FULL SAP CALCULATION PRINTOUT
Calculation Type: Conversion (As Built)

Property and Energy Services Ltd.

Property Reference	3573-2	Issued on Date	18/03/2021
Assessment Reference	3473-2br	Prop Type Ref	
Property	FLAT 2, 379 OXFORD ROAD, READING, READING, RG30 1HA		

SAP Rating	79 C	DER	N/A	TER	N/A
Environmental	84 B	% DER<TER	N/A		
CO_2 Emissions (t/year)	0.87	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Ian Lloyd, Property and Energy Services Limited, Tel: 01367240212, ianl@propertyandenergy.co.uk	Assessor ID	H044-0001
Client	Keen Partnership, Keen		

CALCULATION OF HEAT DEMAND 09 Jan 2014

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SAP 2012 WORKSHEET FOR Conversion (As Built)   (Version 9.92, January 2014)
CALCULATION OF HEAT DEMAND      09 Jan 2014
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1. Overall dwelling dimensions
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                                                                    Area        Storey height              Volume
                                                                    (m2)              (m)                  (m3)
Ground floor                                                     35.3700 (1b)    x      2.4100 (2b)    =    85.2417 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)              35.3700                                        (4)
Dwelling volume                                                                (3a)+(3b)+(3c)+(3d)+(3e)...(3n) =    85.2417 (5)
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2. Ventilation rate
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                                                   main          secondary          other              total        m3 per hour
                                                 heating          heating
Number of chimneys                                    0     +          0     +          0     =          0 * 40 =      0.0000 (6a)
Number of open flues                                  0     +          0     +          0     =          0 * 20 =      0.0000 (6b)
Number of intermittent fans                                                                          1 * 10 =     10.0000 (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)+(7a)+(7b)+(7c) =                      10.0000 / (5) =       0.1173 (8)
Pressure test                                                                                                            No
Measured/design AP50                                                                                                  15.0000
Infiltration rate                                                                                                      0.8673 (18)
Number of sides sheltered                                                                                                   3 (19)

Shelter factor                                                                  (20) =  1  -  [0.075 x (19)]  =       0.7750 (20)
Infiltration rate adjusted to include shelter factor                                      (21) = (18) x (20)  =       0.6722 (21)
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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.4000	4.1000	4.1000	3.9000	3.9000	3.4000	3.4000	3.3000	3.4000	3.8000	3.7000	4.0000	(22)
Wind factor	1.1000	1.0250	1.0250	0.9750	0.9750	0.8500	0.8500	0.8250	0.8500	0.9500	0.9250	1.0000	(22a)
Adj infilt rate	0.7394	0.6890	0.6890	0.6554	0.6554	0.5713	0.5713	0.5545	0.5713	0.6386	0.6218	0.6722	(22b)
Effective ac	0.7733	0.7373	0.7373	0.7148	0.7148	0.6632	0.6632	0.6538	0.6632	0.7039	0.6933	0.7259	(25)

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3. Heat losses and heat loss parameter
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Element                                          Gross       Openings       NetArea       U-value          A x U        K-value          A x K
                                                  m2            m2             m2           W/m2K            W/K          kJ/m2K           kJ/K
W-1.6 (Uw = 1.60)                                                            6.4000        1.5038           9.6241                                (27)
Original wall                                  25.4700        6.4000       19.0700        0.3000           5.7210                                (29a)
Ceiling                                        35.3700                     35.3700        0.1600           5.6592                                (30)
Total net area of external elements Aum(A, m2)                             60.8400                                                              (31)
Fabric heat loss, W/K = Sum (A x U)                                              (26)...(30) + (32) =       21.0043                                (33)
Party Wall old                                                             41.2100        0.0000           0.0000                                (32)
Party Floor                                                                45.9900                                                              (32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K                                                                                   250.0000 (35)
Thermal bridges (Default value 0.150 * total exposed area)                                                                            9.1260 (36)
Total fabric heat loss                                                                                   (33) + (36) =             30.1303 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
                  Jan        Feb        Mar        Apr        May        Jun        Jul        Aug        Sep        Oct        Nov        Dec
(38)m           21.7540    20.7412    20.7412    20.1058    20.1058    18.6561    18.6561    18.3900    18.6561    19.8000    19.5021    20.4195 (38)
Heat transfer coeff
                51.8843    50.8715    50.8715    50.2360    50.2360    48.7864    48.7864    48.5203    48.7864    49.9302    49.6323    50.5498 (39)
Average = Sum(39)m / 12 =                                                                                                             49.9243 (39)
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CALCULATION OF HEAT DEMAND 09 Jan 2014

