.

The building area measurement specified in the legislation is the Total Useful Floor Area (TUFA). This is the same as the Gross Internal Area (GIA) commonly used in commercial property surveying, and for which measurement conventions are based on the SCS/IAVI Measuring Practice Guidance Notes. The method of measurement of total useful floor area is also set out in Technical Guidance Document L of the Building Regulations, which states that *'linear measurements for the calculation of wall, roof and floor areas and building volumes should be taken between the finished internal faces of the appropriate external building elements'*

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 plan; and

b areas that are not enclosed such as open floors, covered ways and balconies are excluded.

Do you have metered, estimated or apportioned measurements of energy consumption to cover more than 95% of all the energy used by the building? (No to this question results in a 'G' grade energy rating.)

➢ Enter "Yes" or "No" to the question.

To answer "Yes" over 95% of the energy consumption from all fuels must come from:

- Metered Data
- Estimates from utilities suppliers
- For tenancies BPF Landlord Energy Statement suitable

If less than 95% of the energy consumption can comply with the above guidelines "No" is answered to the question which results in a "G" grade energy rating.

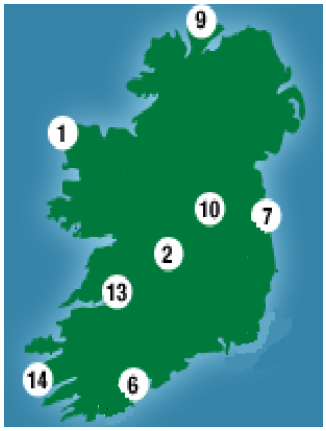
3.2 Initial Energy Data

INITIAL ENERGY DATA		
Please select closest weather station	VALENTIA OBSERVATORY	
Main heating fuel measurement period Start Date(dd/mm/yyyy)	01/06/2007	*only dates from 1/1/06 will be accepted
Main heating fuel measurement period End Date (dd/mm/yyyy)	01/06/2008	*only dates up until 30/9/08
Main heating fuel	Mains Gas	
	-	
Is the consumption directly from meter readings or is it an estimate from a utility company	Metered	
No. of days in measurement period:	366	OK
Assessment period alignment	Start	
Nominated Issue Date	01/01/2009	Assessment Period Out of Alignment with Nominated Issue Date
		Assessment Period must be within 180days of Validity Period

Please select closest weather station

- Select the closest weather station, as the crow flies, to your site from the available locations – there are 8 locations to select from, these are

BELMULLET	1
BIRR	2
CORK AIRPORT	6
DUBLIN AIRPORT	7
MALIN HEAD	9
MULLINGAR	10
SHANNON AIRPORT	13
VALENTIA OBSERVATORY	14



Based on the weather station chosen the degree days for the assessment period and the measurement period are determined.

Main heating fuel measurement period Start Date

- Enter the Start Date of the Main Heating Fuel measurement period.

Main heating fuel measurement period End Date

- Enter the End Date of the Main Heating Fuel measurement period.

Main Heating Fuel

- Select from the following list the fuels, the fuel that is used to provide the Main Space Heating within the building.

Mains Gas

LPG

Heating oil

Coal

Anthracite

Smokeless fuel (inc. Coke)

Biomass

Dual fuel appliances (mineral + wood)

Electricity

District Cooling

District Heating

Is the Heating Electricity metered separately from other uses of Electricity

- Enter "Yes" or "No" to the question.

Is the consumption directly from meter readings or is it an estimate from a utility company

- Enter "Metered" if the Main Heating Fuel is metered.
- Enter "Estimated" if the Main Heating Fuel is estimated from a utility company or from a landlord energy statement.

No. of days in measurement period.

This is the number of days between the start and end date of the Main Heating Fuel Measurement Period.

The Main Heating Fuel Measurement Period must be 365 days +/- 31days to be accepted in the calculation.

- If the measurement period is within these ranges the calculation tool will state that the measurement period is "Ok".
- If the measurement period is outside these ranges the calculation tool will state that the measurement period is "Measurement Period Out of Range". If this is the case it will not be accepted by SEAI for registration.

Assessment period alignment.

- Enter "Start" or "End".

"Start" chooses the start date of the Main Heating Fuel Measurement Period as the Start Date of the Assessment Period and uses it to align all other energy measurement periods

"End" chooses the end date of the Main Heating Fuel Measurement Period as the End Date of the Assessment Period and uses it to align all other energy measurement periods

Before setting the start or end date of the assessment period to align with the main heating fuel measurement period, examine the start and end dates of all the measured energies. The start or end dates of all other energy measurement periods must be aligned with the start and end dates of the assessment period within +/- 31days.

Nominated Issue Date

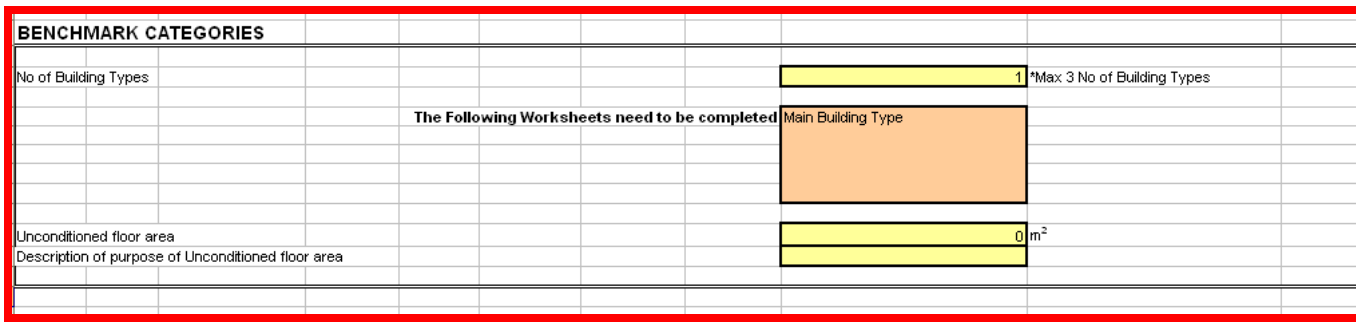
- Enter a date that the energy assessor would like the Display Energy Certificate to be valid from.

