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 10.0 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 10.0 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 10.0 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/m^2 p.a. for non-residential)
- TER, DER and BER figures ($kgCO_2/m^2$ p.a.)
- TFEE and DFEE figures for residential (kWh//m² p.a.)
- Unregulated figures (tCO_2 p.a.) **[In the 'GLA Summary tables' tab only]**
- Actual and notional building cooling demand (MJ/m²) **[In the 'GLA Summary tables' tab only]**
- Distribution loss factor (if applicable) **[In the 'Development information' tab, Table 4]**

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 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 10.0 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. Applicants are generally encouraged to model each individual typology independently.

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 10.0 scenarios have been provided in the 'Development Information' 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 10.0 methodology documents. 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. DEVELOPMENT INFORMATION		NOTES
Date of Application	*04/02/2022*	Please provide the date the application was submitted to the Local Planning Authority.
Local Planning Authority	*Richmond*	Please indicate the Local Planning Authority determining the application.
Confirmed carbon offset price (£/tonne of carbon dioxide)	*95*	Please confirm the agreed carbon offset price for the Local Planning Authority. Evidence of communication on the price is expected to be included in the energy assessment. If no value is entered then the GLA's recommend price of £95 per tonne of carbon dioxide will be used.

TABLE 2. CARBON (CO_2) FACTORS			NOTES
Fuel type	Fuel Carbon Factor ($kgCO_2/kWh$) SAP 2012	SAP 10.0	
Natural Gas	0.216	0.210	SAP 2012 and SAP 10.0 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 must be taken from Table 12 within the SAP 2012 and SAP 10.0 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			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 separate factors should be provided using SAP 2012 and SAP 10.0 fuel factors. Assumptions and workings should be shown below in Table 4.

TABLE 3. BESPOKE DH CARBON FACTOR CALCULATION METHODOLOGY
Please provide below details of the calculation methodology followed to establish the bespoke carbon factor, if applicable.

TABLE 4. DISTRIBUTION LOSSES			COMMENTS
Primary network (buried pipe)	Total pipe length (m)		
	Average heat loss rate (W/m)		
Secondary network (buried pipe)	Total pipe length (m)		
	Average heat loss rate (W/m)		
Total losses (MWh/year)			
Total heat supplied (MWh/year)			
Distribution Loss Factor (DLF)			
Calculation included in energy statement (yes/no)			

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 CO_2 PERFORMANCE

SAP 10.0 CO_2 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		REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - TER WORKSHEET							REGULATED CO_2 EMISSIONS PER UNIT ($kgCO_2$ p.a.)						REGULATED CO_2 EMISSIONS PER UNIT						DEMAND
				Calculated TER 2012 ($kgCO_2$ / m^2)	TER Worksheet TER 2012 ($kgCO_2$ / m^2)	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 CO_2 emissions ($kgCO_2$ p.a.)	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	SAP 10.0 CO_2 emissions ($kgCO_2$ p.a.)	Calculated TER SAP 10.0 ($kgCO_2$ / m^2)	Fabric Energy Efficiency (FEE)
	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														Target Fabric Energy Efficiency (TFEE) (kWh/m²)
10275 vB06-TY-03	100.5	1	100.5	14.7	14.7	3195.498822	Natural Gas	2512.1906	Natural Gas	404.7566	75		690	543	210	39		1,482	671	528	94	17		1,310	13.0	41.89
10276 vB09-TY-01	84.4	1	84.4	14.6	14.6	2229.641997	Natural Gas	2439.4042	Natural Gas	359.5847	75		482	527	187	39		1,234	468	512	84	17		1,082	12.8	36.62
10277 vB09-TY-02	111.4	1	111.4	15.1	15.1	4320.233774	Natural Gas	2251.1929	Natural Gas	430.6888	75		933	486	224	39		1,682	907	473	100	17		1,498	13.4	47.9
10278 vB09-TY-03	102.3	1	102.3	15.2	15.2	3787.031592	Natural Gas	2228.174	Natural Gas	409.3412	75		818	481	212	39		1,551	795	468	95	17		1,376	13.5	46.24
10279 vB09-TY-04	78.4	1	78.4	14.9	14.9	2028.917113	Natural Gas	2393.9155	Natural Gas	340.1088	75		438	517	177	39		1,171	426	503	79	17		1,026	13.1	36.27
10280 vB10-TY-03	50.63	1	50.63	19.5	19.5	1768.648745	Natural Gas	2064.5717	Natural Gas	235.1619	75		382	446	122	39		989	371	434	55	17		877	17.3	47.38
10281 vB08-TR-02	99	1	99	14.9	14.9	3185.326943	Natural Gas	2506.6279	Natural Gas	401.0087	75		688	541	208	39		1,477	669	526	93	17		1,306	13.2	42.46
10282 vB08-TY-04	117	1	117	11.6	11.6	2337.057783	Natural Gas	2576.3428	Natural Gas	499.5672	75		505	556	259	39		1,359	491	541	116	17		1,166	10.0	27.14
10283 vB08-TY-03	50	1	50	18.8	18.8	1551.189063	Natural Gas	2064.6657	Natural Gas	231.8095	75		335	446	120	39		940	326	434	54	17		831	16.6	43.89
10284 vB08-TY-05	60	1	60	18.3	18.3	2070.180546	Natural Gas	2184.5607	Natural Gas	272.2928	75		447	472	141	39		1,099	435	459	63	17		974	16.2	46.86
10285 vB08-TY-06	80	1	80	15.4	15.4	2306.466664	Natural Gas	2400.7659	Natural Gas	345.4937	75		498	519	179	39		1,235	484	504	81	17		1,086	13.6	39.47
10286 vB08-TY-07	71	1	71	14.5	14.5	1492.62903	Natural Gas	2335.3794	Natural Gas	314.2871	75		322	504	163	39		1,029	313	490	73	17		895	12.6	31.23
10287 vB08-TY-10	102	1	102	15.3	15.3	3554.767876	Natural Gas	2511.9987	Natural Gas	408.5977	75		768	543	212	39		1,561	747	528	95	17		1,387	13.6	45.13
10288 vB08-TY-11	104	1	104	15.4	15.4	3720.096302	Natural Gas	2515.9907	Natural Gas	413.5033	75		804	543	215	39		1,601	781	528	96	17		1,423	13.7	45.74
10289 vB08-TY-12	88	1	88	13.9	13.9	2083.883002	Natural Gas	2465.6551	Natural Gas	391.8852	75		450	533	203	39		1,225	438	518	91	17		1,064	12.1	32.64
10290 vB08-TY-13	103	1	103	15.2	15.2	3582.767423	Natural Gas	2515.9987	Natural Gas	411.0654	75		774	543	213	39		1,570	752	528	96	17		1,394	13.5	45.06
Sum	1,402	16	1,402	15.1	-	43,214	N/A	37,967	N/A	5,869	1,200	0	9,334	8,201	3,046	623	0	21,204	9,075	7,973	1,368	280	0	18,695	13.3	40.84

