BER Research Tool

User Information Guide

Version 2.0

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Introduction

The BER (Building Energy Rating) Research Tool gives researchers access to statistical data from the BER scheme which is administered by the Sustainable Energy Authority of Ireland. Under the BER scheme a building which is put forward for sale or lease requires a BER certificate. A BER certificate is also required to avail of the grants for energy-efficiency improvements to the home that are provided under the Better Energy Homes scheme (formerly Home Energy Savings scheme).

The BER certificate indicates the annual primary energy usage and carbon dioxide emissions associated with the provision of space heating, water heating, ventilation and lighting to the dwelling. The BER Research Tool will give researchers access to information on all aspects of construction that affect the energy performance of dwellings, across a broad cross-section of the housing stock in Ireland.

The BER Research Tool allows users to search the database of information and download the results in the form of a Microsoft Excel spreadsheet. This document is a catalogue of all the data available in the spreadsheet and is intended as a reference for users of the tool.

The definitions listed below describe the output data available through the BER Research Tool. That is followed by a Glossary which defines some frequently used technical terms and an Appendix which lists other data relevant to the BER that is not available elsewhere. Information relating to DEAP, the methodology behind the BER scheme, can be found in the DEAP manual available on the SEAI website.

Data description

From 1st January 2009, a Building Energy Rating (BER) certificate and advisory report[1] became compulsory for all homes being sold or offered for rent. A BER is based on the characteristics of major components of the dwelling including wall, roof and floor dimensions, window and door sizes and orientations, as well as the construction type and insulation, ventilation and air tightness features, the system for heat supply (including renewable energy), distribution and control, and the type of lighting. The rating covers annual energy use for space heating, water heating, ventilation, lighting and associated pumps and fans, calculated based on a notional family with a standard pattern of occupancy[2].

A BER is only an *indication* of the energy performance of a house (represented as kWh/m^2/annum). Actual energy performance will depend on how the occupants operate the house. A BER does not cover electricity used for purposes other than heating, lighting, pumps, and fans i.e., cooking, refrigeration, laundry, and appliance use is not included.

BER assessments are published by BER assessors who have completed training under the National Framework of Qualifications and registered with SEAI. BER assessors are responsible for ensuring that, within reason, the data compiled and inputted to SEAI approved calculation software, and all other related and recorded calculations are an accurate representation of all characteristics relevant to the energy performance of the building. SEAI has established a quality assurance system to monitor the performance of BER assessors.

To comply with data protection legislation any data that would serve to identify any individual dwelling (e.g., MPRN (Meter Point Reference Number), owner name, full address etc.) has been removed from the BER records available on this web facility.

It is hoped that by making this dataset available to researchers and the public, more in-depth analysis will be facilitated to enhance our understanding of the current state of Ireland's building stock and the potential for its improvement to reduce energy demand and CO_2 emissions within the sector. Re-production of the BER data is permitted provided the source is acknowledged.

Further information on the BER http://www.seai.ie/BER/

[1] The advisory report helps identify how home owners might improve the performance of their home.
[2] Details of these assumptions are available in the Dwelling Energy Assessment Procedure manual available from the BER section of the SEAI website.

Definitions

Column	Spread sheet reference	Alternative field title	Description
A	CountyName	County	The county in which the dwelling is located. The range of allowed values is shown in Table A1 of Appendix A.
B	DwellingTypeDescr	Dwelling Type	The type of dwelling, selected from the following range of values: • House • Apartment • Ground-floor apartment • Mid-floor apartment • Top-floor apartment • End of Terrace • Mid-terrace • Semi-detached house • Detached house • Maisonette • Basement apartment
C	Year_of_Construction	Year of Construction	The year the dwelling was originally constructed. For older dwellings this is likely to be approximate. It does not take account of the construction of extensions to the dwelling at a subsequent date, though any upgrades or extensions will be dealt with when calculating heat loss from the dwelling.

Column	Spread sheet reference	Alternative field title	Description
D	TypeofRating	Ratings Type	There are 3 types of BER Certificate: • "New Dwelling – Provisional BER": required for a dwelling that is not yet built but is offered for sale "off the plans". If a dwelling is not offered for sale at this stage then this certificate is not required. This certificate is valid for 2 years from the date of issue or until the dwelling is finished, whichever is shorter. It is based on the architectural drawings and specifications of the proposed dwelling. Once construction is finished a "New Dwelling – Final" certificate is required. • "New Dwelling – Final BER": required for a newly-built dwelling before it is occupied, regardless of whether the dwelling has a "New Dwelling – Provisional BER". This certificate is based on data collected in a site survey carried out by a registered BER Assessor as well as drawings & specifications for the completed dwelling. It is valid for 10 years from the date of issue though it becomes invalid if material changes are made to the dwelling during that period. • "Existing Dwelling BER": required for any existing dwelling that is offered for sale or to let. An existing dwelling is one that has previously been sold or occupied. This is based on data collected in a site survey carried out by a registered BER Assessor. It is valid for 10 years from the date of issue though it becomes invalid if material changes are made to the dwelling during that period.
E	EnergyRating	Energy Rating Category	The BER scale is divided into categories from G (largest primary energy usage) to an A1 rating (lowest primary energy usage). The full range of categories is described in Table 2 of the Appendix.
F	BerRating	Energy Rating	The Building Energy Rating of the dwelling, i.e. the total Primary Energy Use for the dwelling expressed in units of kWh/m2/year. A low BER indicates an energy efficient dwelling. It is critical to note that multiple factors including dwelling dimensions, orientation, ventilation, dwelling fabric, water heating, lighting, space heating, heating controls and fuel type influence the building energy rating and must all be considered when determining the actual rating and where potential improvements could be made.

Column	Spread sheet reference	Alternative field title	Description
G	GroundFloorArea(sq m)	Ground Floor Area	Any floor separating the dwelling from another heated dwelling, e.g. the floor in a mid-floor apartment that is situated directly over another apartment, is assumed to have no heat loss so it is not included here.
H	UValueWall	Average Wall U-value	The average U-value of all exposed and semi-exposed walls in the dwelling. For the purposes of comparison, the 2019 Building Regulations Part L specifies a maximum wall U-value of 0.18 W/m2K though higher values can be expected in older dwellings.
I	UValueRoof	Average Roof U-value	The average U-value of all exposed and semi-exposed roofs in the dwelling. For the purposes of comparison, the 2019 Building Regulations Part L specifies a maximum U-value of 0.16 W/m2K for a pitched roof insulated at the joists, though higher values can be expected in older dwellings.
J	UValueFloor	Average Floor U-value	The average U-value of all exposed and semi-exposed floors in the dwelling. For the purposes of comparison, the 2019 Building Regulations Part L specifies a maximum floor U-value of 0.18 W/m2K though higher values can be expected in older dwellings.
K	UValueWindow	Average Window U-value	The average U-value of all windows in the dwelling. The U-value is for the whole window: glazing and frame. For the purposes of comparison, the 2019 Building Regulations Part L specifies a maximum U-value of 1.4 W/m2K for windows, though this can vary depending on the amount of glazing.
L	UvalueDoor	Average Door U-value	The average U-value of all doors in the dwelling.
M	WallArea	Exposed Wall Area	The total area of exposed and semi-exposed walls in the dwelling. Any wall separating the dwelling from another heated dwelling, e.g. the party wall in a semi-detached house, is assumed to have no heat loss so it is not included here.

Column	Spread sheet reference	Alternative field title	Description
N	RoofArea	Exposed Roof Area	The total area of exposed and semi-exposed roofs in the dwelling. The area is measured at the thermal envelope which is where the insulation is located. In a typical Irish house with a pitched roof and insulation laid between (and possibly above) the ceiling joists, the ceiling area is the relevant measurement.
O	FloorArea	Total Floor Area	The total internal floor area of the dwelling, excluding any unheated areas that are thermally separated from the dwelling. Units: m2. The total area of exposed and semi-exposed floors in the dwelling.
P	WindowArea	Window Area	The total area of all windows in the dwelling. This is the area of the whole opening: glazing and frame.
Q	DoorArea	Door Area	The total area of all doors in the dwelling. This is the area of the whole opening including any glazing.
R	NoStoreys	No. of Storeys	The number of storeys in the dwelling.
S	CO2Rating	Annual CO_2 Emissions	The amount of carbon dioxide emitted by the dwelling per annum expressed in units of kg CO2/ m2/year. As with the BER, multiple factors influence the level of carbon dioxide emissions from a dwelling, and must all be considered when determining where potential improvements could be made.
T	MainSpaceHeatingFuel	Main SH Fuel	The fuel used by the Main Space Heating system. Fuel data is taken from DEAP manual Table 8.
U	MainWaterHeatingFuel	Main WH Fuel	The fuel used by the Main Water Heating system. Fuel data is taken from DEAP manual Table 8.