The Nominated Issue Date must be within 180 days of the end of the assessment period.

- If the Nominated Issue Date is within 180 days the following message appears "Assessment Period In Alignment with Nominated Issue Date"

- If the Nominated Issue Date is more than 180 days from the end of the assessment period the following message appears "Assessment Period Out of Alignment with Nominated Issue Date". A Display Energy Certificate will therefore not be issued.

3.3 Benchmark Categories



No of Building Types

- Enter the number of Building Types that are in the building.

There are 29 Building Categories to choose from, the energy assessor selects the relevant benchmark category applicable to the building uses.

Where a building has a mix of uses that would place parts of the building in different benchmark categories the number of different building types is entered. A maximum of 5 building types is allowed.

The Following Worksheets need to be completed

This outlines the worksheets that need to be completed based on the number of Building Types.

The Main Building Type Worksheet will always have to be completed. Depending on the number of building types additional worksheets are completed for Building Type 2/3/4/5.

Unconditioned floor area

- Enter the area of Unconditioned floor area within the building

Unconditioned floor area is an area within the Total Useful Floor Area that is untreated (not heated, cooled or mechanically ventilated), and are termed accessible unconditioned areas (for example habitable attics and basements).

Although the calculation of the rating is not adjusted to take any account of these areas, and they do not appear on the DEC, these areas (measured in terms of useful floor area) are recorded as part of the data entered into the calculation procedure.

Description of Purpose of Unconditioned floor area

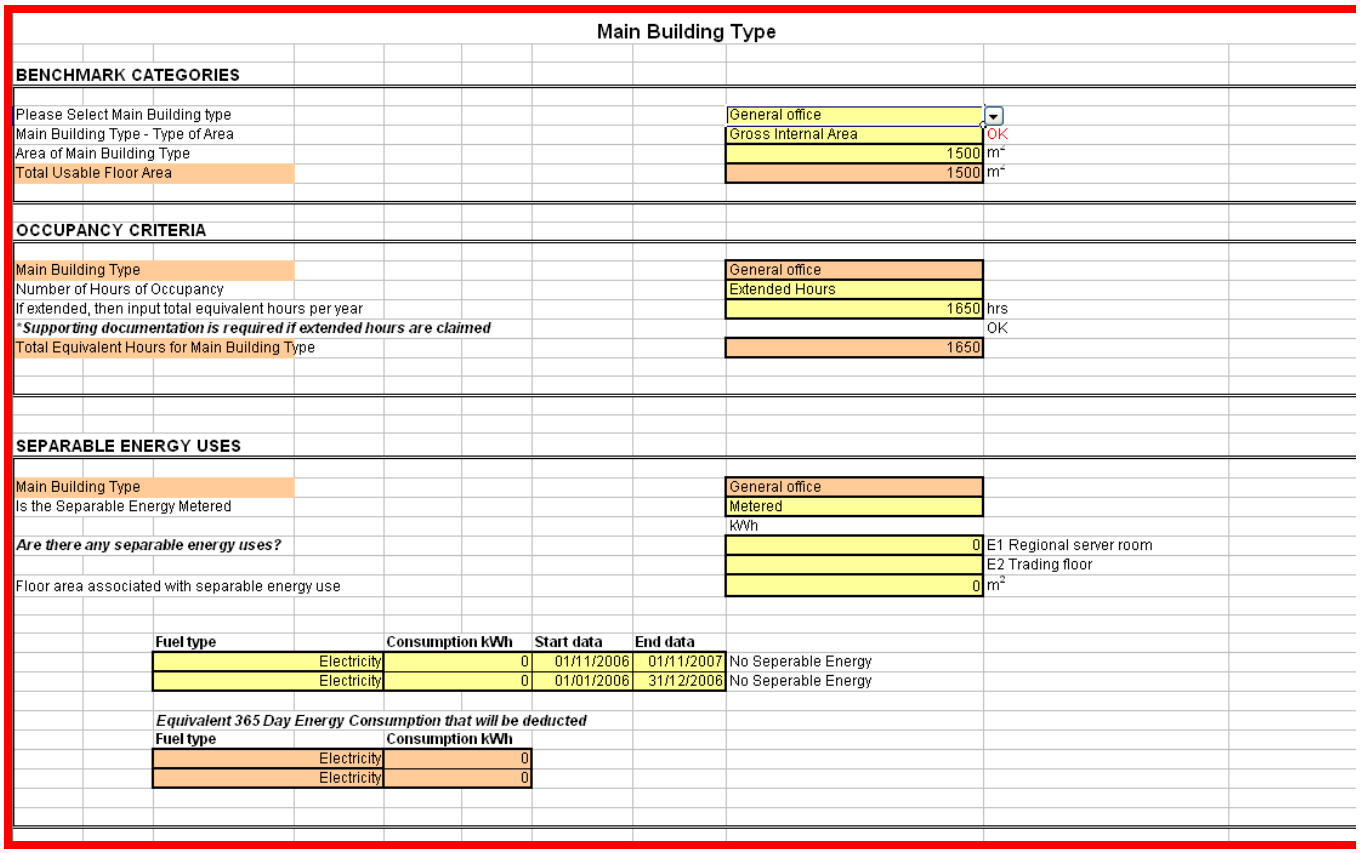
- Enter the Description of Purpose of Unconditioned floor area.

