

Property Reference	Unit 01		Issued on Date	05/02/2025	
Assessment Reference	Lytton Court	Prop Type Ref	Lytton Court		
Property					

SAP Rating	90 B	DER	2.07	TER	13.75
Environmental	98 A	% DER < TER			84.95
CO ₂ Emissions (t/year)	0.15	DFEE	33.04	TFEE	40.48
Compliance Check	See BREL	% DFEE < TFEE			18.38
% DPER < TPER	66.15	DPER	24.76	TPER	73.13

	Mr. Neil Ingham	Assessor ID	AV35-0001
Client			

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
 CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)	
Ground floor	86.5700 (1b)	x 2.5000 (2b)	= 216.4250 (1b) - (3b)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	86.5700			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 216.4250 (5)	

2. Ventilation rate

											m3 per hour	
Number of open chimneys											0 * 80 =	0.0000 (6a)
Number of open flues											0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire											0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler											0 * 20 =	0.0000 (6d)
Number of flues attached to other heater											0 * 35 =	0.0000 (6e)
Number of blocked chimneys											0 * 20 =	0.0000 (6f)
Number of intermittent extract fans											0 * 10 =	0.0000 (7a)
Number of passive vents											0 * 10 =	0.0000 (7b)
Number of flueless gas fires											0 * 40 =	0.0000 (7c)
											Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											0.0000 / (5) =	0.0000 (8)
Pressure test											Yes	
Pressure Test Method											Blower Door	
Measured/design AP50											2.5000 (17)	
Infiltration rate											0.1250 (18)	
Number of sides sheltered											1 (19)	
Shelter factor											(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor											(21) = (18) x (20) =	0.1156 (21)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate												
	0.1474	0.1445	0.1416	0.1272	0.1243	0.1098	0.1098	0.1070	0.1156	0.1243	0.1301	0.1359 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation											0.5000 (23a)	
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)											0.5000 (23b)	
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =											80.1000 (23c)	
Effective ac	0.2469	0.2440	0.2411	0.2267	0.2238	0.2093	0.2093	0.2065	0.2151	0.2238	0.2296	0.2354 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K	
G (Uw = 0.80)			23.6000	0.7752	18.2946			(27)
EW	76.0200	23.6000	52.4200	0.1400	7.3388	14.0000	733.8800	(29a)
SW	34.8500		34.8500	0.1300	4.5305	14.0000	487.9000	(29a)
FR	20.0200		20.0200	0.1100	2.2022	9.0000	180.1800	(30)
Total net area of external elements Aum(A, m ²)			130.8900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		32.3661			(33)
PW			22.0800	0.0000	0.0000	45.0000	993.6000	(32)
Party Floor 1			86.5700			40.0000	3462.8000	(32d)
Party Ceiling 1			66.5500			30.0000	1996.5000	(32b)
IW			96.8000			75.0000	7260.0000	(32c)
Heat capacity Cm = Sum(A x k)								(28)...(30) + (32) + (32a)...(32e) = 15114.8600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K								174.5970 (35)
List of Thermal Bridges								
K1 Element				Length	Psi-value		Total	

4. Water heating energy requirements (kWh/year)												

Assumed occupancy												2.5758 (42)
Hot water usage for mixer showers												
	67.4075	66.3945	64.9183	62.0940	60.0097	57.6853	56.3641	57.8291	59.4350	61.9307	64.8157	67.1492 (42a)
Hot water usage for baths												
	29.1106	28.6783	28.0695	26.9469	26.1064	25.1744	24.6709	25.2755	25.9337	26.9310	28.0767	29.0122 (42b)
Hot water usage for other uses												
	41.0088	39.5176	38.0263	36.5351	35.0439	33.5526	33.5526	35.0439	36.5351	38.0263	39.5176	41.0088 (42c)
Average daily hot water use (litres/day)												126.4183 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
	137.5269	134.5903	131.0141	125.5760	121.1600	116.4123	114.5877	118.1485	121.9038	126.8880	132.4099	137.1702 (44)
Energy content (annual)												
	217.8090	191.6548	201.3639	171.9073	163.1046	143.1425	138.5839	146.2925	150.3196	172.1859	188.6422	214.7754 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 2099.7816
	32.6713	28.7482	30.2046	25.7861	24.4657	21.4714	20.7876	21.9439	22.5479	25.8279	28.2963	32.2163 (46)
Water storage loss:												
Store volume												
	a) If manufacturer declared loss factor is known (kWh/day):											1.4100 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.7614 (55)
Total storage loss												
	23.6034	21.3192	23.6034	22.8420	23.6034	22.8420	23.6034	23.6034	22.8420	23.6034	22.8420	23.6034 (56)
If cylinder contains dedicated solar storage												
	23.6034	21.3192	23.6034	22.8420	23.6034	22.8420	23.6034	23.6034	22.8420	23.6034	22.8420	23.6034 (57)
Primary loss												
	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	264.6748	233.9852	248.2297	217.2613	209.9704	188.4965	185.4497	193.1583	195.6736	219.0517	233.9962	261.6412 (62)
WWHRS												
	-60.0634	-53.1205	-55.6248	-46.0595	-42.9258	-36.7319	-34.4303	-36.6132	-38.0043	-44.8028	-50.7562	-58.9511 (63a)
PV diverter												
	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
Solar input												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	204.6114	180.8647	192.6049	171.2018	167.0446	151.7646	151.0194	156.5451	157.6694	174.2489	183.2401	202.6901 (64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 2093.5049 (64)
Electric shower(s)												2094 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
	109.9141	97.5896	104.4461	93.4424	91.7249	83.8781	83.5718	86.1349	86.2645	94.7444	99.0067	108.9055 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	117.3321	129.9034	117.3321	121.2432	117.3321	121.2432	117.3321	117.3321	121.2432	117.3321	121.2432	117.3321 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	232.6240	235.0380	228.9550	216.0051	199.6581	184.2942	174.0303	171.6163	177.6993	190.6493	206.9962	222.3601 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321 (71)
Water heating gains (Table 5)	147.7340	145.2226	140.3846	129.7811	123.2862	116.4973	112.3277	115.7727	119.8118	127.3447	137.5094	146.3783 (72)
Total internal gains	559.3272	571.8010	548.3087	528.6664	501.9134	483.6718	465.3271	466.3582	480.3913	496.9631	527.3858	547.7075 (73)