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4669	1.4383	1.4383	1.4203	1.4203	1.3793	1.3793	1.3718	1.3793	1.4117	1.4032	1.4292	(40)
HLP (average)												1.4115	(40)
Days in month													
	31	28	31	30	31	30	31	31	30	31	30	31	(41)

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4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.2895	(42)
Average daily hot water use (litres/day)	64.8244	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	71.3069	68.7139	66.1209	63.5280	60.9350	58.3420	58.3420	60.9350	63.5280	66.1209	68.7139	71.3069	(44)
Energy conte	105.7461	92.4862	95.4374	83.2047	79.8369	68.8931	63.8396	73.2569	74.1318	86.3935	94.3053	102.4094	(45)
Energy content (annual)										Total = Sum(45)m =		1019.9409	(45)
Distribution loss (46)m = 0.15 x (45)m													
	15.8619	13.8729	14.3156	12.4807	11.9755	10.3340	9.5759	10.9885	11.1198	12.9590	14.1458	15.3614	(46)
Water storage loss:													
Total storage 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	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	43.2019	39.0097	43.1712	41.7580	43.1351	41.7264	43.1065	43.1250	41.7436	43.1562	41.7879	43.1960	(61)
Total heat required for water heating calculated for each month													
	148.9480	131.4959	138.6086	124.9627	122.9719	110.6195	106.9462	116.3819	115.8755	129.5497	136.0932	145.6054	(62)
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	(63)
								Solar input (sum of months) = Sum(63)m =				0.0000	(63)
Output from w/h													
	148.9480	131.4959	138.6086	124.9627	122.9719	110.6195	106.9462	116.3819	115.8755	129.5497	136.0932	145.6054	(64)
								Total per year (kWh/year) = Sum(64)m =				1528.0586	(64)
RHI water heating demand												1528	(64)
Heat gains from water heating, kWh/month													
	45.9610	40.5041	42.5257	38.1051	37.3295	33.3386	32.0033	35.1392	35.0847	39.5149	41.8035	44.8501	(65)

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5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	25.0397	22.2400	18.0868	13.6929	10.2356	8.6413	9.3372	12.1369	16.2901	20.6840	24.1413	25.7356	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	164.3130	166.0181	161.7214	152.5743	141.0276	130.1755	122.9255	121.2205	125.5172	134.6643	146.2109	157.0631	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	(71)
Water heating gains (Table 5)													
	61.7756	60.2739	57.1583	52.9237	50.1741	46.3036	43.0152	47.2301	48.7288	53.1114	58.0604	60.2824	(72)
Total internal gains													
	323.9434	321.3472	309.7816	292.0060	274.2525	257.9355	248.0931	253.4026	263.3512	281.2749	301.2278	315.8963	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
North	6.4000	12.7500	0.6300	0.7000	0.7700	24.9380	(74)

Solar gains	24.9380	42.0553	71.7709	117.6692	154.2673	174.3860	161.3435	130.7596	92.2783	53.9917	30.3918	20.8528	(83)
Total gains	348.8814	363.4025	381.5525	409.6752	428.5198	432.3215	409.4367	384.1622	355.6296	335.2666	331.6196	336.7491	(84)