Each accessible unconditioned area is recorded together with a description of the purpose of the area, so that these can be included in the output data file and be available for subsequent analysis.

Note that where a benchmark is available for the accessible unconditioned space, then a composite benchmark approach should be adopted.

3.3.1 Main Building Type

The worksheets Building Type 2, Building Type 3, Building Type 4 and Building Type 5 follow a similar format to the worksheet Main Building Type and therefore the same methodology should be applied.



Main Building Type

BENCHMARK CATEGORIES

Please Select Main Building type	General office	
Main Building Type - Type of Area	Gross Internal Area	OK
Area of Main Building Type	1500	m²
Total Usable Floor Area	1500	m²

OCCUPANCY CRITERIA

Main Building Type	General office	
Number of Hours of Occupancy	Extended Hours	
If extended, then input total equivalent hours per year	1650	hrs
**Supporting documentation is required if extended hours are claimed*		OK
Total Equivalent Hours for Main Building Type	1650	

SEPARABLE ENERGY USES

Main Building Type	General office	
Is the Separable Energy Metered	Metered	
	kWh	
Are there any separable energy uses?	0	E1 Regional server room
		E2 Trading floor
Floor area associated with separable energy use	0	m²

Fuel type	Consumption kWh	Start data	End data	
Electricity	0	01/11/2006	01/11/2007	No Seperable Energy
Electricity	0	01/01/2006	31/12/2006	No Seperable Energy

Equivalent 365 Day Energy Consumption that will be deducted

Fuel type	Consumption kWh
Electricity	0
Electricity	0

Select Main Building Type

- Select the Main Building Type from a list of 29 categories.

1. General office	16. Public buildings with light usage
2. High street agency	17. Schools and seasonal public buildings
3. General retail	18. University campus
4. Large non-foodshop	19. Clinic Health centres
5. Small food shop	20. Hospital — clinical and research
6. Large food shop	21. Long term residential
7. Restaurant	22. General accommodation
8. Bar, pub or licensed club	23. Emergency services
9. Hotel	24. Laboratory or operating theatre
10. Cultural activities Museum, art gallery or other public building	25. Public waiting or circulation
11. Entertainment halls	26. Terminal Regional transport terminal with concourse
12. Swimming pool centre	27. Workshop

13. Fitness and health centre 14. Dry sports and leisure facility 15. Covered car park	28. Storage facility 29. Cold storage

See Appendix A for more details of the buildings in each Building Category

Main Building Type - Type of Area

- Enter the Type of Area that the Area of the Building has been measured in.

Gross Internal Area (or Total Useful Floor Area) - the method of measurement is set out in Technical Guidance Document L of the Building Regulations, which states that *'linear measurements for the calculation of wall, roof and floor areas and building volumes should be taken between the finished internal faces of the appropriate external building elements'*

Some building sectors commonly use alternative measures of area, notably Net Lettable Area (NLA) for the commercial office sector, and Sales Floor Area (SFA) for retail premises. Where these are the only measurements available for these building types, then the calculation may use standard, conservative, conversion factors to obtain GIA from NLA or SFA. These conversion factors, and the building categories for which they may be applied are as follows:

Table 3.3.1 Allowable alternatives to Total Useful Floor Area

Category	Name	Brief Description	Approved alternate floor area	Default multiplier applied to alternate area to obtain TUFA
1	General office	General office and commercial working areas	Net lettable area (NLA) measured as RICS	1.25
3	General retail	General street retail and services	Sales Floor Area (SFA)	1.80
4	Large non-food shop	Retail warehouse or other large non-food store	Sales Floor Area (SFA)	1.80
5	Small food store	Small food store	Sales Floor Area (SFA)	1.35
6	Large food store	Supermarket or other large food store	Sales Floor Area (SFA)	2.00

- If the type of area does not match the Building Category an error message will appear stating "Edit Type of Area", if this appears the Type of Area must be changed to match the Building Category as outlined in the Table above.

Area of the Main Building Type

- Enter the Area of the Main Building Type

Total Useful Floor Area

The total useful floor area is calculated based on the Building Type, the type of Area and the area of the building type.

The conversion factors for calculating the Total Useful Floor Area are shown in Table 3.3.1

Number of Hours of Occupancy

- Select if the hours of occupancy are "Standard Occupancy" or "Extended Hours"

"Extended Hours" may be selected if the energy assessor can demonstrate that the building is occupied for significantly longer periods than the standard hours quoted for the benchmark category and where the benchmark information includes for allowing correction for extended hours of use.

If extended, then input total equivalent hours per year

- If "Extended Hours" has been selected, Enter the total equivalent hours of occupancy per year.

- "Ok" if number of hours entered is ok

- " No Occupation Correction for Building Type" means the Building category does not allow for the benchmark to be corrected for extended hours

- "Value is out of Range" means that the number of hours entered is outside the range of standard and maximum number of hours allowed for the Building Type. This should be corrected prior to registering the Display Energy Certificate with SEAI.

Total Equivalent Hours for Main Building Type

The number of hours to be used in the benchmarking is shown here. If "Standard Occupancy" has been selected it will show the equivalent standard hours for the building type. If "Extended Hours" has been selected it will show the equivalent hours of occupancy.

Separable Energy Uses

Buildings may include activities that consume energy and which are not considered typical of that building type. Including these activities could reduce the validity of the benchmark, and so it may be reasonable to subtract these separable energy uses in certain circumstances.

Allowed separable uses are included as part of the benchmark information. No other energy uses may be separated for the assessment. The allowed separable energy uses

are:

- Regional server room
- Trading floor
- Bakery oven
- Sports flood lighting
- Furnace, heat treatment or forming process
- Blast chilling or freezing.