6. Solar gains

[Jan				Area	Solar flux	g		FF	Access		Gains	
				m2	Table 6a	Specific data		factor	factor		W	
					W/m2	or Table 6b		or Table 6c	Table 6d			
Northeast				19.7800	11.2829	0.5700		0.7000	0.7700		61.5227 (75)	
Northwest				3.8800	11.2829	0.5700		0.7000	0.7700		12.1049 (81)	
Solar gains	73.6276	149.8710	270.0200	443.4503	596.0843	635.4889	594.4869	473.9318	329.0235	183.1543	92.6425	60.1280 (83)
Total gains	632.9548	721.6720	818.3287	972.1167	1097.9977	1119.1607	1059.8139	940.2900	809.4148	680.1174	620.0283	607.8355 (84)

7. Mean internal temperature (heating season)

Full SAP Calculation Printout



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ods in the living area from Table 9, Th1 (C)

21.0000 (85)

Verification factor for gains for living area, nil, m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	65.5387	65.7506	65.9638	67.0512	67.2730	68.4044	68.4044	68.6353	67.9473	67.2730	66.8309	66.3945
alpha	5.3692	5.3834	5.3976	5.4701	5.4849	5.5603	5.5603	5.5757	5.5298	5.4849	5.4554	5.4263
util living area	0.9747	0.9505	0.8897	0.7245	0.5209	0.3503	0.2547	0.2990	0.5194	0.8254	0.9497	0.9787 (86)
Living	20.3299	20.4795	20.6788	20.8708	20.9320	20.9432	20.9441	20.9440	20.9359	20.8242	20.5572	20.3092
Non living	19.5177	19.7056	19.9491	20.1763	20.2402	20.2606	20.2612	20.2634	20.2509	20.1331	19.8133	19.4987
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10
MIT	20.6572	20.4795	20.6788	20.8708	20.9320	20.9432	20.9441	20.9440	20.9359	20.8242	20.5572	20.4058 (87)
Th 2	20.3056	20.3077	20.3098	20.3203	20.3224	20.3329	20.3329	20.3350	20.3287	20.3224	20.3182	20.3140 (88)
util rest of house	0.9699	0.9417	0.8722	0.6936	0.4851	0.3141	0.2162	0.2559	0.4714	0.7938	0.9393	0.9746 (89)
MIT 2	19.9915	19.7056	19.9491	20.1763	20.2402	20.2606	20.2612	20.2634	20.2509	20.1331	19.8133	19.6456 (90)
Living area fraction									fLA = Living area / (4) =			0.4347 (91)
MIT	20.2809	20.0420	20.2663	20.4782	20.5409	20.5573	20.5581	20.5593	20.5486	20.4335	20.1367	19.9761 (92)
Temperature adjustment												0.0000
adjusted MIT	20.2809	20.0420	20.2663	20.4782	20.5409	20.5573	20.5581	20.5593	20.5486	20.4335	20.1367	19.9761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9697	0.9379	0.8710	0.7010	0.4967	0.3263	0.2292	0.2705	0.4873	0.7993	0.9362	0.9723 (94)
Useful gains	613.7825	676.8479	712.7852	681.4184	545.3937	365.1623	242.8883	254.3060	394.4125	543.5892	580.4694	590.9942 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1023.7749	966.9075	876.2167	724.9963	551.7682	365.6524	242.9402	254.4329	398.4708	613.7202	819.0132	997.6273 (97)
Space heating kWh	305.0344	194.9200	121.5930	31.3761	4.7426	0.0000	0.0000	0.0000	0.0000	52.1774	171.7515	302.5351 (98a)
Space heating requirement - total per year (kWh/year)												1184.1301
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	305.0344	194.9200	121.5930	31.3761	4.7426	0.0000	0.0000	0.0000	0.0000	52.1774	171.7515	302.5351 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1184.1301
Space heating per m2											(98c) / (4) =	13.6783 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)

Fraction of space heat from secondary/supplementary system (table 11)
 Fraction of space heat from main system(s)

Efficiency of main space heating system 1 (in %)

Efficiency of main space heating system 2 (in %)

Efficiency of secondary/supplementary heating system, %

0.0000 (201)

1.0000 (202)

311.2058 (206)

0.0000 (207)

0.0000 (208)

[illegible]

Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												380.4974	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												176.7000	
Water heating fuel used												1184.7792	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)													
mechanical ventilation fans (SFP = 0.8260)												218.0958	(230a)
Total electricity for the above, kWh/year												218.0958	(231)
Electricity for lighting (calculated in Appendix L)												217.3744	(232)
Energy saving/generation technologies													
PV generation												-848.0499	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												1152.6971	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	380.4974	0.1579	60.0786 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1184.7792	0.1406	166.6324 (264)
Space and water heating			226.7111 (265)
Pumps, fans and electric keep-hot	218.0958	0.1387	30.2526 (267)
Energy for lighting	217.3744	0.1443	31.3739 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.6724	0.1326	-69.0510
PV Unit electricity exported	-327.3774	0.1233	-40.3648
Total			-109.4159 (269)
Total CO2, kg/year			178.9216 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			2.0700 (273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	380.4974	1.5845	602.8866 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1184.7792	1.5200	1800.9101 (278)
Space and water heating			2403.7967 (279)
Pumps, fans and electric keep-hot	218.0958	1.5128	329.9353 (281)
Energy for lighting	217.3744	1.5338	333.4162 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.6724	1.4900	-775.8157
PV Unit electricity exported	-327.3774	0.4525	-148.1317
Total			-923.9475 (283)
Total Primary energy kWh/year			2143.2007 (286)
Dwelling Primary energy Rate (DPER)			24.7600 (287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	86.5700 (1b)	x 2.5000 (2b)	= 216.4250 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	86.5700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 216.4250 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 30.0000 / (5) = 0.1386 (8)
Pressure test	Yes

Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered
Blower Door
5.0000 (17)
0.3886 (18)
1 (19)
Shelter factor
Infiltration rate adjusted to include shelter factor
(20) = 1 - [0.075 x (19)] = 0.9250 (20)
(21) = (18) x (20) = 0.3595 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate													
	0.4583	0.4493	0.4404	0.3954	0.3864	0.3415	0.3415	0.3325	0.3595	0.3864	0.4044	0.4224	(22b)
Effective ac	0.6050	0.6010	0.5970	0.5782	0.5747	0.5583	0.5583	0.5553	0.5646	0.5747	0.5818	0.5892	(25)

Energy Saving Calculation Summary

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Opening Type (Uw = 1.20)			21.6400	1.1450	24.7786			(27)
EW	76.0200	21.6400	54.3800	0.1800	9.7884			(29a)
SW	34.8500		34.8500	0.1800	6.2730			(29a)
FR	20.0200		20.0200	0.1100	2.2022			(30)
Total net area of external elements Aum(A, m2)			130.8900					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	43.0422			(33)
PW			22.0800	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 182.2844 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	11.0600	0.0500	0.5530
E3 Sill	11.0600	0.0500	0.5530
E4 Jamb	18.8600	0.0500	0.9430
E5 Ground floor (normal)	0.0000	0.1600	0.0000
E6 Intermediate floor within a dwelling	0.0000	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	0.0000	0.0600	0.0000
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.2400	0.0000
E11 Eaves (insulation at rafter level)	0.0000	0.0400	0.0000
E12 Gable (insulation at ceiling level)	0.0000	0.0600	0.0000
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000
E14 Flat roof	23.5000	0.0800	1.8800
E16 Corner (normal)	17.5000	0.0900	1.5750
E17 Corner (inverted - internal area greater than external area)	10.0000	-0.0900	-0.9000
E18 Party wall between dwellings	10.0000	0.0600	0.6000
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E21 Exposed floor (inverted)	0.0000	0.3200	0.0000
E7 Party floor between dwellings (in blocks of flats)	101.2100	0.0700	7.0847
E15 Flat roof with parapet	0.0000	0.5600	0.0000
E20 Exposed floor (normal)	0.0000	0.3200	0.0000

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 12.2887 (36)

Point Thermal bridges (36a) = 0.0000

Total fabric heat loss (33) + (36) + (36a) = 55.3309 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	43.2114	42.9201	42.6346	41.2936	41.0427	39.8746	39.8746	39.6583	40.3245	41.0427	41.5502	42.0809	(38)
Heat transfer coeff	98.5424	98.2511	97.9656	96.6245	96.3736	95.2056	95.2056	94.9893	95.6555	96.3736	96.8812	97.4118	(39)
Average = Sum(39)m / 12 =												96.6233	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	1.1383	1.1349	1.1316	1.1161	1.1132	1.0998	1.0998	1.0973	1.1049	1.1132	1.1191	1.1252	(40)
HLP (average)												1.1161	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.5758 (42)

Hot water usage for mixer showers													
	67.4075	66.3945	64.9183	62.0940	60.0097	57.6853	56.3641	57.8291	59.4350	61.9307	64.8157	67.1492	(42a)
Hot water usage for baths	29.1106	28.6783	28.0695	26.9469	26.1064	25.1744	24.6709	25.2755	25.9337	26.9310	28.0767	29.0122	(42b)
Hot water usage for other uses	41.0088	39.5176	38.0263	36.5351	35.0439	33.5526	33.5526	35.0439	36.5351	38.0263	39.5176	41.0088	(42c)
Average daily hot water use (litres/day)												126.4183	(43)

Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	137.5269	134.5903	131.0141	125.5760	121.1600	116.4123	114.5877	118.1485	121.9038	126.8880	132.4099	137.1702	(44)
Energy conte	217.8090	191.6548	201.3639	171.9073	163.1046	143.1425	138.5839	146.2925	150.3196	172.1859	188.6422	214.7754	(45)
Energy content (annual)										Total = Sum(45)m =		2099.7816	
Distribution loss (46)m = 0.15 x (45)m	32.6713	28.7482	30.2046	25.7861	24.4657	21.4714	20.7876	21.9439	22.5479	25.8279	28.2963	32.2163	(46)

