Project InformationBuilding type Detached house

Reference Date

Project

Type A Oaklands Drive Almondsbury BS32 4AB

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	54.00	2.35	126.90	(3a)
First floor	54.00	2.65	143.10	(3b)
	108.00			(4)
			270.00	(5)

2. Ventilation rate

											m³ per ho	our
							main + s heating	eondary	y + othe	r	•	
	er of chim						0 + 0 + 0		40		0.00	(6a)
	er of ope						0 + 0 + 0		20		0.00	(6b)
		mittent f					4		(10		40.00	(7a)
		sive vent					0		(10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	×	40		0.00	(7c)
											Air chang	ges per hour
											0.15	(8)
Pressu	ıre test, r	esult q50)						7.00			(17)
Air per	meability	•									0.50	(18)
											2.00	(19)
											0.85	(20)
		ncorpora modified									0.42	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\											52.50	(22)
Wind F	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13		(22.)
Adjuste	ed infiltra	tion rate	(allowing	for she	Iter and v	wind spe	ed)				13.13	(22a)
0.54	0.53	0.52	0.47	0.46	0.40	0.40	0.39	0.42	0.46	0.48	0.50	
									1		5.56	(22b)
		ural vent ange rate		ntermitte	nt extrac	t fans						
0.65	0.64	0.63	0.61	0.60	0.58	0.58	0.58	0.59	0.60	0.61	0.62	(25)
											1	

3. Heat losses and l	heat loss paramete	r					
Element Gro	- 1	Net area	U-value	AxU	kappa-value	e A x K	
	a, m² m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	t)						
dg							
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	t)						
dg							
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	t)						
dg							(a=)
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	t)						
dg		4.040	4.4.7.4.00\	4.04			(07)
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (NorthEast)							
dg	d	4 040	4.45 (4.00)	4.04			(07)
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (NorthEast)							
dg Window - Double-gla	270d	1.610	4 45 (4 20)	1.84			(27)
argon filled, low-E, E		1.610	1.15 (1.20)	1.04			(27)
soft coat (NorthEast)							
dg							
Solid door		1.890	1.20	2.27			(26)
dg		1.090	1.20	2.21			(20)
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argor	n filled	3.040	1.20	0.00			(20)
low-E, En=0.1, soft c							
(NorthEast)	out						
dg							
Pitched roofs insulate	ed between joists	54.00	0.10	5.40	9.00	486.00	(30)
Walls	22.2300 ,0.010	131.80	0.19	25.04	60.00	7908.00	(29)
Brick and block cav	vitv wall, full fill		50	_5.5.	23.00		(-0)
Ground floors	,,	54.00	0.14	7.56	110.00	5940.00	(28)
			****				()

		g energy	/ require	ements							kWh/year
	d occupa	ancy, iv hot wate	r iisane	in litres r	ner day \	/d avera	ne				2.80 100.75
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		in litres				100	· · · · 9	1000	0 01	1	
		102.77		94.71	90.68	90.68	94.71	98.74	102.77	106.80	110.83
		of hot wa			00.00	00.00	0 1.7 1	00.7 1	102.77	100.00	110.00
		148.33			107.08	99.22	113.86	115.22	134.28	146.57	159.17
Energy	content (annual)			I	l	ı	1	l	ı	1585.25
Distribut	ion loss										
24.65	21.56	22.25	19.40	18.61	16.06	14.88	17.08	17.28	20.14	21.99	23.88
Manufad	volume, cturer's c ature Fa	leclared	cylinder	loss fact	or (kWh		150.00 1.86 0.5400				
•		hot wate	er cylinde	er (kWh/	day)		0.0 100				1.00
Total sto	orage los	ss	•	•	• ,						
31.14	28.12	31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
Net stor	age loss		•			•			•		
31.14	28.12	31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
Primary	loss		•			•			•		
23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26
Total he	at requir	ed for wa	ater heat	ing calcu	ulated for	r each m	onth				
218.76	192.88	202.73	181.97	178.49	159.72	153.62	168.26	167.86	188.68	199.22	213.57
Output f	rom water	er heater	for eacl	n month,	kWh/mo	onth					
218.76	192.88	202.73	181.97	178.49	159.72	153.62	168.26	167.86	188.68	199.22	213.57
Heat na	ins from	water he	eating kl	Nh/mont	· ·h	•	•	•	•	•	2225.75
98.17	87.10	92.84	85.11	84.78	77.72	76.51	81.38	80.43	88.17	90.85	96.44
50.17	07.10	JZ.UT	00.11	07.70	11.12	70.01	01.00	50.45	00.17	30.03	50.44

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5	Interr	าลเกเ	aıne
v.	1111011	iui y	ullis

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabol	ic gains,	Watts	•			•					
168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14
Lighting	gains	•									
68.52	60.86	49.49	37.47	28.01	23.65	25.55	33.21	44.58	56.60	66.06	70.42
Appliances gains											
400.97	405.13	394.65	372.33	344.15	317.67	299.97	295.81	306.30	328.62	356.80	383.28
Cooking gains											
54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62
Pumps a	and fans	gains	,								
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Losses	e.g. evap	oration (negative	values)							
-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09
Water h	eating ga	ains				•					
131.95	129.62	124.79	118.21	113.95	107.94	102.84	109.38	111.70	118.50	126.18	129.63
Total internal gains											
712.10	706.27	679.59	638.67	596.77	559.92	539.02	549.06	573.24	614.38	659.70	693.99

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79		0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

		l tempei									
Tempera Heating s				ds in the	living a	rea, Th1	(°C)				21.00 0.75
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
au		•	•	•			•	•	1	•	
57.36	57.58	57.80	58.85	59.05	60.01	60.01	60.19	59.64	59.05	58.65	58.23
alpha		•				•			•		
4.82	4.84	4.85	4.92	4.94	5.00	5.00	5.01	4.98	4.94	4.91	4.88
Jtilisation	n factor	for gains	for livin	g area	•					•	
0.99	0.99	0.98	0.95	0.86	0.69	0.52	0.57	0.81	0.96	0.99	1.00
Tweekda	ıy	•	•		•		•	1		•	
19.93	20.05	20.25	20.53	20.77	20.90	20.93	20.93	20.84	20.55	20.20	19.91
Tweeken	ıd	•	•	•	•		•	1		•	
20.39	20.46	20.58	20.74	20.87	20.94	20.96	20.96	20.91	20.75	20.55	20.39
24 instea	d of 16	•	•	•			•	1	1	•	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 instea	d of 9	•	•		•	•		1		•	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16 instea	d of 9	•	•		•	•		1		•	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean inte	ernal ter	mperatui	re in livin	g area T	1	•	•	1		•	
20.06	20.16	20.35	20.59	20.79	20.91	20.94	20.93	20.86	20.61	20.29	20.05
Tempera	ture du	ring heat	ing perio	ds in res	t of dwe	lling Th2	2	1		•	
19.91	19.92	19.92	19.94	19.94	19.95	19.95	19.96	19.95	19.94	19.93	19.93
Jtilisation	n factor	for gains	for rest	of dwell	ing			1	1		
0.99	0.99	0.97	0.93	0.81	0.59	0.40	0.45	0.73	0.94	0.99	0.99
Tweekda	ıy	•	•		•	•		1		•	
18.67	18.82	19.09	19.45	19.71	19.85	19.87	19.87	19.80	19.48	19.03	18.66
Tweeken	ıd							1	1		
18.67	18.82	19.09	19.45	19.71	19.85	19.87	19.87	19.80	19.48	19.03	18.66
Mean inte	ernal ter	mperatui	re in the	rest of d	welling T	2		1	1		
18.67	18.82	19.09	19.45	19.71	19.85	19.87	19.87	19.80	19.48	19.03	18.66
_iving are					•	•	•	1		•	0.19
Mean inte					dwelling))					
	19.07	19.32	19.66	19.91	20.05	20.07	20.07	20.00	19.69	19.27	18.92
Apply adj											
18.93	19.07	19.32	19.66	19.91	20.05	20.07	20.07	20.00	19.69	19.27	18.92

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisatio	n factor	for gains	3		•				•		
0.99	0.98	0.97	0.92	0.81	0.60	0.41	0.46	0.74	0.93	0.98	0.99
Useful g	ains										
810.68	884.50	941.87	968.56	892.01	654.71	430.43	451.74	671.08	780.54	775.11	777.56
Monthly average external temperature											
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
Heat los	s rate fo	r mean ii	nternal te	emperati	ire						
1912.50	1845.87	1663.33	1370.84	1043.16	680.88	433.65	457.29	741.91	1154.10	1555.76	1895.95
Fraction	of mont	h for hea	iting								
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space h	eating re	quireme	nt for ea	ch mont	h, kWh/r	nonth					
819.75	646.04	536.77	289.65	112.46	-	-	-	-	277.93	562.07	832.08
	ace heat					ar) (Oct	ober to N	lay)			4076.74
Space h	eating re	equireme	nt per m	² (kWh/r	n²/year)						37.75

8c. Space cooling requirement - not applicable

9a. Energy requirements

ya. Energy requirements kWh/year											ar	
Fraction	of spac	eating sy e heat fro in heating	om main	system((s)				1.0000 89.02%			(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space h	eating re	equireme	ent		1	1	1			1		
819.75	646.04	536.77	289.65	112.46	-	-	-	-	277.93	562.07	832.08	(98)
Appendi	ix Q - mo	nthly en	ergy sav	ed (mair	heating	system	1)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	eating fu	uel (main	heating	system	1)							
210.72	166.07	137.98	74.46	28.91	-	-	-	-	71.44	144.48	213.89	(211)
Appendi	ix Q - mo	onthly en	ergy sav	ed (mair	heating	system	2)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space h	eating fu	uel (main	heating	system	2)		-					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendi	ix Q - mo	nthly en	ergy sav	ed (seco	ndary he	eating sy	stem)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space h	eating fu	uel (seco	ndary)									
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water h Water h		equireme	ent				•					
218.76	192.88	202.73	181.97	178.49	159.72	153.62	168.26	167.86	188.68	199.22	213.57	(64)
Efficience	y of wat	er heate	r		1	1	1	1			295.93	(216)
295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	(217)
Water h	eating fu	iel										
73.92	65.18	68.51	61.49	60.31	53.97	51.91	56.86	56.73	63.76	67.32	72.17	(219)
Annual t		00.51	01.43	00.51	33.31	01.91	30.00	30.73	03.70	07.52	kWh/yea	` ,
		uel used,		stem 1							1047.96	(211)
		uel (seco	ndary)								0.00	١ /
Water h		ıel mps, fan	e and al	octric kov	on hot						752.13	(219)
		or the ab			ер-пос						0.00	(231)
		nting (10)						484.02	` ,
		eneration										
		ated - μC	CHP/heat	pump							0.00	(235)
Appendi Energ		or genera	ated ()·								0.000	(236a)
	y used ()		().								0.000	
Total de	livered e	energy fo	r all uses	3							2284.12	(238)