The building types for which each particular separable use is acceptable is also specified in the benchmark information in CIBSE TM 46.

"NOT APPLICABLE FOR BUILDING TYPE" will appear if separable energy cannot be used with the building type selected

Is the Separable Energy Metered

Select "Metered" or "Unmetered"

In order for an energy use to be treated as a separable energy use it must be permanently metered. Selecting "Metered" will allow the separable energy to be included. Selecting "Unmetered" will result in the separable energy being ignored.

Are there any Separable Energy Uses

Enter the energy use associated with each Separable Energy Use.

The allowed separable energy uses associated with the building type are listed. Beside each allowed separable energy use enter the energy use In kWh for the year.

Floor area associated with separable energy use

Enter the associated floor area.

The separable energy must have associated floor area that is measured and recorded. The area must be given in the form of gross internal area.

Fuel Type

Enter the fuel types associated with the separable energy use.

Consumption kWh

Enter the annual energy consumption for the separable energy for each fuel type.

Start Date/ End Date

- Enter the Start Date of the separable energy measurement period
- Enter the End Date of the separable energy measurement period

The separable energy Measurement Period must be within the range 365 +/- 7 days, and the measurement period must be aligned to begin within +/- 31 days of the beginning, or end within +/- 31 days of the end, of the assessment period. Otherwise, the separable energy use will not be accommodated and discounted in the calculation.

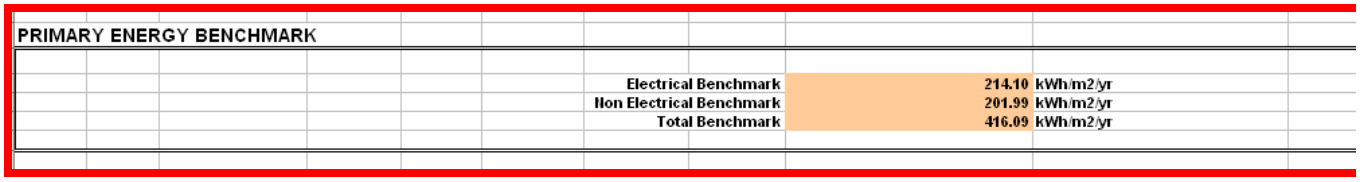
- "No Separable Energy" appears if there is no separable energy.
- "Measurement period out of range - Separable Energy cannot be deducted" appears if the measurement period is outside 365 +/- 7 days.
- "Dates Out of alignment - Separable Energy cannot be deducted" appears if the measurement period is not within +/- 31 days of either the start/ end date of the assessment period

Equivalent 365 Day Energy Consumption that will be deducted

Depending the on the parameters outlined above, this shows the amount of energy that will be deducted as a Separable Energy Use for the Building Type.

The energy use is pro rated to 365 days.

3.4 Primary Energy Benchmark



PRIMARY ENERGY BENCHMARK		
Electrical Benchmark	214.10	kWh/m2/yr
Non Electrical Benchmark	201.99	kWh/m2/yr
Total Benchmark	416.09	kWh/m2/yr

Electrical Benchmark

This is the electrical benchmark calculated from the Building Types entered, and the associated adjustments for location and longer hours of occupancy.

The Benchmark is converted to Primary Energy using a Primary Energy Factor of 2.7

Non Electrical Benchmark

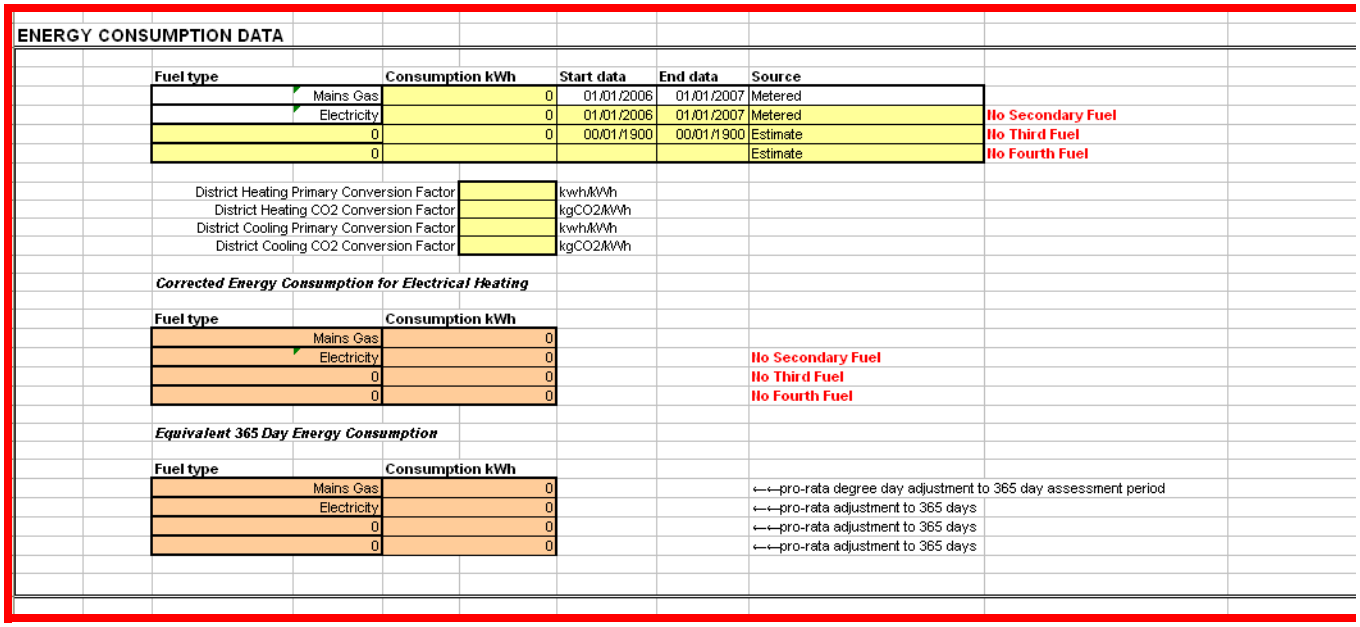
This is the non electrical benchmark calculated from the Building Types entered, and the associated adjustments for location and longer hours of occupancy.