Column	Spread sheet reference	Alternative field title	Description
V	HSMainSystemEfficiency	Main SH Efficiency	For all systems except heat pumps this is the (gross) seasonal efficiency of the main space heating system and can have a value between 0 and 100. For heat pumps it is the seasonal performance factor (SPF) expressed as a percentage and may have a value greater than 100. The efficiency may be taken from one of three sources: • the HARP database, • a manufacturer's value certified by an accredited testing laboratory, or, • a default value from DEAP manual Table 4a/4b. A high value indicates an efficient system, e.g. new oil/gas boilers are required by Building Regulations to have an efficiency of at least 90%.
W	MultiDwellingMPRN	MPRN shared with other dwelling	Indicates that the dwelling shares its electricity meter with another dwelling. This could apply to a main dwelling and a smaller adjoining apartment for example.
X	TGDLEdition	Building Regulations	The edition of the Building Regulations, Part L that applies to the dwelling. This is only relevant to New Dwellings. Options are: • None • 2005 • 2008 • 2011 • 2019
Y	MPCDERValue	MPCDER Value	The Maximum Permitted Carbon Dioxide Emission Rating value. This is the maximum amount of carbon dioxide allowed to be emitted by a new dwelling according to the Building Regulations, Part L. The MPCDER is calculated by DEAP, based on a reference house of the same dimensions as the dwelling being tested. If the CO2 Emissions of the dwelling (see Row G) is greater than the MPCDER value then the dwelling does not comply with Part L. This only applies to New Dwellings built according to the 2005 edition of the Building Regulations, Part L.

Column	Spread sheet reference	Alternative field title	Description
Z	HSEffAdjFactor	Main SH Efficiency Adjustment	This is an adjustment to the efficiency of the main heating system which may be applied depending on the type of heating system and other factors such as heating controls or the type of distribution system. The default value is 1. Alternative values are taken from Table 4c of the DEAP manual.
AA	HSSupplHeatFraction	Secondary SH Fraction	The fraction of the space heating load that is provided by the secondary space heating system. A secondary space heating system is specified if: • fixed secondary heaters are present, e.g. an open fire, or, • the main heating system is insufficient to heat the dwelling to the temperatures required. If there is no secondary system specified this has a value of zero. Otherwise the value depends on the type of the main space heating system and the type of the secondary space heating system and is taken from DEAP manual Table 7.
AB	HSSupplSystemEff	Secondary SH Efficiency	The (gross) seasonal efficiency of the secondary space heating system, if one is present. The efficiency may be taken from one of three sources: • the HARP database, • a manufacturer's value certified by an accredited testing laboratory, or, • a default value from DEAP manual Table 4a/4b may be used. If there is no secondary system then this field will have a value of zero. Otherwise it will have a value between 0 and 100 with a high value indicating an efficient heating system.
AC	WHMainSystemEff	Main WH Efficiency	The (gross) seasonal efficiency of the main water heating system. The efficiency may be taken from one of three sources: • the HARP database, • a manufacturer's value certified by an accredited testing laboratory, or, • a default value from DEAP manual Table 4a/4b may be used.
AD	WHEffAdjFactor	Main WH Efficiency Adjustment	This is an adjustment to the efficiency of the main water heating system which may be applied depending on the type of heating system and other factors such as heating controls or distribution system. The default value is 1. Alternative values are taken from Table 4c of the DEAP manual.

Column	Spread sheet reference	Alternative field title	Description
AE	SupplSHFuel	Secondary SH Fuel	The fuel used by the secondary space heating system, if present (see Column Y). Fuel data is taken from DEAP manual Table 8.
AF	SupplWHFuel	Secondary WH Fuel	The fuel used by the supplementary water heating system, if one is required. Currently there is only one type of supplementary water heating system recognised in the BER, namely the immersion heater located in the hot water cylinder, so the fuel in question, if specified, is always 'Electricity'.
AG	SHRenewableResources	SH Renewables	Do renewable sources meet the main space heating need? Allowed values: • No • Yes – Solar • Yes – Woodchip or Wood Pellet • Yes – Heat Pump • Yes – Other This is used in the MPCDER calculation for houses built according to the Building Regulations Part L, 2005.
AH	WHRenewableResources	WH Renewables	Do renewable sources meet the main water heating need? Allowed values: • No • Yes – Solar • Yes – Woodchip or Wood Pellet • Yes – Heat Pump • Yes – Other This is used in the MPCDER calculation for houses built according to the Building Regulations Part L, 2005.
AI	NoOfChimneys	No. of chimneys	The number of chimneys in the dwelling. A chimney is defined as a vertical duct for combustion gases of diameter 200 mm or more. In DEAP a chimney contributes 40 m3/hour to the ventilation rate of the dwelling.

Column	Spread sheet reference	Alternative field title	Description
AJ	NoOfOpenFlues	No. of open flues.	The number of open flues in the dwelling. An open flue is defined as a vertical duct for combustion gases of diameter less than 200 mm. In addition, a chimney with a restricted airflow – e.g., a chimney with a flexible flue liner, a chimney with a damper, a stove with its outlet flue sealed to the chimney – is considered to be an open flue. In DEAP an open flue contributes 20 m3/hour to the ventilation rate of the dwelling.
AK	NoOfFansAndVents	No. of fans and vents.	The number of intermittent fans - e.g., automatic extract fans in toilets, the extract fan in a cooker hood – and permanent vents in the dwelling. Only vents with a permanently open area greater than 3500mm2 are counted. Vents which can be closed to less than 3500mm2, e.g. by a sliding mechanism, are not counted. In DEAP an intermittent fan or a permanent vent contributes 10 m3/hour to the ventilation rate of the dwelling.
AL	NoOfFluelessGasFires	No. fixed flueless gas fires.	The number of fixed flueless gas fires in the dwelling. Portable flueless gas fires are not counted. In DEAP a flueless gas fire contributes 40 m3/hour to the ventilation rate of the dwelling.
AM	DraftLobby	Draft lobby	Is there a draft lobby? Allowed Values: Yes or No. This specifies if the house has a draft lobby on the main entrance to the dwelling. A draught lobby is an arrangement of two doors that forms an airlock to the dwelling, sized such that a person with a pushchair or similar can close the outer door before opening the inner door. The draft lobby acts as an airlock which reduces the amount of warm air lost from the dwelling when the main entrance door is opened.

Column	Spread sheet reference	Alternative field title	Description
AN	VentilationMethod	Ventilation	The main type of ventilation system used in the house: • Natural ventilation • Positive input ventilation from loft • Positive input ventilation from outside • Whole-house extract ventilation • Balanced whole-house mechanical ventilation, no heat recovery • Balanced whole-house mechanical ventilation with heat recovery • Exhaust air heat pump Natural Ventilation is by far the most common in Irish dwellings though mechanical ventilation, in particular 'balanced whole-house mechanical ventilation with heat recovery' is becoming more common.
AO	FanPowerManuDeclaredValue	Mech. Vent. SFP	The specific fan power of the mechanical ventilation system. If there is no mechanical ventilation system this has a value of 0. If a mechanical ventilation system is present a default value of 2 W/[l/s] is assumed unless an appropriately-certified manufacturer's declared value is provided.
AP	HeatExchangerEff	HR Efficiency	The efficiency of the heat recovery unit in a balanced whole-house mechanical ventilation with heat recovery system. If there is no heat recovery unit this has a value of 0. If such a system is present a default value of 66% is assumed unless an appropriately-certified manufacturer's declared value is provided.
AQ	StructureType	Wall Structure	The structural make-up of the walls of the house. There are 3 possible values: • Masonry, • Timber or Steel-frame, • Insulated Concrete Form. This information is used to estimate the amount of air leakage through cracks in the walls of the dwelling which is necessary if an air permeability test has not been performed on the dwelling. Air leakage through masonry walls contributes 0.35 ac/h to the ventilation rate whereas timber/steel-frame and ICF walls have an assumed leakage rate of 0.25 ac/h.

Column	Spread sheet reference	Alternative field title	Description
AR	SuspendedWoodenFloor	Susp. Wood Floor	Is there a suspended wooden floor? There are 3 possible values: • No, which means there is a solid floor; • Yes (Sealed), which means there is a suspended timber floor sealed at the edges and between the floorboards. • Yes (Unsealed), which means there is a suspended timber floor which is not sealed at the edges or between the floorboards. This information is used to estimate the amount of air leakage through the floor of the dwelling which is necessary if an air permeability test has not been performed on the dwelling. Air leakage through a solid floor is taken to be zero. A sealed suspended wooden floor has a leakage rate of 0.1 ac/h and an unsealed suspended wooden floor has a leakage rate of 0.2 ac/h.
AS	PercentageDraughtStripped	Percentage draught-stripping	The percentage of openings (windows, doors and attic-hatches) in the dwelling that have draught-stripping. Any whole number from 0 and 100% is allowed. In New Dwellings a value of 100% is assumed. In Existing Dwellings this number is calculated from survey data. It is assumed that double- or triple-glazed windows are draught-stripped.
AT	NoOfSidesSheltered	No. Sheltered Sides	The number of sides of the dwelling receiving shelter from nearby obstacles such as neighbouring buildings or trees. Allowed values: 0 – 4. This information is determined by site survey. Obstacles must be sufficiently high, wide and near to the dwelling to be considered to offer shelter to a side of the dwelling.
AU	PermeabilityTest	Perm. Test	Has an air permeability test been performed on the dwelling? Allowed values: Yes or No. An air permeability test (see Glossary) is used to determine the amount of air leakage through the structure of the dwelling under normal conditions. Most existing dwellings will not have had this test done though it is now a requirement for new dwellings.