10a. Fuel costs using Table 12 prices

70a.7 ao. 000.0 aog 7 ao 12 p. 1000	kWh/year	Fuel price	£/year	
	•	p/kWh	,	
Space heating - main system 1	1047.959	13.190	138.23	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
High-rate percentage	100.000%			(243)
Low-rate percentage	0.000%			(244)
High-rate cost	752.13	13.190	99.21	(245)
Low-rate	0.00	13.190	0.00	(246)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	0.000	13.190	0.00	(249)
Energy for lighting	484.022	13.190	63.84	(250)
Additional standing charges			0.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			301.27	(255)
44 040 4				
11a. SAP rating			0.40	(050)
			0.42	(256)
CAD value			0.83	(257)
SAP value			88.46	(250)
CAD hand			88	(258)
SAP band			В	

12a. Carbon dioxide emissions

	Energy	Emission factor	Emission	S
	kWh/year	kg CO2/kWh	kg CO2/ye	ear
Space heating, main system 1	1047.96	0.519	543.89	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	752.13	0.519	390.36	(264)
Space and water heating			934.25	(265)
Electricity for pumps and fans	0.00	0.519	0.00	(267)
Electricity for lighting	484.02	0.519	251.21	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - µCHP	0.00	0.519	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1185.46	(272)
			kg/m²/yea	ır
CO2 emissions per m ²			10.98	(273)
El value			89.62	(273a)
El rating			90	(274)
El band			В	

Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

 $(13.19 / 3.8902) \times (1 + (0.29 \times 0.25)) = 3.6364$, stars = 5 $(0.5190 / 3.8902) \times (1 + (0.29 \times 0.25)) = 0.1431$, stars = 5 13.19 / 2.9593 = 4.4572, stars = 4 $0.52 / + (0.00 \times 0.52) = 0.1754$, stars = 5

Project Information

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 worksheet for New dwelling as designed - calculation of dwelling emissions

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	54.00	2.35	126.90	(3a)
First floor	54.00	2.65	143.10	(3b)
	108.00			(4)
			270.00	(5)

2. Ventilation rate

											m³ per ho	ur
							main + s heating	eondar	y + othe	er		
Numbe	r of chim	neys					0 + 0 + 0)	< 40		0.00	(6a)
Numbe	r of oper	ı flues					0 + 0 + 0)	¢ 20		0.00	(6b)
Numbe	r of inter	mittent fa	ans				4)	< 10		40.00	(7a)
	r of pass						0		< 10		0.00	(7b)
Numbe	r of fluele	ess gas f	fires				0)	< 40		0.00	(7c)
											Air chang	jes per hour
											0.15	(8)
Pressu	re test, re	esult q50)						5.00			(17)
Air perr	meability										0.50	(18)
											2.00	(19)
											0.85	(20)
	on rate in on rate n										0.42	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor										52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
	-1	1	1		I			1			13.13	(22a)
Adjuste	ed infiltrat		(allowing	g for she	Iter and	wind spe	ed)	_				
0.54	0.53	0.52	0.47	0.46	0.40	0.40	0.39	0.42	0.46	0.48	0.50	
					<u> </u>			•	•		5.56	(22b)
	tion : natı ⁄e air cha			ntermitte	nt extrac	t fans						
0.65	0.64	0.63	0.61	0.60	0.58	0.58	0.58	0.59	0.60	0.61	0.62	(25)

3. Heat losses and l	heat loss paramete	r					
Element Gros	- 1	Net area	U-value	AxU	kappa-value	∍АхК	
	a, m² m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (NorthEast))						
dg							
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (NorthEast)							
dg	_						>
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (NorthEast)							
dg							()
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	t)						
dg	1	4.040	4.4.7.4.00\	4.04			(07)
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	t)						
dg	J	4 040	4.45 (4.00)	4.04			(07)
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	ι)						
dg Window Double dla	70d	4 640	4 45 (4 20)	1 0 1			(27)
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest dg	i)						
Solid door		1.890	1.20	2.27			(26)
dg		1.090	1.20	2.21			(20)
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argor	n filled	3.040	1.20	0.00			(20)
low-E, En=0.1, soft c							
(NorthEast)	oat						
dg							
Pitched roofs insulate	ed between joists	54.00	0.10	5.40	9.00	486.00	(30)
Walls	54 20th 0011 joi0t0	131.80	0.19	25.04	60.00	7908.00	(29)
Brick and block cav	ity wall, full fill	.07.00	0.10	_5.5 .	00.00	. 000.00	(=0)
Ground floors	,,	54.00	0.14	7.56	110.00	5940.00	(28)
		2	÷	00	5.00	30.3.00	(-0)

100.75 1		r heating		/ require	ements							kWh/year 2.80
tot water usage in litres per day for each month 110.83 106.80 102.77 98.74 94.71 90.68 90.68 94.71 98.74 102.77 106.80 110.83 110.83 106.80 102.77 98.74 94.71 90.68 90.68 94.71 98.74 102.77 106.80 110.83 110.83 106.80 102.77 98.74 94.71 90.68 90.68 94.71 98.74 102.77 106.80 110.83 110.83 106.80 102.77 98.74 94.71 90.68 90.68 94.71 98.74 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 106.80 102.77 106.80 110.83 110.83 102.77 106.80 110.83 110.83 102.77 106.80 110.83 110.83 102.77 106.80 110.83 110.83 102.77 106.80 110.83 110.83 102.77 106.80 110.80 110.83 102.77 106.80 110.80 110.83 102.77 106.80 110.80 110.83 102.77 106.80 110.80 110.83 102.77 106.80 110.80 110.83 102.77 106.80 110.80 110.83 102.77 106.80 110.80 110.83 102.77 106.80 102.77 106.80 110.80 102.77 106.80 102.77 106.80 110.80 102.77 106.80 102.77 106.80 110.80 102.77 102.80 102.77 102.80 110.80 102.80 102.77 102.80 102.77 102.80 110.80 102.80 102.77 102.80 102.77 102.80 110.80 102.80 102.80 102.77 102.80 102.77 102.80 110.80 102.80 102.80 102.77 102.80 102.77 102.80 110.80 102.80 102.80 102.77 102.80 102.77 102.80 102.77 102.80 102.77 110.80 102.80 102.80 102.77 102.80 102.77 102.80 102.77 102				r usage i	in litres p	er day ∖	/d,avera	ge				
110.83 106.80 102.77 98.74 94.71 90.68 90.68 94.71 98.74 102.77 106.80 110.83 106.80 102.77 98.74 94.71 90.68 90.68 94.71 98.74 102.77 106.80 110.83 106.80 148.35 148.33 129.32 124.09 107.08 99.22 113.86 115.22 134.28 146.57 159.17 1585.25 15	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content of hot water used 164.36	Hot water	er usage	in litres	per day 1	or each	month		1			•	
164.36 143.75 148.33 129.32 124.09 107.08 99.22 113.86 115.22 134.28 146.57 159.17	110.83	106.80	102.77	98.74	94.71	90.68	90.68	94.71	98.74	102.77	106.80	110.83
1585.25 1585	Energy	content o	of hot wa	ter used				•				<u>. </u>
Distribution loss 24.65 21.56 22.25 19.40 18.61 16.06 14.88 17.08 17.28 20.14 21.99 23.88 23.14 23.14 23.14 23.14 23.14 23.14 23.14 23.14 23.14 23.14 23.14 23.14 23.14 23.1	164.36	143.75	148.33	129.32	124.09	107.08	99.22	113.86	115.22	134.28	146.57	159.17
Cylinder volume, I			annual)									1585.25
Manufacturer's declared cylinder loss factor (kWh/day) 1.86 (emperature Factor 0.5400 (emperature Factor 0.5400 (emperature Factor 1.00 (emperature fa	24.65	21.56	22.25	19.40	18.61	16.06	14.88	17.08	17.28	20.14	21.99	23.88
Temperature Factor	,			•	•							
1.00 total storage loss 31.14 28.12 31.14 30.13 31.14				cylinder	loss fact	or (kWh						
Total storage loss 31.14 28.12 31.14 30.13 31.14 30	•			ar avlinda	sr /lc\A/b/	day)		0.5400				1.00
Net storage loss 31.14 28.12 31.14 30.13				er cylinae	er (KVVII/	uay)						1.00
31.14 28.12 31.14 30.13	31.14	28.12	31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
Primary loss 23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 Total heat required for water heating calculated for each month 218.76 192.88 202.73 181.97 178.49 159.72 153.62 168.26 167.86 188.68 199.22 213.57 Output from water heater for each month, kWh/month 218.76 192.88 202.73 181.97 178.49 159.72 153.62 168.26 167.86 188.68 199.22 213.57 2225.75 Heat gains from water heating, kWh/month	Net stor	age loss		•	•	•	•			•	•	
23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 23.26 23.26 23.26 23.26 23.26 23.26 23.26 23.26 23.26 23.26	31.14	28.12	31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
Total heat required for water heating calculated for each month 218.76 192.88 202.73 181.97 178.49 159.72 153.62 168.26 167.86 188.68 199.22 213.57 Output from water heater for each month, kWh/month 218.76 192.88 202.73 181.97 178.49 159.72 153.62 168.26 167.86 188.68 199.22 213.57 2225.75 Heat gains from water heating, kWh/month	Primary	loss		•		•		•		•	•	
218.76 192.88 202.73 181.97 178.49 159.72 153.62 168.26 167.86 188.68 199.22 213.57 Output from water heater for each month, kWh/month 218.76 192.88 202.73 181.97 178.49 159.72 153.62 168.26 167.86 188.68 199.22 213.57 2225.75 Heat gains from water heating, kWh/month	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26
Output from water heater for each month, kWh/month 218.76 192.88 202.73 181.97 178.49 159.72 153.62 168.26 167.86 188.68 199.22 213.57 2225.75 Heat gains from water heating, kWh/month	Total he	at requir	ed for wa	ater heat	ing calcu	lated fo	r each m	onth				
218.76 192.88 202.73 181.97 178.49 159.72 153.62 168.26 167.86 188.68 199.22 213.57 2225.75 leat gains from water heating, kWh/month	218.76	192.88	202.73	181.97	178.49	159.72	153.62	168.26	167.86	188.68	199.22	213.57
2225.75 leat gains from water heating, kWh/month	Output from water heater for each month, kWh/month											
leat gains from water heating, kWh/month	218.76	192.88	202.73	181.97	178.49	159.72	153.62	168.26	167.86	188.68	199.22	213.57
09 17 97 10 02 94 95 11 94 79 77 72 76 51 91 29 90 42 99 17 00 95 06 44	Heat ga	ins from	water he	eating, k\	Vh/mont	:h	1			I	ı	2225.75
90.17 07.10 92.04 03.11 04.70 77.72 70.31 01.30 00.43 00.17 90.03 90.44	98.17	87.10	92.84	85.11	84.78	77.72	76.51	81.38	80.43	88.17	90.85	96.44