The Benchmark is converted to Primary Energy using a Primary Energy Factor of 1.1

Total Benchmark

This is the total benchmark calculated from the Building Types entered, and the associated adjustments for location and longer hours of occupancy.

3.5 Energy Consumption Data



ENERGY CONSUMPTION DATA

Fuel type	Consumption kWh	Start data	End data	Source	
Mains Gas	0	01/01/2006	01/01/2007	Metered	
Electricity	0	01/01/2006	01/01/2007	Metered	No Secondary Fuel
0	0	00/01/1900	00/01/1900	Estimate	No Third Fuel
0				Estimate	No Fourth Fuel

District Heating Primary Conversion Factor		kwh/kWh
District Heating CO2 Conversion Factor		kgCO2/kWh
District Cooling Primary Conversion Factor		kwh/kWh
District Cooling CO2 Conversion Factor		kgCO2/kWh

Corrected Energy Consumption for Electrical Heating

Fuel type	Consumption kWh		
Mains Gas	0		
Electricity	0		No Secondary Fuel
0	0		No Third Fuel
0	0		No Fourth Fuel

Equivalent 365 Day Energy Consumption

Fuel type	Consumption kWh	
Mains Gas	0	←←pro-rata degree day adjustment to 365 day assessment period
Electricity	0	←←pro-rata adjustment to 365 days
0	0	←←pro-rata adjustment to 365 days
0	0	←←pro-rata adjustment to 365 days

Fuel Type

- Enter the fuel types associated with the energy use within the building.

The first fuel type will always be the Main Heating Fuel selected under Initial Energy Data

The second fuel type will always be Electricity unless the Main Heating Fuel is Electricity and is not metered separately. If this is the case leave the second fuel blank.

Consumption kWh

- Enter the annual energy consumption for each fuel type.

Start Date/ End Date

- Enter the Start Date of the energy measurement period
- Enter the End Date of the energy measurement period

The first fuel type will automatically take the Start and End dates of the Main Heating Fuel Measurement Period which were input in Initial Energy Data.

If the Fuel is Metered the Fuel Measurement Period must be 365 days +/- 31days to be accepted in the calculation.

If the is Estimated the Main Heating Fuel Measurement Period must be 365 days +/- 90days to be accepted in the calculation.

- "No Secondary/Third/Fourth Fuel" appears if there is no Second/ Third or Fourth Fuel.

- "Dates Out of alignment" appears if the measurement period is not within +/- 31 days of either the start/ end date of the assessment period. If this is the case this must be corrected otherwise a "G" rating will be awarded when registered with SEI.

District Heating Primary Conversion Factor & CO2 Factor

- Enter the Primary Conversion Factor for the District Heating Scheme

- Enter the CO2 Factor for the District Heating Scheme

If heating is supplied from district heating then the annual readings of the relevant meters should be used. These will have to be supplemented by a statement from the system operator specifying the primary energy consumption and the CO_2 emissions associated with the delivered energy i.e. kWh primary energy per kWh of delivered energy, and kg of carbon per kWh of delivered energy. The suppliers of these services are required to calculate, from their own energy records, the primary energy consumption and CO_2 content per kWh of energy supplied.

Calculations should take account of the annual average performance of the whole system (including all heat/cool/power generating plant, any heat recovery, rejection, or dumping and the distribution circuits). The assessment of primary energy consumption and CO_2 content per kWh should be accompanied by a report signed by a suitably qualified person, detailing how the factors have been derived.

The energy assessor will need a copy of this report together with the start and end dates for the measurement period and the kWh of energy delivered.

District Cooling Primary Conversion Factor & CO2 Factor

- Enter the Primary Conversion Factor for the District Cooling Scheme

- Enter the CO2 Factor for the District Cooling Scheme

If cooling is supplied from district cooling then the annual readings of the relevant meters should be used. These will have to be supplemented by a statement from the system operator specifying the primary energy consumption and the CO_2 emissions associated with the delivered energy i.e. kWh primary energy per kWh of delivered energy, and kg of carbon per kWh of delivered energy. The suppliers of these services are required to calculate, from their own energy records, the primary energy consumption and CO_2 content per kWh of energy supplied.

Calculations should take account of the annual average performance of the whole system (including all heat/cool/power generating plant, any heat recovery, rejection, or dumping

and the distribution circuits). The assessment of primary energy consumption and CO_2 content per kWh should be accompanied by a report signed by a suitably qualified person, detailing how the factors have been derived.

The energy assessor will need a copy of this report together with the start and end dates for the measurement period and the kWh of energy delivered.

Corrected Energy Consumption for Electrical Heating

The energy consumption is corrected if electrical heating is the Main Heating Fuel and is not metered separately to other Electricity Uses.