Column	Spread sheet reference	Alternative field title	Description
AV	PermeabilityTestResult	Perm. Test Result	The result of the pressurisation test expressed in units of ac/h (see Glossary). If no test has been performed on the dwelling a value of 0 is used. For the purposes of comparison, the 2019 Building Regulations Part L specifies a maximum value of 0.25 ac/h though higher values can be expected in older dwellings.
AW	TempAdjustment	Temperature Adjustment	This is an adjustment to the "mean internal temperature during heating hours" used to account for very poor or very good levels of control of the main heating system. For most systems it is zero. For systems with poor control, e.g. an oil boiler & radiators with no room thermostats and no programmer, it has a positive value thereby increasing the internal temperature of the dwelling. This requires more fuel to be used which will increase the BER. A negative temperature adjustment is also possible, e.g. a delayed-start thermostat has a temperature adjustment of -0.15°C, which will reduce fuel use and reduce the BER.
AX	HeatSystemControlCat	Control Cat.	The controls on the main space heating system are assigned a control category depending on whether they offer poor, good or ideal control. Allowed values: 1 – 3. Control Category Control Level 1 Poor control 2 Good control 3 Ideal control A control category of 1 or 2 will increase the internal temperature in the dwelling. This requires more fuel to be used which will increase the BER. Control Category values are taken from DEAP manual Table 4e.

Column	Spread sheet reference	Alternative field title	Description
AY	HeatSystemResponseCat	Responsiveness Cat.	The Heating System Responsiveness category is a measure of how well the heating distribution system responds to a change of the control input. Allowed values: 1 – 5. Systems which respond quickly, e.g. radiators, have a low responsiveness category. Systems which respond slowly, e.g. underfloor heating where the pipes are embedded in concrete slab, have a high responsiveness category. A low responsiveness category will lead to a better BER.
AZ	NoCentralHeatingPumps	No. C.H. Pumps	The number of circulating pumps on the central heating system. Allowed values: 0, 1, 2,…
BA	CHBoilerThermostatControlled	Boiler Stat1	Is the boiler controlled by a room thermostat? Allowed values: Yes or No. This relates to the amount of energy used by the circulating pump(s) on the central heating system. If the boiler is controlled by a room thermostat the pumps will run less and therefore consume less electricity.
BB	NoOilBoilerHeatingPumps	No. Oil Pumps	The number of oil boiler pumps. Allowed values: 0, 1, 2,… In the absence of an oil boiler this is zero.
BC	OBBoilerThermostatControlled	Boiler Stat2	Is the boiler controlled by a room thermostat? Allowed values: Yes or No. This relates to the amount of energy used by the oil boiler pump(s). If the boiler is controlled by a room thermostat the pumps will be running less and therefore consume less electricity.
BD	OBPumpInsideDwelling	Oil Pump In	Is the oil boiler pump inside the dwelling? Allowed values: Yes or no. An oil boiler pump gives out heat when in use and if the pump is inside the dwelling, this heat makes a contribution to the space heat requirement of the dwelling. If the pump is outside the dwelling it does not contribute to the space heating.

Column	Spread sheet reference	Alternative field title	Description
BE	NoGasBoilerHeatingPumps	No. Gas Fans	The number of gas boiler flue fans. Allowed values: 0, 1, 2, …. Some gas boilers have a fan in the flue to increase the throughput of air (going in) and exhaust gases (coming out) which makes the combustion process more efficient. In the absence of data to the contrary it is assumed that a gas boiler has one flue fan. If there is no gas boiler in the dwelling then this field is set to zero.
BF	WarmAirHeatingSystem	Warm Air	Is there a Warm-air heating system present? Allowed values: Yes or No. A warm-air heating system is one where space heating is provided by warm air delivered to rooms via a system of ducts.
BG	UndergroundHeating	Underfloor	Is there an underfloor heating system present? Allowed values: Yes or No. This option is no longer used in DEAP.
BH	GroundFloorUValue	Ground Floor U	The U-value of the ground floor of the dwelling. This value is only stated when there is an underfloor heating system present, otherwise it is zero. This option is no longer used in DEAP.
BI	DistributionLosses	Distribution Loss	Distribution Loss: the amount of energy lost transferring hot water to the taps. This is calculated by the software from the total floor area of the dwelling. In any system in which hot water is transferred from a central storage vessel to the taps - e.g. water heated by a regular boiler and stored in a hot water cylinder - the hot water will inevitably lose some heat as it travels through the pipes to the taps. Systems in which water is only heated at the point of use - e.g. a system of instantaneous electric under-sink heaters - do not have any distribution losses. For most Irish dwellings the distribution loss has a value between 200 - 500 kWh/year.

Column	Spread sheet reference	Alternative field title	Description
BJ	StorageLosses	Storage Loss	Storage Loss: the amount of energy lost storing hot water. Allowed values: Yes or No. Many HW systems heat water and store it for use at a later time, e.g. the regular-boiler & hot water cylinder system common in Irish dwellings. The hot water cylinder stores the water at a high temperature, typically around 60°C, so it is inevitable that some of this heat will be lost to the cooler surroundings, though the rate of heat loss can be reduced by insulating the cylinder. In DEAP the storage loss depends on the type of hot water store, the volume of the store and the amount and type of insulation. For systems with no storage vessel, e.g. instantaneous combi boilers, storage losses are zero. Depending on the system installed storage losses can range from 0 to several thousand kWh/year.
BK	ManuLossFactorAvail	Declared Loss	Is the Manufacturer's Declared Loss Factor available for the HW store? Allowed Values: Yes or No. The declared loss factor of the hot water store may be used if it is known. Otherwise the storage losses must be calculated using the type of hot water store, the volume of the store and the amount and type of insulation.
BL	SolarHotWaterHeating	SolarHotWaterHeating	Is there a solar hot water heating system? Allowed values: Yes or No. Set to true if there is a solar water heating system specified in the BER assessment.
BM	ElecImmersionInSummer	Electric Immersion in Summer	Is supplementary electric water heating used in summer? Allowed values: Yes or No. Supplementary electric water heating is specified where the main water heater is incapable of providing water heating without space heating, e.g. in a dwelling with an open fire and back boiler as the main water heating system, it is assumed that the occupant would use the immersion to heat the water in summer rather than light a fire. If set to "Yes" DEAP assumes that 33% of the water heating demand is provided by electricity and that the main water heating system provides the rest.

Column	Spread sheet reference	Alternative field title	Description
BN	CombiBoiler	Combi	This indicates the type of combi boiler present, if any; Allowed values are: • None, • Instantaneous, without keep-hot facility, • Instantaneous, with keep-hot facility controlled by time clock, • Instantaneous, with keep-hot facility not controlled by time clock, • Storage combi boiler: store volume ≥ 55 litres, • Storage combi boiler: store volume < 55 litres. An instantaneous combi boiler is one with a store volume less than 15 litres.
BO	KeepHotFacility	Keep Hot	This indicates the type of Keep-hot facility present, if any. Allowed values are: • None • keep-hot facility, controlled by time clock • keep-hot facility, not controlled by time clock This is a facility within an instantaneous combination boiler whereby water within the boiler may be kept hot while there is no demand. The water is kept hot either (i) solely by burning fuel, or (ii) by electricity, or (iii) both by burning fuel and by electricity, though not necessarily simultaneously.
BP	WaterStorageVolume	Water Storage Volume	The volume of the hot water store in litres.
BQ	DeclaredLossFactor	Loss Factor	The manufacturer's declared loss factor for the hot water store, if available (see Row BI). Units: kWh/day.
BR	TempFactorUnadj	Temp Factor	The unadjusted Temperature Factor. This is used to calculate storage losses from the hot water store in the absence of the manufacturer's declared loss factor. The value depends on the type of water store and for storage combi boilers it also depends upon the volume of the hot water store. Increasing the temperature factor means a larger storage loss. The various possible values are detailed in DEAP manual Table 2.

