GLA Carbon Emission Reporting Spreadsheet

BACKGROUND AND PURPOSE

The GLA has decided that from **January 2019** 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_2 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_2 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 **January 2019** 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_2 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/m^2 p.a. for non-residential)
- Regulated energy consumption by fuel type (kWh/m2 p.a. for non-residential)
- TER, DER and BER figures (kgCO_2/m² 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/m^2 p.a. for non-domestic) from the Part L modelling output reports should be reported and used to estimate the CO_2 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_2 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 CO_2 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 (CO_2) FACTORS			Notes
Fuel type	Fuel Carbon Factor (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	
Waste Heat From Power Stat	*0.058*	*0.015*	These factors should be used where alternative fuel is used to grid gas and electricity. Carbon emission factors used here must be taken from Table 12 within the SAP 2012 and SAP 10 documents. Fuel type should be updated and referenced in Column A when additional carbon factor values have been added.
Enter Carbon Factor 2			
Enter Carbon Factor 3			
Enter Carbon Factor 4			
Bespoke DH Factor	*0.058*	*0.015*	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 methodology followed to establish the bespoke carbon factor, if applicable.

The applicant should complete all the light blue cells including information on the modelled units, the area per unit, the number of units, the baseline energy consumption figures, the TER and the TFEE.

SAP 2012 CO2 PERFORMANCE

SAP10 CO2 PERFORMANCE

DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

DEMAND

Unit identifier (e.g. plot number, dwelling type etc.)	Model total floor area (m^2)	Number of units	Total area represented by model (m^2)	VALIDATION CHECK		REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - TER WORKSHEET							REGULATED CO2 EMISSIONS PER UNIT (kgCO2 p.a.)						REGULATED CO2 EMISSIONS PER UNIT							Fabric Energy Efficiency (FEE)
				Calculated TER 2012 (kgCO2 / m2)	TER Worksheet TER 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	Domestic Hot Water	Lighting	Auxiliary	Cooling	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated TER SAP10 (kgCO2 / m2)	Target Fabric Energy Efficiency (TFEE) (kWh/m^2)
	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														
Hilltop Road	*132.24*	*1*	*132.24*	**18.0**	**18.0**	*7105.3*	*Natural Gas*	*2585.66*	*Natural Gas*	*472.96*	*75*		**1,535**	**559**	**245**	**39**		**2,378**	**1,492**	**543**	**110**	**17**		**2,163**	**16.4**	
Sum	132	1	132	18.0	-	7,105	N/A	2,586	N/A	473	75	0	1,535	559	245	39	0	*2,378*	1,492	543	110	17	0	*2,163*	16.4	0.00

NON-DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

Building Use	Area per unit (m^2)	Number of units	Total area represented by model (m^2)	VALIDATION CHECK		REGULATED ENERGY CONSUMPTION BY END USE (kWh/m^2 p.a.) TER - SOURCE: BRUKL OUTPUT							REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m^2 p.a.) TER - SOURCE: BRUKL.INP or *SIM.CSV FILE						REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m^2 p.a.) - TER BRUKL					REGULATED CO2 EMISSIONS	
				Calculated TER 2012 (kgCO2 / m2)	BRUKL TER 2012 (kgCO2 / m2)	Space Heating	Fuel type Space Heating	Domestic Hot Water	Fuel type Domestic Hot Water	Lighting	Auxiliary	Cooling	Natural Gas	Grid Electricity				2012 CO2 emissions (kgCO2 p.a.)	Natural Gas	Grid Electricity				SAP10 CO2 emissions (kgCO2 p.a.)	BRUKL TER SAP10 (kgCO2 / m2)
													##############	##############					##############	##############					
Sum	0	0	0		-	0	0	0	0	0	0	0	0	0	N/A	N/A	N/A	*0*	0	0	N/A	N/A	N/A	*0*	#DIV/0!

