# **GLA Carbon Emission Reporting Spreadsheet**

# **BACKGROUND AND PURPOSE**

The GLA has decided that from <u>January 2019</u> and until central Government updates Part L with the latest carbon emission factors, planning applicants are encouraged to use the SAP 10 emission factors for **referable applications** when estimating CO<sub>2</sub> emission performance against London Plan policies. This is a new approach being taken by the GLA to reflect the decarbonisation of the electricity grid, which is not currently taken into account by Part L of Building Regulations. This approach will remain in place until Government adopts new Building Regulations with updated emission factors.

This GLA Carbon Emission Reporting Spreadsheet facilitates the use of the SAP 10 emission factors and ensures a consistent and transparent process for updating Part L 2013 CO<sub>2</sub> emission performance. In particular, the approach has been developed to ensure that SAP 10 results can still be validated against supporting Part L 2013 BRUKL and SAP outputs.

From <u>January 2019</u> all GLA referable applications (including refurbishments) are expected to use this spreadsheet to report the anticipated carbon performance of a development. This includes planning applicants who are continuing to use SAP 2012 emission factors; although doing so will need to be supported by sufficient justification in line with the Energy Assessment Guidance. Applicants are required to submit this spreadsheet to the GLA alongside the energy assessment. It should be used for both domestic and non-domestic uses. The GLA will not accept the use of alternative methodologies or tools. This is to ensure consistency and to minimise the need for clarifications during the determination period.

Planning applicants should use Part L 2013 BRUKL and SAP outputs to fill in this spreadsheet which serves as a the final step in reporting the carbon emission performance of the proposed energy strategy. It is solely for the purpose of reporting to the GLA and does not replace Part L calculations submitted for Building Regulations approval.

The spreadsheet has been developed to fit as wide a range of policy compliant approaches for referable schemes as possible. Any planning applicants with a policy compliant approach that the spreadsheet does not serve should contact the GLA at: environment@london.gov.uk. Applicants must not amend or alter the spreadsheet to suit non-policy compliant strategies. Any unauthorised amendment to the spreadsheet will invalidate the CO<sub>2</sub> emission calculations.

Applicants should note that we will update the spreadsheet from time to time to ensure it remains fit for purpose. Applicants are expected to use the latest version at the time of the planning submission.

Any feedback on this spreadsheet should be sent to: environment@london.gov.uk.

#### **METHODOLOGY**

Applicants are required to complete all light blue input cells in the applicable tabs ('Carbon Factors', 'Baseline', 'Be Lean', 'Be Clean', 'Be Green' and 'GLA Summary Tables').

# Input Data

For all applications, the input data required includes:

- Bespoke Carbon Factors (if applicable)
- Type of units modelled
- Area of units modelled (m²)
- Number of units modelled
- Total area represented by model (m2)
- Regulated energy consumption by end use (kWh p.a. for residential and kWh/m² p.a. for non-residential)
- Regulated energy consumption by fuel type (kWh/m2 p.a. for non-residential)
- TER, DER and BER figures (kgCO<sub>2</sub>/m<sup>2</sup> p.a.)
- TFEE and DFEE figures for residential (kWh//m² p.a.)
- Regulated energy demand figures (kWh p.a. for both residential and non-residential)
- Unregulated gas and electricity consumption figures (kWh p.a. for both residential and non-residential) [In the 'GLA Summary tables' tab only]
- Actual and notional building cooling demand (MJ/m²) [In the 'GLA Summary tables' tab only]

Applicants should update the highlighted cells with the type, area and number of modelled units. The consumption figures (kWh p.a. for domestic and kWh/m² p.a. for non-domestic) from the Part L modelling output reports should be reported and used to estimate the CO₂ emissions for each stage of the Energy Hierarchy. The TER, DER and BER figures from the Part L 2013 modelling output sheets should also be reported for cross-reference purposes. The applicant should ensure that the manually calculated TER, DER and BER figures are equal to the figures reported within the output sheets. TFEE and DFEE information should also be provided as well as unregulated uses consumption, energy demand figures and cooling demand performance.

The total carbon emissions figures in the 'GLA Summary tables' tab are now calculated based on the area input for 'Total area represented by model (m²)'. This input requirement has been added to ensure that the carbon emission figures align with the development area schedule (included within the DAS) rather than the number of representative models.

#### Required Part L Outputs for the GLA spreadsheet

#### **Domestic Part L Outputs:**

For the domestic conversion applicants are required to use the outputs from the SAP TER and DER worksheets. To assist in the conversion process the required SAP worksheet rows have been referenced in each input cell. For Space Heating and Hot Water applicants will be required to manually convert the SAP energy requirements to energy consumption by fuel type, the appropriate SAP rows for this calculation have also been listed. **Note.** The SAP worksheet rows are based on a communal heating system, which is an expectation for GLA referrable schemes. Applicants proposing individual systems must first seek confirmation from the GLA as to whether the approach will be acceptable.

### Non-domestic Part L Outputs:

The required Part L outputs from non-domestic modelling will be energy consumption by **fuel type** (e.g. grid electricity, natural gas). The energy consumption by end use (e.g. heating, hot water, cooling etc.) included in the BRUKL documents are no longer used to estimate the CO<sub>2</sub> emission performance with SAP 10 emission factors in this spreadsheet. This decision has been taken as the consumption figures provided in the BRUKL may include a mixture of fuel types, for instance heating may include energy consumption from gas boilers and electrically driven heat pumps. The required data can be found in:

- SBEM software: the required data is included in the output file ending "\*sim.csv"
- Government approved software (such as IES and TAS): the required data is included in the output file ending in "\*BRUKL.inp"

The above output files should be appended to the energy assessment document.