NON-DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

Building Use	Model Area (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					2012 CO_2 emissions ($kgCO_2$ p.a.)	REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m^2 p.a.) - TER BRUKL					REGULATED CO_2 EMISSIONS	
				Calculated TER 2012 ($kgCO_2$ / m^2)	BRUKL TER 2012 ($kgCO_2$ / m^2)	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	Equipment				Natural Gas	Grid Electricity	Unregulated Grid Electricity			SAP10.0 CO_2 emissions ($kgCO_2$ p.a.)	BRUKL TER SAP10.0 ($kgCO_2$ / m^2)	
													0.216 $kgCO_2$/kWh	0.519 $kgCO_2$/kWh	0.519 $kgCO_2$/kWh				0.210 $kgCO_2$/kWh	0.233 $kgCO_2$/kWh	0.233 $kgCO_2$/kWh					
Office	2850.73	1	4547	19.4	18.9	4.634891765	Natural Gas	1.83514	Natural Gas	15.8820675	9.8446725	8.079138473	6	35				55,284	6	35				26,904	9.4	
Cinema	1740.51	1	1606	23.5	23.0	4.334173372	Natural Gas	9.60754	Natural Gas	20.2906275	12.4159425	5.771409558	14	39				40,891	14	39				21,100	12.1	
Hotel	1169.64	1	1765	41.8	41.7	26.88855804	Natural Gas	133.913	Natural Gas	8.854131	3.4693815	1.03141432	161	14				48,940	161	14				43,230	37.0	
Sum	5,761	3	7,918	34.7	-	75,494	N/A	260,131	N/A	120,430	70,827	47,825	335,624	245,216	0	N/A	N/A	199,762	335,624	245,216	0	N/A	N/A	127,616	16.1	

SITE-WIDE ENERGY CONSUMPTION AND CO_2 ANALYSIS

Use	Total Area (m^2)	Calculated TER 2012 ($kgCO_2 / m^2$)	-	REGULATED ENERGY CONSUMPTION								REGULATED CO_2 EMISSIONS		REGULATED CO_2 EMISSIONS PER UNIT	
				Space Heating (kWh p.a.)	N/A	Domestic Hot Water (kWh p.a.)	N/A	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)		2012 CO_2 emissions ($kgCO_2$ p.a.)		SAP 10.0 CO_2 emissions ($kgCO_2$ p.a.)	Calculated TER SAP 10.0 ($kgCO_2 / m^2$)
Sum	9,320	23.7	-	118,708		298,098		126,299	72,027	47,825		*220,966*		*146,312*	15.7

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 CO_2 PERFORMANCE | SAP 10.0 CO_2 PERFORMANCE | FEES

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 ($kgCO_2$ / m^2)	VALIDATION CHECK: DER Worksheet DER 2012 ($kgCO_2$ / m^2)	REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE LEAN' SAP DER WORKSHEET: Space Heating	Fuel type Space Heating	Domestic Hot Water (Heat Source 1)	Fuel type Domestic Hot Water	Secondary Heating system	Fuel type Space Heating	Lighting	Auxiliary	Cooling
					DER Sheet (Row 384)	DER Sheet [(Row 367a) + (Row 367a x 0.01)]	Select fuel type	DER Sheet [Row 310b + (Row 367b x 0.01)]	Select fuel type	DER Sheet [Row 309]	Select fuel type	DER Sheet Row 332	DER Sheet (Row 313 + 331)	DER Sheet Row 315
10275 vB06-TY-(	100.5	1	100.5	14.9	15.2	2931.631579	Natural Gas	2447.442105	Natural Gas			404.8387	251.044	
10276 vB09-TY-(	84.4	1	84.4	14.3	14.6	1931.694737	Natural Gas	2363.589474	Natural Gas			359.5847	184.0553	
10277 vB09-TY-(	111.4	1	111.4	15.4	15.7	4030.705263	Natural Gas	2201.073684	Natural Gas			430.6888	278.2716	
10278 vB09-TY-(	102.3	1	102.3	13.9	14.1	2896.2	Natural Gas	2070.178947	Natural Gas			409.3412	255.5403	
10279 vB09-TY-(	78.4	1	78.4	14.6	14.9	1757.673684	Natural Gas	2318.463158	Natural Gas			340.1777	170.9708	
10280 vB10-TY-(	50.63	1	50.63	18.7	19.1	1555.694737	Natural Gas	2019.789474	Natural Gas			234.3855	104.3889	
10281 vB08-TR-(	99	1	99	13.9	14.2	2486	Natural Gas	2441.652632	Natural Gas			401.0087	207.5906	
10282 vB08-TY-(	117	1	117	9.7	9.8	970.5684211	Natural Gas	2491.568421	Natural Gas			499.5672	245.3344	
10283 vB08-TY-(	50	1	50	17.2	17.5	1165.642105	Natural Gas	2012.126316	Natural Gas			231.8095	99.125	
10284 vB08-TY-(	60	1	60	16.4	16.7	1487.263158	Natural Gas	2132.536842	Natural Gas			272.2928	118.95	
10285 vB08-TY-(	80	1	80	14.4	14.6	1782.715789	Natural Gas	2331.284211	Natural Gas			345.4937	158.6	
10286 vB08-TY-(	71	1	71	13.3	13.5	1007.873684	Natural Gas	2251.694737	Natural Gas			314.2871	148.8781	
10287 vB08-TY-1	102	1	102	13.8	14.1	2571.821053	Natural Gas	2452.894737	Natural Gas			408.5977	213.8812	
10288 vB08-TY-1	104	1	104	13.1	13.3	2330.8	Natural Gas	2459.631579	Natural Gas			413.5033	218.075	
10289 vB08-TY-1	88	1	88	11.3	11.5	823.9473684	Natural Gas	2386.831579	Natural Gas			391.8852	184.525	
10290 vB08-TY-1	103	1	103	14.0	14.3	2726.610526	Natural Gas	2456.326316	Natural Gas			411.0654	215.9781	
Sum	1,402	16	1,402	14.0	-	32,457	N/A	36,837	N/A	0	N/A	5,869	3,055	0