SITE-WIDE ENERGY CONSUMPTION AND CO_2 ANALYSIS

Use	Total Area (m^2)	Calculated TER 2012 (kgCO2 / m2)		REGULATED ENERGY CONSUMPTION							REGULATED CO2 EMISSIONS		REGULATED CO2 EMISSIONS PER UNIT	
				Space Heating (kWh p.a.)		Domestic Hot Water (kWh p.a.)		Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)		2012 CO2 emissions (kgCO2 p.a.)	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated TER SAP10 (kgCO2 / m2)
Sum	132	18.0	-	7,105	N/A	2,586	N/A	473	75	0		*2,378*	*2,163*	16.4

The applicant should complete all the light blue cells including information on the 'be lean' energy consumption figures, the 'be lean' DER, the DFEE and the regulated energy demand of the 'be lean' scenario.

SAP 2012 CO2 PERFORMANCE

SAP10 CO2 PERFORMANCE

DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

DOMESTIC ENERGY DEMAND DATA

Unit identifier (e.g. plot number, dwelling type etc.)	Model total floor area (m^2)	Number of units	Total area represented by model (m^2)	VALIDATION CHECK		REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE LEAN' SAP DER WORKSHEET							REGULATED CO2 EMISSIONS PER UNIT (kgCO2 p.a.)						REGULATED CO2 EMISSIONS PER UNIT							Fabric Energy Efficiency (FEE)	REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.)					
				Calculated DER 2012 (kgCO2 / 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 (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated DER SAP10 (kgCO2 / m2)	Dwelling Fabric Energy Efficiency (DFEE) (kWh/m^2)	Space Heating (kWh p.a.)	Domestic Hot Water (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)
					DER Sheet (Row 384)	DER Sheet [(Row 307a) ÷ (Row 367a x 0.01)]	Select fuel type	DER Sheet [(Row 310a) ÷ (Row 367a x 0.01)]	Select fuel type	DER Sheet Row 332	DER Sheet (Row 313 + 331)	DER Sheet Row 315																			
Hilltop Road	*132.24*	*1*	*132.24*	16.0	16.0	*6862.41*	*Natural Gas*	*1602.31*	*Natural Gas*	*472.96*	*75*	*0*	1,482	346	245	39	0	2,113	1,441	336	110	17	0	1,905	14.4						
Sum	132	1	132	16.0	-	6,862	N/A	1,602	N/A	473	75	0	1,482	346	245	39	0	*2,113*	1,441	336	110	17	0	*1,905*	14.4	0.00	0	0	0	0	0

NON-DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

NON-DOMESTIC ENERGY DEMAND

Building Use	Area per unit (m^2)	Number of units	Total area represented by model (m^2)	VALIDATION CHECK		REGULATED ENERGY CONSUMPTION BY END USE (kWh/m^2 p.a.) 'BE LEAN' BER - SOURCE: BRUKL OUTPUT							LATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m^2 p.a.) 'BE LEAN' BER - SOURCE: BRUKL.INP or *SIM.CSV						REGULATED CO2 EMISSIONS PER UNIT								REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.)					
				Calculated BER 2012 (kgCO2 / m2)	BRUKL BER 2012 (kgCO2 / m2)	Space Heating (kWh/m^2 p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh/m^2 p.a.)	Fuel type Domestic Hot Water	Lighting (kWh/m^2 p.a.)	Auxiliary (kWh/m^2 p.a.)	Cooling (kWh/m^2 p.a.)	Natural Gas	Grid Electricity				2012 CO2 emissions (kgCO2 p.a.)	Natural Gas	Grid Electricity				SAP10 CO2 emissions (kgCO2 p.a.)	BRUKL BER SAP10 (kgCO2 / m2)			Space Heating (kWh p.a.)	Domestic Hot Water (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)
													############	############					############	############											
Sum	0	0	0	#DIV/0!	-	0	N/A	0	N/A	0	0	0	0	0	N/A	N/A	N/A	*0*	0	0				*0*	#DIV/0!			0	0	0	0	0