Regarding the non-domestic uses, the applicant can determine whether each individual unit will be modelled independently and apportioned to the entire scheme or whether a single model will be generated for the entire development. The applicant should, however, include the results from all BRUKL outputs generated for the proposed development under the "NON-DOMESTIC ENERGY CONSUMPTION AND CO2 ANALYSIS" sections.

**Note:** GLA are aware that the Part L outputs for grid supplied electricity consumption does not account for power factor correction. Where power factor correction is present applicants may be required to amend the electricity consumption by the appropriate adjustment factor. The power factor correction is found in Table 1 of the Government's Approved Document L2A (ADL2A). Applicants should note in the appropriate cells where power factor correction has been applied.

#### **Carbon Factors**

The carbon factors for SAP 2012 and SAP 10 scenarios have been provided in the 'Carbon Factors' tab. The table has been pre-populated with grid electricity and gas factors. Additional space has been included for alternative fuel factors that are included in Table 12 of the SAP 2012 and SAP 10 methodology document. For applications with non-domestic buildings connecting to external heat networks a bespoke carbon factor needs to be introduced, the applicant should provide the full calculation behind the introduced bespoke carbon factor.

#### **Validation Check**

A validation check is required for each model entered to ensure that the conversion is robust. Applicants must ensure that the calculated TER/DER/BER in this spreadsheet matches the actual values from the Part L 2013 BRUKL and SAP worksheets.

Table 1. CARBON (CO2) FAC	TORS		Notes
Fuel type	Fuel Carbon Fac	ctor (kgCO2/kWh)	
	SAP 2012	SAP 10	
Natural Gas	0.216	0.210	SAP 2012 and SAP 10 carbon emission factors (Table 12).
Grid Electricity	0.519	0.233	
Enter Carbon Factor 1			These factors should be used where alternative fuel is used to grid gas and electricity. Carbon emission factors used here
Enter Carbon Factor 2			must be taken from Table 12 within the SAP 2012 and SAP 10 documents.
Enter Carbon Factor 3			
Enter Carbon Factor 4			Fuel type should be updated and referenced in Column A when additional carbon factor values have been added.
Bespoke DH Factor			This should only be used for non-domestic buildings that are connecting to District Heating (DH) networks. The network carbon factor should be calculated in line with Part L requirements and a seperate factors should be provided using SAP 2012 and SAP 10 fuel factors. Assumptions and workings should be shown below in Table 4.

Table 2. BESPOKE DH CARBON FACTOR CALCULATION METHODOLOGY	
Please provide below details of the calculation method	ology followed to establish the bespoke carbon factor, if applicable.
riease provide below details of the calculation method	nogy followed to establish the bespoke carbon factor, if applicable.