Water storage loss: 210.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.7016 (48)

Temperature factor from Table 2b 0.5400 (49)

Enter (49) or (54) in (55) 0.9188 (55)

Total storage loss 28.4842 (56)

If cylinder contains dedicated solar storage 28.4842 (57)

Primary loss 23.2624 (59)

Combi loss 0.0000 (61)

Total heat required for water heating calculated for each month 269.5556 (62)

WWHRS -30.8159 (63a)

PV diverter -0.0000 (63b)

Solar input 0.0000 (63c)

FGHRS 0.0000 (63d)

Output from w/h 238.7397 (64)

Total per year (kWh/year) = Sum(64)m = 2422.7277 (64)

12	Total per year (kWh/year)											2423 (64)
	Electric shower(s)											
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =											0.0000 (64a)
	Heat gains from water heating, kWh/month											
	113.8188	101.1163	108.3508	97.2211	95.6296	87.6568	87.4764	90.0395	90.0431	98.6491	102.7854	112.8101 (65)

5. Internal gains (see Table 5 and 5a)													
Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	128.7901	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	121.2432	121.2432	121.2432	121.2432	121.2432	121.2432	121.2432	121.2432	121.2432	121.2432	121.2432	121.2432	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.6581	199.6581	199.6581	199.6581	199.6581	199.6581	199.6581	199.6581	199.6581	199.6581	199.6581	199.6581	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	174.0303	174.0303	174.0303	174.0303	174.0303	174.0303	174.0303	174.0303	174.0303	174.0303	174.0303	174.0303	(69)
Pumps, fans	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	35.8790	(70)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(71)
Water heating gains (Table 5)	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	-103.0321	(72)
Total internal gains	152.9822	150.4707	145.6327	135.0292	128.5343	121.7455	117.5758	121.0209	125.0599	132.5928	142.7575	151.6265	(73)
	567.5754	580.0491	556.5569	536.9145	510.1616	488.9200	470.5752	471.6064	485.6395	505.2112	535.6340	555.9557	(74)

6. Solar gains												
[Jan]					Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W		
Northeast					18.0800	11.2829	0.6300	0.7000	0.7700	62.3437 (75)		
Northwest					3.5600	11.2829	0.6300	0.7000	0.7700	12.2756 (81)		
Solar gains	74.6193	151.8898	273.6572	449.4237	604.1136	644.0490	602.4947	480.3157	333.4555	185.6214	93.8904	60.9379 (83)
Total gains	642.1947	731.9389	830.2140	986.3382	1114.2752	1132.9690	1073.0699	951.9221	819.0950	690.8327	629.5244	616.8936 (84)

7. Mean internal temperature (heating season)												
Temperature during heating periods in the living area from Table 9, Th1 (C)												
Utilisation factor for gains for living area, n _{l,m} (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	44.4827	44.6146	44.7446	45.3657	45.4838	46.0418	46.0418	46.1466	45.8252	45.4838	45.2455	44.9990
alpha	3.9655	3.9743	3.9830	4.0244	4.0323	4.0695	4.0695	4.0764	4.0550	4.0323	4.0164	3.9999
util living area	0.9853	0.9743	0.9475	0.8627	0.7061	0.5170	0.3852	0.4484	0.7077	0.9181	0.9743	0.9873 (86)
MIT	19.3996	19.6264	19.9969	20.4946	20.8260	20.9624	20.9911	20.9839	20.8720	20.4151	19.8362	19.3717 (87)
Th 2	19.9697	19.9724	19.9751	19.9877	19.9900	20.0010	20.0010	20.0031	19.9968	19.9900	19.9853	19.9803 (88)
util rest of house	0.9818	0.9683	0.9350	0.8326	0.6517	0.4437	0.3001	0.3560	0.6329	0.8928	0.9672	0.9843 (89)
MIT 2	18.1174	18.4058	18.8709	19.4780	19.8417	19.9775	19.9975	19.9961	19.9036	19.4024	18.6831	18.0891 (90)
Living area fraction									f _{LA} = Living area / (4) =			0.4347 (91)
MIT	18.6747	18.9364	19.3603	19.9199	20.2695	20.4056	20.4294	20.4255	20.3245	19.8426	19.1843	18.6467 (92)
Temperature adjustment												0.0000
adjusted MIT	18.6747	18.9364	19.3603	19.9199	20.2695	20.4056	20.4294	20.4255	20.3245	19.8426	19.1843	18.6467 (93)

8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9758	0.9605	0.9260	0.8304	0.6675	0.4740	0.3370	0.3958	0.6589	0.8884	0.9600	0.9789 (94)
Useful gains	626.6486	702.9998	768.7545	819.0388	743.8096	537.0611	361.5901	376.7678	539.6887	613.7362	604.3195	603.8888 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1416.5206	1379.0885	1259.8697	1064.7917	825.8757	552.7286	364.5783	382.3778	595.4109	890.7413	1170.7445	1407.2755 (97)
Space heating kWh	587.6648	454.3316	365.3897	176.9421	61.0572	0.0000	0.0000	0.0000	0.0000	206.0918	407.8260	597.7198 (98a)
Space heating requirement - total per year (kWh/year)												2857.0229
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	587.6648	454.3316	365.3897	176.9421	61.0572	0.0000	0.0000	0.0000	0.0000	206.0918	407.8260	597.7198 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2857.0229
Space heating per m2										(98c) / (4) =		33.0025 (99)