- "Fuel Measurement period out of range" appears if the measurement period is outside 365 +/- 31 days
- "Ok" appears if the measurement period is inside 365 +/- 31 days

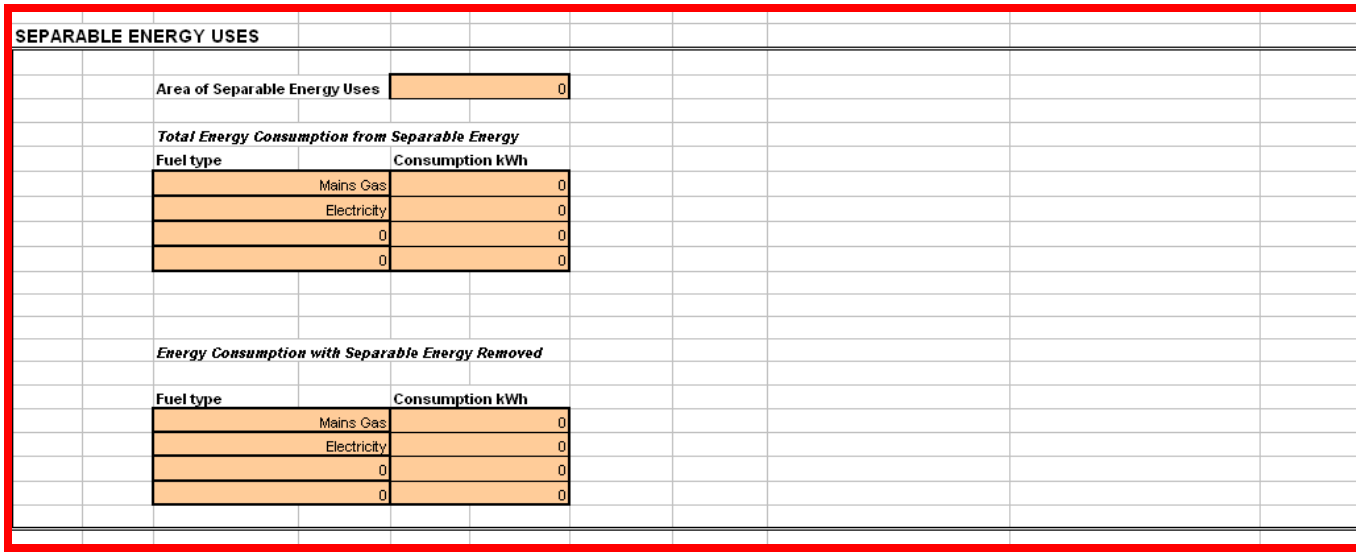
Equivalent 365 Day Energy Consumption

The energy consumption is corrected for 365 days measurement period.

The Main Heating Fuel is adjusted based on degree day adjustment

The other fuels are adjusted based on no of days in the measurement period.

3.6 Separable Energy Uses



SEPARABLE ENERGY USES

Area of Separable Energy Uses	0

Total Energy Consumption from Separable Energy

Fuel type	Consumption kWh
Mains Gas	0
Electricity	0
0	0
0	0

Energy Consumption with Separable Energy Removed

Fuel type	Consumption kWh
Mains Gas	0
Electricity	0
0	0
0	0

Area of Separable Energy Uses

This is the areas of all the separable energy uses under each building type.

Total Energy Consumption from Separable Energy

This is the total energy consumption from the separable energy uses under each building type.

Energy Consumption with Separable Energy Removed

This is the total energy consumption from the building which has been adjusted for 365 days with the separable energy removed.

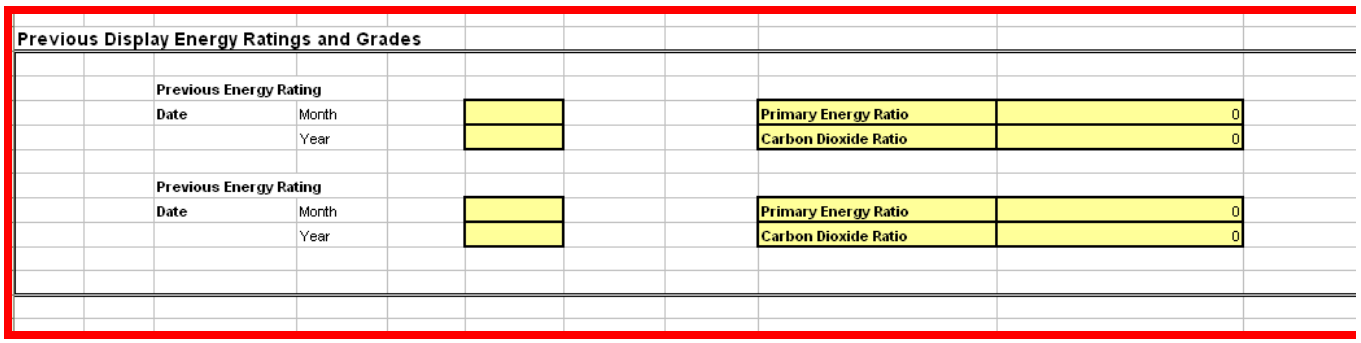
The total energy consumption will be converted into Primary Energy and used in producing the Display Energy Certificate.

The primary energy factors used to convert total energy consumption are based on the fuel type and are as follows:

	Primary Conversion Factor	CO2 Conversion Factor
Mains Gas	1.1	0.203
LPG	1.1	0.232
Heating oil	1.1	0.272
Coal	1.1	0.361

Anthracite	1.1	0.361
Smokeless fuel (inc. Coke)	1.2	0.392
Biomass	1.1	0.025
Dual fuel appliances (mineral + wood)	1.1	0.289
Electricity	2.7	0.643
District Cooling	As Given	As Given
District Heating	As Given	As Given

3.7 Previous Display Energy Ratings and Grades



Previous Energy Rating Month & Year

- Enter the Valid Until Month of Previous Display Energy Certificate
- Enter the Valid Until Year of Previous Display Energy Certificate

Primary Energy Ratio

- Enter the Primary Energy Ratio of the previous Display Energy Certificate

The Primary Energy Ratio is the (Building Primary Energy Consumption per m2) x (100/ Typical Primary Energy Consumption per m2)