The applicant shou	ld complete all t	the light blue	cells including inf	formation on the m	odelled units, the ar	ea per unit, the num	nber of units, the base	line energy consum	ption figures, the Ti	ER and the TFEE.					SAP 2012 CO2 F	PERFORMANCE					5	SAP10 CO2 PERFORM	MANCE			
DOMESTIC EN	ERGY CONS	SUMPTION	N AND CO2 AN	1																						DEMAND
Unit identifier	Model total		, Total area		TION CHECK			D ENERGY CONSUM							LATED CO2 EMISSIO							LATED CO2 EMISSIO				Fabric Energy Efficiency (FEE)
(e.g. plot number, dwelling type etc.)	floor area	Number of units	represented by model (m²)	Calculated TER 2012 (kgCO2 / m2)	TER Worksheet TER 2012 (kgCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Hot Water	Domestic Hot Water	Lighting	Auxiliary	Cooling	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	2012 CO2 emissions (kgCO2 p.a.)	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated TER SAP10 (kgCO2 / m2)	Target Fabric Energy Efficiency (TFEE) (kWh/m²)
	TER Worksheet (Row 4)				TER Worksheet (Row 273)	TER Worksheet (Row 211)		TER Worksheet (Row 219)		TER Worksheet (Row 232)	TER Worksheet (Row 231)	N/A														
81-A03-5W v2 81-A02-W v2 81-A02-W v2 82-A02-W v2 82-A03-5 w2 82-A03-5 w2 82-A03-5 v2 84-A03-5 v2 94-A03-0 v2 94-A03-0 v2 94-A03-0 v2 94-A03-0 v2 94-A03-0 v2	101.94 93.86 94.97 95.05.8 86.33 78.71 54.96 86.33 50.28 135.42	23 17 73 49 10 44 13 13 110 3	2409 380814 1619 692664 867 70792 887 145231 5558 8924 887 74 71 71 71 71 71 71 71 71 71 71 71 71 71	14.6 14.1 10.5 10.5 10.2 10.8 14.2 15.8 15.2 16.7 13.9	146 141 165 175 175 168 142 158 152 167	1134.34 2479.75 270.75 137.64	Notural Gas	2575.09 2547.36 2583.03 2482.77 2482.77 2587.08 2080.06 2482.83 2080.06 2482.27 2482.83	Natural Gas Natural Gas	40E.45 390.98 348.8 20.7 96 341.22 362.26 47E.85	75 75 75 75 75 75 75 75 75 75 75 75 75 7		677 536 539 701 387 288 522 240 1,024	556 550 537 537 538 538 538 538 537 439 566	212 203 182 182 192 193 195 196 196 196 249	39 39 39 39 39 39 39 39 39 39		1,484 1,123 1,135 8 8 8 8 87 1,121 867 1,109 842 1,678	658 521 522 523 523 523 527 222 537 233 996	541 535 539 627 627 550 64 441 512 427 551	95 91 82 83 95 90 61 86 96 96 112	17 17 17 17 17 17 17 17 17 17		1,812 1,168 1,172 1,728 1,729 1,729 1,152 7,74 1,676	11.9 12.4 16.4 16.5 11.0 12.4 11.7 11.3 16.6 12.4	41.1179241 35.5887234 43.924523 48.00594777 31.004786 33.0027977 31.004786 44.56079337
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retail A1		1		44.9	43.5	13.15	Netural Gas		Natural Gas		17.66	8.82	15	n 0.519 kgC07/AWH				19,490	15	0.233 kgC02/AWh				9,487	21.6	
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The applicant shou	ld complete all 1	the light blue	cells including in	formation on the	e 'be lean' energy o	consumption figures,	the 'be lean' DER, th	ne DFEE and the reg	ulated energy dem	and of the 'be lear	' scenario.				SAP 2012 CO2	PERFORMANCE					SAP	10 CO2 PERFORM	MANCE			Ī					
DOMESTIC EN																											DOM	MESTIC ENERG	Y DEMAND DA	TA	
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(e.g. plot number, dwelling type etc.)	Model total floor area (m²)	Number of units	represented by model (m²)	Calculated DER 2012 (keCO2 / m2)	DER Worksheet DER 2012 (kgCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Hot Water	Fuel type Domestic Hot Water	Lighting	Auxiliary	Cooling	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	2012 CO2 emissions (kgCO2 p.a.)	Space Heating CO2 emissions (keCO2 p.a.)	Domestic Hot Water CO2 emissions	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (keCO2 p.a.)	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated DER SAP10 (kgCO2 / m2)	Dwelling Fabric Energy Efficiency (DFEE) (kWh/m²)	Space Heating (kWh p.a.)	Domestic Hot Water (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)
			ų ,		DER Sheet (Row 384)	DER Sheet [(Row 307a) + (Row 367a x	Select fuel type	DER Sheet [(Row 310a) + (Row 367a x	Select fuel type	DER Sheet Row 332	DER Sheet (Row 313 + 331)	DER Sheet Row 315								(kgCO2 p.a.)											
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B2-A01-N v2 B2-A02-W v2	81.01 50.58	73 49	6077.0733 2546.876507	16.4 18.8	16.4 18.8	2290.52514 1427.318436	Natural Gas Natural Gas	2374.611669 1973.386403	Natural Gas Natural Gas	348.7967433 234.1810471	241.8950882 154.9289122	25.07 30.63	495	E12	181 122	126 80	13 16	1,327	481	499 414	81 55	56 36	6 7	1 122	13.9 16.1	42.80600938 43.72004566	1952.4 1216.62	2024.07 1682.08	348.7967433 234.1810471	241.902935 154.92635	101.51 124.05