Unit identifier	REGULATED CO_2 EMISSIONS PER UNIT ($kgCO_2$ p.a.): Space Heating CO_2 emissions	Domestic Hot Water CO_2 emissions	Lighting CO_2 emissions	Auxiliary CO_2 emissions	Cooling CO_2 emissions	2012 CO_2 emissions ($kgCO_2$ p.a.)	REGULATED CO_2 EMISSIONS PER UNIT: Space Heating CO_2 emissions	Domestic Hot Water CO_2 emissions	Lighting CO_2 emissions	Auxiliary CO_2 emissions	Cooling CO_2 emissions	Unregulated ($kgCO_2$ p.a.)	SAP 10.0 CO_2 emissions ($kgCO_2$ p.a.)	Calculated DER SAP 10.0 ($kgCO_2$ / m^2)	Fabric Energy Efficiency (FEE)
															Dwelling Fabric Energy Efficiency (DFEE) (kWh/m^2)
10275 vB06-TY-(	633	529	210	130		1,502	616	514	94	58		728	1,282	12.8	44.91
10276 vB09-TY-(	417	511	187	96		1,210	406	496	84	43		650	1,029	12.2	39.55
10277 vB09-TY-(	871	475	224	144		1,714	846	462	100	65		772	1,474	13.2	47.16
10278 vB09-TY-(	626	447	212	133		1,418	608	435	95	60		735	1,198	11.7	43.05
10279 vB09-TY-(	380	501	177	89		1,146	369	487	79	40		617	975	12.4	39.37
10280 vB10-TY-(	336	436	122	54		948	327	424	55	24		434	830	16.4	48.8
10281 vB08-TR-(	537	527	208	108		1,380	522	513	93	48		721	1,177	11.9	42.41
10282 vB08-TY-(	210	538	259	127		1,134	204	523	116	57		793	901	7.7	26.99
10283 vB08-TY-(	252	435	120	51		858	245	423	54	23		429	744	14.9	44.2
10284 vB08-TY-(	321	461	141	62		985	312	448	63	28		499	851	14.2	44.79
10285 vB08-TY-(	385	504	179	82		1,150	374	490	81	37		626	981	12.3	40.65
10286 vB08-TY-(	218	486	163	77		944	212	473	73	35		572	792	11.2	33.83
10287 vB08-TY-1	556	530	212	111		1,408	540	515	95	50		734	1,200	11.8	42.61
10288 vB08-TY-1	603	531	215	113		1,363	489	517	96	51		743	1,153	11.1	40.59
10289 vB08-TY-1	178	516	203	96		993	173	501	91	43		669	809	9.2	28.76
10290 vB08-TY-1	589	531	213	112		1,445	573	516	96	50		738	1,235	12.0	44.38
Sum	7,011	7,957	3,046	1,586	0	19,599	6,816	7,736	1,367	712	0	10,460	16,631	11.9	40.41

NON-DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

Building Use	Model Area (m^2)	Number of units	Total area represented by model (m^2)	VALIDATION CHECK: Calculated BER 2012 ($kgCO_2$ / m^2)	VALIDATION CHECK: BRUKL BER 2012 ($kgCO_2$ / m^2)	REGULATED ENERGY CONSUMPTION BY END USE (kWh/m^2 p.a.) 'BE LEAN' BER - SOURCE: BRUKL OUTPUT: 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.)
Office	2850.73	1	4547	18.8	18.8	8.257063655	Natural Gas	1.83516	Natural Gas	7.119411	16.68381	8.194832362
Cinema	1740.51	1	1606	23.3	23.3	6.724340933	Natural Gas	9.60755	Natural Gas	13.4872725	18.97194	5.599337167
Hotel	1169.64	1	1765	40.2	40.2	28.10521659	Natural Gas	136.445	Natural Gas	4.812873	3.748563	0.37764786
Sum	5,761	3	7,918	24.5	-	97,950	N/A	264,600	N/A	62,527	112,946	46,921

Building Use	REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m^2 p.a.) 'BE LEAN' BER - SOURCE: BRUKL.INP or *SIM.CSV FILE: Natural Gas 0.216 $kgCO_2$/kWh	Grid Electricity 0.519 $kgCO_2$/kWh	Equipment 0.519 $kgCO_2$/kWh	2012 CO_2 emissions ($kgCO_2$ p.a.)	REGULATED CO_2 EMISSIONS PER UNIT: Natural Gas 0.210 $kgCO_2$/kWh	Grid Electricity 0.233 $kgCO_2$/kWh	Equipment 0.233 $kgCO_2$/kWh	SAP 10.0 CO_2 emissions ($kgCO_2$ p.a.)	BRUKL BER SAP 10.0 ($kgCO_2$ / m^2)	
Office	10	32		53,558	10	32		27,296	9.6	N/A
Cinema	16	38		40,519	16	38		21,404	12.3	
Hotel	165	9		46,998	165	9		42,853	36.6	
Sum	362,546	222,400	0	193,736	362,546	222,400	0	127,954	16.2	