[illegible]

Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	238.7397	211.1399	224.5718	198.3535	192.8278	174.3743	172.6658	179.2544	180.8986	200.9461	212.6788	236.2768	(64)
Efficiency of water heater	85.9981	85.7322	85.1447	83.8046	81.7937	79.8000	79.8000	79.8000	79.8000	84.1166	85.4951	79.8000	(216)
Fuel for water heating, kWh/month	277.6106	246.2783	263.7533	236.6859	235.7492	218.5142	216.3732	224.6296	226.6900	238.8901	248.7614	274.5791	(217)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	(231)
Lighting	24.3793	19.5580	17.6098	12.9017	9.9656	8.1420	9.0910	11.8168	15.3489	20.1385	22.7464	25.0569	(232)
Electricity generated by wind turbines (Appendix M) (negative quantity)	-43.3510	-51.7490	-58.4548	-55.5252	-54.8365	-50.4375	-43.1698	-33.8245	-21.4875	-16.2679			(233a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)	-6.3207	-13.6347	-27.7470	-42.6475	-57.3646	-58.0084	-57.3390	-48.1099	-34.6840	-19.8260	-8.5411	-4.9743	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3095.3661	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												79.8000	
Water heating fuel used												2908.5149	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												86.0000	(231)
Electricity for lighting (calculated in Appendix L)												196.7549	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-855.7878	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5430.8481	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP			
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	3095.3661	0.2100	650.0269 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2908.5149	0.2100	610.7881 (264)
Space and water heating			1260.8150 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	196.7549	0.1443	28.3978 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-476.5906	0.1334	-63.5658
PV Unit electricity exported	-379.1972	0.1252	-47.4832
Total			-111.0490 (269)
Total CO2, kg/year			1190.0931 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.7500 (273)

13a. Primary energy - Individual heating systems including micro-CHP			
	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	3095.3661	1.1300	3497.7637 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2908.5149	1.1300	3286.6219 (278)
Space and water heating			6784.3856 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	196.7549	1.5338	301.7892 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-476.5906	1.4929	-711.4863
PV Unit electricity exported	-379.1972	0.4596	-174.2834
Total			-885.7697 (283)
Total Primary energy kWh/year			6330.5059 (286)
Target Primary Energy Rate (TPER)			73.1300 (287)

Property Reference	Unit 03		Issued on Date	05/02/2025	
Assessment Reference	Lytton Court	Prop Type Ref	Lytton Court		
Property					
SAP Rating	89 B	DER	2.20	TER	11.84
Environmental	98 A	% DER < TER			81.42
CO ₂ Emissions (t/year)	0.28	DFEE	33.12	TFEE	44.24
Compliance Check	See BREL	% DFEE < TFEE			25.15
% DPER < TPER	60.73	DPER	24.58	TPER	62.61
Client	Mr. Neil Ingham		Assessor ID	AV35-0001	

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	149.4000 (1b)	2.6100 (2b)	389.9340 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	149.4000		389.9340 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	389.9340 (5)

2. Ventilation rate

Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	0 * 10 =	0.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	2.5000	(17)
Infiltration rate	0.1250	(18)
Number of sides sheltered	1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1156 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1474	0.1445	0.1416	0.1272	0.1243	0.1098	0.1098	0.1070	0.1156	0.1243	0.1301	0.1359 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												77.4000 (23c)
Effective ac	0.2604	0.2575	0.2546	0.2402	0.2373	0.2228	0.2228	0.2200	0.2286	0.2373	0.2431	0.2489 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
G (Uw = 0.80)			26.2800	0.7752	20.3721		(27)
RL			15.7400	0.7752	12.2016		(27a)
EW	35.5000		35.5000	0.1400	4.9700	14.0000	497.0000 (29a)
SW	38.0300		38.0300	0.1300	4.9439	14.0000	532.4200 (29a)
MW	42.8000		42.8000	0.1400	5.9920	9.0000	385.2000 (29a)
DW	47.6200	26.2800	21.3400	0.1400	2.9876	9.0000	192.0600 (29a)
FR	141.9100	15.7400	126.1700	0.1100	13.8787	9.0000	1135.5300 (30)
Total net area of external elements Aum(A, m ²)			305.8600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		65.3458		(33)
PW			29.2600	0.0000	0.0000	45.0000	1316.7000 (32)
Party Floor 1			149.4000			40.0000	5976.0000 (32d)
IW			237.0400			75.0000	17778.0000 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		27812.9100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							186.1641 (35)

List of Thermal Bridges			
K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	9.9100	0.0250	0.2478
E3 Sill	9.9100	0.0250	0.2478
E4 Jamb	42.4000	0.0240	1.0176
E5 Ground floor (normal)	0.0000	0.0730	0.0000
E6 Intermediate floor within a dwelling	0.0000	-0.0100	-0.0000
E10 Eaves (insulation at ceiling level)	0.0000	0.1230	0.0000
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.0000	0.0000
E11 Eaves (insulation at rafter level)	0.0000	0.0070	0.0000
E12 Gable (insulation at ceiling level)	0.0000	0.0730	0.0000
E13 Gable (insulation at rafter level)	0.0000	0.0720	0.0000
E14 Flat roof	74.5200	0.0620	4.6202
E16 Corner (normal)	46.0000	0.0800	3.6800
E17 Corner (inverted - internal area greater than external area)	37.7500	-0.0290	-1.0948
E18 Party wall between dwellings	2.4000	0.0570	0.1368
E19 Party wall between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
E20 Exposed floor (normal)	0.0000	0.0000	0.0000
E21 Exposed floor (inverted)	0.0000	0.0000	0.0000
E7 Party floor between dwellings (in blocks of flats)	74.5200	0.0980	7.3030
E15 Flat roof with parapet	0.0000	0.0000	0.0000
E20 Exposed floor (normal)	0.0000	0.1430	0.0000