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B4-T01-SE v2	135.42	3	417.4813187	15.4	15.4	4888.592179	Natural Gas	2641.042612	Natural Gas	478.8492789	397.5214632	20.45	1,056	570	249	206	11	2,092	1,027	555	112	93	5	1,790	13.2	48.2258436	4166.94	2251.17	478.8492789	397.520155	82.8
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TELUI AL	434.3	•	400	34.4	33.0	11.33	Natara Gas	1.00	Notara Gas	37.77	10.57	3.00		••				14,525	2	••				7,301	16.9						
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The applicant sho	ould complete al	all the light blu	e cells including i	information on the	e 'be clean' energy	consumption figure	s and the 'be clean' [	DER.											SAP 2012 CO2 PEF	RFORMANCE							SAI	P10 CO2 PERFORM	IANCE			
DOMESTIC E	NERGY CO	ONSUMPTI	ON AND CO	2 ANALYSIS																												
Unit identifier	Model total		Total area		TION CHECK	1				SUMPTION PER UNIT (k									ED CO2 EMISSIONS										UNIT (kgCO2 p.a.)			
(e.g. plot number, dwelling type etc.)	, Model total floor area (m³)	Number of units	f represented by model (m²)	Calculated DER 2012 (kgCO2 / m2)	DER Worksheet DER 2012 (kgCO2 / m2)	Space Heating (Heat Source 1)	Fuel type Space Heating	Domestic Hot Water (Heat Source 1)	Fuel type Domestic Hot Wat	Space and Domestic Hot Water from CHP	Fuel type CHP	Total Electricity generated by CHP (- ) if applicable	Lighting	Auxiliary	Cooling	Space Heating	Domestic Hot Water	Space Heating and DHW from g CHP if applicable	Electricity generated by CHP if applicable	Lighting	Auxiliary	Cooling	2012 CO2 emissions (kgCO2 p.a.)	Space Heating	Domestic Hot Water	Space Heating and DHW from CHP	Electricity generated by CHP if applicable	Lighting	Auxiliary	Cooling	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated DER SAP10 (kgCO2 / m2)
					DER Sheet (Row 384)	DER Sheet [Row 307b + (Row 367b x 0.01)]	Select fuel type	DER Sheet (Row 310b + (Row 367b x 0.01)		if applicable  DER Sheet [(Row 307a + 310a) + (Row 362 x 0.01)]	Select fuel type	DER Sheet ((Row 307a + 310a) × (Row 361 + 362))		(Row 313 + 331)	DER Sheet Row 315																	
B1-A01-SW v2 B1-A02-W v2 B2-A01-N v2	101.94 93.86 81.01	23 17 73	2409.380814 1639.692664 6077.0733	15.2 13.7	16.4 14.6 17.6	2826.77095 1755.977654 2290.52514	Natural Gas Natural Gas Natural Gas	2574.83026 2538.962008 2374.611669	Natural Gas Natural Gas Natural Gas				408.4486709 387.3139901 348.7967433	300.1952067 269.4508601 241.8950882	32.59 26.51	611 379	556 548 513 426			212 201	156 140	17 14 13	1,551 1,282	594 369	541 533			95 90	70 63 56	8 6	1,307 1,061	12.8 11.3
B2-A02-W v2	50.58 86.33	49 10	2546.876507	16.4 18.8 16.9	20.3	1427.318436	Natural Gas	1973.386403	Natural Gas				234.1810471	154.9289122	25.07 30.63 23.65	308 605	426 521			122 190	80 134	16	1,327 952 1,463	300 588	499 414 507			55 85	36 60	7	812 1,246	16.1 14.4
B3-A01-SE v2 B4-A01-S v2 B4-A02-E v2	81.01 50.58 86.33 78.71 54.96 86.33 50.28 135.42	44 13 42	3558.898248 734.2146718 3726.009979	13.9	17.9 15.7 14.7 14.9	1582.681564 468.7821229 1610.882682	Natural Gas Natural Gas Natural Gas	2355.402575 2029.939342 2414.21501	Natural Gas Natural Gas Natural Gas				341.2156521 254.491081 365.5465307	227.4944524 158.1453851 248.4978132	23.65 22.34 25.3 31.12	611 379 495 308 605 342 101 348 127 1,056	521 509 438 521			212 201 181 122 190 177 132 190 121 249	126 80 134 118 82 129 75 206	12 12 13 16	1,463 1,157 767 1,204 763 2,092	594 369 481 300 588 332 98 338 124 1,027	507 495 426 507			80 59 85	53 37 58	5 6 7	1,307 1,061 1,123 812 1,246 965 627 996 631 1,790	12.8 11.3 13.9 16.1 14.4 12.3 11.4 11.5 12.6
B4-A03-W v2 B4-T01-SE v2	50.28 135.42	110 3	5683.56638 417.4813187	15.2 15.4	16.0 16.6	588.3351955 4888.592179	Natural Gas Natural Gas	1969.510813 2641.042612	Natural Gas Natural Gas				233.3495231 478.8492789	145.2235529 397.5214632	26.34 20.45	127 1,056	425 570			121 249	75 206	14 11	763 2,092	124 1,027	414 555			54 112	34 93	6 5	631 1,790	12.6 13.2
Sum NON-DOMES	26,936																															