SITE-WIDE ENERGY CONSUMPTION AND CO_2 ANALYSIS

Use	Total Area (m^2)	Calculated BER 2012 (kgCO2 / m2)	-	REGULATED ENERGY CONSUMPTION							REGULATED CO2 EMISSIONS		REGULATED CO2 EMISSIONS			REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.)					
				Space Heating (kWh p.a.)		Domestic Hot Water (kWh p.a.)		Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)		2012 CO2 emissions (kgCO2 p.a.)		SAP10 CO2 emissions (kgCO2 p.a.)	Calculated BER SAP10 (kgCO2 / m2)		Space Heating (kWh p.a.)	Domestic Hot Water (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)
Sum	132	16.0	-	6,862	N/A	1,602	N/A	473	75	0		*2,113*		*1,905*	14.4		0	0	0	0	0

The applicant should complete all the light blue cells including information on the 'be clean' energy consumption figures and the 'be clean' DER.

SAP 2012 CO2 PERFORMANCE

SAP10 CO2 PERFORMANCE

DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

Unit identifier (e.g. plot number, dwelling type etc.)	Model total floor area (m^2)	Number of units	Total area represented by model (m^2)	VALIDATION CHECK: Calculated DER 2012 (kgCO2 / m2)	VALIDATION CHECK: DER Worksheet DER 2012 (kgCO2 / m2)	REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE CLEAN' SAP DER WORKSHEET: Space Heating (Heat Source 1)	Fuel type Space Heating	Domestic Hot Water (Heat Source 1)	Fuel type Domestic Hot Water	Space and Domestic Hot Water from CHP if applicable	Fuel type CHP if applicable	Total Electricity generated by CHP (-) if applicable	Lighting	Auxiliary	Cooling
					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)]	Select fuel type	DER Sheet [(Row 307a + 310a) ÷ (Row 362 x 0.01)]	Select fuel type	DER Sheet [(Row 307a + 310a) × (Row 361 ÷ 362)]	DER Sheet Row 332	DER Sheet (Row 313 + 331)	DER Sheet Row 315
Hilltop Road	*132.24*	*1*	*132.24*												
Sum	132	1	132	0.0	-	0	N/A	0	N/A	0	N/A	0	0	0	0

REGULATED CO2 EMISSIONS PER UNIT (kgCO2 p.a.): Space Heating	Domestic Hot Water	Space Heating and DHW from CHP if applicable	Electricity generated by CHP if applicable	Lighting	Auxiliary	Cooling	2012 CO2 emissions (kgCO2 p.a.)
0	0	0	0	0	0	0	*0*

REGULATED CO2 EMISSIONS PER UNIT (kgCO2 p.a.): Space Heating	Domestic Hot Water	Space Heating and DHW from CHP if applicable	Electricity generated by CHP if applicable	Lighting	Auxiliary	Cooling	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated DER SAP10 (kgCO2 / m2)
0	0	0	0	0	0	0	*0*	0.0

NON-DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

Building Use	Area per unit (m^2)	Number of units	Total area represented by model (m^2)	VALIDATION CHECK: Calculated BER 2012 (kgCO2 / m2)	VALIDATION CHECK: BRUKL BER 2012 (kgCO2 / m2)	REGULATED ENERGY CONSUMPTION BY END USE (kWh/m^2 p.a.) 'BE CLEAN' BER - SOURCE: BRUKL OUTPUT: Space Heating	Fuel type Space Heating	Domestic Hot Water	Fuel type Domestic Hot Water			Total Electricity generated by CHP (-) if applicable	Lighting	Auxiliary	Cooling
										N/A	N/A				
Sum	0	0	0	#DIV/0!	-	0	N/A	0	N/A			0	0	0	0

REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m^2 p.a.) 'BE CLEAN' BER - SOURCE: BRUKL.INP or *SIM.CSV FILE: Natural Gas	Grid Electricity	Bespoke DH Factor	Electricity generated by CHP (-) if applicable		2012 CO2 emissions (kgCO2 p.a.)
############	############	############	############		
0	0	0	0		*0*

REGULATED CO2 EMISSIONS PER UNIT: Natural Gas	Grid Electricity	Bespoke DH Factor	Electricity generated by CHP (-) if applicable		SAP 10 CO2 emissions (kgCO2 p.a.)	BRUKL BER SAP10 (kgCO2 / m2)
############	############	############	############			
0	0	0	0		*0*	#DIV/0!