_		
_	Intorna	il anınc
IJ.	IIILEI II a	ıl gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabol	ic gains,	Watts				•					
140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11
Lighting	gains										
27.41	24.34	19.80	14.99	11.20	9.46	10.22	13.28	17.83	22.64	26.42	28.17
Appliances gains											
268.65	271.44	264.41	249.46	230.58	212.84	200.98	198.19	205.22	220.18	239.05	256.80
Cooking gains											
37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01
Pumps a	and fans	gains					,				
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Losses	e.g. evap	oration (negative	values)		•					
-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09
Water h	eating ga	ains		•							
131.95	129.62	124.79	118.21	113.95	107.94	102.84	109.38	111.70	118.50	126.18	129.63
Total internal gains											
493.04	490.43	474.03	447.69	420.77	395.27	379.07	385.89	399.79	426.35	456.69	479.63
	•	•	•	-		•	•		-		

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28		0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

	n interna										
	rature du g system			ods in the	e living a	rea, Th1	(°C)				21.00 0.75
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau		1	1		1	1	1	1	1	1	
57.36	57.58	57.80	58.85	59.05	60.01	60.01	60.19	59.64	59.05	58.65	58.23
alpha									•		
4.82	4.84	4.85	4.92	4.94	5.00	5.00	5.01	4.98	4.94	4.91	4.88
Utilisati	ion factor	for gain	s for livin	ig area	•	•	•	•	•		
1.00	1.00	0.99	0.97	0.91	0.77	0.60	0.67	0.89	0.98	1.00	1.00
Tweek	day										
19.77	19.89	20.11	20.42	20.69	20.87	20.92	20.91	20.78	20.43	20.05	19.76
Tweek	end										
20.30	20.37	20.50	20.67	20.83	20.93	20.96	20.95	20.88	20.68	20.46	20.30
24 inste	ead of 16										
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 inste	ead of 9										
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16 inste	ead of 9								•		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean iı	nternal te	mperatu	re in livir	ng area T	1						
19.92	20.03	20.22	20.48	20.73	20.89	20.93	20.92	20.81	20.50	20.16	19.91
Tempe	rature du	ring hea	ting perio	ds in re	st of dwe	iling Th2	<u> </u>		•		
19.91	19.92	19.92	19.94	19.94	19.95	19.95	19.96	19.95	19.94	19.93	19.93
Utilisati	ion factor	for gain	s for rest	of dwell	ing						
1.00	1.00	0.99	0.96	0.88	0.68	0.47	0.53	0.83	0.98	1.00	1.00
Tweek	day						-		_		
18.47	18.63	18.91	19.31	19.64	19.83	19.87	19.87	19.75	19.33	18.85	18.46
Tweek	end								_		
18.47	18.63	18.91	19.31	19.64	19.83	19.87	19.87	19.75	19.33	18.85	18.46
Mean ii	nternal te	mperatu	re in the	rest of d	welling 7	Γ2					
18.47	18.63	18.91	19.31	19.64	19.83	19.87	19.87	19.75	19.33	18.85	18.46
	area fract										0.19
	nternal te					<u> </u>	T		1		
18.74	18.89	19.15	19.53	19.84	20.03	20.07	20.06	19.95	19.55	19.09	18.73
	adjustmer							_	1		
18.74	18.89	19.15	19.53	19.84	20.03	20.07	20.06	19.95	19.55	19.09	18.73

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisatio	n factor	for gains	5		•	•	•		•			
1.00	0.99	0.99	0.96	0.87	0.69	0.49	0.55	0.83	0.97	0.99	1.00	
Useful gains												
597.87	679.34	757.28	825.43	811.60	632.44	426.72	444.94	611.97	629.40	583.02	568.21	
Monthly average external temperature												
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20	
Heat los	s rate fo	r mean i	nternal te	emperati	ire				•			
1887.58	1821.82	1641.62	1354.11	1033.98	678.46	433.23	456.53	735.29	1136.53	1533.53	1871.76	
Fraction	of mont	h for hea	iting									
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	
Space h	eating re	quireme	nt for ea	ch mont	h, kWh/r	nonth	•		•			
959.55	767.74	657.94	380.65	165.45	-	-	-	-	377.30	684.36	969.84	
	ace heat					ar) (Oct	ober to N	lay)	•		4962.84	
Space h	eating re	equireme	ent per m	² (kWh/r	n²/year)						45.95	(

8c. Space cooling requirement - not applicable

9a. Energy requirements

		un emem									kWh/year	
Fraction	of spac	eating sy e heat fro in heating	om main	system((s)				1.0000 39.02%			(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space h	eating re	equireme	nt	l								
959.55	767.74	657.94	380.65	165.45	-	-	-	-	377.30	684.36	969.84	(98)
Appendi	ix Q - mo	onthly en	ergy sav	ed (mair	heating	system	1)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	eating fu	uel (main	heating	system	1)							
246.66	197.35	169.13	97.85	42.53	-	-	-	-	96.99	175.92	249.31	(211)
Appendi	ix Q - mo	onthly en	ergy sav	ed (mair	heating	system	2)	ı				
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space h	eating fu	uel (main	heating	system	2)		1	ı				
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendi	ix Q - mo	onthly en	ergy sav	ed (seco	ndary he	eating sy	stem)	ı				
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space h	eating fu	iel (seco	ndary)		•		•					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water h												
		equireme										
218.76		202.73	181.97	178.49	159.72	153.62	168.26	167.86	188.68	199.22	213.57	(64)
		er heate						1			295.93	(216)
		295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	(217)
Water h					_			1				
73.92	65.18	68.51	61.49	60.31	53.97	51.91	56.86	56.73	63.76	67.32	72.17	(219)
Annual t	totals										kWh/year	
		uel used,		stem 1							1275.74	(211)
		uel (seco	ndary)								0.00	(215)
Water h			a and ala	otrio ko	on hat						752.13	(219)
		mps, fan or the ab			ер-пос						0.00	(231)
		nting (10)						484.02	(232)
Energy	saving/g	eneratior	n technol	ogies								, ,
		ated - µC	HP/heat	pump							0.00	(235)
Appendi		or gener	ated ():								0.000	(236a)
	y saved y used ()		aicu ().								0.000	(237a)
Total de	livered e	energy fo	r all uses	5							2511.90	(238)

10a. Does not apply

11a. Does not apply

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions	_
Space heating, main system 1	1275.74	0.519	662.11	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	752.13	0.519	390.36	(264)
Space and water heating			1052.47	(265)
Electricity for pumps and fans	0.00	0.519	0.00	(267)
Electricity for lighting	484.02	0.519	251.21	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - μCHP	0.00	0.519	0.00	(269)
Appendix Q -				, ,
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1303.67	(272)
			kg/m²/yea	r
Dwelling Carbon Dioxide Emission Rate (DER)			12.07	(273)

Project Information

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury BS32 4AB

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.05.063, printed on 02/06/2022 at 06:57:50

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate
Dwelling Carbon Dioxide Emission Rate

TER = 26.36 DER = 12.07 OK

OK

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)
Dwelling Fabric Energy Efficiency (DFEE)

TFEE = 58.3 DFEE = 51.1

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element Highest <u>Average</u> Wall OK 0.19 (max. 0.30) 0.19 (max. 0.70) Floor 0.14 (max. 0.25) 0.14 (max. 0.70) OK 0.10 (max. 0.20) Roof 0.10 (max. 0.35) OK Openings 1.20 (max. 2.00) 1.20 (max. 3.30) OK

3 Air permeability

Air permeability at 50 pascals: 5.00 Maximum: 10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric

Mitsubishi Electric Ecodan 6.0 kW

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls 2207 Time and temperature zone control OK

Hot water controls No cylinder

Boiler Interlock No OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Severn Valley):

OK

Not significant

OK

Based on:

Thermal mass parameter: 250.00

Overshading: Average or unknown (20-60 % sky blocked)

Orientation : SouthWest

Ventilation rate: 8.00

Blinds/curtains:

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Pitched roofs insulated between joists U-value 0.10 W/m²K

Project Information

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 06:57 AM

Type A ASHP

Type A

Oaklands Drive Almondsbury BS32 4AB

Located in: England
Region: Severn Valley
Postcode: BS32 4AB

UPRN:

Date of assessment: 2022-06-01 Date of certificate: 2022-06-02

Assessment type: New dwelling as designed

Tenure: Unknown
Transaction type: New dwelling
Related party disclosure: No related party

PCDF revision number: 495

Property description

Dwelling type: Detached house

Ground floor (1) area = 54.00m² storey height = 2.35m storey height = 2.65m storey height = 2.65m

Living area: 20.00 (fraction 0.185)

Front of dwelling faces: SouthWest

Doors

Solid door area = 1.89 U = 1.20

Full glazed door area = 5.04 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Windows

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Page 22 of 26

Project InformationBuilding type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 06:57 AM

Type A ASHP

Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Rooflights			
Opaque Elements Roofs Walls Ground floors	area = 54.00 area = 131.80 area = 54.00	U = 0.10, k = 9.0 U = 0.19, k = 60.0 U = 0.14, k = 110.0	Brick and block cavity wall, full fill
Thermal bridges: E10 Eaves (insulation at ceiling level) [A]	Htb = 14.00 0.060	0.060	14.100
E12 Gable (insulation at ceiling level) [A]	0.240	0.240	23.900
E16 Corner (normal) [A]	0.090	0.090	27.400
E17 Corner (inverted – internal area greater than external area) [A]	-0.090	-0.090	5.000
E2 Other lintels (including other steel lintels) [A] Openings lintels	0.300	0.300	21.850
E3 Sill [A] Openings sills	0.040	0.040	21.850
E4 Jamb [A] Openings jambs	0.050	0.050	43.500
E5 Ground floor (normal) [A]	0.160	0.160	38.900
E6 Intermediate floor within a dwelling [A]	0.070	0.070	38.900