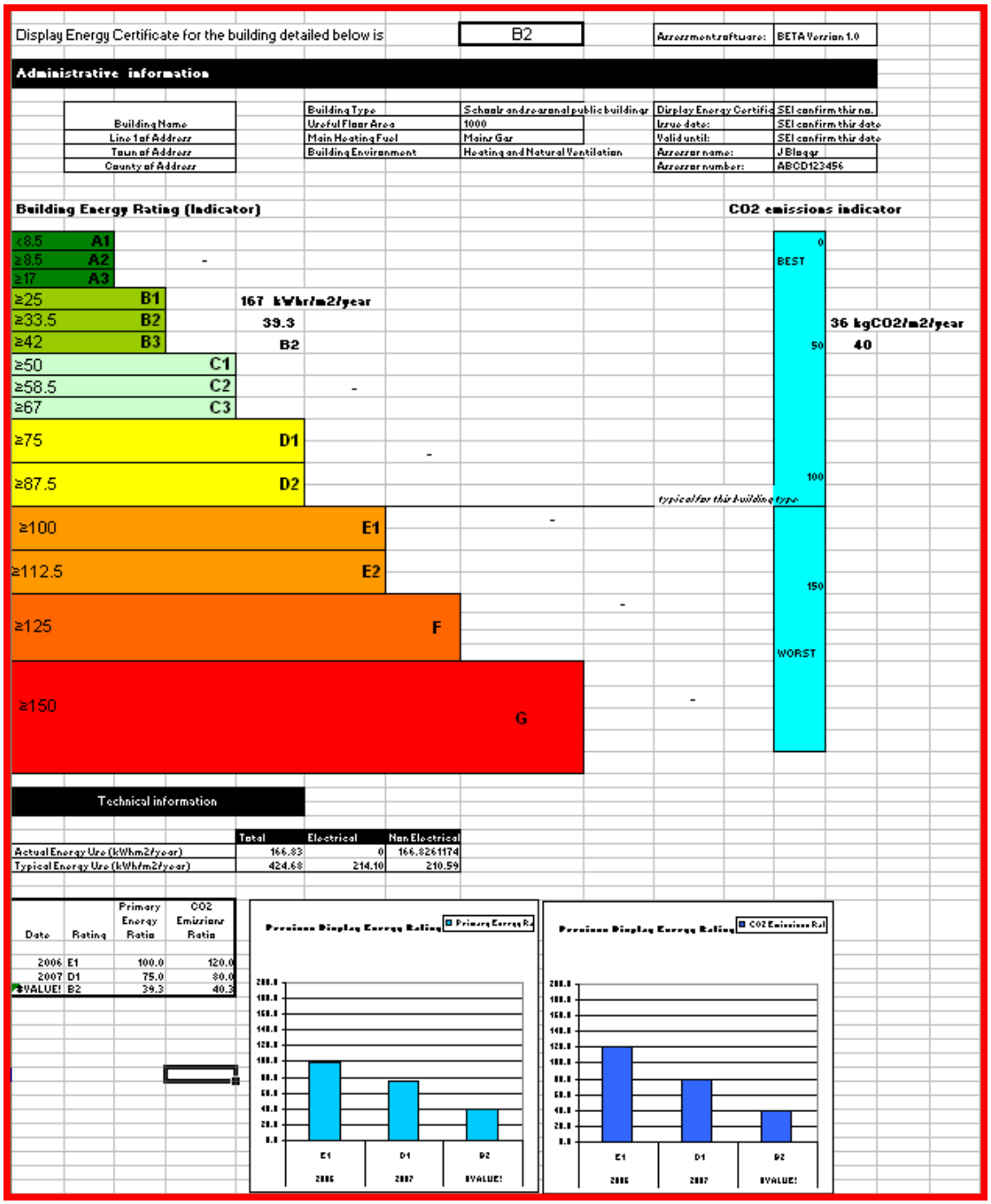
Carbon Dioxide Ratio

- Enter the Carbon Dioxide Ratio of the previous Display Energy Certificate

The Carbon Dioxide Ratio is the (Building Carbon Dioxide Consumption per m2) x (100/ Typical Carbon Dioxide Consumption per m2)

Section 4

Results



The operational BER is calculated as the relevant total primary energy associated with the delivered energy to the building over the assessment period divided by the degree day and

occupancy corrected primary energy density benchmark $P_{dd\&occ}$. To avoid fractions, the result of the comparison is expressed as a percentage, rounded to the nearest whole number.

In the case of a composite benchmark assessment, the relevant total primary energy associated with the delivered energy to the building over the assessment period is divided by the overall composite primary energy density benchmark ($P_{dd\&occ}$ [comp]).

The DEC demonstrates the relative performance of the building assessed against a standardised scale of energy performance. The A to G banding, with subdivisions, of the DEC is determined as:

Calculated values	rating bands	
0 to 8.5	A1	A
8.5 to 17	A2	
17 to 25	A3	
25 to 33.5	B1	B
33.5 to 42	B2	
42 to 50	B3	
50 to 58.5	C1	C
58.5 to 67	C2	
67 to 75	C3	
75 to 87.5	D1	D
87.5 to 100	D2	
100 to 112.5	E1	E
112.5 to 125	E2	
125 to 150	F	F
More than 150	G	G

The Results worksheet contains the following key elements:

:

- An operational BER for the building with performance expressed as a grade on a subdivided A - G scale. scale expressing the equivalent primary energy consumption per unit floor area as a percentage of a value that would be considered typical for the particular type of building;