Column	Spread sheet reference	Alternative field title	Description
BS	TempFactorMultiplier	Temp Factor Mult	The Temperature Factor Multiplier. This is used to account for how heating controls on the main water heating system can affect the storage losses, e.g. a cylinder thermostat is assumed to reduce storage losses by 10% giving a Temperature Factor Multiplier of 0.9. The various possible values are detailed in the notes following DEAP manual Table 2.
BT	InsulationType	HW Insulation Type	The type of insulation on the hot water store. There are two possible values: • Loose jacket • Factory insulated Factory applied insulation is better than loose (lagging) jacket insulation.
BU	InsulationThickness	HW Insulation Thickness	The thickness of insulation on the hot water store, in millimetres. The thicker the insulation the smaller the storage losses.
BV	PrimaryCircuitLoss	Primary Loss	The Primary Circuit Loss. This is the amount of energy lost transferring water from where it is heated to where it is stored, e.g. from a regular boiler to the hot water cylinder. For the regular boiler & cylinder system the primary circuit loss can be reduced by insulating the pipes and installing a cylinder thermostat. For combi boilers the primary circuit is very short and contained within the insulated casing of the boiler so the primary circuit loss is taken to be zero. Values are taken from DEAP manual Table 3 and depend on the type of system installed.
BW	CombiBoilerAddLoss	Combi Loss	Additional Losses for Combi Boilers. Allowed values: see DEAP manual Table 3a. For a combi boiler an additional loss is included to allow for the draw-off of water until an adequate water temperature is attained at the taps.

Column	Spread sheet reference	Alternative field title	Description
BX	ElecConsumpKeepHot	Keep-Hot Elec.	The amount of electricity consumed by the keep-hot facility of an instantaneous combi boiler (see Row BM). A keep-hot facility controlled by time clock is taken to use 600 kWh/year whereas one without time clock control is assumed to use 900 kWh/year
BY	ApertureArea	Aperture Area	The Aperture Area of a system of solar water heating collectors, measured in m2. This information is taken from the HARP database or from certified test data, if it is available. Otherwise default values from DEAP manual Table H1 are used.
BZ	ZeroLossCollectorEff	Zero Loss Coll. Eff.	The Zero-loss Collector Efficiency of a system of solar water heating collectors. It is a number between 0 and 1, and is a measure of the fraction of solar energy incident on the collector that is absorbed. This information is taken from the HARP database or from certified test data, if it is available. Otherwise default values from DEAP manual Table H1 are used.
CA	CollectorHeatLossCoEff	Coll. Heat Loss	The Collector Heat-loss Coefficient of a system of solar water heating collectors. Some of the energy absorbed by a solar collector will inevitably be lost to the surroundings. The amount of heat lost is quantified by the collector heat-loss coefficient. The higher the value, the more of the collected heat that is lost. This information is taken from the HARP database or from certified test data, if it is available. Otherwise default values from DEAP manual Table H1 are used.
CB	AnnualSolarRadiation	Solar Radiation	The Annual Solar Radiation incident on 1 m2 of solar collectors. This depends on the orientation and angle of the collectors to the horizontal. The optimal set-up is to have the collectors facing south at an angle of 30° to the horizontal though any orientation between south-east and south-west or any angle between 15° to 45° will be close to the optimum. This data must be taken from DEAP manual Table H2.

Column	Spread sheet reference	Alternative field title	Description
CC	OvershadingFactor	Overshading	The Overshading Factor for a system of solar water heating collectors. The calculation of the performance of a solar hot water system must take account of any obstacles that prevent sunlight from falling on the solar collectors for some or all of the day. The overshading factor fulfils this role. It has one of four values depending on the percentage of the sky blocked by obstacles when viewed from the collectors: Overshading % of sky blocked by obstacles. Overshading factor Heavy > 80% 0.5 Significant > 60% - 80% 0.65 Modest 20% - 60% 0.8 None or very little < 20% 1.0 Ideally the collectors will be situated so that there is as little shading as possible.
CD	CylinderStat	Cylinder Stat	If the cylinder is heated by a boiler, is there a Cylinder Thermostat? Allowed values: Yes, No, NA. This relates to systems where hot water is provided by a boiler and a solar hot water system. If there is no cylinder thermostat on the hot water cylinder the output of the solar hot water system is reduced by 10%. If the question does not apply the “NA” option (Not Applicable) is chosen.
CE	SolarStorageVolume	Dedicated Solar Vol	The Dedicated Solar Storage Volume. This is the volume of water in the storage cylinder(s) that is only heated by the solar collectors.
CF	VolumeOfPreHeatStore	n/a	(this field is not used in DEAP)
CG	CombinedCylinder	Combined Cylinder	Is the dedicated solar storage in a combined cylinder? Allowed Values: Yes or No. If the cylinder that is heated by the solar collector is also heated by other heat sources, e.g. a regular oil/gas boiler or a solid fuel stove with a back boiler, this is set to “Yes”. If the cylinder is heated only by the solar collector it is set to “No”.

Column	Spread sheet reference	Alternative field title	Description
CH	ElectricityConsumption	Solar pump elec	The electricity consumption of the solar circuit circulation pump. If the pump is solar powered (see next entry) this has a value of zero. Otherwise a default value of 75 kWh/year is assumed.
CI	SWHPumpSolarPowered	Solar pump power	Is the solar hot water pump solar powered? Allowed Values: Yes or No. A pump is usually installed to maintain the flow of water around the solar circuit. This pump may be solar powered in which case no electricity is required to run it. If it is not solar-powered, however, electricity is required and must be accounted for (see previous row).
CJ	ChargingBasisHeatConsumed	Charging	Group Heating Scheme: Is charging based on heat consumed? Allowed Values: Yes or No. In a group heating scheme if all houses are charged a flat fee, and no account is taken of how much energy each individual household actually uses, a factor of 0.9 is applied to the efficiency of the group heating system on the assumption that the heating will be overused.
CK	gsdHSSupplHeatFraction	Group Supp. Frac	Group Heating Scheme: Percentage of heat supplied by the Supplementary system. This is the percentage of the space heating demand provided by the secondary system in a dwelling which is part of a group heating scheme. Currently this has a value of 10%. If there is no secondary system then this quantity has a value of zero.

Column	Spread sheet reference	Alternative field title	Description
CL	gsdHSSupplSystemEff	Group Supp. Eff	Group Heating Scheme: Efficiency of the Supplementary system. The (gross) seasonal efficiency of the secondary space heating system, if one is present. As in dwellings with individual heating systems, a secondary space heating system is specified if: • fixed secondary heaters are present, e.g. an open fire, or, • the main heating system is insufficient to heat the dwelling to the temperatures required. The efficiency may be taken from one of three sources: • the HARP database, • a manufacturer's value certified by an accredited testing laboratory, or, • a default value from DEAP manual Table 4a/4b. If there is no secondary system then this will have a value of zero.
CM	DistLossFactor	Group Loss	The energy lost distributing the hot water from the group boiler to the individual dwellings is accounted for by this factor. Values are taken from DEAP manual Table 9.
CN	CHPUnitHeatFraction	CHP Fraction	Group Scheme: The fraction of heat provided by a CHP unit/recovered from a power station. If there is a CHP unit or Waste Heat is recovered from a power station then this value is taken from operational records. Otherwise it has a value of zero.
CO	CHPSystemType	CHP Type	The type of CHP system. There are three allowed values: • None • Combined Heat and Power • Waste Heat from Power Stations
CP	CHPElecEff	CHP Elec Eff	The Electrical efficiency of the CHP unit, taken from certified test data. If there is no CHP unit this is zero.

Column	Spread sheet reference	Alternative field title	Description
CQ	CHPHeatEff	CHP Therm Eff	The Thermal efficiency of the CHP unit, taken from certified test data. If there is no CHP unit this is zero.
CR	CHPFuelType	CHP Fuel	The fuel used by the CHP unit. Fuel data is taken from DEAP manual Table 8.
CS	SupplHSFuelTypeID	Group Supp. Fuel	The fuel used by the secondary space heating system, if one is present. Fuel data is taken from DEAP manual Table 8.
CT	gsdSHRenewableResources	Group SH Renewables	Do renewable sources meet the main space heating need? Allowed values: • No • Yes – Solar • Yes – Woodchip or Wood Pellet • Yes – Heat Pump • Yes – Other This is used in the MPCDER calculation for houses built according to the Building Regulations Part L, 2005.
CU	gsdWHRenewableResources	Group WH Renewables	Do renewable sources meet the main water heating need? Allowed values: • No • Yes – Solar • Yes – Woodchip or Wood Pellet • Yes – Heat Pump • Yes – Other This is used in the MPCDER calculation for houses built according to the Building Regulations Part L, 2005.
CV	SolarHeatFraction	Solar Heat Fraction	The Solar Heating Fraction This is the percentage of the heating demand met by the solar collectors. For a solar hot water installation this should ideally be greater than 45% but less than 60% to avoid overheating and stagnation in the solar water heating system.