Project Information

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 06:57 AM

Type A ASHP

Thermal mass: User defined - 250.00

Pressure test: Yes (q50 - 5.00): measured in this dwelling: No Ventilation: Natural ventilation with intermittent extract fans

Number of chimneys: 0 Number of open flues: 0 Number of intermittent 4

fans:

Number of passive stacks: 0 Number of sides sheltered: 2.00 Measured/design q50: 5.00

Main heating system: Central heating systems with radiators or underfloor heating

Heat pumps

Electric Air source heat pump with flow temperature <= 35°C

Index: 104634

Mitsubishi Electric Ecodan 6.0 kW PUZ-WM60VAA

Underfloor, pipes in screed above insulation

Pump in heated space: No

Boiler has load or weather compensator: Yes

Boiler Interlock: No

Design flow temperature: Unknown Central heating pump 2013 or later

Not MCS Approved Installer

Standard tariff

Main heating controls: 2207 Time and temperature zone control

Boiler has load

compensator:

No

Boiler has weather

compensator:

Boiler has emhanced load N

No

Yes

compensator:

Boiler interlock: No

Secondary heating system: None

Water heating: MicroCHP or Heat Pump

Manufacturer's declared cylinder loss factor (kWh/day) 1.86

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Project Information

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 06:57 AM

Type A ASHP

Cylinder volume: 150.00 Insulation type: Factory Insulation thickness: -1.00 Cylinder heater: n/a

Cylinder in heated space: Yes

Insulated primary: Yes Cylinder thermostat: Yes

Separate timer for domestic hot water: Yes

Solar panel: no

Water use <= 125 Yes

litres/person/day:

Low energy lights: 100.0% of fixed lighting outlets

Total fixed lighting outlets: 30

Electricity tariff: Standard tariff
Photovoltaics 1: Peak kW: 0.00
Photovoltaics 2: Peak kW: 0.00
Photovoltaics 3: Peak kW: 0.00

Conservatory: No Fixed air conditioning: No

Smoke Control Area: Not specified Additional allowable electricity generation:

0.00kg/m²/year

Predicted Energy Assessment

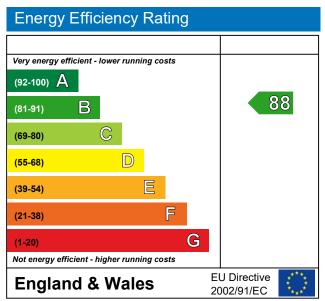
Type A Oaklands Drive Almondsbury BS32 4AB Dwelling type: Detached house
Date of assessment: 2 June 2022
Dradical day: Complete Foreign

Produced by Complete Energy Consultancy Ltd

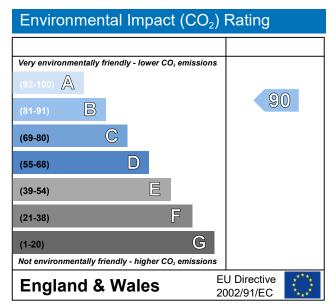
Total floor area: 108 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Project InformationBuilding type Detached house

Reference Date

Project

Type A Oaklands Drive Almondsbury BS32 4AB

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	54.00	2.35	126.90	(3a)
First floor	54.00	2.65	143.10	(3b)
	108.00			(4)
			270.00	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondary	/ + othe	r		
	er of chin						0 + 0 + 0		40		0.00	(6a)
	er of ope						0 + 0 + 0		20		0.00	(6b)
		mittent f					4		: 10		40.00	(7a)
		sive vent					0		: 10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	×	40		0.00	(7c)
											Air chan	ges per hour
											0.15	(8)
Pressu	ıre test, r	esult q50)						7.00			(17)
Air per	meability	•									0.50	(18)
											2.00	(19)
											0.85	(20)
		ncorpora modified									0.42	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor	•	•		•					•	52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
						-					13.13	(22a)
Adjuste	ed infiltra	tion rate	(allowing	g for she	Iter and v	wind spe	eed)					
0.54	0.53	0.52	0.47	0.46	0.40	0.40	0.39	0.42	0.46	0.48	0.50	
						_					5.56	(22b)
		ural vent ange rate		ntermitte	nt extrac	t fans						
0.65	0.64	0.63	0.61	0.60	0.58	0.58	0.58	0.59	0.60	0.61	0.62	(25)
					-			1	-		-	

3. Heat losses and h	eat loss paramete	r					
Element Gros		Net area	U-value	AxU	kappa-value	e A x K	
area,	•	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En	n=0.1,						
soft coat (NorthEast)							
dg							
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En	า=0.1,						
soft coat (NorthEast)							
dg							
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En	า=0.1,						
soft coat (NorthEast)							
dg							
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En							
soft coat (SouthWest))						
dg				4.04			(07)
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En							
soft coat (SouthWest))						
dg	1	4.040	4.45.44.00\	4.04			(07)
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En	•						
soft coat (SouthWest))						
dg		4.040	4.45 (4.00)	4.04			(07)
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En							
soft coat (SouthWest))						
dg Solid door		4 000	4.00	2.27			(26)
Solid door		1.890	1.20	2.27			(26)
dg		E 040	4.20	6.05			(26)
Full glazed door -	filled	5.040	1.20	0.03			(26)
Double-glazed, argon low-E, En=0.1, soft co							
(NorthEast)	Jai						
(Norm⊑ast) dg							
Pitched roofs insulate	nd hatwaan inists	54.00	0.10	5.40	9.00	486.00	(30)
Walls	a permeen joists	131.80	0.10	25.04	60.00	7908.00	(29)
Brick and block cavi	ity wall full fill	131.00	0.19	20.04	00.00	1 300.00	(29)
Ground floors	ity wall, full IIII	54.00	0.14	7.56	110.00	5940.00	(28)
Ordana noors		J4.00	U. 1 4	1.50	110.00	5340.00	(20)

	r heating d occupa		require	ements							kWh/year 2.80
			r usage	in litres p	er day ∖	/d,avera	ge				100.75
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot wate	er usage	in litres	per day	or each	month					•	
	106.80			94.71	90.68	90.68	94.71	98.74	102.77	106.80	110.83
Energy o	content o	of hot wa	ter used								
164.36	143.75	148.33	129.32	124.09	107.08	99.22	113.86	115.22	134.28	146.57	159.17
Energy content (annual) 1585.25 Distribution loss											
24.65	21.56	22.25	19.40	18.61	16.06	14.88	17.08	17.28	20.14	21.99	23.88
	ost from orage los 0.00		Wh/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	age loss			0.00	0.00	10.00		0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Primary 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			r each m		00.00		04.07	00.04	04.00	00.54	04.00
24.35	21.97	24.27	23.41	24.12	23.26	23.98	24.07	23.34	24.20	23.51	24.33
			ater heat					400.50	450.40	470.00	400.50
			152.73				137.93	138.56	158.48	170.08	183.50
			for each				107.00	100 50	450.40	170.00	400.50
188.71	165.72	1/2.61	152.73	148.21	130.34	123.21	137.93	138.56	158.48	170.08	
Heat gai	ins from	water he	eating, k\	Wh/mont	:h						1870.08
60.74	53.29	55.39	48.85	47.29	41.42	38.99	43.88	44.15	50.70	54.61	59.01
	1	1				1			1		

_		
_	Intorna	il anınc
IJ.	IIILEI II a	ıl gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabol	ic gains,	Watts				•			•		
168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14
Lighting	gains			•			,				
68.52	60.86	49.49	37.47	28.01	23.65	25.55	33.21	44.58	56.60	66.06	70.42
Applianc	es gains	3									
400.97	405.13	394.65	372.33	344.15	317.67	299.97	295.81	306.30	328.62	356.80	383.28
Cooking	gains					•	•				
54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62
Pumps a	and fans	gains									
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Losses	e.g. evap	oration (negative	values)			,				
-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09
Water h	eating ga	ains				•					
81.64	79.30	74.45	67.85	63.56	57.53	52.40	58.97	61.31	68.14	75.85	79.31
Total int	ernal gai	ns				•	•				
664.79	658.95	632.25	591.31	549.38	512.50	491.59	501.66	525.85	567.02	612.37	646.67
	•	•	•	•		•	•	•	•		

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28		0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

	interna					- . 4	(0. 0)				04.00
	rature du system			ods in the	e living a	rea, Th1	(°C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
au	I GD	IVIAI	Δρι	iviay	Juli	Jui	Aug	Зер	OCI	INOV	Dec
	57.58	57.80	58.85	E0.0E	60.04	60.04	60.19	E0.64	E0.0E	E0 6E	E0 00
57.36	57.58	57.80	56.65	59.05	60.01	60.01	60.19	59.64	59.05	58.65	58.23
alpha	1.04	4.05	1.00	1.04	5.00	5.00	5.04	4.00	1.04	1.04	1.00
4.82	4.84	4.85	4.92	4.94	5.00	5.00	5.01	4.98	4.94	4.91	4.88
	on factor				1	1	1	1	1	1	T 1
1.00	0.99	0.98	0.95	0.87	0.71	0.54	0.60	0.84	0.97	0.99	1.00
	ternal te			<u> </u>					1		
19.78	19.92	20.16	20.50	20.78	20.95	20.99	20.98	20.87	20.52	20.10	19.77
•	ature du										
19.91	19.92	19.92	19.94	19.94	19.95	19.95	19.96	19.95	19.94	19.93	19.93
	on factor	for gains		of dwelli	ing						
0.99	0.99	0.98	0.94	0.83	0.62	0.42	0.47	0.76	0.95	0.99	1.00
Mean in	iternal te	mperatu	re in the	rest of d	welling T	2					
18.31	18.51	18.86	19.35	19.72	19.92	19.95	19.95	19.85	19.39	18.78	18.29
	rea fracti										0.19
	ternal te										
18.58	18.77	19.10	19.56	19.92	20.11	20.14	20.14	20.04	19.60	19.03	18.57
Apply a	djustmen		mean inte		nperatur	e, where	appropr	iate			
18.58	18.77	19.10	19.56	19.92	20.11	20.14	20.14	20.04	19.60	19.03	18.57
e Snac	e heatin	a roaui	romont								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	on factor			iviay	Juli	Jui	Aug	Seh	OCI	INOV	Dec
				0.00	0.62	0.44	0.50	0.77	0.04	0.00	0.00
0.99	0.99	0.97	0.93	0.83	0.63	0.44	0.50	0.77	0.94	0.98	0.99
Useful o		000.54	1004.00	074.00	050.00	400.04	450.04	004.07	744.00	700 70	704.40
	839.61				656.02	438.34	458.61	661.37	744.09	730.70	731.48
	average				14400	10.00	10.10	14440	10.00	I = 40	14.00
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
	ss rate fo			•			T		T	1	T
	31807.03			1043.7	688.45	442.74	466.14	746.55	1142.41	1525.34	41850.27
	of mont										
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
•	neating re					month					
	650.10					-	-	-	296.35	572.14	832.38
	ace heat					ear) (Oct	ober to N	Лау)	•	•	4150.40
3pace l	neating re	equireme	ent per m	ı² (kWh/r	m²/year)						38.43