	STIC ENERG	384 GY CONSU	27,680 IMPTION AN	ND CO2 ANALY	YSIS TION CHECK	582,800	N/A		N/A ENERGY CONSUMPT	0 TION BY END USE (kWh/	N/A m³ p.a.) 'BE CLEAN'	0 BER - SOURCE: BRUKL	117,351 OUTPUT	78,988	10,345	125,885 REGUL	184,153  LATED ENERGY CON	0 NSUMPTION BY FUEL	0 TYPE (kWh/m² p.	60,905 .a.) 'BE CLEAN' BE	40,995 ER - SOURCE: BRU	5,369 JKLINP or *SIM.C	428,834 SV FILE	122,388	179,038	0	0 REGULATED CO2 EN	27,343	18,404	2,410	359,239	13.3
Building Use	Area per unit	GY CONSU	IMPTION AN	VALIDAT  Calculated  BER 2012	TION CHECK BRUKL BER 2012	Space Heating	N/A Fuel type Space Heating	REGULATED Domestic Hot		ION BY END USE (kWh/				78,988 Auxiliary	10,345 Cooling		LATED ENERGY CON	NSUMPTION BY FUEL Bespoke DH	. TYPE (kWh/m³ p.				SV FILE 2012 CO2		179,038  Grid Electricity	ı	REGULATED CO2 EN			2,410	SAP 10 CO2 emissions	BRUKL BER SAP10
<b>Building Use</b>		GY CONSU	IMPTION AN	ND CO2 ANALY	TION CHECK BRUKL BER 2012		Fuel type	REGULATED Domestic Hot	ENERGY CONSUMPT	ION BY END USE (kWh/		BER - SOURCE: BRUKL Total Electricity	ОИТРИТ	78,988 Auxiliary	10,345 Cooling		LATED ENERGY CON	NSUMPTION BY FUEL Bespoke DH	. TYPE (kWh/m² p.				SV FILE			ı	REGULATED CO2 EN			2,410	SAP 10 CO2	
Building Use		GY CONSU	Total area f represented by model	VALIDAT  Calculated  BER 2012	TION CHECK BRUKL BER 2012		Fuel type	REGULATED Domestic Hot	ENERGY CONSUMPT	ION BY END USE (kWh/		BER - SOURCE: BRUKL Total Electricity	ОИТРИТ	78,988 Aux#ary	10,345  Cooling  5.88		LATED ENERGY CON	NSUMPTION BY FUEL Bespoke DH	. TYPE (kWh/m³ p.				SV FILE 2012 CO2			ı	REGULATED CO2 EN Electricity generated by CHP (-)			2,410	SAP 10 CO2 emissions	BRUKL BER SAP10
Building Use retail A1  Sum SITE-WIDE E1	Area per unit (m²) 434.5	R Number of units	Total area of represented by model (m²) 480	VALUATA  VALUATA  VALUATA  REF 2032  (Ref 202 / m2)  34.4	BRUKL BER 2012 (kgCO2 / m2)	Space Heating	Fuel type	REGULATED Comments in the Market Nation (Market Nation )	ENERGY CONSUMPT	TON BY END USE (MW)	m² pa) 'BE CLEAN'	BER - SOURCE: BRUKL Total Electricity	ОИТРИТ	Auditory 16.97	Cooling	REGUL Natural Gas	LATED ENERGY CON	NSUMPTION BY FUEL Bespoke DH	. TYPE (kWh/m³ p.				201 CO2 emissions (ReCO2 p. 1) 14,929	Natural Gas		ı	REGULATED CO2 EN Electricity generated by CHP (-)				5AP 10 CO2 emissions (hgCO2 p.a.) 7,361	BRUKI BERSAPIO (kgCO2 / m2) 16.9
Sum	Area per unit (m²) 434.5	R Number of units	Total area of represented by model (m²) 480	VAUDATA VAUDATA  VAUDATA  (Dividual in Ea 2012 (PagCO2 / m2)  34.4	FIDN OHECK BRIAN BRIA 2012 BRIAN BRIA 2012 BRIAN BRIA 2013 BRIAN BRIA 2013 BRIAN BRI	Space Heating	Fault type Space Heating Abtural Gos	REGULATED Comments in the Market Nation (Market Nation )	ENERGY CONSUMPRISE Fact type Commission Heat Water Ancharol Case	TON BY END USE (MW).	m² pa) 'BE CLEAN'	ess - source: enux.  Total Electricity generated by CIP (-)	OUTPUT  Lighting  37.77	Auditory 16.97	Cooling S.88	REGULA Natural Gas	LATID ENERGY COLOR Gnd Electricity  ***********************************	NSUMPTION BY FUEL Begokh Off Factor 8 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	TYPE (AMA)/m <sup>2</sup> p. Electricity generated by CSP (3) (4) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7				2012 CO2 emissions (PgCO2 p. 1) 14,929	Natural Gas	Grid Electricity	Bespoke DH Factor	REGULATED CO2 EN Electricity generated by CHP (-)				5AP 10 CO2 emissions (hgCO2 p.a.) 7,361	BRUSE. BRESAPID (RgC02 / m2) 16.9
Sum	Area per unitin (er) 424.5	R Number of units	Total area	VALUATA  VALUATA  VALUATA  REF 2032  (Ref 202 / m2)  34.4	FIDN OHECK BRIAN BRIA 2012 BRIAN BRIA 2012 BRIAN BRIA 2013 BRIAN BRIA 2013 BRIAN BRI	Space Heating	Fault type Space Heating Abtural Gos	REGULATED Comments in the Market Water Market 1.85	ENERGY CONSUMPRISE Fact type Commission Heat Water Ancharol Case	TON BY END USE (MW)	m² pa) 'BE CLEAN'	eas -sounce: enux - rotal faceroiny generated by CVP (-)	OUTPUT  Lighting  37.77	Ausflary 16.97	Cooling S.88	REGULA Natural Gas	LATID ENERGY COLOR Gnd Electricity  ***********************************	NSUMPTION BY FUEL Begokh Off Factor 8 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	TYPE (AMA)/m <sup>2</sup> p. Electricity generated by CSP (3) (4) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7				20 FIE 2012 CO2 emissions (PeCO2 p. 1, 3) 14,929 15,492	Natural Gas	Grid Electricity	Bespoke DH Factor	REGULATED CO2 EN Electricity generated by CHP (-)				5AP 10 CO2 emissions (hgCO2 p.a.) 7,361	BRUKI BERSAPIO (kgCO2 / m2) 16.9