Column	Spread sheet reference	Alternative field title	Description
CW	DeliveredLightingEnergy	Estimated lighting energy demand (final consumption)	See Appendix 3 of the user manual for detail.
CX	DeliveredEnergyPumpsFans	Estimated pumps and fans energy demand (final consumption)	See Appendix 3 of the user manual for detail.
CY	DeliveredEnergyMainWater	Estimated main water heating energy demand (final consumption)	See Appendix 3 of the user manual for detail.
CZ	DeliveredEnergyMainSpace	Estimated main space energy demand (final consumption)	See Appendix 3 of the user manual for detail.
DA	PrimaryEnergyLighting	Estimated lighting energy requirement (primary energy)	See Appendix 3 of the user manual for detail.
DB	PrimaryEnergyPumpsFans	Estimated pumps and fans energy requirement (primary energy)	See Appendix 3 of the user manual for detail.
DC	PrimaryEnergyMainWater	Estimated main water heating energy requirement (primary energy)	See Appendix 3 of the user manual for detail.
DD	PrimaryEnergyMainSpace	Estimated main space heating energy requirement (primary energy)	See Appendix 3 of the user manual for detail.
DE	CO2Lighting	Energy related CO2 - Lighting	See Appendix 3 of the user manual for detail.
DF	CO2PumpsFans	Energy related CO2 - Pumps and fans	See Appendix 3 of the user manual for detail.
DG	CO2MainWater	Energy related CO2 - Main water heating	See Appendix 3 of the user manual for detail.

Column	Spread sheet reference	Alternative field title	Description
DH	CO2MainSpace	Energy related CO2 - Main space heating	See Appendix 3 of the user manual for detail.
DI	GroundFloorArea	GroundFloorArea(sq m)	Any floor separating the dwelling from another heated dwelling, e.g. the floor in a mid-floor apartment that is situated directly over another apartment, is assumed to have no heat loss so it is not included here.
DJ	GroundFloorHeight	GroundFloorHeight (sq m)	Height of the ground floor in metres. Average height between the ceiling surface of the ground floor and the floor below.
DK	FirstFloorArea	First floor area (sqm)	First floor area in square metres
DL	FirstFloorHeight	First floor height (sqm)	Height of the first floor in metres. Average height between the ceiling surface of the first floor and the ceiling surface of the floor below.
DM	SecondFloorArea	Second floor area (sqm)	Second floor area in square metres
DN	SecondFloorHeight	Second floor height (sqm)	Height of the first second in metres. Average height between the ceiling surface of the second floor and the ceiling surface of the floor below.
DO	ThirdFloorArea	Third floor area (sqm)	Third floor area in square metres
DP	ThirdFloorHeight	Third floor height (sqm)	Height of the third floor in metres. Average height between the ceiling surface of the third floor and the ceiling surface of the floor below.
DQ	ThermalBridgingFactor	Thermal bridging Y factor	Thermal bridging at junctions as defined in DEAP Appendix K
DR	ThermalMassCategory	Thermal mass of dwelling	Thermal mass is an indicator of the internal heat capacity of the dwelling.
DS	PredominantRoofTypeArea	PredominantRoofTypeArea (sq m)	Area of the largest (most predominant) roof type in a dwelling
DT	PredominantRoofType	PredominantRoofType	The type of roof with the largest area in a given dwelling
DU	LowEnergyLightingPercent	Low energy lighting percentage	Percentage of fixed light fittings or installed bulbs in fixed lighting sockets which are low energy (such as LED, CFL or fluorescent). This option is no longer used in DEAP 4.0.0 or later XMLs
DV	TotalDeliveredEnergy	Estimated total energy demand (final consumption)	See Appendix 3 of the user manual for detail.
DW	DeliveredEnergySecondarySpace	Estimated secondary space energy demand (final consumption)	See Appendix 3 of the user manual for detail.

Column	Spread sheet reference	Alternative field title	Description
DX	DeliveredEnergySupplementaryWater	Estimated secondary water energy demand (final consumption)	See Appendix 3 of the user manual for detail.
DY	LivingAreaPercent	Percentage living area	Area of the living room area divided by total dwelling floor area. The definition of the living room area is given in DEAP manual section one and is assumed to be heated to 21 degrees celcius during heating periods.
DZ	CO2SecondarySpace	Energy related CO2 - Secondary space heating	See Appendix 3 of the user manual for detail.
EA	CO2SupplementaryWater	Energy related CO2 - Secondary water heating	See Appendix 3 of the user manual for detail.
EB	PrimaryEnergySecondarySpace	Estimated secondary space heating energy requirement (primary energy)	See Appendix 3 of the user manual for detail.
EC	PrimaryEnergySupplementaryWater	Estimated secondary water heating energy requirement (primary energy)	See Appendix 3 of the user manual for detail.
ED	HESSchemeUpgrade	Home Energy Savings / Better Energy Homes upgrade	BER published as part of Better Energy Homes grant assisted upgrade project
EE	RoomInRoofArea	Room in roof area	Room in roof floor area in square metres
EF	PurposeOfRating	Purpose of Rating	Allowed values: • Grant support • New dwelling for owner occupation • Other • Private letting • Sale • Social housing letting • Unknown • Major renovation

Column	Spread sheet reference	Alternative field title	Description
EG	DateOfAssessment	Date of assessment	Date BER assessment completed
EH	FirstEnergyTypeId	Renewable energy - Type Id	The Renewables tab allows for the benefits of newer energy-saving technologies that are not included in the published DEAP software (including photovoltaics, wind energy, solar space heating amongst others). Heat pumps, biomass, heat recovery ventilation and solar water heating are all accounted for elsewhere in DEAP and are not to be included in this section. The energy produced (and consumed) by the technology is entered as delivered energy. The associated primary energy factor and CO2 emissions are taken from Table 8. Further guidance is taken in Appendix M and Appendix Q. Section 13.2 provides details on use of the Renewables tab to contribute towards the renewable energy requirement of Building Regulations 2008, 2011 and 2019 TGD L. Renewable energy Type Id?. Allowed Id values : • 1 - Renewable Thermal • 2 - Renewable Electrical • 3 - No Renewable
EI	FirstEnergyType_Description	Renewable energy 1 - Type	Renewable energy Type. selected from the following range of values: Renewable Thermal Renewable Electrical No Renewable
EJ	FirstEnerProdComment	Renewable energy - Energy Produced or Saved Technology/Comment	Renewable energy produced or saved description
EK	FirstEnerProdDelivered	Renewable energy - Energy Produced or Saved Delivered energy [kWh/y]	Annual renewable energy produced or saved by renewable energy
EL	FirstPartLTotalContribution	Renewable energy - Energy Produced or Saved Part L Total Contribution [kWh/y]	Annual renewable energy produced or saved Part L contribution by renewable energy

Column	Spread sheet reference	Alternative field title	Description
EM	FirstEnerProdConvFactor	Renewable energy - Energy Produced or Saved Primary energy conversion factor	Annual renewable energy produced or saved primary energy conversion factor
EN	FirstEnerProdCO2EmissionFactor	Renewable energy - Energy Produced or Saved CO2 Emission Factor (kg/kWh)	Annual renewable energy produced or saved CO2 conversion factor
EO	FirstEnerConsumedComment	Renewable energy consumed description	Renewable energy consumed description
EP	FirstEnerConsumedDelivered	Renewable energy consumed delivered	Renewable energy consumed
EQ	FirstEnerConsumedConvFactor	Renewable energy - Energy Consumed Primary energy conversion factor	Renewable energy - Energy Consumed Primary energy conversion factor
ER	FirstEnerConsumedCO2EmissionFactor	Renewable energy - Energy Consumed CO2 Emission Factor (kg/kWh)	Renewable energy - Energy Consumed CO2 Emission Factor (kg/kWh)
ES	SecondEnergyTypeId	Renewable energy - Type Id	Renewable energy Type Id?. Allowed Id values : • 1 - Renewable Thermal • 2 - Renewable Electrical • 3 - No Renewable
ET	SecondEnergyType_Description	Renewable energy 1 - Type	Renewable energy Type. selected from the following range of values: Renewable Thermal Renewable Electrical No Renewable

Column	Spread sheet reference	Alternative field title	Description
EU	SecondEnerProdComment	Renewable energy - Energy Produced or Saved Technology/Comment	Renewable energy produced or saved description
EV	SecondEnerProdDelivered	Renewable energy - Energy Produced or Saved Delivered energy [kWh/y]	Annual renewable energy produced or saved by renewable energy
EW	SecondPartLTotalContribution	Renewable energy - Energy Produced or Saved Part L Total Contribution [kWh/y]	Annual renewable energy produced or saved Part L contribution by renewable energy
EX	SecondEnerProdConvFactor	Renewable energy - Energy Produced or Saved Primary energy conversion factor	Annual renewable energy produced or saved primary energy conversion factor
EY	SecondEnerProdCO2EmissionFactor	Renewable energy - Energy Produced or Saved CO2 Emission Factor (kg/kWh)	Annual renewable energy produced or saved CO2 conversion factor
EZ	SecondEnerConsumedComment	Renewable energy consumed description	Renewable energy consumed description
FA	SecondEnerConsumedDelivered	Renewable energy consumed delivered	Renewable energy consumed
FB	SecondEnerConsumedConvFactor	Renewable energy - Energy Consumed Primary energy conversion factor	Renewable energy - Energy Consumed Primary energy conversion factor