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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	47.3409	48.2834	48.2834	48.8942	48.8942	50.3470	50.3470	50.6232	50.3470	49.1937	49.4889	48.5907	
alpha	4.1561	4.2189	4.2189	4.2596	4.2596	4.3565	4.3565	4.3749	4.3565	4.2796	4.2993	4.2394	
util living area													
	0.9844	0.9791	0.9628	0.9154	0.7986	0.5798	0.4004	0.4467	0.7422	0.9233	0.9728	0.9860	(86)
MIT	19.7651	19.9084	20.1685	20.5125	20.8109	20.9674	20.9951	20.9922	20.9018	20.5697	20.1560	19.7825	(87)
Th 2	19.7124	19.7341	19.7341	19.7478	19.7478	19.7792	19.7792	19.7850	19.7792	19.7544	19.7609	19.7410	(88)
util rest of house													
	0.9791	0.9721	0.9493	0.8838	0.7257	0.4620	0.2591	0.3001	0.6358	0.8874	0.9622	0.9812	(89)
MIT 2	18.6407	18.7985	19.0522	19.3867	19.6388	19.7686	19.7787	19.7839	19.7364	19.4513	19.0639	18.6804	(90)
Living area fraction									fLA = Living area / (4) =			0.8089	(91)
MIT	19.5502	19.6963	19.9551	20.2973	20.5869	20.7383	20.7626	20.7612	20.6791	20.3559	19.9472	19.5719	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.5502	19.6963	19.9551	20.2973	20.5869	20.7383	20.7626	20.7612	20.6791	20.3559	19.9472	19.5719	(93)

CALCULATION OF HEAT DEMAND 09 Jan 2014

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9783	0.9718	0.9521	0.8990	0.7768	0.5559	0.3735	0.4187	0.7171	0.9066	0.9640	0.9805	(94)
Useful gains	341.3269	353.1586	363.2585	368.3145	332.8938	240.3150	152.9139	160.8548	255.0219	303.9644	319.6964	330.1759	(95)
Ext temp.	4.9000	5.5000	7.3000	9.7000	12.7000	15.6000	17.6000	17.4000	14.8000	11.4000	7.8000	4.9000	(96)
Heat loss rate W	760.1163	722.1854	643.7863	532.3677	396.2056	250.6782	154.2904	163.0882	286.8195	447.1717	602.8963	741.6601	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	311.5793	247.9861	208.7127	118.1183	47.1040	0.0000	0.0000	0.0000	0.0000	106.5462	203.9039	306.1443	(98)
Space heating												1550.0947	(98)
RHI space heating demand												1550	(98)

SAP 2012 WORKSHEET FOR Conversion (As Built) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	35.3700 (1b)	x	2.4100 (2b)	=	85.2417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	35.3700					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	85.2417	(5)

2. Ventilation rate

	main heating		secondary heating		other		total		m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =		0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =		0.0000	(6b)
Number of intermittent fans							1 * 10 =		10.0000	(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)+(7a)+(7b)+(7c) =	10.0000 / (5) =	0.1173	(8)
Pressure test		No	
Measured/design AP50		15.0000	
Infiltration rate		0.8673	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6722	(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	0.8570	0.8402	0.8234	0.7394	0.7226	0.6386	0.6386	0.6218	0.6722	0.7226	0.7562	0.7898	(22b)
Effective ac	0.8672	0.8530	0.8390	0.7733	0.7611	0.7039	0.7039	0.6933	0.7259	0.7611	0.7859	0.8119	(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	
W-1.6 (Uw = 1.60)			6.4000	1.5038	9.6241			(27)
Original wall	25.4700	6.4000	19.0700	0.3000	5.7210			(29a)
Ceiling	35.3700		35.3700	0.1600	5.6592			(30)
Total net area of external elements Aum(A, m2)			60.8400					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	21.0043			(33)
Party Wall old			41.2100	0.0000	0.0000			(32)
Party Floor			45.9900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.150 * total exposed area)	9.1260	(36)
Total fabric heat loss (33) + (36) =	30.1303	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	24.3952	23.9940	23.6008	21.7540	21.4085	19.8000	19.8000	19.5021	20.4195	21.4085	22.1075	22.8383	(38)
Heat transfer coeff	54.5254	54.1243	53.7311	51.8843	51.5387	49.9302	49.9302	49.6323	50.5498	51.5387	52.2377	52.9685	(39)
Average = Sum(39)m / 12 =												51.8826	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5416	1.5302	1.5191	1.4669	1.4571	1.4117	1.4117	1.4032	1.4292	1.4571	1.4769	1.4976	(40)
HLP (average)												1.4669	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.2895	(42)
Average daily hot water use (litres/day)	64.8244	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	71.3069	68.7139	66.1209	63.5280	60.9350	58.3420	58.3420	60.9350	63.5280	66.1209	68.7139	71.3069	(44)
Energy conte	105.7461	92.4862	95.4374	83.2047	79.8369	68.8931	63.8396	73.2569	74.1318	86.3935	94.3053	102.4094	(45)
Energy content (annual)										Total = Sum(45)m =		1019.9409	(45)
Distribution loss (46)m = 0.15 x (45)m	15.8619	13.8729	14.3156	12.4807	11.9755	10.3340	9.5759	10.9885	11.1198	12.9590	14.1458	15.3614	(46)
Water storage loss:													
Total storage 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	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)