					consumption figure	es and the 'be green' i	DER.															SAP 2012 CO	PERFORMANCE								SAP10 CO2 PE	RFORMANCE				
DOMESTIC ENE		MPTION AND C		ATION CHECK							CA CONTINUESTON DE	TO LINET DOMEST A	'BE GREEN' SAP DER V	WORKS WEST					T			EGULATED CO2 EMISS	ONE SER LINET (Incom								MCIII ATED CO3 ES	MISSIONS PER UNIT				
Unit identifier a (e.g. plot number, dwelling	Model total No floor area (m²)	Total are mber of represent units by mode (m <sup>2</sup> )	rea ited Calculated itel DER 2012		Space Heating (Heat Source 1)	Fuel type Space Heating	Domestic Hot Water (Heat Source 1)	Fuel type Domestic Hot Water	Space Heating				Space and ter Domestic Hot Water from CHP		Total Electricity generated by CHP	Electricity	Lighting	Auxiliary Cooli	Space Heating	Domestic Hot Water	Space Heating and DHW from g	Electricity Ele enerated by gene CHP rer	ctricity Lighti rated by ewable		Cooling	2012 CO2	Space Heating	Domestic Hot :	pace Heating and DHW from CHP		Electricity			Cooling	SAP10 CO2 emissions (kgCO2 p.s.)	Calcula DER SA
type etc.)	(m <sup>2</sup> )	(m²)	(kgCO2 / m2	(kgCO2 / m2)	,	.,			f andrable		(Heat source 2)			if annicable							CHP If annihable	CHP rer	ewable			emissions (kgCO2 p.s.)			HP if applicable	CIEP If annihable	generated by renewable			1	(kgCO2 p.s.)	(kgCO2 /
				DER Sheet (Row 354)	DER Sheet (Row 307b + (Row 367b x	Select fuel type	DER Sheet [Row 310b + (Row 367b x 0.01)]	Select fuel type	DER Sheet  Row 307c+  Row 367c x	Select fuel type	If applicable DER Sheet [Row 310c + (Row 367c x 0.01)]	Select fuel type	If applicable DER Sheet ((Row 307a + 310a)	Select fuel type	if applicable DER Sheet [(Row 307a + 310a × (Row 361 + 362)]	If applicable DER Sheet Row 380	DER Sheet Row 332 (R	DER Sheet DER Sh w 313 + 331) Row 3	et 5		паруский п		y in a second						II approach	II approace	пересале					
81-A01-5W v2	101.94	23 2409.380		21.8	1673.255556	Grid Electricity	1524.122409	Grid Electricity	(Row 367c x 0.01)]	Grid Electricity	(Row 167c x 0.01)]	Grid Electricity	(Row 362 x 0.01))		× (Row 361 + 362)	1	408.45	109.412875 32.5901	145 868	791			211	161	17	2,049	390	355				95	72		920	9.0
81.401.5W v2 81.402.W v2 82.401.W v2 82.402.W v2 82.404.5 R v2 81.404.5 R v2 81.404.5 v2 84.402.5 v2 84.402.W v2 84.403.W v2	91.85 81.01 50.58 86.33 78.71 54.95 86.33 50.28 135.42	17 1639.6926 73 6077.073 49 2546.8763	33 21.7	19.2 23.3 27.1	1039.416667 1355.833333 844.8722222	Grid Electricity	1502.890871 1405.606775 1168.109015	Grid Electricity Grid Electricity Grid Electricity		Grid Electricity Grid Electricity Grid Electricity		Grid Electricity Grid Electricity Grid Electricity					387.37 348.8 234.28	276.7715 26.5086 549.855875 25.0642 160.72175 30.6296 567.241125 23.6469	106 808 198 539 753 704 1053 861 1058 861 106 106 106 106 106 106 106 106 106 1	780 730 606 742 724 624 742 605 811			201 181 122 190 177 133 190	144 130 83	14 13 16	1,678 1,757 1,266 1,943 1,520 998 1,575 999 2,785	242 315 197 385 218 65 222 81 674	350 328 272 333 325 280 333 272 364				90 81	64 58	6	753 789 568 872 682 448 707 448 1,250	8.0 9.7 11.2 10.1 8.7 8.2 8.2 8.9
82-A04-5-R v2 83-A01-5E v2	86.33 78.72	10 887.14521 44 3558.8982	1337 25.0 1331 22.5 1248 19.3	27.1 23.8 20.8	1658.238889 936.838889	Grid Electricity  Grid Electricity  Grid Electricity	1429.049229 1194.236313	Grid Electricity  Grid Electricity  Grid Electricity				Grid Electricity					365.82 341.22	160.72375 30.6296 167.241125 23.6469 234.19925 22.3382	158 861 26 486	742 724			190	139 122	12	1,943 1,943	386 218	333 325				85 80	62 55	6	872 682	10.1
84-A01-5 v2 84-A02-E v2	54.96 86.33	10 887.34521 44 3558.8985 13 734.2146; 42 3726.0091 120 5681.566 3 417.48131	1718 18.2 1979 18.2	23.8 20.8 19.1 19.6 21.0	1658.238889 936.8388889 277.4888889 953.5333333 948.25555356	Grid Electricity Grid Electricity Grid Electricity Grid Electricity Grid Electricity Grid Electricity	1108.109015 3429.049229 1394.236313 1201.584465 3429.049229 1165.814932	Grid Electricity Grid Electricity Grid Electricity Grid Electricity Grid Electricity Grid Electricity		Grid Electricity Grid Electricity Grid Electricity Grid Electricity		Grid Electricity Grid Electricity Grid Electricity					365.82 341.22 257 365.55 234.75	234.19925 22.3382 162.41325 25.3037 255.3665 31.1185 169.58325 26.3407	97 144 152 495	624 742			133 190	139 122 84 133 78	12 13 16 14	998 1,575	65 222	280 333				60 85	38 60	6 7	445 707	8.2 8.2
84-R03-W v2 84-T01-SE v2	50.28 135.42	3 427.48131	1287 20.6	22.2	2893.711111	Grid Electricity Grid Electricity	1165.814932 1563.315567	Grid Electricity Grid Electricity		Grid Electricity Grid Electricity		Grid Electricity Grid Electricity					234.75 478.85	169.58325 26.3407 120.356375 20.4444	174 181 144 1,502	811			122 245	78 213	14	999 2,785	674	272 364				112	96 96	5	1,250	9.2
	26.936	384 27.480	0 21.0		344.978	N/A	504.558	N/A	0	N/A		N/A		N/A			117.542	81.416 10.3	179,043	261.917		0	0 61.0	4 42.265	5.160	564.780	80.380	117.585	0	0	0	27,367	18.975	2.410	253.552	24
		384 27,680 DNSUMPTION A	AND CO2 ANA		344,978	N/A	504,658	N/A							0	o	117,542	81,436 10,34	179,043				0 61,0			564,780	80,380	117,585	0	0		27,387		2,410	253,552	9.4
		ONSUMPTION A	AND CO2 ANA	ATION CHECK	344,978 Space Heating		504,658  Domestik Not Water						0 ME GREEN' BER - SOURCE		Electricity	Electricity	117,542 Lighting	S1,436 10,34  Audilary Coels	279,043		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co		or *SIM.CSV FILE	264,780 2012 CO2	E0,380 Natural Gas	117,585 Grid Electricity	Response DM	Electricity	REGULATED CO2 EN	MISSIONS PER UNIT				65840