Column	Spread sheet reference	Alternative field title	Description
FC	SecondEnerConsumedCO2EmissionFactor	Renewable energy - Energy Consumed CO2 Emission Factor (kg/kWh)	Renewable energy - Energy Consumed CO2 Emission Factor (kg/kWh)
FD	ThirdEnergyTypeId	Renewable energy - Type Id	Renewable energy Type Id? Allowed Id values: • 1 - Renewable Thermal • 2 - Renewable Electrical • 3 - No Renewable
FE	ThirdEnergyType_Description	Renewable energy 1 - Type	Renewable energy Type. selected from the following range of values: Renewable Thermal Renewable Electrical No Renewable
FF	ThirdEnerProdComment	Renewable energy - Energy Produced or Saved Technology/Comment	Renewable energy produced or saved description
FG	ThirdEnerProdDelivered	Renewable energy - Energy Produced or Saved Delivered energy [kWh/y]	Annual renewable energy produced or saved by renewable energy
FH	ThirdPartLTotalContribution	Renewable energy - Energy Produced or Saved Part L Total Contribution [kWh/y]	Annual renewable energy produced or saved Part L contribution by renewable energy
FI	ThirdEnerProdConvFactor	Renewable energy - Energy Produced or Saved Primary energy conversion factor	Annual renewable energy produced or saved primary energy conversion factor
FJ	ThirdEnerProdCO2EmissionFactor	Renewable energy - Energy Produced or Saved CO2 Emission Factor (kg/kWh)	Annual renewable energy produced or saved CO2 conversion factor

Column	Spread sheet reference	Alternative field title	Description
FK	ThirdEnerConsumedComment	Renewable energy consumed description	Renewable energy consumed description
FL	ThirdEnerConsumedDelivered	Renewable energy consumed delivered	Renewable energy consumed
FM	ThirdEnerConsumedConvFactor	Renewable energy - Energy Consumed Primary energy conversion factor	Renewable energy - Energy Consumed Primary energy conversion factor
FN	ThirdEnerConsumedCO2EmissionFactor	Renewable energy - Energy Consumed CO2 Emission Factor (kg/kWh)	Renewable energy - Energy Consumed CO2 Emission Factor (kg/kWh)
FO	FirstBoilerFuelType	Group heating system 1 fuel type	Group heating system 1 fuel type
FP	FirstHeatGenPlantEff	Group heating system 1 efficiency	Group heating system 1 efficiency
FQ	FirstPercentageHeat	Group heating system 1 percentage of heat	Group heating system 1 percentage of heat
FR	SecondBoilerFuelType	Group heating system 2 fuel type	Group heating system 2 fuel type
FS	SecondHeatGenPlantEff	Group heating system 2 efficiency	Group heating system 2 efficiency

Column	Spread sheet reference	Alternative field title	Description
FT	SecondPercentageHeat	Group heating system 2 percentage of heat	Group heating system 2 percentage of heat
FU	ThirdBoilerFuelType	Group heating system 3 fuel type	Group heating system 3 fuel type
FV	ThirdHeatGenPlantEff	Group heating system 3 efficiency	Group heating system 3 efficiency
FW	ThirdPercentageHeat	Group heating system 3 percentage of heat	Group heating system 3 percentage of heat
FX	SolarSpaceHeatingSystem	Solar space heating system percentage of heat	Solar space heating system percentage of heat
FY	TotalPrimaryEnergyFact	Primary energy conversion factor for group heating systems 1/2/3	Primary energy conversion factor for group heating systems 1/2/3
FZ	TotalCO2Emissions	CO2 emission factor for group heating systems 1/2/3	CO2 emission factor for group heating systems 1/2/3
GA	FirstWallType_Description	First wall type description	First wall type description
GB	FirstWallDescription	First wall description	First wall description
GC	FirstWallArea	First wall area	First wall area

Column	Spread sheet reference	Alternative field title	Description
GD	FirstWallUValue	First wall U Value	First wall U Value
GE	FirstWallisSemiExposed	First wall is semi exposed	First wall is semi exposed
GF	FirstWallAgeBandId	First wall age band id	First wall age band id
GG	FirstWallTypeId	First wall type id	First wall type id
GH	SecondWallType_Description	Second wall type description	Second wall type description
GI	SecondWallDescription	Second wall description	Second wall description
GJ	SecondWallArea	Second wall area	Second wall area
GK	SecondWallUValue	Second wall U Value	Second wall U Value
GL	SecondWallisSemiExposed	Second wall is semi exposed	Second wall is semi exposed
GM	SecondWallAgeBandId	Second wall age band id	Second wall age band id

Column	Spread sheet reference	Alternative field title	Description
GN	SecondWallTypeId	Second wall type id	Second wall type id
GO	ThirdWallType_Description	Third wall type description	Third wall type description
GP	ThirdWallDescription	Third wall description	Third wall description
GQ	ThirdWallArea	Third wall area	Third wall area
GR	ThirdWallUValue	Third wall U Value	Third wall U Value
GS	ThirdWallisSemiExposed	Third wall is semi exposed	Third wall is semi exposed
GT	ThirdWallAgeBandId	Third wall age band id	Third wall age band id
GU	ThirdWallTypeId	Third wall type id	Third wall type id
GV	SA_Code	Small Area Code	Small Areas are a relatively recent geographic concept compiled by the National Institute of Regional and Spatial Analysis (NIRSA) on behalf of the Ordnance Survey Ireland (OSi) and in consultation with the CSO. They were designed as the lowest level of geography for the compilation of statistics in line with data protection guidelines and typically contain between 50 and 200 dwellings. A further constraint imposed when creating these new areas, was that they nested within Electoral Division boundaries. Finally, they are generally comprised either of complete townlands or neighbourhoods.

Column	Spread sheet reference	Alternative field title	Description
GW	Prob_smarea_error_0corr	Probability small area error 0	Probability small area error 0
GX	Prob_smarea_error_100corr	Probability small area error 100	Probability small area error 100
GY	RER	Renewable Energy Ratio	Renewable Energy Ratio TGD L 2008 and 2011 define the renewable energy requirement as an absolute figure in kWh renewable energy per m2 floor area per year, whereas TGD L 2019 defines it as a Renewable Energy Ratio (RER). DEAP automatically derives the renewable energy ratio for renewable technologies. Full visibility into the DEAP algorithms, including RER is available in the published Excel Workbook version of DEAP. Calculated for DEAP 4.0.0 or later
GZ	RenewEPnren	Primary energy for non-renewable sources	Primary energy for non-renewable sources
HA	RenewEPren	Primary energy for renewable sources	Primary energy for renewable sources
HB	CPC	Carbon Performance Coefficient	Carbon Performance Coefficient
HC	EPC	Energy Performance Coefficient	Energy Performance Coefficient

Glossary

ac/h – Air changes per hour.
One of the two units of ventilation rate used in DEAP (the other is m^3/h).
Air changes per hour expresses the ventilation rate in terms of the volume of the dwelling so a ventilation rate of 1 ac/h means that all of the air in the dwelling is changed every hour, a rate of 0.5 ac/h means that half the air in the dwelling is changed every hour and so on.

Air Permeability Test
An air permeability test (also called a pressurisation test) is a method of measuring the amount of air leakage through the structure of a dwelling. It is performed by installing a fan in the principal entrance doorway, sealing all fans, flues, chimneys, vents, etc. and determining the air flow rate required to maintain an excess pressure of 50 Pascals (Pa) above outdoor air pressure. The air permeability measured in this way is divided by 20 for use in the DEAP software to give an estimate of the air change rate per hour (ac/h) at typical pressure differences under real operating conditions.

DEAP –Dwelling Energy Assessment Procedure.
This is the methodology used to calculate the energy performance and carbon dioxide emissions associated with the provision of space heating, water heating, ventilation and lighting to the dwelling in the BER scheme.
It includes factors such as,

- Size, geometry and exposure
- Construction materials
- Thermal insulation properties of the building fabric elements
- Dwelling ventilation characteristics and ventilation equipment
- Heating system(s) efficiency, responsiveness and control characteristics
- Solar gains through glazed openings
- Thermal storage (mass) capacity of the dwelling
- Fuels used to provide space and water heating, ventilation and lighting
- Renewable and alternative energy generation technologies

Details of the calculation method are provided in the DEAP manual.

Delivered Energy, in kWh/year.
This corresponds to the energy consumption that normally appears on the energy bills for the assumed standardised occupancy and end-uses considered.

Exposed/semi-exposed elements
An exposed element is an area of floor, wall, roof, window or door that separates the heated space from the outside world, e.g. the external wall of a house.

A semi-exposed element is an area of floor, wall, roof, window or door that separates the heated space from an unheated space, e.g. the wall between a dwelling and an attached, unheated garage.

In calculating the BER, the heat loss through all the exposed and semi-exposed elements must be considered.

An element that separates the dwelling from another heated space - e.g. the separating wall in a semi-detached house, the floor of a mid-floor apartment, the ceiling of a mid-floor apartment - is assumed to have no heat loss.