SITE-WIDE ENERGY CONSUMPTION AND CO_2 ANALYSIS

Use	Total Area (m^2)	Calculated BER 2012 ($kgCO_2$ / m^2)	-	REGULATED ENERGY CONSUMPTION: Space Heating (kWh p.a.)	Domestic Hot Water (kWh p.a.)	Secondary Heating System (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	REGULATED CO_2 EMISSIONS: 2012 CO_2 emissions ($kgCO_2$ p.a.)	REGULATED CO_2 EMISSIONS: SAP 10.0 CO_2 emissions ($kgCO_2$ p.a.)	Calculated BER SAP 10.0 ($kgCO_2$ / m^2)	
Sum	9,320	22.9	-	130,407	301,437	0	68,396	116,002	46,921	213,334	144,585	15.5	N/A

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 CO_2 PERFORMANCE

SAP 10.0 CO_2 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 ($kgCO_2$ / m^2)	VALIDATION CHECK: DER Worksheet DER 2012 ($kgCO_2$ / m^2)	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)	Secondary Heating system	Fuel type Secondary Heating	Lighting	Auxiliary	Cooling	REGULATED CO_2 EMISSIONS PER UNIT ($kgCO_2$ 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 CO_2 emissions ($kgCO_2$ p.a.)	REGULATED CO_2 EMISSIONS PER UNIT ($kgCO_2$ p.a.): Space Heating	Domestic Hot Water	Space Heating and DHW from CHP (if applicable)	Electricity generated by CHP (if applicable)	Lighting	Auxiliary	Cooling	SAP 10.0 CO_2 emissions ($kgCO_2$ p.a.)	Calculated DER SAP 10.0 ($kgCO_2$ / m^2)
					DER Sheet (Row 384)	DER Sheet (Row 367b + (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 382 x	Select fuel type	DER Sheet ((Row 307a + 310a) + (Row 361 + 382))	DER Sheet (Row 309)	Select fuel type	DER Sheet Row 332	DER Sheet (Row 313 + 331)	DER Sheet Row 315															
10275 v606-TY-(	100.5	1	100.5	14.9	15.2	2931.631579	Natural Gas	3447.842326	Natural Gas						404.8387	251.048		633	529			219	130		1,502	616	514			94	58		1,282	12.8
10276 v609-TY-(	84.4	1	84.4	14.3	14.6	1931.494737	Natural Gas	2363.589474	Natural Gas						359.5867	184.0553		417	511			197	96		1,210	406	496			94	43		1,029	12.2
10277 v609-TY-(	111.4	1	111.4	15.4	15.7	4030.705263	Natural Gas	2201.073684	Natural Gas						430.6888	278.2716		671	475			224	144		1,714	846	462			100	65		1,474	13.2
10278 v609-TY-(	102.3	1	102.3	13.9	14.1	2896.2	Natural Gas	2070.178947	Natural Gas						409.3412	255.5403		626	447			212	133		1,418	608	435			95	60		1,198	11.7
10279 v609-TY-(	78.4	1	78.4	14.6	14.9	1757.673684	Natural Gas	2218.463158	Natural Gas						340.1777	170.9708		380	501			177	89		1,146	369	487			79	40		975	12.4
10280 v610-TY-(	50.63	1	50.63	18.7	19.1	1555.694737	Natural Gas	2019.789474	Natural Gas						234.3855	104.3889		336	436			122	54		948	327	424			55	24		830	16.4
10281 v608-TR-(	99	1	99	13.9	14.2	2486	Natural Gas	2441.653632	Natural Gas						401.0087	207.0906		537	527			208	108		1,380	522	513			93	48		1,177	11.9
10282 v608-TY-(	117	1	117	9.7	9.8	970.5589211	Natural Gas	2491.542621	Natural Gas						499.5472	245.3344		210	538			209	127		1,134	204	533			116	57		910	7.7
10283 v608-TY-(	50	1	50	17.2	17.5	1165.642105	Natural Gas	2012.126316	Natural Gas						231.8095	99.125		252	435			120	51		858	245	423			54	23		744	14.9
10284 v608-TY-(	80	1	80	16.4	16.7	1487.242158	Natural Gas	2122.536842	Natural Gas						272.2938	118.95		321	461			141	62		985	312	448			63	28		851	14.2
10285 v608-TY-(	80	1	80	14.4	14.6	1782.715789	Natural Gas	2331.284211	Natural Gas						345.4937	158.6		385	594			179	82		1,150	374	490			81	37		981	12.3
10286 v608-TY-(	71	1	71	13.3	13.5	1007.673684	Natural Gas	2251.694737	Natural Gas						334.2871	148.8781		218	486			163	77		944	212	473			73	35		792	11.2
10287 v608-TY-(	102	1	102	13.8	14.1	2571.831053	Natural Gas	2452.894737	Natural Gas						408.5977	213.8812		556	530			212	111		1,408	540	515			95	50		1,200	11.8
10288 v608-TY-(	104	1	104	13.1	13.3	2330.8	Natural Gas	2459.631579	Natural Gas						413.1033	218.075		503	531			215	113		1,363	489	517			96	51		1,153	11.1
10289 v608-TY-(	88	1	88	11.3	11.5	823.9473684	Natural Gas	2386.631579	Natural Gas						390.8852	184.525		178	516			203	96		993	173	501			91	43		809	9.2
10290 v608-TY-(	103	1	103	14.0	14.3	2726.620526	Natural Gas	2456.326316	Natural Gas						411.0654	215.9781		589	531			213	112		1,445	573	516			96	50		1,235	12.0
Sum	1,402	16	1,402	14.0	-	32,457	N/A	36,837	N/A	0	N/A	0	0	N/A	5,869	3,055	0	7,011	7,957	0	0	3,046	1,586	0	19,599	6,816	7,736	0	0	1,367	712	0	16,631	11.9