Thermal bridges (Sum(L x Psi) calculated using Appendix K)

Point Thermal bridges (36a) = 0.0000

Total fabric heat loss (33) + (36) + (36a) = 81.5042 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	33.5106	33.1387	32.7667	30.9069	30.5349	28.6751	28.6751	28.3032	29.4191	30.5349	31.2789	32.0228
Average = Sum(39)m / 12 =	115.0148	114.6429	114.2709	112.4111	112.0391	110.1793	110.1793	109.8074	110.9233	112.0391	112.7831	113.5270
HLP	0.7698	0.7674	0.7649	0.7524	0.7499	0.7375	0.7375	0.7350	0.7425	0.7499	0.7549	0.7599
HLP (average)												0.7518
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.9332 (42)
Hot water usage for mixer showers												73.1195 (42a)
Hot water usage for baths												31.5808 (42b)
Hot water usage for other uses												44.6694 (42c)
Average daily hot water use (litres/day)												137.6613 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	149.7581	146.5601	142.6656	136.7439	131.9350	126.7651	124.7784	128.6561	132.7456	138.1731	144.1861	149.3698
Energy content (annual)	237.1803	208.6996	219.2718	187.1956	177.6099	155.8724	150.9087	159.3031	163.6886	187.4996	205.4195	233.8770
Distribution loss (46)m = 0.15 x (45)m												2286.5259
Water storage loss:												210.0000 (47)
Store volume												1.4100 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.7614 (55)
Enter (49) or (54) in (55)												
Total storage loss	23.6034	21.3192	23.6034	22.8420	23.6034	22.8420	23.6034	23.6034	22.8420	23.6034	22.8420	23.6034
If cylinder contains dedicated solar storage	23.6034	21.3192	23.6034	22.8420	23.6034	22.8420	23.6034	23.6034	22.8420	23.6034	22.8420	23.6034
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total heat required for water heating calculated for each month	284.0461	251.0300	266.1376	232.5496	224.4757	201.2264	197.7745	206.1689	209.0426	234.3654	250.7735	280.7428
WWHRS	-65.4037	-57.8436	-60.5704	-50.1547	-46.7424	-39.9978	-37.4916	-39.8685	-41.3833	-48.7863	-55.2690	-64.1925
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Output from w/h	218.6424	193.1865	205.5671	182.3949	177.7333	161.2286	160.2829	166.3003	167.6593	185.5791	195.5045	216.5502
12Total per year (kWh/year)												2230.6292
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000
Heat gains from water heating, kWh/month	116.3551	103.2569	110.4005	98.5257	96.5479	88.1108	87.6698	90.4609	90.7097	99.8363	104.5852	115.2567

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	161.3373	178.6235	161.3373	166.7152	161.3373	166.7152	161.3373	161.3373	166.7152	161.3373	166.7152	161.3373
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	319.8693	323.1886	314.8242	297.0174	274.5395	253.4135	239.3000	235.9808	244.3452	262.1519	284.6298	305.7558
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Losses e.g. evaporation (negative values) (Table 5)	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299
Water heating gains (Table 5)	156.3912	153.6562	148.3878	136.8413	129.7687	122.3761	117.8357	121.5872	125.9856	134.1885	145.2572	154.9150
Total internal gains	704.5966	722.4669	691.5480	667.5726	632.6443	609.5035	585.4718	585.9041	604.0448	624.6765	663.6010	689.0068

6. Solar gains

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													297.5606 (206)
Efficiency of main space heating system 2 (in %)													0.0000 (207)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement	634.7930	350.7528	162.6099	25.9553	2.7392	0.0000	0.0000	0.0000	0.0000	74.9108	349.2923	641.4759	(98)
Space heating efficiency (main heating system 1)	297.5606	297.5606	297.5606	297.5606	297.5606	0.0000	0.0000	0.0000	0.0000	297.5606	297.5606	297.5606	(210)
Space heating fuel (main heating system)	213.3324	117.8761	54.6477	8.7227	0.9206	0.0000	0.0000	0.0000	0.0000	25.1750	117.3853	215.5783	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	218.6424	193.1865	205.5671	182.3949	177.7333	161.2286	160.2829	166.3003	167.6593	185.5791	195.5045	216.5502	(64)
Efficiency of water heater	171.8970	171.8970	171.8970	171.8970	171.8970	171.8970	171.8970	171.8970	171.8970	171.8970	171.8970	171.8970	(216)
Fuel for water heating, kWh/month	127.1939	112.3850	119.5874	106.1071	103.3952	93.7938	93.2436	96.7442	97.5348	107.9595	113.7336	125.9768	(217)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	56.5650	51.0910	56.5650	54.7403	56.5650	54.7403	56.5650	56.5650	54.7403	56.5650	54.7403	56.5650	(231)
Lighting	37.1680	29.8175	26.8474	19.6696	15.1933	12.4131	13.8599	18.0156	23.4004	30.7027	34.6786	38.2010	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	-19.2387	-30.5145	-49.2154	-61.6687	-72.4246	-69.9250	-69.0079	-62.0336	-50.5617	-37.0302	-22.1431	-16.1921	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)	-3.4632	-8.4035	-19.3676	-32.8557	-46.0789	-47.1561	-46.2936	-37.6588	-25.7722	-13.3905	-4.9995	-2.6548	(233b)

Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	4 * 10 =	40.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 40.0000 / (5) = 0.1026 (8)

Pressure test Yes

Pressure Test Method Blower Door

Measured/design AP50 5.0000 (17)

Infiltration rate 0.3526 (18)

Number of sides sheltered 1 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 0.9250 (20)

Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3261 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Effective ac	0.5865	0.5831	0.5798	0.5644	0.5615	0.5480	0.5480	0.5455	0.5532	0.5615	0.5673	0.5734	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Opening Type (Uw = 1.20)			23.3500	1.1450	26.7366			(27)
RL			13.9900	2.0221	28.2886			(27a)
EW	35.5000		35.5000	0.1800	6.3900			(29a)
SW	38.0300		38.0300	0.1800	6.8454			(29a)
MW	42.8000		42.8000	0.1800	7.7040			(29a)
DW	47.6200	23.3500	24.2700	0.1800	4.3686			(29a)
FR	141.9100	13.9900	127.9200	0.1100	14.0712			(30)
Total net area of external elements Aum(A, m2)			305.8600					(31)
Fabric heat loss, W/K = Sum (A x U)				(26) ... (30) + (32) =	94.4044			(33)
PW			29.2600	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 186.1641 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)	9.9100	0.0500	0.4955	
E3 Sill	9.9100	0.0500	0.4955	
E4 Jamb	42.4000	0.0500	2.1200	
E5 Ground floor (normal)	0.0000	0.1600	0.0000	
E6 Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	0.0000	0.0600	0.0000	
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.2400	0.0000	
E11 Eaves (insulation at rafter level)	0.0000	0.0400	0.0000	
E12 Gable (insulation at ceiling level)	0.0000	0.0600	0.0000	
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000	
E14 Flat roof	74.5200	0.0800	5.9616	
E16 Corner (normal)	46.0000	0.0900	4.1400	
E17 Corner (inverted - internal area greater than external area)	37.7500	-0.0900	-3.3975	
E18 Party wall between dwellings	2.4000	0.0600	0.1440	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E21 Exposed floor (inverted)	0.0000	0.3200	0.0000	
E7 Party floor between dwellings (in blocks of flats)	74.5200	0.0700	5.2164	
E15 Flat roof with parapet	0.0000	0.5600	0.0000	
E20 Exposed floor (normal)	0.0000	0.3200	0.0000	

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 15.1755 (36)

Point Thermal bridges

Total fabric heat loss (33) + (36) + (36a) = 109.5799 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	75.4641	75.0321	74.6086	72.6197	72.2476	70.5154	70.5154	70.1946	71.1826	72.2476	73.0004	73.7874	(38)
Average = Sum(39)m / 12 =	185.0440	184.6120	184.1886	182.1997	181.8276	180.0953	180.0953	179.7745	180.7625	181.8276	182.5803	183.3673	(39)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2386	1.2357	1.2329	1.2195	1.2171	1.2055	1.2055	1.2033	1.2099	1.2171	1.2221	1.2274	(40)
HLP (average)												1.2195	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9332 (42)
Hot water usage for mixer showers												
73.4008	72.2977	70.6903	67.6149	65.3453	62.8142	61.3756	62.9708	64.7195	67.4370	70.5785	73.1195	(42a)
Hot water usage for baths												
31.6880	31.2173	30.5546	29.3327	28.4177	27.4032	26.8552	27.5132	28.2298	29.3154	30.5625	31.5808	(42b)
Hot water usage for other uses												
44.6694	43.0451	41.4207	39.7964	38.1720	36.5477	36.5477	38.1720	39.7964	41.4207	43.0451	44.6694	(42c)
Average daily hot water use (litres/day)												137.6613 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.7581	146.5601	142.6656	136.7439	131.9350	126.7651	124.7784	128.6561	132.7456	138.1731	144.1861	149.3698	(44)
Energy conte	237.1803	208.6996	219.2718	187.1956	177.6099	155.8724	150.9087	159.3031	163.6886	187.4996	205.4195	233.8770	(45)
Energy content (annual)										Total = Sum(45)m =		2286.5259	
Distribution loss (46)m = 0.15 x (45)m	35.5770	31.3049	32.8908	28.0793	26.6415	23.3809	22.6363	23.8955	24.5533	28.1249	30.8129	35.0815	(46)

Water storage loss:

Store volume													210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.7016 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.9188 (55)
Total storage loss	28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842	(56)

If cylinder contains dedicated solar storage

28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842	27.5653	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

288.9268	255.4385	271.0184	237.2729	229.3565	205.9498	202.6553	211.0497	213.7659	239.2462	255.4968	285.6235	(62)
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WVHRS	-33.5558	-29.6770	-3.0760	-25.7322	-23.9815	-20.5211	-19.2353	-20.4548	-21.2319	-25.0301	-28.3561	-32.9344 (63a)
PV diverter	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	255.3711	225.7615	239.9423	211.5407	205.3750	185.4287	183.4200	190.5949	192.5340	214.2161	227.1407	252.6892 (64)
Total per year (kWh/year) = Sum(64)m =												2584.0141 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month	120.2597	106.7837	114.3051	102.3044	100.4526	91.8895	91.5744	94.3655	94.4883	103.7409	108.3639	119.1614 (65)