- A primary energy indicator expressed in terms of primary energy use per unit floor area;
- a subsidiary CO_2 performance indicator shown as a position on a linear scale representing the annual CO_2 emission per unit of area of the building caused by its consumption of energy as a percentage of a value that would be considered typical for the particular type of building) together with a numerical indicator of the CO_2 emissions of the building;
- histograms of trends in energy and CO_2 performance in up to three most recent years.
- A Building identifier, e.g. name, address. This should be sufficient to uniquely identify the building;
- Basic building technical information, e.g. building type, floor area, main heating fuel, main heating/cooling type, sufficient to assist understanding of the more detailed information contained on the certificate;
- A unique DEC number, provided by SEAI;
- Period of validity of the certificate. This commences on a Nominated date chosen by SEAI. The period is for 365 days. For other than the first DEC for a building, there should be no gap from period covered by previous DEC but there may be overlap of up to 90 days where this facilitates preparation of the DEC taking account of the fuel measurement system and consumption data available ;
- Unique assessor number. Each assessor is assigned an unique assessor number;
- Primary electrical and heating energy per unit floor area for the building being assessed and for the relevant benchmark building type. For the building this is the net primary energy figure, excluding separable energy and any renewable energy generated on-site, derived for the assessment period of 365 days.

Appendix 1 Building Types

Building Category	Types of Building
Bar	Disco Nightclub Public House Wine Bar
Clinic	Health Centre and/ or Clinic Dentists Surgery Doctors Surgery Medical and Dental Centre Combined Medical Centre Mortuary Occupational Health Centre Out Patient Treatment Establishment Primary Health Care Building Surgery Veterinary Surgery
Cold Storage	Cold Store
Cover Carpark	Covered Parking
Cultural Activities	Art Gallery Art Centre Library Museum
Dry Sports/ Leisure Facility	Ice Skating Rank Indoor Bowling Leisure Centre Pavilion/ Sports Clubhouse Racecourse Roller Skating Rinks Snooker Club Sports Centre with pool Sports Ground Sports Ground Building Sports Hall Squash Club Tennis Courts
Emergency Services	Ambulance Station Emergency Service Fire Station Lifeboat Station Police Station
Entertainment Halls	Auditorium Bingo Hall

	Casino Cinema Concert Hall Dancing School Entertainment Hall Theatre
Fitness/ Health	Fitness Centre Gym Health Club
General Accommodation	Boarding/ Guest House Cadet Hut Holiday Accommodation Holiday Centre Junior Rank Accommodation Mess/ Officers - Accommodation Mess/ Officers - Accommodation & Catering Mess/ wos & sgts - Accommodation Mess/ wos & sgts - Accommodation & Catering MOD Civilian Rooms Official Service Residence School Boarding House Service Families Accommodation Transient Accommodation
General Office	Adult education centre Air traffic control Bank Office Building Society Office Business Units Call Centre Central Government Office Commercial Office Conference Centre Courts Financial service office Flight Crew Facility Guardroom Law Facilities Legal/ Financial Services Local Government Office Office Showroom Office with industry Office Cellular Offices Open Plan Offices Professional/ Design Professional Services off street

	Public Sector Offices Simulator Studio Office Town Hall Warehouse Office
General Retail	Amusement Arcade Beauty Salon Confectioners, newsagents, off licence Dry Cleaner Garden Centres Hairdressing Salon Indoor markets Laundrette Personal services Pet shops Petrol filling stations
High Street agency	Bank/ Building Society Betting Shop Estate Agents Insurance Brokers Legal/insurance/accountants high street premises Post Office Public services Travel Agent Undertakers
Hospital - clinical and research	General Acute Hospital Teaching/ Specialist Hospital
Hotel	Hotel
Laboratory or operating theatre	Laboratory Operating Theatre
Large food store	Supermarket
Large non food store	Department Store General Stores Factory Shop Factory Showroom Hypermarket Large Shop Retail Showroom Retail - Warehouse Shop with Industry Showroom Superstore Vehicle showroom Warehouse shop Warehouse showroom

Long Term Residential	Community and Mental Health Hospitals Detention Centres Home Hospital Hostel Nursing Home Nursing Residential Homes and hostels Prison Remand Centre Young Offenders institution
Public Buildings with light usage	Beach Huts Bus Depot Cemetery Church Parking building Place of Worship Public Lavatory Sacred place Scout or Guide Hut
Public Waiting or circulation	Bus/ Train Station /Seaport Terminal Dock, wharf Railway premise Railway Station Shopping centre mall
Restaurant	Café Canteen Eating Place Food Courts Mess - junior ranks - accommodation only Mess - junior ranks - catering only Mess - officers - catering only Mess - wos & sgts - catering only Motorway service area Restaurant Takeaway Restaurant
Schools and Seasonal public buildings	Clubhouse Community Centre Community Facilities Community Meeting Place Creche Day centre Dogs racecourse Marina or sailing club Nursery or kindergarten Pre school facility Primary and secondary teaching

	establishments Primary School Private School Reserves centres School Secondary School Social clubs Special School Speedway State primary school State school State secondary school Unlicensed club Village hall
Small Food Store	Corner food shop - butchers Corner food shop - greengrocers and delis
Storage Facility	Aircraft Wing - Store Garages Helicopters storage Road Haulage depot Storage Depot Vehicle Storage
Swimming Pool Centre	Swimming Pool
Terminal	Airport Terminal Armoury Railway Mixed Use
University Campus	Classroom Lecture Hall University
Workshop	Comms Facility Contractor Sheds Crematorium Aircraft Wing - Repair Manufacturing premises (excl process energy) Observatories Petrol Filling Station Railway Engine Shed Recording studio Ship/ submarine repair/ refit Sorting Office Telephone exchange Vehicle repair workshop Vehicle services Workshop Workshops/ maintenance depot