NON-DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

Building Use	Model Area (m^2)	Number of units	Total area represented by model (m^2)	VALIDATION CHECK: Calculated BER 2012 ($kgCO_2$ / m^2)	VALIDATION CHECK: BRUKL BER 2012 ($kgCO_2$ / m^2)	REGULATED ENERGY CONSUMPTION BY END USE (kWh/m^2 p.a.) 'BE CLEAN' BER - SOURCE: BRUKL OUTPUT: Space Heating (kWh/m^2 p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh/m^2 p.a.)	Fuel type Domestic Hot Water			Electricity generated by CHP (-) (if applicable)			Lighting (kWh/m^2 p.a.)	Auxiliary (kWh/m^2 p.a.)	Cooling (kWh/m^2 p.a.)	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)	Equipment			2012 CO_2 emissions ($kgCO_2$ p.a.)	REGULATED CO_2 EMISSIONS PER UNIT: Natural Gas	Grid Electricity	Bespoke DH Factor	Electricity generated by CHP (-) if applicable	Equipment		SAP 10.0 CO_2 emissions ($kgCO_2$ p.a.)	BRUKL BER SAP10.0 ($kgCO_2$ / m^2)
																		0.216 kgCO$_2$/kWh	0.519 kgCO$_2$/kWh	0.000 kgCO$_2$/kWh	0.519 kgCO$_2$/kWh	0.519 kgCO$_2$/kWh				0.210 kgCO$_2$/kWh	0.233 kgCO$_2$/kWh	0.000 kgCO$_2$/kWh	0.233 kgCO$_2$/kWh	0.233 kgCO$_2$/kWh			
Office	2850.73	1	4547	18.8	18.8	8.257063655	Natural Gas	1.83516	Natural Gas						7.139411	16.68381	8.194832362	19	33						53,558	10	32						27,296	9.6
Cinema	1740.51	1	1606	23.3	23.3	6.724349933	Natural Gas	9.60755	Natural Gas						13.4872725	18.97194	5.599337167	16	38						40,519	16	38						21,404	12.3
Hotel	1168.64	1	1785	40.2	40.2	28.10521659	Natural Gas	136.465	Natural Gas						6.813873	3.768563	0.377647867	165	9						46,956	165	9						42,883	36.6
Sum	5,761	3	7,918	24.5	-	97,950	N/A	264,600	N/A	N/A	N/A	0	N/A	N/A	62,527	112,946	46,921	362,546	222,400	0	0	0	N/A	N/A	193,736	362,546	222,400	0	0	0			127,954	16.2

SITE-WIDE ENERGY CONSUMPTION AND CO_2 ANALYSIS

Use	Total Area (m^2)	Calculated BER 2012 ($kgCO_2$ / m^2)	-	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	Secondary Heating System (kWh p.a.)		Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	REGULATED CO_2 EMISSIONS: 2012 CO_2 emissions ($kgCO_2$ p.a.)	REGULATED CO_2 EMISSIONS PER UNIT: SAP 10.0 CO_2 emissions ($kgCO_2$ p.a.)	Calculated BER SAP 10.0 ($kgCO_2$ / m^2)
Sum	9,320	22.9	-	130,407	N/A	301,437	N/A	0	N/A	0	0	N/A	68,396	116,002	46,921	213,234	146,585	15.8

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 (m²)	Number of units	Total area represented by model (m²)	VALIDATION CHECK: Calculated DER 2012 ($kgCO_2$ / m²)	VALIDATION CHECK: DER Worksheet DER 2012 ($kgCO_2$ / m²) DER Sheet (Row 384)
10275 vB06-TY-	100.5	1	100.5	10.6	10.6
10276 vB09-TY-	84.4	1	84.4	9.8	9.8
10277 vB09-TY-	111.4	1	111.4	10.4	10.4
10278 vB09-TY-	102.3	1	102.3	9.8	9.8
10279 vB09-TY-	78.4	1	78.4	9.9	9.9
10280 vB10-TY-	50.63	1	50.63	11.8	11.8
10281 vB08-TR	99	1	99	9.8	9.8
10282 vB08-TY-	117	1	117	6.8	6.8
10283 vB08-TY-	50	1	50	10.6	10.6
10284 vB08-TY-	60	1	60	10.6	10.6
10285 vB08-TY-	80	1	80	9.7	9.7
10286 vB08-TY-	71	1	71	8.6	8.6
10287 vB08-TY-	102	1	102	9.7	9.7
10288 vB08-TY-	104	1	104	9.2	9.2
10289 vB08-TY-	88	1	88	7.5	7.5
10290 vB08-TY-	103	1	103	9.9	9.9
Sum	1,402	16	1,402	9.5	-

REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE GREEN' SAP DER WORKSHEET