8c. Space cooling requirement - not applicable

9a. Energy requirements

9a. Energy requirements								kWh/year	
No secondary heating system Fraction of space heat from I Efficiency of main heating sy	nain system	(s)				1.0000 2.90%		•	(202) (206)
Jan Feb Mar Ap	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	•				•				
820.10 650.10 547.61 305	5.62 126.10	-	-	-	-	296.35	572.14	832.38	(98)
Appendix Q - monthly energy	saved (mai	n heating	system	1)	•				
0.00 0.00 0.00 0.0	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space heating fuel (main hea	ting system	1)	1	•	•	•	•		
882.78 699.79 589.46 328	3.97 135.74	-	-	-	-	319.00	615.87	895.99	(211)
Appendix Q - monthly energy	saved (mai	n heating	system	2)	•	•	•		
0.00 0.00 0.00 0.0	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space heating fuel (main hea	ting system	2)	1	•	•	•			
0.00 0.00 0.00 0.0	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - monthly energy	saved (sec	ondary h	eating sy	stem)	•				
0.00 0.00 0.00 0.0	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space heating fuel (seconda	ry)		1	•	•	•	•		
0.00 0.00 0.00 0.0	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water heating									
Water heating requirement									
	2.73 148.21	130.34	123.21	137.93	138.56	158.48	170.08		(64)
Efficiency of water heater								86.60	(216)
89.26 89.21 89.09 88.	77 88.09	86.60	86.60	86.60	86.60	88.72	89.12	89.29	(217)
Water heating fuel									
211.41 185.77 193.75 172	2.05 168.25	150.50	142.27	159.27	160.00	178.63	190.84	205.52	(219)
Annual totals Space heating fuel used, ma Space heating fuel (seconda Water heating fuel	ry)	on hot						kWh/year 4467.60 0.00 2118.27	(211) (215) (219)
boiler with a fan-assisted flue 45.00 (2) Total electricity for the above, kWh/year 75.00 (2)									(230c) (230e) (231) (232)
Energy saved or generated Energy used ():	v							0.000 0.000	(236a) (237a)
Total delivered energy for all	uses							7144.89	(238)

	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	4467.596	3.480	155.47	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	2118.27	3.480	73.72	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	484.022	13.190	63.84	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			422.92	(255)
11a. SAP rating				
			0.42	(256)
			1.16	(257)
SAP value			83.80	(=0.)
			84	(258)
SAP band			В	(/

12a. Carbon dioxide emissions

12a. Garbon Gloxide enii33ion3					
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year		
Space heating, main system 1	4467.60	0.216	965.00	(261)	
Space heating, main system 2	0.00	0.000	0.00	(262)	
Space heating, secondary	0.00	0.519	0.00	(263)	
Water heating	2118.27	0.216	457.55	(264)	
Space and water heating			1422.55	(265)	
Electricity for pumps and fans	75.00	0.519	38.93	(267)	
Electricity for lighting	484.02	0.519	251.21	(268)	
Electricity generated - PVs	0.00	0.519	0.00	(269)	
Electricity generated - µCHP	0.00	0.000	0.00	(269)	
Appendix Q -					
Energy saved ():	0.00	0.000	0.00	(270)	
Energy used ():	0.00	0.000	0.00	(271)	
Total CO2, kg/year			1712.68	(272)	
			kg/m²/yea		
CO2 emissions per m ²			15.86	(273)	
El value			85.00	(273a)	
El rating			85	(274)	
El band			В		

Calculation of stars for heating and DHW

Main heating energy efficiency Main heating environmental impact Water heating energy efficiency Water heating environmental impact

 $(3.48 / 0.8990) \times (1 + (0.29 \times 0.00)) = 3.8710$, stars = 4 (0.2160 / 0.8990) x $(1 + (0.29 \times 0.00)) = 0.2403$, stars = 4 3.48 / 0.8816 = 3.9473, stars = 4 0.2160 / 0.8816 = 0.2450, stars = 4

Project Information

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 worksheet for New dwelling as designed - calculation of dwelling emissions

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	54.00	2.35	126.90	(3a)
First floor	54.00	2.65	143.10	(3b)
	108.00			(4)
			270.00	(5)

2. Ventilation rate

											m³ per ho	our
							main + s heating	eondary	y + othe	r	•	
	er of chim						0 + 0 + 0		40		0.00	(6a)
	er of ope						0 + 0 + 0		20		0.00	(6b)
		mittent f					4		(10		40.00	(7a)
		sive vent					0		(10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	×	40		0.00	(7c)
											Air chan	ges per hour
											0.15	(8)
Pressu	ıre test, r	esult q50)						5.00			(17)
Air per	meability	•									0.50	(18)
											2.00	(19)
											0.85	(20)
		ncorpora modified									0.42	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor	'	'	1	1		'	•		•	52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
											13.13	(22a)
Adjuste	ed infiltra	tion rate	(allowing	g for she	Iter and \	wind spe	ed)					()
0.54	0.53	0.52	0.47	0.46	0.40	0.40	0.39	0.42	0.46	0.48	0.50	
	_			•	•				•		5.56	(22b)
		ural vent ange rate		ntermitte	nt extrac	t fans						
0.65	0.64	0.63	0.61	0.60	0.58	0.58	0.58	0.59	0.60	0.61	0.62	(25)
								-			_	

3. Heat losses and l	heat loss paramete	r					
Element Gro	- 1	Net area	U-value	AxU	kappa-value	e A x K	
	a, m² m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	t)						
dg							
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	t)						
dg							
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	t)						
dg							(a=)
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (SouthWest	t)						
dg		4.040	4.4.7.4.00\	4.04			(07)
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (NorthEast)							
dg	d	4.040	4.45 (4.00)	4.04			(07)
Window - Double-gla		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, E							
soft coat (NorthEast)							
dg Window - Double-gla	270d	1.610	4 45 (4 20)	1.84			(27)
argon filled, low-E, E		1.610	1.15 (1.20)	1.04			(27)
soft coat (NorthEast)							
dg							
Solid door		1.890	1.20	2.27			(26)
dg		1.090	1.20	2.21			(20)
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argor	n filled	3.040	1.20	0.00			(20)
low-E, En=0.1, soft c							
(NorthEast)	out						
dg							
Pitched roofs insulate	ed between joists	54.00	0.10	5.40	9.00	486.00	(30)
Walls	22.2300 ,0.010	131.80	0.19	25.04	60.00	7908.00	(29)
Brick and block cav	vitv wall, full fill		50	_5.5.	23.00		(-0)
Ground floors	,,	54.00	0.14	7.56	110.00	5940.00	(28)
			****				()

	r heating d occupa		/ require	ements							kWh/year 2.80	(42)
Annual a			r usage i	in litres p	er day V	/d,avera	ge				100.75	(42) (43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	, ,
Hot water	er usage	in litres	per day t	or each	month							
110.83	106.80	102.77	98.74	94.71	90.68	90.68	94.71	98.74	102.77	106.80	110.83	(44)
Energy	content o	of hot wa	ter used			•						
164.36			129.32	124.09	107.08	99.22	113.86	115.22	134.28	146.57	159.17	
Energy of Distribut	content (ion loss	annual)					,				1585.25	(45)
24.65	21.56	22.25	19.40	18.61	16.06	14.88	17.08	17.28	20.14	21.99	23.88	(46)
store I	oss dete	rmined f	rom EN	13203-2	tests, ta	ken fron	n boiler d	ata reco	rd	•	<u> </u>	(50)
Volume Tempera Energy I	factor ature fac	tor store (k	ictor (kW Wh/day)	/h/day)							0.0000 0.0000 0.0000 0.00	(51) (52) (53) (55)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(56)
Net stor	age loss											
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(57)
Primary	loss	•	•	•	•	•	•		•	•		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(59)
Combi lo	oss calcu	ilated for	each m	onth								
24.35	21.97	24.27	23.41	24.12	23.26	23.98	24.07	23.34	24.20	23.51	24.33	(61)
Total he	at requir	ed for wa	ater heat	ing calcu	ilated fo	r each m	onth					
188.71	165.72	172.61	152.73	148.21	130.34	123.21	137.93	138.56	158.48	170.08	183.50	(62)
Output f	rom wate	er heater	for each	month,	kWh/mo	onth						
188.71	165.72	172.61	152.73	148.21	130.34	123.21	137.93	138.56	158.48	170.08	183.50	(64)
114				A/I. /	1.						1870.08	(64)
			eating, k\			00.00	10.00	1115	F0.70	E4.04	50.04	(OF)
60.74	53.29	55.39	48.85	47.29	41.42	38.99	43.88	44.15	50.70	54.61	59.01	(65)

_			-	
_	Into	rnal	gains	•
	m	ıııaı	uani	•

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metaboli	ic gains,	Watts	,	•		•	,					
140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	(
Lighting	gains		,	•		•	,					
27.41	24.34	19.80	14.99	11.20	9.46	10.22	13.28	17.83	22.64	26.42	28.17	(
Applianc	es gains	;	•									
268.65	271.44	264.41	249.46	230.58	212.84	200.98	198.19	205.22	220.18	239.05	256.80	
Cooking	gains		•				•					
37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	
Pumps a	and fans	gains	•			•	•					
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	
Losses	e.g. evap	oration (negative	values)		•	•					
-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	
Water h	eating ga	ains										
81.64	79.30	74.45	67.85	63.56	57.53	52.40	58.97	61.31	68.14	75.85	79.31	
Total into	ernal gai	ns	•				•					
445.73	443.12	426.69	400.33	373.38	347.85	331.64	338.49	352.40	378.99	409.36	432.31	