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Combi loss	43.2019	39.0097	43.1712	41.7580	43.1351	41.7264	43.1065	43.1250	41.7436	43.1562	41.7879	43.1960	(61)
Total heat required for water heating calculated for each month													
	148.9480	131.4959	138.6086	124.9627	122.9719	110.6195	106.9462	116.3819	115.8755	129.5497	136.0932	145.6054	(62)
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	(63)
Solar input (sum of months) = Sum(63)m =												0.0000	(63)
Output from w/h													
	148.9480	131.4959	138.6086	124.9627	122.9719	110.6195	106.9462	116.3819	115.8755	129.5497	136.0932	145.6054	(64)
Total per year (kWh/year) = Sum(64)m =												1528.0586	(64)
Heat gains from water heating, kWh/month													
	45.9610	40.5041	42.5257	38.1051	37.3295	33.3386	32.0033	35.1392	35.0847	39.5149	41.8035	44.8501	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	25.0397	22.2400	18.0868	13.6929	10.2356	8.6413	9.3372	12.1369	16.2901	20.6840	24.1413	25.7356	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	164.3130	166.0181	161.7214	152.5743	141.0276	130.1755	122.9255	121.2205	125.5172	134.6643	146.2109	157.0631	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	(71)
Water heating gains (Table 5)													
	61.7756	60.2739	57.1583	52.9237	50.1741	46.3036	43.0152	47.2301	48.7288	53.1114	58.0604	60.2824	(72)
Total internal gains													
	323.9434	321.3472	309.7816	292.0060	274.2525	257.9355	248.0931	253.4026	263.3512	281.2749	301.2278	315.8963	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
North	6.4000	10.6334	0.6300	0.7000	0.7700	20.7981	(74)