Unit identifier	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)	Fuel type Space Heating	Domestic Hot Water (Heat source 2)	Fuel type Domestic Hot Water	Space and Domestic Hot Water from CHP	Fuel type CHP	Total Electricity generated by CHP (-)	Secondary Heating system	Fuel type Secondary Heating	Electricity generated by renewable (-)	Lighting	Auxiliary	Cooling
					if applicable		if applicable		if applicable	if applicable	if applicable			if applicable			
	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 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	Select fuel type	DER Sheet [(Row 307a + 310a) × (Row 361 ÷ 362)]	DER Sheet Row 309	Select fuel type	DER Sheet Row 333	DER Sheet Row 332	DER Sheet (Row 313 + 331)	DER Sheet Row 315
10275 vB06-TY-	928.35	Grid Electricity	775.0233333	Grid Electricity										-350	404.8387	302.144	
10276 vB09-TY-	611.7033333	Grid Electricity	748.47	Grid Electricity										-350	359.5847	224.8653	
10277 vB09-TY-	1162.733333	Grid Electricity	663.8166667	Grid Electricity										-350	430.6888	333.0716	
10278 vB09-TY-	917.13	Grid Electricity	655.5566667	Grid Electricity										-350	409.3412	302.7203	
10279 vB09-TY-	556.5966667	Grid Electricity	734.18	Grid Electricity										-350	340.1777	209.6908	
10280 vB10-TY-	492.6366667	Grid Electricity	639.6	Grid Electricity										-350	234.3855	138.3589	
10281 vB08-TR	787.2333333	Grid Electricity	773.19	Grid Electricity										-350	401.0087	254.4006	
10282 vB08-TY-	307.3466667	Grid Electricity	788.9966667	Grid Electricity										-350	499.5672	278.2244	
10283 vB08-TY-	369.12	Grid Electricity	637.1733333	Grid Electricity										-350	231.8095	129.315	
10284 vB08-TY-	470.9666667	Grid Electricity	675.3033333	Grid Electricity										-350	272.2928	153.34	
10285 vB08-TY-	564.5266667	Grid Electricity	738.24	Grid Electricity										-350	345.4937	197.68	
10286 vB08-TY-	319.16	Grid Electricity	713.0366667	Grid Electricity										-350	314.2871	179.8481	
10287 vB08-TY-	814.41	Grid Electricity	776.75	Grid Electricity										-350	408.5977	261.6112	
10288 vB08-TY-	738.0866667	Grid Electricity	778.8833333	Grid Electricity										-350	413.5033	263.585	
10289 vB08-TY-	260.9166667	Grid Electricity	755.83	Grid Electricity										-350	391.8852	215.025	
10290 vB08-TY-	863.4266667	Grid Electricity	777.8366667	Grid Electricity										-350	411.0654	265.2181	
Sum	10,164	N/A	11,632	N/A	0	N/A	0	N/A	0	N/A	0	0	N/A	-5,600	5,869	3,709	0

SAP 2012 CO_2 PERFORMANCE

REGULATED CO_2 EMISSIONS PER UNIT ($kgCO_2$ p.a.)

Unit identifier	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 CO_2 emissions ($kgCO_2$ p.a.)
10275 vB06-TY-	482	402			-182	210	157			1,069
10276 vB09-TY-	317	388			-182	187	117			828
10277 vB09-TY-	603	345			-182	224	173			1,163
10278 vB09-TY-	476	340			-182	212	157			1,004
10279 vB09-TY-	289	381			-182	177	109			774
10280 vB10-TY-	256	332			-182	122	72			599
10281 vB08-TR	409	401			-182	208	132			968
10282 vB08-TY-	160	409			-182	259	144			791
10283 vB08-TY-	192	331			-182	120	67			528
10284 vB08-TY-	244	350			-182	141	80			634
10285 vB08-TY-	293	383			-182	179	103			776
10286 vB08-TY-	166	370			-182	163	93			611
10287 vB08-TY-	423	403			-182	212	136			992
10288 vB08-TY-	383	404			-182	215	137			957
10289 vB08-TY-	135	392			-182	203	112			661
10290 vB08-TY-	448	404			-182	213	138			1,021
Sum	5,275	6,037	0	0	-2,906	3,046	1,925	0	NA	13,377

SAP 10.0 CO_2 PERFORMANCE

REGULATED CO_2 EMISSIONS PER UNIT

Unit identifier	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		SAP 10.0 CO_2 emissions ($kgCO_2$ p.a.)	Calculated DER SAP 10.0 ($kgCO_2$ / m²)
10275 vB06-TY-	216	181			-82	94	70			480	4.8
10276 vB09-TY-	143	174			-82	84	52			372	4.4
10277 vB09-TY-	271	155			-82	100	78			522	4.7
10278 vB09-TY-	214	153			-82	95	71			451	4.4
10279 vB09-TY-	130	171			-82	79	49			347	4.4
10280 vB10-TY-	115	149			-82	55	32			269	5.3
10281 vB08-TR	183	180			-82	93	59			435	4.4
10282 vB08-TY-	72	184			-82	116	65			355	3.0
10283 vB08-TY-	86	148			-82	54	30			237	4.7
10284 vB08-TY-	110	157			-82	63	36			285	4.7
10285 vB08-TY-	132	172			-82	81	46			349	4.4
10286 vB08-TY-	74	166			-82	73	42			274	3.9
10287 vB08-TY-	190	181			-82	95	61			445	4.4
10288 vB08-TY-	172	181			-82	96	61			430	4.1
10289 vB08-TY-	61	176			-82	91	50			297	3.4
10290 vB08-TY-	201	181			-82	96	62			458	4.5
Sum	2,368	2,710	0	0	-1,305	1,367	864	0	NA	6,005	4.3

NON-DOMESTIC ENERGY CONSUMPTION AND CO_2 ANALYSIS

Use	Area per unit (m²)	Number of units	Total area represented by model (m²)	VALIDATION CHECK: Calculated BER 2012 ($kgCO_2$ / m²)	VALIDATION CHECK: BRUKL BER 2012 ($kgCO_2$ / m²)
Office	2850.73	1	4547	18.1	18.1
Cinema	1740.51	1	1606	22.1	22.1
Hotel	1169.64	1	1765	10.5	23.8
Sum	5,761	3	7,918	17.2	-