SITE-WIDE ENERGY CONSUMPTION AND CO_2 ANALYSIS

Use	Total Area (m^2)	Calculated BER 2012 (kgCO2 / m2)		REGULATED ENERGY CONSUMPTION: Space Heating (kWh p.a.)		Domestic Hot Water (kWh p.a.)		Space and Domestic Hot Water from CHP (kWh p.a.)		Electricity generated by CHP (kWh p.a.) if applicable	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)
					N/A		N/A		N/A				
Sum	132	0.0	-	0		0		0		0	0	0	0

REGULATED CO2 EMISSIONS: 2012 CO2 emissions (kgCO2 p.a.)	REGULATED CO2 EMISSIONS PER UNIT: SAP 10 CO2 emissions (kgCO2 p.a.)	Calculated BER SAP10 (kgCO2 / m2)
0	*0*	0.0

The applicant should complete all the light blue cells including information on the 'be green' energy consumption figures and the 'be green' DER.

DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

Unit identifier (e.g. plot number, dwelling type etc.)	Model total floor area (m^2)	Number of units	Total area represented by model (m^2)	VALIDATION CHECK: Calculated DER 2012 (kgCO2 / m2)	VALIDATION CHECK: DER Worksheet DER 2012 (kgCO2 / m2)	REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE GREEN' SAP DER WORKSHEET: Space Heating (Heat Source 1)	Fuel type Space Heating	Domestic Hot Water (Heat Source 1)	Fuel type Domestic Hot Water	Space Heating (Heat source 2) if applicable	Fuel type Space Heating	Domestic Hot Water (Heat source 2) if applicable	Fuel type Domestic Hot Water	Space and Domestic Hot Water from CHP if applicable	Fuel type CHP if applicable	Total Electricity generated by CHP (-) if applicable	Electricity generated by renewable (-) if applicable	Lighting	Auxiliary	Cooling
					DER Sheet (Row 384)	DER Sheet [Row 307b + (Row 307b x 0.01)]	Select fuel type	DER Sheet [Row 310b + (Row 367b x 0.01)]	Select fuel type	DER Sheet [Row 307c + (Row 367c x 0.01)]	Select fuel type	DER Sheet [Row 310c + (Row 367c x 0.01)]	Select fuel type	DER Sheet [[Row 307a + 310a) + (Row 362 x 0.01)]	Select fuel type	DER Sheet [(Row 307a + 310a) x (Row 361 + 362)]	DER Sheet Row 380	DER Sheet Row 332	DER Sheet (Row 313 + 331)	DER Sheet Row 315
Hilltop Road	*132.24*	*1*	*132.24*	11.6	11.6	*2168.47*	*Grid Electricity*	*1156.69*	*Grid Electricity*		*Grid Electricity*		*Grid Electricity*				*-854.98*	*472.96*		
Sum	132	1	132	11.6	-	2,168	N/A	1,157	N/A	0	N/A	0	N/A	0	N/A	0	-855	473	0	0

REGULATED CO2 EMISSIONS PER UNIT (kgCO2 p.a.): Space Heating	Domestic Hot Water	Space Heating and DHW from CHP if applicable	Electricity generated by CHP if applicable	Electricity generated by renewable if applicable	Lighting	Auxiliary	Cooling	2012 CO2 emissions (kgCO2 p.a.)
1,125	600			-444	245			1,527
Sum	1,125	600	0	0	-444	245	0	0	*1,527*