Solar gains	20.7981	39.7462	67.5386	108.4842	146.1382	156.4453	146.0617	115.8813	81.2032	47.3127	25.6571	17.3383	(83)
Total gains	344.7415	361.0934	377.3201	400.4902	420.3907	414.3808	394.1548	369.2839	344.5545	328.5876	326.8849	333.2346	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	45.0478	45.3817	45.7138	47.3409	47.6583	49.1937	49.1937	49.4889	48.5907	47.6583	47.0206	46.3719	
alpha	4.0032	4.0254	4.0476	4.1561	4.1772	4.2796	4.2796	4.2993	4.2394	4.1772	4.1347	4.0915	
util living area													
	0.9872	0.9829	0.9719	0.9380	0.8558	0.6934	0.5362	0.5859	0.8141	0.9456	0.9794	0.9887	(86)
MIT	19.5866	19.7174	19.9740	20.3670	20.6994	20.9183	20.9788	20.9696	20.8274	20.4335	19.9826	19.6006	(87)
Th 2	19.6565	19.6649	19.6732	19.7124	19.7198	19.7544	19.7544	19.7609	19.7410	19.7198	19.7049	19.6893	(88)
util rest of house													
	0.9829	0.9772	0.9618	0.9144	0.8000	0.5877	0.3948	0.4435	0.7259	0.9200	0.9714	0.9850	(89)
MIT 2	18.4211	18.5567	18.8151	19.2235	19.5261	19.7194	19.7496	19.7531	19.6525	19.2981	18.8505	18.4602	(90)
Living area fraction									fLA = Living area / (4) =			0.8089	(91)
MIT	19.3639	19.4956	19.7525	20.1485	20.4752	20.6892	20.7439	20.7371	20.6028	20.2165	19.7663	19.3826	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.3639	19.4956	19.7525	20.1485	20.4752	20.6892	20.7439	20.7371	20.6028	20.2165	19.7663	19.3826	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9818	0.9763	0.9625	0.9234	0.8351	0.6692	0.5086	0.5576	0.7896	0.9313	0.9718	0.9839	(94)
Useful gains	338.4690	352.5369	363.1784	369.8135	351.0830	277.3059	200.4585	205.9062	272.0718	306.0064	317.6785	327.8662	(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													
	821.3636	789.9761	712.0703	583.6189	452.2612	304.0346	206.9062	215.2621	328.7177	495.6202	661.6574	804.2006	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	359.2736	293.9591	259.5755	153.9399	75.2766	0.0000	0.0000	0.0000	0.0000	141.0727	247.6648	354.3928	(98)
Space heating												1885.1551	(98)
Space heating per m2											(98) / (4) =	53.2981	(99)

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	90.5000	(206)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)
Space heating requirement	2083.0443	(211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	359.2736	293.9591	259.5755	153.9399	75.2766	0.0000	0.0000	0.0000	0.0000	141.0727	247.6648	354.3928	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	396.9874	324.8167	286.8238	170.0994	83.1785	0.0000	0.0000	0.0000	0.0000	155.8814	273.6628	391.5943	(211)
Water heating 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	(215)
Water heating													
Water heating requirement	148.9480	131.4959	138.6086	124.9627	122.9719	110.6195	106.9462	116.3819	115.8755	129.5497	136.0932	145.6054	(64)
Efficiency of water heater												87.3000	(216)
(217)m	89.5381	89.4862	89.3598	89.0377	88.4881	87.3000	87.3000	87.3000	87.3000	88.9394	89.3387	89.5442	(217)
Fuel for water heating, kWh/month	166.3515	146.9454	155.1130	140.3481	138.9701	126.7119	122.5042	133.3126	132.7325	145.6607	152.3340	162.6074	(219)

Water heating fuel used	1723.5915	(219)
Annual totals kWh/year		
Space heating fuel - main system	2083.0443	(211)
Space heating fuel - secondary	0.0000	(215)
Electricity for pumps and fans:		
central heating pump	30.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	75.0000	(231)
Electricity for lighting (calculated in Appendix L)	176.8833	(232)
Total delivered energy for all uses	4058.5191	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2083.0443	3.4800	72.4899	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1723.5915	3.4800	59.9810	(247)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	176.8833	13.1900	23.3309	(250)
Additional standing charges			120.0000	(251)
Total energy cost			285.6943	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.4930	(257)
SAP value		79.1728	
SAP rating (Section 12)		79	(258)
SAP band		C	

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	2083.0443	0.2160	449.9376	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1723.5915	0.2160	372.2958	(264)
Space and water heating			822.2333	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	176.8833	0.5190	91.8024	(268)
Total kg/year			952.9608	(272)
CO2 emissions per m2			26.9400	(273)
EI value			84.1114	
EI rating			84	(274)
EI band			B	

Calculation of stars for heating and DHW

Main heating energy efficiency	3.48 × (1 + 0.29 × 0.00) / 0.9050 = 3.845, stars = 4
Main heating environmental impact	0.216 × (1 + 0.29 × 0.00) / 0.9050 = 0.2387, stars = 4
Water heating energy efficiency	3.48 / 0.8858 = 3.929, stars = 4
Water heating environmental impact	0.216 / 0.8858 = 0.2439, stars = 4

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Built) (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	35.3700 (1b)	x	2.4100 (2b)	=	85.2417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	35.3700					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	85.2417	(5)