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79		0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

		l tempei					(0 -)				
	rature du g system i			ds in the	living a	rea, Th1	(°C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
au			1 .		l	1					
57.36	57.58	57.80	58.85	59.05	60.01	60.01	60.19	59.64	59.05	58.65	58.23
alpha						1					
4.82	4.84	4.85	4.92	4.94	5.00	5.00	5.01	4.98	4.94	4.91	4.88
Jtilisati	on factor	for gains	for livin	g area			1				
1.00	1.00	0.99	0.98	0.93	0.79	0.63	0.70	0.91	0.99	1.00	1.00
Mean ir	nternal te	mperatui	re in livin	g area T	1		•	1			
19.60	19.74	20.00	20.36	20.69	20.91	20.98	20.96	20.79	20.37	19.93	19.58
Temper	rature du	ring heat	ing peric	ds in res	t of dwe	lling Th2	<u>.</u>		•	•	
19.91	19.92	19.92	19.94	19.94	19.95	19.95	19.96	19.95	19.94	19.93	19.93
Jtilisati	on factor	for gains	for rest	of dwelli	ing					•	
1.00	1.00	0.99	0.97	0.89	0.71	0.50	0.56	0.86	0.98	1.00	1.00
Mean ir	nternal te	mperatui	re in the	rest of d	welling T	2		•		•	
18.03	18.25	18.62	19.16	19.61	19.89	19.95	19.94	19.76	19.18	18.54	18.03
	rea fracti										0.19
	nternal te										
18.32	18.52	18.88	19.38	19.81	20.08	20.14	20.13	19.95	19.40	18.79	18.31
	djustmen										
18.32	18.52	18.88	19.38	19.81	20.08	20.14	20.13	19.95	19.40	18.79	18.31
8 Snac	ce heatin	a reauir	rement								
Jan	Feb	Mar	Apr	May	lun						
					LJUH	lJul	Aua	Sep	Oct	Nov	Dec
	on factor	for gains		iviay	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		for gains	s .					,			
1.00	1.00	for gains 0.99		0.89	0.72	Jul 0.52	Aug 0.59	Sep 0.86	Oct 0.98	1.00	1.00
	1.00 gains	0.99	0.96	0.89	0.72	0.52		0.86	0.98	1.00	1.00
1.00 Useful (551.00	1.00 gains 632.90	712.10	0.96	0.89			0.59	0.86			
1.00 Useful (551.00 Monthly	1.00 gains 632.90 average	0.99 712.10 externa	0.96 785.01	0.89 784.81 ature	0.72 627.75	0.52	0.59	0.86	0.98	1.00	1.00
1.00 Useful (551.00 Monthly 4.30	1.00 gains 632.90 y average 4.90	712.10 externa 6.50	785.01 I tempera	0.89 784.81 ature	0.72 627.75 14.60	0.52	0.59	0.86	0.98	1.00	1.00
1.00 Useful of 551.00 Monthly 4.30 Heat los	1.00 gains 632.90 v average 4.90 ss rate fo	0.99 712.10 externa 6.50 r mean i	785.01 I tempera 8.90 nternal te	0.89 784.81 ature 11.70 emperature	0.72 627.75 14.60 ure	0.52 432.99 16.60	0.59 448.88	0.86 591.03	0.98 586.78 10.60	1.00 536.62 7.10	1.00
1.00 Useful (551.00 Monthly 4.30 Heat los	1.00 gains 632.90 y average 4.90 ss rate fo	0.99 712.10 externa 6.50 r mean i	785.01 I tempera 8.90 nternal te	0.89 784.81 ature 11.70 emperature	0.72 627.75 14.60 ure	0.52 432.99 16.60	0.59 448.88	0.86 591.03	0.98 586.78 10.60	1.00 536.62 7.10	1.00 521.23 4.20
1.00 Useful (551.00 Monthly 4.30 Heat los 1833.7 Fractior	1.00 gains 632.90 vaverage 4.90 ss rate for 21774.68 on of mont	0.99 712.10 externa 6.50 r mean i 1606.08 h for hea	785.01 I tempera 8.90 nternal te 1335.27	0.89 784.81 ature 11.70 emperature 1030.24	0.72 627.75 14.60 ure	0.52 432.99 16.60	0.59 448.88	0.86 591.03	0.98 586.78 10.60	1.00 536.62 7.10	1.00 521.23 4.20 1817.84
1.00 Useful (551.00 Monthly 4.30 Heat los 1833.7 Fraction 1.00	1.00 gains 632.90 y average 4.90 ss rate for 21774.68 n of mont	0.99 712.10 externa 6.50 r mean i 1606.08 h for hea	785.01 785.01 tempera 8.90 nternal te 1335.27 ating 1.00	0.89 784.81 ature 11.70 emperature 1030.24 1.00	0.72 627.75 14.60 ure 684.59	0.52 432.99 16.60 442.02	0.59 448.88 16.40 464.84	0.86 591.03 14.10 736.31	0.98 586.78 10.60	1.00 536.62 7.10	1.00 521.23 4.20
1.00 Useful (551.00 Monthly 4.30 Heat los 1833.7 Fractior 1.00 Space I	1.00 gains 632.90 y average 4.90 ss rate fo 21774.68 n of mont 1.00 heating re	0.99 712.10 externa 6.50 r mean i 1606.08 h for hea 1.00 equireme	785.01 I tempera 8.90 nternal te 1335.27 ating 1.00 ent for ea	0.89 784.81 ature 11.70 emperature 1030.24 1.00 ach mont	0.72 627.75 14.60 ure 684.59 - h, kWh/r	0.52 432.99 16.60 442.02	0.59 448.88 16.40 464.84	0.86 591.03 14.10 736.31	0.98 586.78 10.60 1118.00	1.00 536.62 7.10 1495.40 1.00	1.00 521.23 4.20 1817.84 1.00
1.00 Useful (551.00 Monthly 4.30 Heat los 1833.7 Fractior 1.00 Space I	1.00 gains 632.90 y average 4.90 ss rate for 21774.68 n of mont	0.99 712.10 externa 6.50 r mean i 1606.08 h for hea 1.00 equireme 665.12	0.96 785.01 1 tempera 8.90 1335.27 ating 1.00 ent for ea 396.19	0.89 784.81 ature 11.70 emperator 1030.24 1.00 ech mont 182.60	0.72 627.75 14.60 ure 684.59 - h, kWh/r	0.52 432.99 16.60 442.02 - month -	0.59 448.88 16.40 464.84 -	0.86 591.03 14.10 736.31	0.98 586.78 10.60	1.00 536.62 7.10 1495.40 1.00	1.00 521.23 4.20 1817.84

8c. Space cooling requirement - not applicable

9a. Energy requirements

9a. Energy requirements	kWh/year	
No secondary heating system selected Fraction of space heat from main system(s) Efficiency of main heating system 1.0000 92.90%	-	(202) (206)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Dec	
Space heating requirement		
954.34 767.28 665.12 396.19 182.60 - - - - 395.22 690.32	964.68	(98)
Appendix Q - monthly energy saved (main heating system 1)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	0.00	(210)
Space heating fuel (main heating system 1)		
1027.28825.92 715.95 426.47 196.56 425.43 743.08	1038.40	(211)
Appendix Q - monthly energy saved (main heating system 2)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	0.00	(212)
Space heating fuel (main heating system 2)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	0.00	(214)
Space heating fuel (secondary)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	0.00	(215)
Water heating		
Water heating requirement		
188.71 165.72 172.61 152.73 148.21 130.34 123.21 137.93 138.56 158.48 170.08	183.50	(64)
Efficiency of water heater	86.60	(216)
89.34 89.30 89.20 88.96 88.39 86.60 86.60 86.60 86.60 88.93 89.23	89.36	(217)
Water heating fuel		
211.23 185.59 193.51 171.69 167.67 150.50 142.27 159.27 160.00 178.21 190.61	205.36	(219)
Annual totals Space heating fuel used, main system 1 Space heating fuel (secondary) Water heating fuel Electricity for pumps, fans and electric keep-hot	kWh/year 5399.09 0.00 2115.93	(211) (215) (219)
central heating pump boiler with a fan-assisted flue Total electricity for the above, kWh/year Electricity for lighting (100.00% fixed LEL) Energy saving/generation technologies Appendix Q -	30.00 45.00 75.00 484.02	(230c) (230e) (231) (232)
Energy saved or generated (): Energy used (): Total delivered energy for all uses	0.000 0.000 8074.04	(236a) (237a) (238)

10a. Does not apply

11a. Does not apply

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions	_
Space heating, main system 1	5399.09	0.216	1166.20	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2115.93	0.216	457.04	(264)
Space and water heating			1623.24	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	484.02	0.519	251.21	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - μCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1913.38	(272)
			kg/m²/yea	r
Dwelling Carbon Dioxide Emission Rate (DER)			17.72	(273)

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury BS32 4AB

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.05.063, printed on 02/06/2022 at 06:58:35

New dwelling as designed

1 TER and DER

Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate TER = 18.35

Dwelling Carbon Dioxide Emission Rate DER = 17.72

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

TFEE = 58.3

DFEE = 51.1

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element Highest <u>Average</u> Wall OK 0.19 (max. 0.30) 0.19 (max. 0.70) Floor 0.14 (max. 0.25) 0.14 (max. 0.70) OK 0.10 (max. 0.20) Roof 0.10 (max. 0.35) OK Openings 1.20 (max. 2.00) 1.20 (max. 3.30) OK

3 Air permeability

Air permeability at 50 pascals: 5.00 Maximum: 5.00

4 Heating efficiency

Main heating system:

Boiler and radiators, mains gas

Worcester 2000

Source of efficiency: from boiler database

Worcester 2000 GC2000iW 30 C NG

Efficiency: 89.0% SEDBUK2009

Minimum: 88.0% OK

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls Time and temperature zone control OK

No cylinder Hot water controls

Boiler Interlock Yes OK

Hot water controls No cylinder

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0%

OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

OK Overheating risk (Severn Valley): OK

Not significant

Based on:

Thermal mass parameter: 250.00

Overshading: Average or unknown (20-60 % sky blocked)

Orientation: SouthWest

Ventilation rate: 8.00

Blinds/curtains:

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Pitched roofs insulated between joists U-value 0.10 W/m²K

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 06:58 AM

Type A baseline

Type A

Oaklands Drive Almondsbury BS32 4AB

Located in: England
Region: Severn Valley
Postcode: BS32 4AB

UPRN:

Date of assessment: 2022-06-01 Date of certificate: 2022-06-02

Assessment type: New dwelling as designed

Tenure: Unknown
Transaction type: New dwelling
Related party disclosure: No related party

PCDF revision number: 495

Property description

Dwelling type: Detached house

Ground floor (1) area = 54.00m² storey height = 2.35m storey height = 2.65m storey height = 2.65m

Living area: 20.00 (fraction 0.185)

Front of dwelling faces: SouthWest

Doors

Solid door area = 1.89 U = 1.20

Full glazed door area = 5.04 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Windows