	IC ENERGY C	ONSUMPTION A	AND CO2 ANA	ATION CHECK	344,978 Space Heating	N/A Fuel type Space Heating	Domestic Not Water								Electricity	Electricity		82,436 10,34 Audiliery Coels	: 179,043		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE	2012 CO2 emissions (BgCO2 p.s.)	80,380 Natural Gas	117,585 Grid Electricity	Response DM	Electricity	REGULATED CO2 EN	WISSIONS PER UNIT	Enter Carbon E	Enter Carbon	253,552 SAP20 CO2 emissions	9.4 BRUS BR SA (kgCO2 /
	IC ENERGY C		AND CO2 ANA	ATION CHECK	344,978 Space Heating	Fuel type	Domestic Not Water	Fuel type							Electricity			81,436 10,34 Audiliey Cools	277,043		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	o <sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Ca	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2	E0,380 Natural Gas	117,585 Grid Electricity	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	MISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2	65840
	IC ENERGY C	ONSUMPTION A	AND CO2 ANA	ATION CHECK	344,978 Space Heating	Fuel type	Domestic Not Water	Fuel type							Electricity	Electricity	Lighting	81,436 10,34 Audiliery Cools 2.13 5.33	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2	EO,380 Natural Gas	117,585  Grid Electricity	Bespoke DH Factor	Electricity generated by CND (-)	REGULATED CO2 EN	MISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2	65840
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water							Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	80,380 Natural Gas	117,585 Grid Electricity	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	MISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BER SA (kgCO2)
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water							Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	80,380 Natural Gas	117,565  Grid Electricity  DEPARTMENT OF THE PROPERTY OF THE P	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	MISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BER SA (kgCO2)
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water							Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	Notural Gas	117,585 Grid Electricity	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	MISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BER SI (kgCO2
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water							Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	80,380 Natural Gas	117,585  Grid Electricity  PROFESSIONAL PROFESSION  50	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	MISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BER S (kgCO2
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water					SE GREEN BER - SOURC	CC: BRUKL OUTPUT	Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	80,380 Natural Gas	117,585  Grid Electricity  PROASTWORKSHOW  50	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	MISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BER S (kgCO2
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water							Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	80,399 Natural Gas	117,585 Grid Electricity	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	MISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BER (kgCO
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water					SE GREEN BER - SOURC	CC: BRUKL OUTPUT	Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	80,399 Natural Gas	117,585 Grid Electricity	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	MISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BER (kgCC
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water					SE GREEN BER - SOURC	CC: BRUKL OUTPUT	Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	SO, 380	117,565 Grid Electricity	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	MISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BES (kgC)
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water					SE GREEN BER - SOURC	CC: BRUKL OUTPUT	Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	90,380	117,565  Grid Electricity  TO  TO	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	WISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BES (kgC)
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water					SE GREEN BER - SOURC	CCE: BRUKE OUTPUT	Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	No.300  Natural Gas	117,585  Grid Electricity  10048109001000  50	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	WISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BER (kgCC
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water					SE GREEN BER - SOURC	CCE: BRUKE OUTPUT	Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	80,300  Natural Gas	117,585  Grid Electricity  PREASURABLESS  50	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	WISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BER S (kgCO2
	rea per unit No	Total are mber of represent units by mode (m²)	AND CO: ANA  VALIE  Calculated BER 2012 (kgC02 / m2	BRUSE BRUSE BER 2012 (ligCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Not Water	Fuel type Domestic Hot Water					SE GREEN BER - SOURC	CCE: BRUKE OUTPUT	Electricity generated by CHP (-)	Electricity	Lighting	Auditory Cools	Natural Gas		RGY CONSUMPTION	BY FUEL TYPE (kWh/n	<sup>1</sup> p.s.) 'SE GREEN' SE ctricity Enter Co	- SOURCE: BRUKL.We	or *SIM.CSV FILE Enter Carbon	2012 CO2 emissions (kgCO2 p.s.)	80,399	117,585  Grid Electricity  TOTAL STREET, STREE	Bespoke DH Factor	Electricity generated by CND (-)	EEGULATED CO2 EN Electricity generated by renewable technology (-)	WISSIONS PER UNIT	Enter Carbon E	Enter Carbon	SAP10 CO2 emissions	BER SA (kgCO2 /
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### DOMESTIC