2. Ventilation rate

	main heating		secondary heating		other		total		m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =		0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =		0.0000	(6b)
Number of intermittent fans							1 * 10 =		10.0000	(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)+(7a)+(7b)+(7c) =	10.0000 / (5) =	0.1173	(8)
Pressure test		No	
Measured/design AP50		15.0000	
Infiltration rate		0.8673	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6722	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.4000	4.1000	4.1000	3.9000	3.9000	3.4000	3.4000	3.3000	3.4000	3.8000	3.7000	4.0000	(22)
Wind factor	1.1000	1.0250	1.0250	0.9750	0.9750	0.8500	0.8500	0.8250	0.8500	0.9500	0.9250	1.0000	(22a)
Adj infilt rate	0.7394	0.6890	0.6890	0.6554	0.6554	0.5713	0.5713	0.5545	0.5713	0.6386	0.6218	0.6722	(22b)
Effective ac	0.7733	0.7373	0.7373	0.7148	0.7148	0.6632	0.6632	0.6538	0.6632	0.7039	0.6933	0.7259	(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	
W-1.6 (Uw = 1.60)			6.4000	1.5038	9.6241			(27)
Original wall	25.4700	6.4000	19.0700	0.3000	5.7210			(29a)
Ceiling	35.3700		35.3700	0.1600	5.6592			(30)
Total net area of external elements Aum(A, m2)			60.8400					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	21.0043			(33)
Party Wall old			41.2100	0.0000	0.0000			(32)
Party Floor			45.9900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.150 * total exposed area)	9.1260	(36)
Total fabric heat loss (33) + (36) =	30.1303	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	21.7540	20.7412	20.7412	20.1058	20.1058	18.6561	18.6561	18.3900	18.6561	19.8000	19.5021	20.4195	(38)
Heat transfer coeff	51.8843	50.8715	50.8715	50.2360	50.2360	48.7864	48.7864	48.5203	48.7864	49.9302	49.6323	50.5498	(39)
Average = Sum(39)m / 12 =												49.9243	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4669	1.4383	1.4383	1.4203	1.4203	1.3793	1.3793	1.3718	1.3793	1.4117	1.4032	1.4292	(40)
HLP (average)												1.4115	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.2895	(42)
Average daily hot water use (litres/day)	64.8244	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	71.3069	68.7139	66.1209	63.5280	60.9350	58.3420	58.3420	60.9350	63.5280	66.1209	68.7139	71.3069	(44)
Energy conte	105.7461	92.4862	95.4374	83.2047	79.8369	68.8931	63.8396	73.2569	74.1318	86.3935	94.3053	102.4094	(45)
Energy content (annual)										Total = Sum(45)m =		1019.9409	(45)
Distribution loss (46)m = 0.15 x (45)m	15.8619	13.8729	14.3156	12.4807	11.9755	10.3340	9.5759	10.9885	11.1198	12.9590	14.1458	15.3614	(46)
Water storage loss:													
Total storage 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	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Combi loss	43.2019	39.0097	43.1712	41.7580	43.1351	41.7264	43.1065	43.1250	41.7436	43.1562	41.7879	43.1960	(61)
Total heat required for water heating calculated for each month													
	148.9480	131.4959	138.6086	124.9627	122.9719	110.6195	106.9462	116.3819	115.8755	129.5497	136.0932	145.6054	(62)
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	(63)
Solar input (sum of months) = Sum(63)m =												0.0000	(63)
Output from w/h													
	148.9480	131.4959	138.6086	124.9627	122.9719	110.6195	106.9462	116.3819	115.8755	129.5497	136.0932	145.6054	(64)
Total per year (kWh/year) = Sum(64)m =												1528.0586	(64)
Heat gains from water heating, kWh/month													
	45.9610	40.5041	42.5257	38.1051	37.3295	33.3386	32.0033	35.1392	35.0847	39.5149	41.8035	44.8501	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	77.3670	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	25.0397	22.2400	18.0868	13.6929	10.2356	8.6413	9.3372	12.1369	16.2901	20.6840	24.1413	25.7356	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	164.3130	166.0181	161.7214	152.5743	141.0276	130.1755	122.9255	121.2205	125.5172	134.6643	146.2109	157.0631	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	44.0262	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	-51.5780	(71)
Water heating gains (Table 5)													
	61.7756	60.2739	57.1583	52.9237	50.1741	46.3036	43.0152	47.2301	48.7288	53.1114	58.0604	60.2824	(72)
Total internal gains													
	323.9434	321.3472	309.7816	292.0060	274.2525	257.9355	248.0931	253.4026	263.3512	281.2749	301.2278	315.8963	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
North	6.4000	12.7500	0.6300	0.7000	0.7700	24.9380	(74)