REGULATED ENERGY CONSUMPTION BY END USE (kWh/m² p.a.) 'BE GREEN' BER - SOURCE: BRUKL OUTPUT

Use	Space Heating (kWh/m² p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh/m² p.a.)	Fuel type Domestic Hot Water	N/A	N/A	N/A	N/A	N/A	N/A	Electricity generated by CHP (-) if applicable	N/A	N/A	Electricity generated by renewable technology (-) if applicable	Lighting (kWh/m² p.a.)	Auxiliary (kWh/m² p.a.)	Cooling (kWh/m² p.a.)
Office	2.275598775	Grid Electricity	0.505786125	Grid Electricity											7.119411	16.68381	8.194832362
Cinema	1.853184789	Grid Electricity	2.64795375	Grid Electricity											13.4872725	18.97194	5.599337167
Hotel	26.34306909	Grid Electricity	129.693	Grid Electricity											7.3548345	3.748563	0.415766257
Sum	59,819	N/A	235,461	N/A							0			0	67,014	112,946	46,988

REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m² p.a.) 'BE GREEN' BER - SOURCE: BRUKL.INP or *SIM.CSV FILE

Use	Natural Gas	Grid Electricity	Bespoke DH Factor	Electricity generated by CHP (-) if applicable	Electricity generated by renewable technology (-)	Enter Carbon Factor 1	Enter Carbon Factor 2	Enter Carbon Factor 3	Equipment	2012 CO_2 emissions ($kgCO_2$ p.a.)
	0.216 $kgCO_2$/kWh	0.519 $kgCO_2$/kWh	0.000 $kgCO_2$/kWh	0.519 $kgCO_2$/kWh	0.519 $kgCO_2$/kWh	0.000 $kgCO_2$/kWh	0.000 $kgCO_2$/kWh	0.000 $kgCO_2$/kWh	0.519 $kgCO_2$/kWh	
Office	0	35								51,459
Cinema	0	43								38,446
Hotel	6	18								12,244
Sum	10,782	257,611	0	0	0	0	0	0	0	136,029

REGULATED CO_2 EMISSIONS PER UNIT

Use	Natural Gas	Grid Electricity	Bespoke DH Factor	Electricity generated by CHP (-) if applicable	Electricity generated by renewable technology (-)	Enter Carbon Factor 1	Enter Carbon Factor 2	Enter Carbon Factor 3	Equipment	SAP 10.0 CO_2 emissions	BRUKL BER SAP 10.0 ($kgCO_2$ / m²)
	0.210 $kgCO_2$/kWh	0.233 $kgCO_2$/kWh	0.000 $kgCO_2$/kWh	0.233 $kgCO_2$/kWh	0.233 $kgCO_2$/kWh	0.000 $kgCO_2$/kWh	0.000 $kgCO_2$/kWh	0.000 $kgCO_2$/kWh	0.233 $kgCO_2$/kWh		
Office		35								23,102	8.1
Cinema		43								17,260	9.9
Hotel	6	18								6,305	5.4
Sum	10,782	257,611	0	0	0	0	0	0	0	62,288	7.9

SITE-WIDE ENERGY CONSUMPTION AND CO_2 ANALYSIS

REGULATED ENERGY CONSUMPTION

Use	Total Area (m²)	Calculated BER 2012 ($kgCO_2$ / m²)	-	Space Heating (kWh p.a.)	N/A	Domestic Hot Water (kWh p.a.)	N/A	Space Heating (Heat source 2) (kWh p.a.)	N/A	Domestic Hot Water (Heat source 2) (kWh p.a.)	N/A	Space and Domestic Hot Water from CHP (kWh p.a.)	N/A	Electricity generated by CHP (kWh p.a.) if applicable	Secondary Heating system (kWh p.a.)	N/A	Electricity generated by renewable (kWh p.a.) if applicable	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)
Sum	9,320	16.0	-	69,983		247,092		0		0		0		0	0		-5,600	72,882	116,656	46,988

	REGULATED CO_2 EMISSIONS: 2012 CO_2 emissions	N/A	REGULATED CO_2 EMISSIONS: SAP 10.0 CO_2 emissions	Calculated BER SAP 10.0 ($kgCO_2$ / m²)
Sum	149,406		68,293	7.3

SAP 2012 Performance

Domestic

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

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	21.2	659.3
After energy demand reduction (be lean)	19.6	659.3
After heat network connection (be clean)	19.6	659.3
After renewable energy (be green)	13.4	659.3

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

	Regulated domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	1.6	8%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	6.2	29%
Cumulative on site savings	**7.8**	**37%**
Annual savings from off-set payment	13.4	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**401**	-
Cash in-lieu contribution (£)	**38,123**	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

Non-domestic

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

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	199.8	421.0
After energy demand reduction (be lean)	193.7	421.0
After heat network connection (be clean)	193.7	421.0
After renewable energy (be green)	136.0	421.0

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

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	6.0	3%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	57.7	29%
Total Cumulative Savings	**63.7**	**32%**
Annual savings from off-set payment	136.0	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**4,081**	-
Cash in-lieu contribution (£)	**387,684**	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

SITE-WIDE

	Total regulated emissions (Tonnes CO_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage savings (%)
Part L 2013 baseline	221.0		
Be lean	213.3	7.6	3%
Be clean	213.3	0.0	0%
Be green	149.4	63.9	29%
Total Savings	-	71.6	32%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**4,482.2**	-

SAP 10.0 Performance

Domestic

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

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	18.7	296.0
After energy demand reduction (be lean)	16.6	296.0
After heat network connection (be clean)	16.6	296.0
After renewable energy (be green)	6.0	296.0

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

	Regulated domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: Savings from energy demand reduction	2.1	11%
Be clean: Savings from heat network	0.0	0%
Be green: Savings from renewable energy	10.6	57%
Cumulative on site savings	**12.7**	**68%**
Annual savings from off-set payment	6.0	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**180**	-
Cash in-lieu contribution (£)	**17,115**	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

Non-domestic

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

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	127.6	189.0
After energy demand reduction (be lean)	128.0	189.0
After heat network connection (be clean)	128.0	189.0
After renewable energy (be green)	62.3	189.0