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

Page 19 of 23

Project InformationBuilding type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 06:58 AM

Type A baseline

Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	 Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	 Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	 Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unkno	wn (20-60 % sky block	red)
Rooflights			
Opaque Elements Roofs Walls Ground floors	area = 54.00 area = 131.80 area = 54.00	U = 0.10, k = 9.0 U = 0.19, k = 60.0 U = 0.14, k = 110.0	Brick and block cavity wall, full fill
Thermal bridges: E10 Eaves (insulation at ceiling level) [A]	Htb = 14.00 0.060	0.060	14.100
E12 Gable (insulation at ceiling level) [A]	0.240	0.240	23.900
E16 Corner (normal) [A] E17 Corner (inverted – internal area greater than	0.090 -0.090	0.090 -0.090	27.400 5.000
external area) [A] E2 Other lintels (including other steel lintels) [A] Openings lintels	0.300	0.300	21.850
E3 Sill [A] Openings sills	0.040	0.040	21.850
E4 Jamb [A] Openings jambs	0.050	0.050	43.500
E5 Ground floor (normal) [A]	0.160	0.160	38.900
E6 Intermediate floor within a dwelling [A]	0.070	0.070	38.900

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 06:58 AM

Type A baseline

Thermal mass: User defined - 250.00

Pressure test: Yes (q50 - 5.00): measured in this dwelling: No Ventilation: Natural ventilation with intermittent extract fans

Number of chimneys: 0 Number of open flues: 0 Number of intermittent 4

fans:

Number of passive stacks: 0 Number of sides sheltered: 2.00 Measured/design q50: 5.00

Main heating system: Central heating systems with radiators or underfloor heating

Gas boilers (including LPG) 1998 or later Condensing combi with automatic ignition

Index: 18687

Eff 86.60% / 89.90% Worcester 2000 GC2000iW 30 C NG

Radiators

Pump in heated space: Yes

Boiler has load or weather compensator: Yes

Boiler Interlock: Yes

Design flow temperature: Unknown Central heating pump 2013 or later

Gas (mains)

Main heating controls: Time and temperature zone control

Boiler has load No

compensator:

Boiler has weather Yes

compensator:

Boiler has emhanced load No

compensator:

Boiler interlock: Yes

Secondary heating system: None

Water heating: Combination boiler

Combination boiler type: Instantaneous

Solar panel: no

Page 21 of 23

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 06:58 AM

Type A baseline

Water use <= 125 Yes

litres/person/day:

Low energy lights: Total fixed lighting outlets: 100.0% of fixed lighting outlets

30

Electricity tariff: Standard tariff Photovoltaics 1: Peak kW: 0.00 Photovoltaics 2: Peak kW: 0.00 Photovoltaics 3: Peak kW: 0.00

Conservatory: No Fixed air conditioning: No

Smoke Control Area: Not specified Additional allowable electricity generation:

0.00kg/m²/year

Predicted Energy Assessment

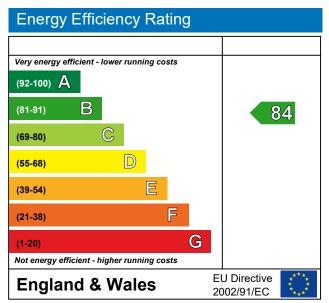
Type A Oaklands Drive Almondsbury BS32 4AB Dwelling type: Detached house
Date of assessment: 2 June 2022
Dradical day: Complete Foreign

Produced by Complete Energy Consultancy Ltd

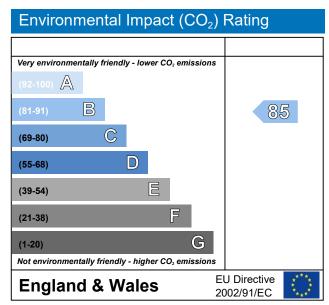
Total floor area: 108 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Project InformationBuilding type Detached house

Reference Date

Project

Type A Oaklands Drive Almondsbury BS32 4AB

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	54.00	2.35	126.90	(3a)
First floor	54.00	2.65	143.10	(3b)
	108.00			(4)
			270.00	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondary	/ + othe	r		
	er of chin						0 + 0 + 0		40		0.00	(6a)
	er of ope						0 + 0 + 0		20		0.00	(6b)
		mittent f					4		: 10		40.00	(7a)
		sive vent					0		: 10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	×	40		0.00	(7c)
											Air chan	ges per hour
											0.15	(8)
Pressu	ıre test, r	esult q50)						7.00			(17)
Air per	meability	•									0.50	(18)
											2.00	(19)
											0.85	(20)
		ncorpora modified									0.42	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor	•	•		•					•	52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
						-					13.13	(22a)
Adjuste	ed infiltra	tion rate	(allowing	g for she	Iter and v	wind spe	ed)					
0.54	0.53	0.52	0.47	0.46	0.40	0.40	0.39	0.42	0.46	0.48	0.50	
						_					5.56	(22b)
		ural vent ange rate		ntermitte	nt extrac	t fans						
0.65	0.64	0.63	0.61	0.60	0.58	0.58	0.58	0.59	0.60	0.61	0.62	(25)
					-			1	-		-	

3. Heat losses and heat	loss paramete	r					
Element Gross	Openings	Net area	U-value	AxU	kappa-value	AxK	
area, m²	m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.	1,						
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.	1,		, ,				` '
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.			(::==,				()
soft coat (SouthWest)	•,						
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.		1.010	(1.20)				(/
soft coat (SouthWest)	•,						
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.		1.010	1.15 (1.20)	1.04			(21)
soft coat (NorthEast)	1,						
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.		1.010	1.15 (1.20)	1.04			(21)
soft coat (NorthEast)	1,						
dg Window - Double-glazed,		1.610	4 45 (4 20)	1.84			(27)
		1.610	1.15 (1.20)	1.04			(27)
argon filled, low-E, En=0.	1,						
soft coat (NorthEast)							
dg Solid door		4 000	4.00	2.27			(26)
Solid door		1.890	1.20	2.27			(26)
dg		5 0 4 0	4.00	0.05			(00)
Full glazed door -	.al	5.040	1.20	6.05			(26)
Double-glazed, argon fille	ea,						
low-E, En=0.1, soft coat							
(NorthEast)							
dg Dit had a fair and to the		E 4 00	0.40	F 40	0.00	400.00	(00)
Pitched roofs insulated be	etween joists	54.00	0.10	5.40	9.00	486.00	(30)
Walls		131.80	0.19	25.04	60.00	7908.00	(29)
Brick and block cavity w	/all, tull fill				440.55	=0.46.55	(6.5)
Ground floors		54.00	0.14	7.56	110.00	5940.00	(28)

	r heating d occupa		require	ements							kWh/year 2.80
			r usage	in litres p	er day ∖	/d,avera	ge				100.75
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot wate	er usage	in litres	per day	or each	month					•	
	106.80			94.71	90.68	90.68	94.71	98.74	102.77	106.80	110.83
Energy o	content o	of hot wa	ter used								
164.36	143.75	148.33	129.32	124.09	107.08	99.22	113.86	115.22	134.28	146.57	159.17
Energy o Distribut	content (ion loss	annual)					,				1585.25
24.65	21.56	22.25	19.40	18.61	16.06	14.88	17.08	17.28	20.14	21.99	23.88
	ost from orage los 0.00		Wh/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	age loss			0.00	0.00	10.00		0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Primary 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			r each m		00.00		04.07	00.04	04.00	00.54	04.00
24.35	21.97	24.27	23.41	24.12	23.26	23.98	24.07	23.34	24.20	23.51	24.33
			ater heat					400.50	450.40	470.00	400.50
			152.73				137.93	138.56	158.48	170.08	183.50
			for each				107.00	100 50	450.40	170.00	400.50
188.71	165.72	1/2.61	152.73	148.21	130.34	123.21	137.93	138.56	158.48	170.08	
Heat gai	ins from	water he	eating, k\	Wh/mont	:h						1870.08
60.74	53.29	55.39	48.85	47.29	41.42	38.99	43.88	44.15	50.70	54.61	59.01
	1	1				1			1		

_		
_	Intorna	il anınc
IJ.	IIILEI II a	ıl gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabol	ic gains,	Watts				•			•		
168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14	168.14
Lighting	gains	•		•			,				
68.52	60.86	49.49	37.47	28.01	23.65	25.55	33.21	44.58	56.60	66.06	70.42
Applianc	es gains	3									
400.97	405.13	394.65	372.33	344.15	317.67	299.97	295.81	306.30	328.62	356.80	383.28
Cooking	gains					•	•				
54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62	54.62
Pumps a	and fans	gains									
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Losses	e.g. evap	oration (negative	values)			,				
-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09
Water h	eating ga	ains				•					
81.64	79.30	74.45	67.85	63.56	57.53	52.40	58.97	61.31	68.14	75.85	79.31
Total internal gains											
664.79	658.95	632.25	591.31	549.38	512.50	491.59	501.66	525.85	567.02	612.37	646.67
	•	•	•	•		•	•	•	•		

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79		0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

	interna					- . 4	(0. 0)				04.00
	rature du system			ods in the	e living a	rea, Th1	(°C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
au	I GD	IVIAI	Δρι	iviay	Juli	Jui	Aug	Зер	OCI	INOV	Dec
	57.58	57.80	58.85	E0.0E	60.04	60.04	60.19	E0.64	E0.0E	E0 6E	E0 00
57.36	57.58	57.80	56.65	59.05	60.01	60.01	60.19	59.64	59.05	58.65	58.23
alpha	1.04	4.05	1.00	1.04	5.00	5.00	5.04	4.00	1.04	1.04	1.00
4.82	4.84	4.85	4.92	4.94	5.00	5.00	5.01	4.98	4.94	4.91	4.88
	on factor				1	1	1	1	1	1	T 1
1.00	0.99	0.98	0.95	0.87	0.71	0.54	0.60	0.84	0.97	0.99	1.00
	ternal te			·					1		
19.78	19.92	20.16	20.50	20.78	20.95	20.99	20.98	20.87	20.52	20.10	19.77
•	ature du										
19.91	19.92	19.92	19.94	19.94	19.95	19.95	19.96	19.95	19.94	19.93	19.93
	on factor	for gains		of dwelli	ing						
0.99	0.99	0.98	0.94	0.83	0.62	0.42	0.47	0.76	0.95	0.99	1.00
Mean in	iternal te	mperatu	re in the	rest of d	welling T	2					
18.31	18.51	18.86	19.35	19.72	19.92	19.95	19.95	19.85	19.39	18.78	18.29
	rea fracti									•	0.19
	ternal te										
18.58	18.77	19.10	19.56	19.92	20.11	20.14	20.14	20.04	19.60	19.03	18.57
Apply a	djustmen		mean inte		nperatur	e, where	appropr	iate			
18.58	18.77	19.10	19.56	19.92	20.11	20.14	20.14	20.04	19.60	19.03	18.57
e Snac	e heatin	a roaui	romont								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	on factor			iviay	Juli	Jui	Aug	Seh	OCI	INOV	Dec
				0.00	0.62	0.44	0.50	0.77	0.04	0.00	0.00
0.99	0.99	0.97	0.93	0.83	0.63	0.44	0.50	0.77	0.94	0.98	0.99
Useful o		000.54	1004.00	074.00	050.00	400.04	450.04	004.07	744.00	700 70	704.40
	839.61				656.02	438.34	458.61	661.37	744.09	730.70	731.48
	average				14400	10.00	10.10	14440	10.00	I = 40	14.00
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
	ss rate fo			•			T		T	1	T
	31807.03			1043.7	688.45	442.74	466.14	746.55	1142.41	1525.34	41850.27
	of mont										
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
•	neating re					month					
	650.10					-	-	-	296.35	572.14	832.38
	ace heat					ear) (Oct	ober to N	Лау)	•	•	4150.40
3pace l	neating re	equireme	ent per m	ı² (kWh/r	m²/year)						38.43