Solar gains	24.9380	42.0553	71.7709	117.6692	154.2673	174.3860	161.3435	130.7596	92.2783	53.9917	30.3918	20.8528	(83)
Total gains	348.8814	363.4025	381.5525	409.6752	428.5198	432.3215	409.4367	384.1622	355.6296	335.2666	331.6196	336.7491	(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	47.3409	48.2834	48.2834	48.8942	48.8942	50.3470	50.3470	50.6232	50.3470	49.1937	49.4889	48.5907	
alpha	4.1561	4.2189	4.2189	4.2596	4.2596	4.3565	4.3565	4.3749	4.3565	4.2796	4.2993	4.2394	
util living area													
	0.9844	0.9791	0.9628	0.9154	0.7986	0.5798	0.4004	0.4467	0.7422	0.9233	0.9728	0.9860	(86)
MIT	19.7651	19.9084	20.1685	20.5125	20.8109	20.9674	20.9951	20.9922	20.9018	20.5697	20.1560	19.7825	(87)
Th 2	19.7124	19.7341	19.7341	19.7478	19.7478	19.7792	19.7792	19.7850	19.7792	19.7544	19.7609	19.7410	(88)
util rest of house													
	0.9791	0.9721	0.9493	0.8838	0.7257	0.4620	0.2591	0.3001	0.6358	0.8874	0.9622	0.9812	(89)
MIT 2	18.6407	18.7985	19.0522	19.3867	19.6388	19.7686	19.7787	19.7839	19.7364	19.4513	19.0639	18.6804	(90)
Living area fraction									fLA = Living area / (4) =			0.8089	(91)
MIT	19.5502	19.6963	19.9551	20.2973	20.5869	20.7383	20.7626	20.7612	20.6791	20.3559	19.9472	19.5719	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.5502	19.6963	19.9551	20.2973	20.5869	20.7383	20.7626	20.7612	20.6791	20.3559	19.9472	19.5719	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9783	0.9718	0.9521	0.8990	0.7768	0.5559	0.3735	0.4187	0.7171	0.9066	0.9640	0.9805	(94)
Useful gains	341.3269	353.1586	363.2585	368.3145	332.8938	240.3150	152.9139	160.8548	255.0219	303.9644	319.6964	330.1759	(95)
Ext temp.	4.9000	5.5000	7.3000	9.7000	12.7000	15.6000	17.6000	17.4000	14.8000	11.4000	7.8000	4.9000	(96)
Heat loss rate W													
	760.1163	722.1854	643.7863	532.3677	396.2056	250.6782	154.2904	163.0882	286.8195	447.1717	602.8963	741.6601	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	311.5793	247.9861	208.7127	118.1183	47.1040	0.0000	0.0000	0.0000	0.0000	106.5462	203.9039	306.1443	(98)
Space heating												1550.0947	(98)
Space heating per m2											(98) / (4) =	43.8251	(99)