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for domestic buildings

Carbon Dioxide Emissions for domestic buildings (Tonnes CO <sub>2</sub> per annum)						
Regulated	Unregulated					
438	441					
429	441					
429	441					
565	441					
	(Tonnes Ci Regulated 438 429 429					

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated domestic	carbon dioxide savings
	(Tonnes CO <sub>2</sub> per annum)	(%)
Savings from energy demand reduction	9	2%
Savings from heat network / CHP	0	0%
Savings from renewable energy	-136	-31%
Cumulative on site savings	-127	-29%
Annual savings from off-set payment	565	-
	(Tonn	es CO2)
Cumulative savings for off-set payment	16,943	-
Cash in-lieu contribution (£)	1,016,603	

# NON-DOMESTIC

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon Dioxide Emissions (Tonnes CO2	for non-domestic buildings per annum)
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	22	12
After energy demand reduction	16	12
After heat network / CHP	16	12
After renewable energy	13	12

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic building:

	Regulated non-domesti	c carbon dioxide savings
	(Tonnes CO <sub>2</sub> per annum)	(%)
Savings from energy demand reduction	5	23%
Savings from heat network / CHP	0	0%
Savings from renewable energy	4	18%
Total Cumulative Savings	9	42%

Table 5: Shortfall in regulated carbon dioxide savings

	Annual Shortfall (Tonnes CO <sub>2</sub> )	Cumulative Shortfall (Tonnes CO <sub>2</sub> )
Total Target Savings	8	-
Shortfall	-1	-45
Cash in-lieu contribution (£)	-2,671	-

# SITE-WIDE

	Total regulated emissions (Tonnes CO2 / year)	CO2 savings (Tonnes CO2 / year)	Percentage savings (%)
Part L 2013 baseline	459		
Be lean	445	14	3%
Be clean	445	0	0%
Be green	577	-132	-29%
	-	CO2 savings off-set (Tonnes CO2)	-
Off-set	-	16,899	-

Building use	Energy demand following energy efficiency measures (MWh/year)						
	Space Heating	Hot Water	Lighting	Auxilary	Cooling	Unregulated electricity	Unregulated gas
Domestic	497	727	117	79	42	850	0
Non-domestic	0	0	0	0	0	24	0

	Target Fabric Energy Efficiency (kWh/m²)	Dwelling Fabric Energy Efficiency (kWh/m²)	Improvement (%)
Development total	38.78	37.10	4%
Development total	38.78	37.10	476

	Area weighted average non-domestic cooling demand (MJ/m <sup>2</sup> )	Total area weighted non-domestic cooling demand (MJ/year)
Actual	93	44640
Notional	120.4	57792

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for domestic buildings

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO <sub>2</sub> per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	385	198
After energy demand reduction	359	198
After heat network / CHP	359	198
After renewable energy	254	198

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated domestic carbon dioxide savings		
	(Tonnes CO <sub>2</sub> per annum)	(%)	
Savings from energy demand reduction	25	7%	
Savings from heat network / CHP	0	0%	
Savings from renewable energy	106	27%	
Cumulative on site savings	131	34%	
Annual savings from off-set payment	254	-	
	(Tonnes	s CO2)	
Cumulative savings for off-set payment	7,607	-	
Cash in-lieu contribution (£)	456,394		

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	10	6
After energy demand reduction	8	6
After heat network / CHP	8	6
After renewable energy	6	6

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO <sub>2</sub> per annum)	(%)
Savings from energy demand reduction	2	22%
Savings from heat network / CHP	0	0%
Savings from renewable energy	3	24%
Total Cumulative Savings	5	46%

Table 5: Shortfall in regulated carbon dioxide saving:

	Annual Shortfall (Tonnes CO₂)	Cumulative Shortfall (Tonnes CO <sub>2</sub> )
Total Target Savings	4	-
Shortfall	-1	-36
Cash in-lieu contribution (£)	-2,152	-

	Total regulated emissions (Tonnes CO2 / year)	CO2 savings (Tonnes CO2 / year)	Percentage savings (%)
Part L 2013 baseline	395		
Be lean	367	28	7%
Be clean	367	0	0%
Be green	259	108	27%
	-	CO2 savings off-set (Tonnes CO2)	-
Off-set	-	7,571	-

Issue	1.1
Date	10/01/2019
Author	Greater London Authority

Update Location	Description of changes made to GLA Carbon Emission Reporting Spreadsheet
Introduction /	Additional explanatory wording has been included in the 'Background and Purpose' and
Version Control	'Methodology' sections to further assist applicants with the reporting process
	A version control tab has been added to list all changes made to the spreadsheet under separate
	versions
Baseline, be lean, be	Domestic
clean & be green tabs	SAP worksheet row reference numbers have been included in the input tabs
labs	Non-domestic  Non-domestic calculation is now based on 'energy consumption by fuel type' instead of the
	consumption figures in the BRUKL tab to enable the accurate calculation of the TER/BER figures.
	This data is available in the output file ending in "*BRUKL.inp" for government approved software
	and output file ending "*sim.csv" for SBEM. Where these files are used they should be appended to
	the Energy Statement.
	Total calculation is now based on the 'total area represented by model (m²)' rather than the 'number
	of units'. This is to ensure that the total model area aligns with the development area schedule.
	Rows with void formulas have now been fixed
	Formula for CHP/Renewable contribution now fixed in SAP 10 calculation
	Extra input rows have been added to account for larger achamas
	Extra input rows have been added to account for larger schemes
	Columns used to calculate the carbon emissions using SAP10 carbon factors have been unhidden
	to allow for greater transparency in the calculation methodology
	Validation check moved to be more prominent
	Additional heat source has been added into the calculation
	Reporting of electricity generated by CHP or renewable technologies has been changed; this should
	now be inputted as a negative value (-)
Da Craan tah	Additional heat source has been added into the calculation in the 'be green' tabs to account for
Be Green tab Carbon factors tab	multiple heating systems, if present
Carbon lactors tab	The carbon emission factor table has been updated and clarification has been provided on how they should be used
	oriodia de asea
	A typo in the carbon factor unit has been corrected (kgCO <sub>2</sub> /kWh)
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