HARP database- Home-Heating Appliance Register of Performance database.
The Home-heating Appliance Register of Performance (HARP) database is a product efficiency database for home-heating appliances that are used in Ireland. The database is used to provide registered BER Assessors with specific product efficiency information which they can use when calculating BERs for dwellings.

kWh – kilowatt-hour
The kilowatt-hour is the unit of energy used in DEAP.
The BER is measured in kWh per square metre of floor area of the dwelling per year (kWh/m^2/year).

Primary Energy, in kWh/year: This includes delivered energy, plus an allowance for the energy "overhead" incurred in extracting, processing and transporting a fuel or other energy carrier to the dwelling. For electricity, the generation-efficiency of power stations is included.

U-value
U-value, also known as Thermal Transmittance, relates to a building component or structure – i.e. floor, wall, roof, window or door - and is a measure of the rate at which heat passes through that component or structure when unit temperature difference is maintained between the ambient air temperatures on each side. It is expressed in units of Watts per square metre per degree of air temperature difference (W/m2K).
A high U-value indicates that the building component does little to prevent the flow of heat to the outside. A well-insulated building component will have a low U-value.

Appendix 1 - Tables

Table 1
Counties in the BER

County ID	County		County ID	County
1	Co. Carlow		29	Dublin 22
2	Co. Cavan		30	Dublin 23
3	Co. Clare		31	Dublin 24
4	Co. Cork		32	Co. Galway
5	Co. Donegal		33	Co. Kerry
6	Co. Dublin		34	Co. Kildare
7	Dublin 1		35	Co. Kilkenny
8	Dublin 2		36	Co. Laois
9	Dublin 3		37	Co. Leitrim
10	Dublin 4		38	Co. Limerick
11	Dublin 5		39	Co. Longford
12	Dublin 6		40	Co. Louth
13	Dublin 6W		41	Co. Mayo
14	Dublin 7		42	Co. Meath
15	Dublin 8		43	Co. Monaghan
16	Dublin 9		44	Co. Offaly
17	Dublin 10		45	Co. Roscommon
18	Dublin 11		46	Co. Sligo
19	Dublin 12		47	Co. Tipperary
20	Dublin 13		48	Co. Waterford
21	Dublin 14		49	Co. Westmeath
22	Dublin 15		50	Co. Wexford
23	Dublin 16		51	Co. Wicklow
24	Dublin 17		53	Galway City
25	Dublin 18		54	Cork City
26	Dublin 19		55	Limerick City
27	Dublin 20		56	Waterford City
28	Dublin 21			

Table 2
Building Energy Rating Categories

Category	BER (kWh/m^2/year)
A1	≤ 25
A2	> 25
A3	> 50
B1	> 75
B2	> 100
B3	> 125
C1	> 150
C2	> 175
C3	> 200
D1	> 225
D2	> 260
E1	> 300
E2	> 340
F	> 380
G	> 450

Appendix 2 - Terms of Use.

1. **Purpose of Database**

   From 1st January 2009, a Building Energy Rating (BER) certificate and advisory report became compulsory for all homes being sold or offered for rent. The advisory report helps identify how home owners might improve the performance of their home.

   A BER is based on the characteristics of major components of the dwelling (wall, roof and floor dimensions, window and door sizes and orientations) as well as the construction types and insulation, ventilation and air tightness features, the system for heat supply (including renewable energy), distribution and control, and the type of lighting. It covers annual energy use for space heating, water heating, ventilation, lighting and associated pumps and fans, calculated on the basis of a notional family with a standard pattern of occupancy.

   A BER is only an indication of the energy performance of a house (represented as kWh/m2/annum). Actual energy performance will depend on how the occupants operate the house. A BER does not cover electricity used for purposes other than heating, lighting, pumps and fans i.e. cooking, refrigeration, laundry and other appliance use is not included.

   BER assessments are published by BER assessors who have completed training under the National Frameworks of Qualifications, passed the national domestic BER examination and registered with SEAI. BER assessors are responsible for ensuring that, within reason, the data compiled and inputted to SEAI approved calculation software and all other related and recorded calculations are an accurate representation of all characteristics relevant to the energy performance of the building. SEAI has established a quality assurance system to monitor the performance of BER assessors.

   The BER records available on this web facility are modified to comply with data protection legislation. It is hoped that by making this database available to researchers and the general public more in-depth analysis will be facilitated to enhance our understanding of the current state of Ireland's building stock and the potential for its improvement to reduce energy and CO_2 emissions from within the sector.

2. **Access and Use**

   The Database may be used for personal, research or education purposes. The production of the BER data is permitted provided the source is acknowledged.

3. **No Warranties**

   SEAI manages a quality assurance system and disciplinary procedure for all BERs. The application or analysis of data made available via this facility is a matter for the recipient and SEAI should be referenced as a source of the data only. SEAI takes no responsibility for errors (as yet undetected) in the data set, nor for any misinterpretation of the data by the recipient.

SEAI DOES NOT WARRANT, GUARANTEE OR MAKE ANY REPRESENTATION REGARDING THE ACCURACY, COMPLETENESS, CORRECTNESS, RELIABILITY, CURRENCY OR OTHERWISE OF THE DATABASE.

SEAI MAKES NO REPRESENTATIONS OR WARRANTIES WHATSOEVER, EXPRESS OR IMPLIED, WITH RESPECT TO THE DATABASE.

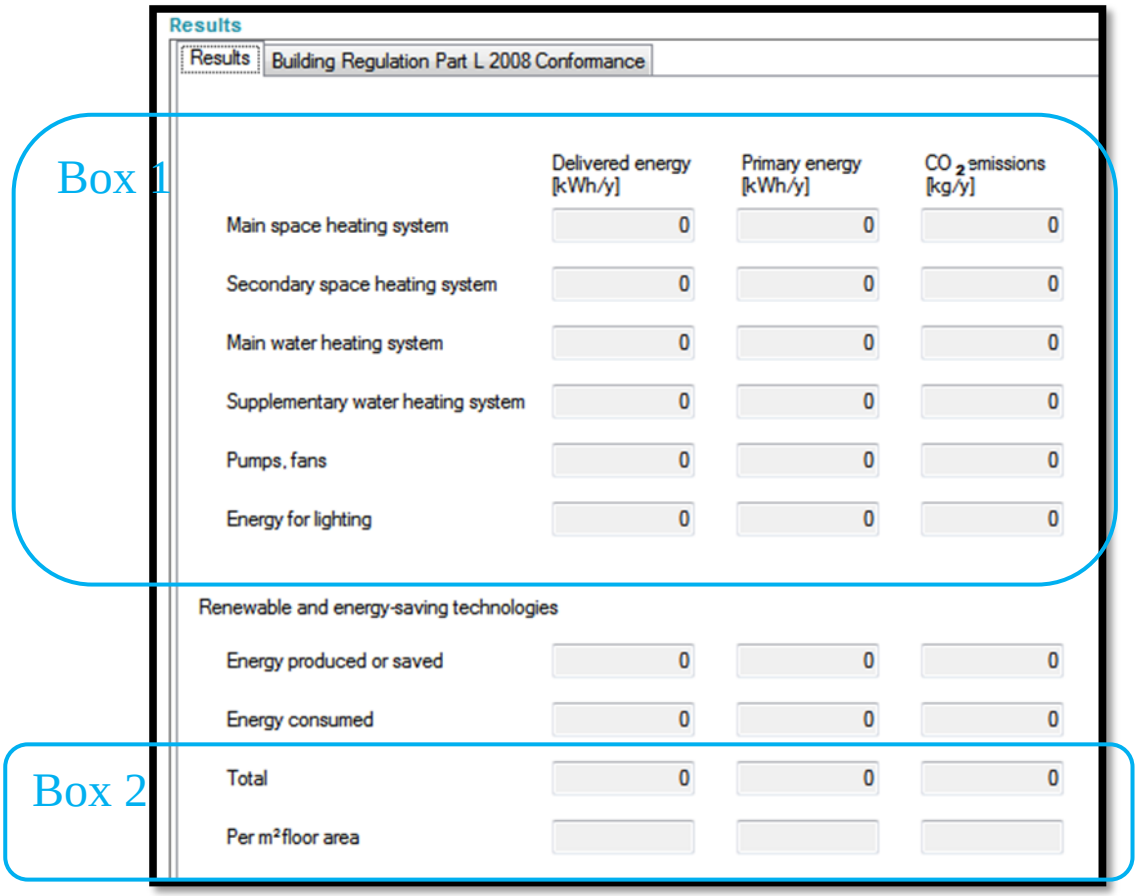
4. **Limitation of Liability**
   SEAI SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE, INCLUDING LOST PROFITS, LOSS OF USE OR INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR EXAMPLARY DAMAGES CAUSED TO ANY PERSON AS A RESULT OF THE USE OF THE DATABASE OR THE INFORMATION CONTAINED THEREIN.

5. **Governing Law**
   The jurisdiction of the Irish courts will apply to settle any dispute that may arise out of or in connection with any of the above.