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	90.5000	(206)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)
Space heating requirement	1712.8118	(211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	311.5793	247.9861	208.7127	118.1183	47.1040	0.0000	0.0000	0.0000	0.0000	106.5462	203.9039	306.1443	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	344.2865	274.0178	230.6218	130.5174	52.0486	0.0000	0.0000	0.0000	0.0000	117.7306	225.3082	338.2810	(211)
Water heating 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	(215)
Water heating													
Water heating requirement	148.9480	131.4959	138.6086	124.9627	122.9719	110.6195	106.9462	116.3819	115.8755	129.5497	136.0932	145.6054	(64)
Efficiency of water heater												87.3000	(216)
(217)m	89.4397	89.3649	89.1952	88.8262	88.1634	87.3000	87.3000	87.3000	87.3000	88.7156	89.1914	89.4433	(217)
Fuel for water heating, kWh/month	166.5346	147.1449	155.3992	140.6823	139.4819	126.7119	122.5042	133.3126	132.7325	146.0281	152.5856	162.7908	(219)
Water heating fuel used												1725.9085	(219)

Annual totals kWh/year		
Space heating fuel - main system	1712.8118	(211)
Space heating fuel - secondary	0.0000	(215)
Electricity for pumps and fans:		
central heating pump	30.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	75.0000	(231)
Electricity for lighting (calculated in Appendix L)	176.8833	(232)
Total delivered energy for all uses	3690.6036	(238)

10a. Fuel costs - using BEDF prices (473)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1712.8118	3.8700	66.2858	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1725.9085	3.8700	66.7927	(247)
Pumps and fans for heating	75.0000	18.9000	14.1750	(249)
Energy for lighting	176.8833	18.9000	33.4309	(250)
Additional standing charges			93.0000	(251)
Total energy cost			273.6844	(255)

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	1712.8118	0.2160	369.9674	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1725.9085	0.2160	372.7962	(264)
Space and water heating			742.7636	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	176.8833	0.5190	91.8024	(268)
Total kg/year			873.4910	(272)

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	1712.8118	1.2200	2089.6304	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1725.9085	1.2200	2105.6084	(264)
Space and water heating			4195.2388	(265)
Pumps and fans	75.0000	3.0700	230.2500	(267)
Energy for lighting	176.8833	3.0700	543.0318	(268)
Primary energy kWh/year			4968.5206	(272)
Primary energy kWh/m2/year			140.4727	(273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating:	C 79
Current environmental impact rating:	B 84

(For testing purposes):

A	Not considered
B	Not considered
C	Not considered
D	Not considered
E Low energy lighting	Already installed
F	Not considered
G	Not considered

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

H		Not considered
I		Not considered
J		Not considered
K		Not considered
M		Not considered
N	Solar water heating	Not applicable
O		Not considered
P		Not considered
R		Not considered
S		Not considered
T		Not considered
U	Solar photovoltaic panels	Not applicable
A2		Not considered
A3		Not considered
T2		Not considered
W		Not considered
X		Not considered
Y		Not considered
J2		Not considered
Q2		Not considered
Z1		Not considered
Z2		Not considered
Z3		Not considered
Z4		Not considered
Z5		Not considered
V2	Wind turbine	Not applicable
L2		Not considered
Q3		Not considered
O3		Not considered

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings		Energy efficiency	Environmental impact
Recommended measures				
(none)				
Total Savings	£0	0.00 kg/m²		

Potential energy efficiency rating: C 79
Potential environmental impact rating: B 84

Fuel prices for cost data on this page from database revision number 473 TEST (26 Feb 2021)
Recommendation texts revision number 4.9c (22 Feb 2014)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current	Potential	Saving
Electricity	£48	£48	£0
Mains gas	£226	£226	£0
Space heating	£173	£173	£0
Water heating	£67	£67	£0
Lighting	£33	£33	£0
Total cost of fuels	£274	£274	£0
Total cost of uses	£273	£273	£0
Delivered energy	104 kWh/m²	104 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.9 tonnes	0.9 tonnes	0.0 tonnes
CO2 emissions per m²	25 kg/m²	25 kg/m²	0 kg/m²
Primary energy	140 kWh/m²	140 kWh/m²	0 kWh/m²

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

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SAP 2012 WORKSHEET FOR Conversion (As Built)   (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING      09 Jan 2014
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No improvements selected / applicable


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SAP 2012 WORKSHEET FOR Conversion (As Built)   (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING      09 Jan 2014
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No improvements selected / applicable
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