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

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	-0.3	0%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	65.7	51%
Total Cumulative Savings	**65.3**	**51%**
Annual savings from off-set payment	62.3	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**1,869**	-
Cash in-lieu contribution (£)*	**177,520**	

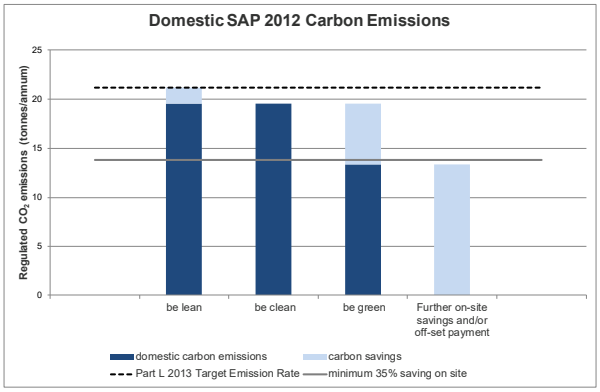
*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

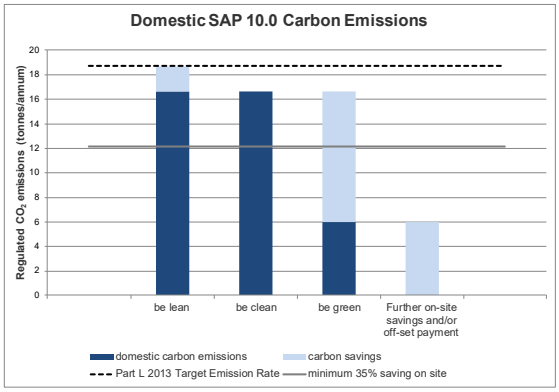
SITE-WIDE

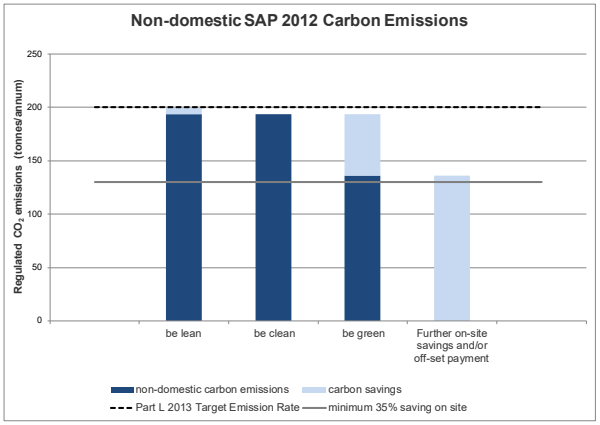
	Total regulated emissions (Tonnes CO_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage savings (%)
Part L 2013 baseline	146.3		
Be lean	144.6	1.7	1%
Be clean	144.6	0.0	0%
Be green	68.3	76.3	52%
Total Savings	-	78.0	53%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**2,048.8**	-

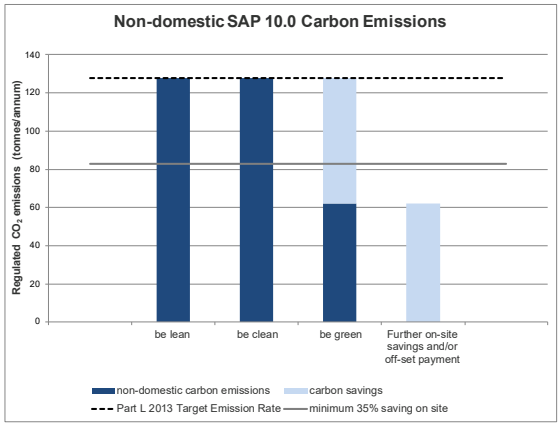
	Target Fabric Energy Efficiency (kWh/m²)	Dwelling Fabric Energy Efficiency (kWh/m²)	Improvement (%)
Development total	40.84	40.41	1%

	Area weighted non-domestic cooling demand (MJ/m²)	Total area weighted non-domestic cooling demand (MJ/year)
Actual	288.1	2281175.8
Notional	267	2114106









Issue	1.2
Date	23/04/2020
Author	Greater London Authority

Update Location	Update Location	Description of changes made to GLA Carbon Emission Reporting Spreadsheet
Version 1.2	Introduction	References to SAP 10 have been updated to SAP 10.0 throughout the reporting spreadsheet to confirm the specific emission factors used in the sheet.
	Development Information	Replaces 'Carbon factor tab' and includes additional inputs for development information on Local Planning Authority for the application, agreed carbon offset price and distribution loss factor.
	Baseline, be lean, be clean & be green tabs	**Domestic** Secondary heating system has been added. Please note that this feature may only be used in exceptional circumstances, for example innovative modular construction methods, and with approval from GLA.
		For consistency all summations for energy consumption and carbon emissions by end energy use on Rows 58 & 94 are now based on 'total area represented by model (m²)'. The calculation for estimating total emissions remains was already based on 'total area represented by model (m²)' in Version 1.1 so remains unchanged.
		Additional rows added to allow for a greater number of representative Part L models.
	Be Clean/Be Green tab	Formula updated so that data input is not required for heat sources that are not used.
	Be Green tab	SAP row reference changed from 380 to 333.
	GLA Summary Tables	Tables now report figures to one decimal place.
		The zero carbon offset fund is now calculated based on the GLA recommended price of £95 per tonne of carbon dioxide unless the borough price is added into the 'Development Information' tab.
		Non-domestic tables have now been updated to include for the new London Plan zero carbon requirement.
	Carbon factors tab	Inclusion of energy assessment graphs, which are automatically generated from the results tables.
Previous version updates		
Version 1.1	Introduction / Version Control	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 SAP 10 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 ($kgCO_2/kWh$).