REGULATED CO2 EMISSIONS PER UNIT: Space Heating	Domestic Hot Water	Space Heating and DHW from CHP if applicable	Electricity generated by CHP if applicable	Electricity generated by renewable if applicable	Lighting	Auxiliary	Cooling	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated DER SAP10 (kgCO2 / m2)
505	270			-199	110			686	5.2
Sum	505	270	0	0	-199	110	0	0	*686*	5.2

NON-DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

Use	Area per unit (m^2)	Number of units	Total area represented by model (m^2)	VALIDATION CHECK: Calculated BER 2012 (kgCO2 / m2)	VALIDATION CHECK: BRUKL BER 2012 (kgCO2 / m2)	REGULATED ENERGY CONSUMPTION BY END USE (kWh/m^2 p.a.) 'BE GREEN' BER - SOURCE: BRUKL OUTPUT: Space Heating	Fuel type Space Heating	Domestic Hot Water	Fuel type Domestic Hot Water						Electricity generated by CHP (-) if applicable	Electricity generated by renewable technology (-) if applicable	Lighting	Auxiliary	Cooling
										N/A	N/A	N/A	N/A	N/A					
Sum	0	0	0	#DIV/0!	-	0	N/A	0	N/A						N/A	0	0	0	0	0

REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m^2 p.a.) 'BE GREEN' BER - SOURCE: BRUKL.INP or *SIM.CSV FILE: Natural Gas	Grid Electricity	Bespoke DH Factor	Electricity generated by CHP (-) if applicable	Electricity generated by renewable technology (-) if applicable	Waste Heat From Power Station	Enter Carbon Factor 2	Enter Carbon Factor 3	2012 CO2 emissions (kgCO2 p.a.)
##########	##########	##########	##########	##########	##########	##########	##########	
Sum	0	0	0	0	0	0	0	0	*0*

REGULATED CO2 EMISSIONS PER UNIT: Natural Gas	Grid Electricity	Bespoke DH Factor	Electricity generated by CHP (-) if applicable	Electricity generated by renewable technology (-) if applicable	Waste Heat From Power Station	Enter Carbon Factor 2	Enter Carbon Factor 3	SAP10 CO2 emissions	BRUKL BER SAP10 (kgCO2 / m2)
##########	##########	##########	##########	##########	##########	##########	##########		
Sum	0	0	0	0	0	0	0	0	*0*	#DIV/0!

SITE-WIDE ENERGY CONSUMPTION AND CO_2 ANALYSIS

Use	Total Area (m^2)	Calculated BER 2012 (kgCO2 / m2)	-	REGULATED CO2 EMISSIONS: Space Heating (kWh p.a.)		Domestic Hot Water (kWh p.a.)		Space Heating (kWh p.a.)		Domestic Hot Water (kWh p.a.)		Space and Domestic Hot Water from CHP (kWh p.a.)		Electricity generated by CHP (kWh p.a.) if applicable	Electricity generated by renewable (kWh p.a.) if applicable	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)
Sum	132	0.0	-	2,168	N/A	1,157	N/A	0	N/A	0	N/A	0	N/A	0	-855	473	0	0

REGULATED CO2 EMISSIONS: Space Heating CO2 emissions	Domestic Hot Water CO2 emissions	Space Heating and DHW from CHP CO2 emissions if applicable	Electricity generated by CHP CO2 savings if applicable	Electricity generated by renewable CO2 savings if applicable	Lighting CO2 emissions	Auxiliary CO2 emissions	Cooling CO2 emissions	2012 CO2 emissions
1,125	600	0	0	-444	245	0	0	1,527

REGULATED CO2 EMISSIONS PER UNIT: Space Heating CO2 emissions	Domestic Hot Water CO2 emissions	Space Heating and DHW from CHP CO2 emissions if applicable	Electricity generated by CHP CO2 savings if applicable	Electricity generated by renewable CO2 savings if applicable	Lighting CO2 emissions	Auxiliary CO2 emissions	Cooling CO2 emissions	SAP10 CO2 emissions	Calculated BER SAP10 (kgCO2 / m2)
505	270	0	0	-199	110	0	0	686	5.2