Appendix 3 – Derivation of DEAP results tab from DEAP XML

This appendix describes derivation of approximate values for the Primary energy and CO2 fields in the DEAP "results" tab based on information in the XML file output from DEAP and held on the NAS database. This approximation is required for assessments produced in version 2.1.2; 3.0.0; 3.0.1; 3.1.0 of DEAP if wishing to calculate these values outside of DEAP. It is not required for assessments produced in DEAP 3.2.0 and later as the primary energy and CO2 fields are available in the XML and may be used directly from the XML.

The DEAP fields to be approximated are as follows. This document only derives the values in question for individual rather than group heating systems.



- TotalCO2EmissionsPerM2 is the total CO2 for the dwelling/m2 from the XML as shown on the BER cert.
- TotalPrimaryEnergyPerM2 is the total primary energy for the dwelling/m2 from the XML as shown on the BER cert.
- The total floor area (TFA) is the sum of the following XML fields:
  - GroundFloorArea
  - FirstFloorArea
  - SecondFloorArea
  - ThirdFloorArea
  - RoomInRoofArea
- TotalPrimaryEnergy = TotalPrimaryEnergyPerM2 *TFA

- TotalCO2 = TotalCO2EmissionsPerM2*TFA
- This approximation ignores EnergyProducedOrSaved and EnergyConsumed. These are rare and represent dwellings with PV or wind energy on site.
- Ignore group heating assessments ("GroupSchemeDetails" present in XML)
- DEAP factors for electricity in DEAP prior to version 3.2.0 are as follows. These fields have changed in DEAP 3.2.0 and are subject to change in XMLs from DEAP 3.2.0 and later.
    - ElecPEFactorDefault = 2.7 (converts from delivered electrical to the associated primary energy)
    - ElecCO2FactorDefault = 0.643 (converts from delivered electrical to the associated CO2 emissions)

Energy for lighting

To determine the energy for lighting in the DEAP results tab:

DeliveredEnergyLighting = LightingEbDefault *TFA*(1 - .5*LowEnergyFixedLighting/100)* LightingC2Approx

Where **LightingC2Approx = 0.95** and **LightingEbDefault = 9.5**

PrimaryEnergyLighting = [DeliveredEnergyLighting] * ElecPEFactorDefault

CO2Lighting = [DeliveredEnergyLighting] * ElecCO2FactorDefault

Energy for Pumps and Fans

To determine the energy for lighting in the DEAP results tab:

DeliveredEnergyPumpsFans = SolarPump + VentilationFans + ElecConsumpKeepHot + HeatingSystemPump

Where:

Solar Pump = SWHDetails-> ElectricityConsumption

VentilationFans = electricity for ventilation fans as per DEAP table 4f, using an approximate SFP of 1.0.

Dwelling volume is the sum of the height by floor area of each storey as shown on the DEAP dimensions tab.

HeatingSystemPump =

[(NoCentralHeatingPumps* CentralHeatingPumpDefault)+ (NoOilBoilerHeatingPumps*OilBoilerPumpDefault)+ (NoGasBoilerHeatingPumps* GasBoilerPump)+ (WarmAirYes*Volume*WarmAirDefault)]

Where the following approximate values are used):

CentralHeatingPumpDefault = 130; OilBoilerPumpDefault = 100; GasBoilerPumpDefault = 45; WarmAirDefault = 0.6;

And **WarmAirYes = 1 IF (WarmAirHeatingSystem = true) ELSE = 0**

PrimaryEnergyPumpsFans = [DeliveredEnergyPumpsFans] * ElecPEFactorDefault

CO2PumpsFans = [DeliveredEnergyPumpsFans] * ElecCO2FactorDefault

Water Heating requirement (approximation)

First determine the **NumberOfOccupants** (N) as per DEAP Water heating tab this is a standardised value based on floor area.

This is used as per the DEAP water heating tab to determine the HotWaterAtTaps assumed based on the standardised number of occupants.

Determine distribution losses:

If DistributionLosses = true then DistributionLosseskWh =HotWaterAtTaps*DistributionLossesDefault/TapsMultiplierDefault else 0

Where DistributionLossesDefault = 0.15 and TapsMultiplierDefault = 0.85

StorageLossesBasic = based on approximate lookup of **InsulationThickness.**

StorageLossesBasic represents a typical cylinder of "normal" size with loose jacket insulation.

InsulationThickness	StorageLossesBasic (approximation)
null	3000
<10	3000
>=10 to <20	1800
>=20 to <30	1300
>=30 to <40	1000
>=40 to <50	900
>=50 to <60	800
>=60 to <70	700
>=70 to <80	600
>80	500

StorageLossesSized is based an approximate lookup of StorageLossesBasic and WaterStorageVolume

WaterStorageVolume	StorageLossesSized (approximate)
null	0
0	0
>0 to < 30	**StorageLossesBasic/2**
>=30 to <300	**StorageLossesBasic**
>=300	**StorageLossesBasic*2**

StorageLossesSized represents the typical cylinder but accounts by approximation for variations in sizes (very small or very big cylinders)

StorageLossesApprox = StorageLossesSized* InsulationType/2

StorageLossesApprox is the sized cylinder halving the losses when there is factory fitted insulation (approximation).

PrimaryCircuitLossApprox = based on lookup of PrimaryCircuitLossID:

PrimaryCircuitLossID	**PrimaryCircuitLossApprox**
0 or null	0
1	0
2	0
3	1220
4	610
5	610
6	360
7	0
8	0
9	0
10	0
11	470
12	280
13	360

TotalHotWaterRequirement = HotWaterAtTaps+DistributionLosseskWh+StorageLossesApprox+PrimaryCircuitLossApprox

If ElecImmersionInSummer = true then SupplementaryWaterFraction= SupplementaryWaterDefault else 0

Where SupplementaryWaterDefault = 0.33

SolarWaterPerM2Approx = energy per m2 solar panel (approximation) = **350**

If SolarHotWaterHeating = true then SolarWaterSavings = SolarWaterPerM2Approx* ApertureArea else 0;

If ElecImmersionInSummer then MainSolarWaterSavings = SolarWaterSavings/2 else MainSolarWaterSavings = SolarWaterSavings;

MainWaterHeaterOutput = [(1- SupplementaryWaterFraction)* TotalHotWaterRequirement] –MainSolarWaterSavings

SupplemenaryWaterHeaterOutput = [SupplementaryWaterFraction*(TotalHotWaterRequirement- PrimaryCircuitLossLossesApprox)] - (MainSolarWaterSavings* SupplementaryWaterFraction*3)

DeliveredEnergyMainWater = MainWaterHeaterOutput/(WHMainSystemEff*.01* WHEffAdjFactor)

DeliveredEnergySupplementaryWater = SupplemenaryWaterHeaterOutput

PrimaryEnergyMainWater = DeliveredEnergyMainWater * (primary energy factor for main water heating fuel)

CO2MainWater = DeliveredEnergyMainWater * (CO2 factor for main water heating fuel)

PrimaryEnergySupplementaryWater = DeliveredEnergySupplementaryWater * ElecPEFactorDefault

CO2SupplementaryWater = DeliveredEnergySupplementaryWater * ElecCO2FactorDefault

The fuel factors above a referenced against DEAP table 8.

Space heating

Primary space heating total is the TotalPrimaryEnergy minus the other primary energy figures previously derived.

This is broken into delivered/primary/secondary/main space heating based on fuel types and fraction of secondary heating and is the final stage in completing the fields from the diagram on page 1.

TotalSpaceHeatingPrimaryEnergy = TotalPrimaryEnergy – (**PrimaryEnergyLighting + PrimaryEnergyPumpsFans + PrimaryEnergyMainWater + PrimaryEnergySupplementaryWater)**

SpaceHeatingReqt = total annual space heating requirement, the space heating energy delivered to the dwelling is as follows:

SpaceHeatingReqt = TotalSpaceHeatingPrimaryEnergy/MainVsSecondarySplit

Where **MainVsSecondarySplit = DeliveredSecondaryFraction + DeliveredMainFraction**

Where **DeliveredSecondaryFraction = (HSSupplHeatFraction*(Secondary space heating fuel primary energy factor))/(HSSupplSystemEff*.01)**

and **DeliveredMainFraction = ([1-HSSupplHeatFraction]*(Main space heating fuel primary energy factor)/ AdjustedMainSpaceEfficiency**

AdjustedMainSpaceEfficiency = (HSMainSystemEfficiency * HSEffAdjFactor *.01)

DeliveredEnergyMainSpace = SpaceHeatingReqt*[1-HSSupplHeatFraction]/ AdjustedMainSpaceEfficiency

DeliveredEnergySecondarySpace = SpaceHeatingReqt*HSSupplHeatFraction/(HSSupplSystemEff*.01)

PrimaryEnergyMainSpace = DeliveredEnergyMainSpace *(Main space heating fuel primary energy factor)

PrimaryEnergySecondarySpace = DeliveredEnergySecondarySpace * (Secondary space heating fuel primary energy factor)

CO2MainSpace = DeliveredEnergyMainSpace *(Main space heating fuel CO2 factor)

CO2SecondarySpace = DeliveredEnergySecondarySpace * (Secondary space heating fuel CO2 factor)