Full SAP Calculation Printout

Internal gains (See Table 5 and 5a)												
Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624	146.6624 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	161.3373	178.6235	161.3373	166.7152	161.3373	166.7152	161.3373	161.3373	166.7152	161.3373	166.7152	161.3373 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	319.8693	323.1886	314.8242	297.0174	274.5395	253.4135	239.3000	235.9808	244.3452	262.1519	284.6298	305.7558 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662	37.6662 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299	-117.3299 (71)
Water heating gains (Table 5)	161.6394	158.9043	153.6359	142.0895	135.0169	127.6243	123.0839	126.8354	131.2338	139.4367	150.5054	160.1631 (72)
Total internal gains	712.8448	730.7151	699.7962	675.8208	640.8924	614.7517	590.7199	591.1522	609.2929	632.9247	671.8491	697.2550 (73)

6. Solar gains

[Jan]													
				Area	Solar flux		g		FF		Access		Gains
				m2	Table 6a	Specific data		Specific data		factor		W	
					W/m2	or Table 6b		or Table 6c		Table 6d			

Northeast				7.7200	11.2829	0.6300		0.7000		0.7700		26.6202 (75)	
Southwest				7.3400	36.7938	0.6300		0.7000		0.7700		82.5359 (79)	
Northwest				8.2900	11.2829	0.6300		0.7000		0.7700		28.5857 (81)	
North				13.9900	26.0000	0.6300		0.7000		1.0000		144.3684 (82)	

Solar gains	282.1102	552.8045	927.8736	1403.7371	1780.0135	1852.0496	1750.7144	1461.2855	1093.5396	659.1836	351.5591	232.3227 (83)	
Total gains	994.9550	1283.5195	1627.6698	2079.5579	2420.9059	2466.8013	2341.4343	2052.4377	1702.8326	1292.1083	1023.4082	929.5777 (84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	41.7512	41.8489	41.9451	42.4030	42.4898	42.8984	42.8984	42.9750	42.7401	42.4898	42.3146	42.1330
alpha	3.7834	3.7899	3.7963	3.8269	3.8327	3.8599	3.8599	3.8650	3.8493	3.8327	3.8210	3.8089
util living area	0.9906	0.9760	0.9343	0.8153	0.6338	0.4537	0.3350	0.3957	0.6566	0.9125	0.9812	0.9927 (86)
MIT	19.1455	19.4838	19.9853	20.5495	20.8614	20.9704	20.9929	20.9868	20.8854	20.3696	19.6435	19.0938 (87)
Th 2	19.8893	19.8916	19.8938	19.9044	19.9064	19.9156	19.9156	19.9174	19.9121	19.9064	19.9024	19.8982 (88)
util rest of house	0.9883	0.9701	0.9188	0.7781	0.5754	0.3819	0.2541	0.3058	0.5762	0.8846	0.9756	0.9908 (89)
MIT 2	17.7393	18.1690	18.7939	19.4651	19.7937	19.8982	19.9130	19.9121	19.8331	19.2824	18.3827	17.6793 (90)
Living area fraction									fLA = Living area / (4)			0.3995 (91)
MIT	18.3010	18.6942	19.2698	19.8983	20.2202	20.3265	20.3444	20.3414	20.2535	19.7167	18.8864	18.2443 (92)
Temperature adjustment												0.0000
adjusted MIT	18.3010	18.6942	19.2698	19.8983	20.2202	20.3265	20.3444	20.3414	20.2535	19.7167	18.8864	18.2443 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9833	0.9616	0.9082	0.7779	0.5928	0.4096	0.2863	0.3415	0.6029	0.8788	0.9685	0.9867 (94)
Useful gains	978.3842	1234.2262	1478.1832	1617.6481	1435.2292	1010.2904	670.4044	700.9080	1026.5601	1135.4440	991.1513	917.2326 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	2590.8049	2546.5735	2352.0576	2003.8782	1549.2134	1031.3115	674.3465	708.5589	1112.3168	1657.6695	2151.9591	2575.2716 (97)
Space heating kWh	1199.6410	881.8974	650.1626	278.0857	84.8043	0.0000	0.0000	0.0000	0.0000	388.5358	835.7816	1233.5810 (98a)
Space heating requirement - total per year (kWh/year)												5552.4892
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	1199.6410	881.8974	650.1626	278.0857	84.8043	0.0000	0.0000	0.0000	0.0000	388.5358	835.7816	1233.5810 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5552.4892
Space heating per m2											(98c) / (4) =	37.1653 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
Fraction of space heat from main system(s)	1.0000 (202)
Efficiency of main space heating system 1 (in %)	92.3000 (206)
Efficiency of main space heating system 2 (in %)	0.0000 (207)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)

13a. Primary energy - Individual heating systems including micro-CHP			
	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year
Space heating - main system 1	6015.6980	1.1300	6797.7387 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	3076.5426	1.1300	3476.4932 (278)
Space and water heating			10274.2319 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	270.5475	1.5338	414.9748 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-759.9832	1.4940	-1135.4219
PV Unit electricity exported	-716.9106	0.4601	-329.8779
Total			-1465.2998 (283)
Total Primary energy kWh/year			9354.0076 (286)
Target Primary Energy Rate (TPER)			62.6100 (287)