SAP 2012 PERFORMANCE

SAP10 PERFORMANCE

DOMESTIC

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

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	2	
After energy demand reduction	2	
After heat network / CHP	0	
After renewable energy	2	

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

	Regulated domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Savings from energy demand reduction	0	11%
Savings from heat network / CHP	2	89%
Savings from renewable energy	-2	-64%
Cumulative on site savings	**1**	**36%**
Annual savings from off-set payment	2	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**46**	-
Cash in-lieu contribution (£)	**2,749**	

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

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	2	
After energy demand reduction	2	
After heat network / CHP	0	
After renewable energy	1	

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

	Regulated domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Savings from energy demand reduction	0	12%
Savings from heat network / CHP	2	88%
Savings from renewable energy	-1	-32%
Cumulative on site savings	**1**	**68%**
Annual savings from off-set payment	1	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**21**	-
Cash in-lieu contribution (£)	**1,234**	

NON-DOMESTIC

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	0	
After energy demand reduction	0	
After heat network / CHP	0	
After renewable energy	0	

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_2 per annum)	(%)
Savings from energy demand reduction	0	#DIV/0!
Savings from heat network / CHP	0	#DIV/0!
Savings from renewable energy	0	#DIV/0!
Total Cumulative Savings	**0**	**#DIV/0!**

Table 5: Shortfall in regulated carbon dioxide savings

	Annual Shortfall (Tonnes CO_2)	Cumulative Shortfall (Tonnes CO_2)
Total Target Savings	**0**	-
Shortfall	0	0
Cash in-lieu contribution (£)	**0**	-

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	0	
After energy demand reduction	0	
After heat network / CHP	0	
After renewable energy	0	

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_2 per annum)	(%)
Savings from energy demand reduction	0	#DIV/0!
Savings from heat network / CHP	0	#DIV/0!
Savings from renewable energy	0	#DIV/0!
Total Cumulative Savings	**0**	**#DIV/0!**

Table 5: Shortfall in regulated carbon dioxide savings

	Annual Shortfall (Tonnes CO_2)	Cumulative Shortfall (Tonnes CO_2)
Total Target Savings	0	-
Shortfall	0	0
Cash in-lieu contribution (£)	**0**	-

SITE-WIDE

	Total regulated emissions (Tonnes CO2 / year)	CO2 savings (Tonnes CO2 / year)	Percentage savings (%)
Part L 2013 baseline	2		
Be lean	2	0	11%
Be clean	0	2	89%
Be green	2	-2	-64%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**46**	-

	Total regulated emissions (Tonnes CO2 / year)	CO2 savings (Tonnes CO2 / year)	Percentage savings (%)
Part L 2013 baseline	2		
Be lean	2	0	12%
Be clean	0	2	88%
Be green	1	-1	-32%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**21**	-

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

	Target Fabric Energy Efficiency (kWh/m²)	Dwelling Fabric Energy Efficiency (kWh/m²)	Improvement (%)
Development total	0.00	0.00	

	Area weighted average non-domestic cooling demand (MJ/m^2)	Total area weighted non-domestic cooling demand (MJ/year)
Actual		
Notional		

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

Update Location	Description of changes made to GLA Carbon Emission Reporting Spreadsheet
Introduction / Version Control	Additional explanatory wording has been included in the 'Background and Purpose' and '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 clean & be green tabs	**Domestic** SAP worksheet row reference numbers have been included in the input tabs
	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 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 (-)
Be Green tab	Additional heat source has been added into the calculation in the 'be green' tabs to account for multiple heating systems, if present
Carbon factors tab	The carbon emission factor table has been updated and clarification has been provided on how they should be used
	A typo in the carbon factor unit has been corrected ($kgCO_2/kWh$)