8c. Space cooling requirement - not applicable

9a. Energy requirements

9a. Ene	rgy requ	urement	ts								kWh/year	
Fraction	of space	eating sy e heat fro in heating	om main	system((s)				1.0000 2.90%		,	(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(200)
		equireme		iviay	Juli	Jui	Aug	оер	OCI	1407	Dec	
		547.61		126.10					296.35	572.14	832.38	(98)
		onthly en	I .			- system	1)	I -	290.55	372.14	032.30	(30)
0.00	0.00	0.00	0.00	0.00	_	_	·, -	T_	0.00	0.00	0.00	(210)
		ıel (main			1)				0.00	0.00	0.00	(= : •)
		589.46				I_	_	_	319.00	615.87	895.99	(211)
		onthly en				⊥ ı svstem	2)		010.00	010.07	000.00	(=)
0.00	0.00	0.00	0.00	0.00	-	-	_, -	T_	0.00	0.00	0.00	(212)
		uel (main			2)				0.00	10.00	0.00	,
0.00	0.00	0.00	0.00	0.00	, -	-	-	-	0.00	0.00	0.00	(213)
Appendi		onthly en			ndary he	ı eating sy	rstem)					,
0.00	0.00	0.00	0.00	0.00	ļ-	-	-	_	0.00	0.00	0.00	(214)
		ıel (seco										, ,
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water h	eating		-	1	1	-	-	-		1		
Water h	eating re	equireme	ent									
188.71	165.72	172.61	152.73	148.21	130.34	123.21	137.93	138.56	158.48	170.08	183.50	(64)
Efficiend	cy of wat	er heate	r								86.60	(216)
89.26	89.21	89.09	88.77	88.09	86.60	86.60	86.60	86.60	88.72	89.12	89.29	(217)
Water h	eating fu											
211.41	185.77	193.75	172.05	168.25	150.50	142.27	159.27	160.00	178.63	190.84	205.52	(219)
Annual t											kWh/year	,
		uel used,		stem 1							4467.60 0.00	(211)
	eating fu	uel (seco uel	iluary)								2118.27	(215) (219)
		mps, fan	s and ele	ectric ke	ep-hot						2	(2.0)
	heating				•						30.00	(230c)
		n-assiste		/h />							45.00	(230e)
		or the ab nting (10)			1						75.00 484.02	(231) (232)
		eneration									404.02	(202)
PVs 0	.80 x 1.0	00 x 102	29.187 x	1.000							823.349	
		0.0×0.0									0.000	
PVSU	.80 X U.U	0.0 x 0.0	00 X 0.50	JU							0.000 823.349	(233)
Appendi	ix Q -										020.040	(200)
Energ	y saved	or gener	ated ():								0.000	(236a)
Energ	y used ()):									0.000	(237a)
Total de	livered e	energy fo	r all uses	6							6321.54	(238)

10a. Fue	l costs	usina	Table	12 r	rices

	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	4467.596	3.480	155.47	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	2118.27	3.480	73.72	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	484.022	13.190	63.84	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	823.349	13.190	-108.60	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			314.32	(255)
11a. SAP rating				
			0.42	(256)
			0.86	(257)
SAP value			87.96	()
			88	(258)
SAP band			В	

12a. Carbon dioxide emissions

	Energy	Emission factor	Emission	S
	kWh/year	kg CO2/kWh	kg CO2/y	ear
Space heating, main system 1	4467.60	0.216	965.00	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2118.27	0.216	457.55	(264)
Space and water heating			1422.55	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	484.02	0.519	251.21	(268)
Electricity generated - PVs	-823.35	0.519	-427.32	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1285.36	(272)
			kg/m²/yea	
CO2 emissions per m ²			11.90	(273)
El value			88.74	(273a)
El rating			89	(274)
El band			В	

Calculation of stars for heating and DHW

Main heating energy efficiency Main heating environmental impact Water heating energy efficiency Water heating environmental impact

 $(3.48 / 0.8990) \times (1 + (0.29 \times 0.00)) = 3.8710$, stars = 4 (0.2160 / 0.8990) x $(1 + (0.29 \times 0.00)) = 0.2403$, stars = 4 3.48 / 0.8816 = 3.9473, stars = 4 0.2160 / 0.8816 = 0.2450, stars = 4

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 worksheet for New dwelling as designed - calculation of dwelling emissions

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	54.00	2.35	126.90	(3a)
First floor	54.00	2.65	143.10	(3b)
	108.00			(4)
			270.00	(5)

2. Ventilation rate

											m³ per ho	our
							main + s heating	eondar	y + othe	er	•	
Numbe	r of chim r of oper	ı flues					0 + 0 + 0 0 + 0 + 0		x 40 x 20		0.00 0.00	(6a) (6b)
	r of inter						4		x 10		40.00	(7a)
	r of pass						0		x 10		0.00	(7b)
Numbe	Number of flueless gas fires						0	2	x 40		0.00	(7c)
												jes per hour
_		=-									0.15	(8)
	re test, r	esult q50)						5.00		0.50	(17)
Air perr	neability										0.50 2.00	(18)
											2.00 0.85	(19) (20)
Infiltrati	on rate i	ncornora	itina she	lter facto	ır						0.65	(20) (21)
	on rate r										0.12	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor										52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
	10	10	1	1	10.00		10.00	1	1		13.13	(22a)
Adjuste	ed infiltra	tion rate	(allowing	g for she	lter and	wind spe	eed)				10.10	(ZZG)
0.54	0.53	0.52	0.47	0.46	0.40	0.40	0.39	0.42	0.46	0.48	0.50	
	•	•	•	•	•			•			5.56	(22b)
Ventilat	lian . nat											
Effectiv	e air cha			ntermitte	nt extrac	ct rans						

3. Heat losses and h	eat loss paramete	r					
Element Gros		Net area	U-value	AxU	kappa-value	e A x K	
area,	•	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En	n=0.1,						
soft coat (NorthEast)							
dg							
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En	า=0.1,						
soft coat (NorthEast)							
dg							
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En	า=0.1,						
soft coat (NorthEast)							
dg							
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En							
soft coat (SouthWest))						
dg				4.04			(07)
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En							
soft coat (SouthWest))						
dg	1	4.040	4.45.44.00\	4.04			(07)
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En	•						
soft coat (SouthWest))						
dg		4.040	4.45 (4.00)	4.04			(07)
Window - Double-glaz		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En							
soft coat (SouthWest))						
dg Solid door		4 000	4.00	2.27			(26)
Solid door		1.890	1.20	2.27			(26)
dg		E 040	4.20	6.05			(26)
Full glazed door -	filled	5.040	1.20	0.03			(26)
Double-glazed, argon low-E, En=0.1, soft co							
(NorthEast)	Jai						
(Norm⊑ast) dg							
Pitched roofs insulate	nd hatwaan inists	54.00	0.10	5.40	9.00	486.00	(30)
Walls	a permeen joists	131.80	0.10	25.04	60.00	7908.00	(29)
Brick and block cavi	ity wall full fill	131.00	0.19	20.04	00.00	1 300.00	(29)
Ground floors	ity wall, full IIII	54.00	0.14	7.56	110.00	5940.00	(28)
Ordana noors		J4.00	U. 1 4	1.50	110.00	5340.00	(20)

	r heating d occupa		/ require	ements							kWh/year 2.80	(42)
Annual a			r usage i	in litres p	er day V	/d,avera	ge				100.75	(42) (43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	, ,
Hot water	Hot water usage in litres per day for each month											
110.83	106.80	102.77	98.74	94.71	90.68	90.68	94.71	98.74	102.77	106.80	110.83	(44)
Energy	Energy content of hot water used											
164.36			129.32	124.09	107.08	99.22	113.86	115.22	134.28	146.57	159.17	
	Energy content (annual) 1585.25 Distribution loss									1585.25	(45)	
24.65	21.56	22.25	19.40	18.61	16.06	14.88	17.08	17.28	20.14	21.99	23.88	(46)
store I	oss dete	rmined f	rom EN	13203-2	tests, ta	ken fron	n boiler d	ata reco	rd	•	<u> </u>	(50)
Volume Tempera Energy I	Hot water cylinder loss factor (kWh/day) Volume factor Temperature factor Energy lost from store (kWh/day) Total storage loss 0.0000 0.0000 0.000									(51) (52) (53) (55)		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(56)
Net stor	age loss											
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(57)
Primary	loss	•	•	•	•	•	•		•	•		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(59)
Combi lo	oss calcu	ilated for	each m	onth								
24.35	21.97	24.27	23.41	24.12	23.26	23.98	24.07	23.34	24.20	23.51	24.33	(61)
Total he	at requir	ed for wa	ater heat	ing calcu	ilated fo	r each m	onth					
188.71	165.72	172.61	152.73	148.21	130.34	123.21	137.93	138.56	158.48	170.08	183.50	(62)
Output f	rom wate	er heater	for each	month,	kWh/mo	onth						
188.71	165.72	172.61	152.73	148.21	130.34	123.21	137.93	138.56	158.48	170.08	183.50	(64)
114				A/I. /	1.						1870.08	(64)
			eating, k\			00.00	10.00	1445	F0.70	E4.04	50.04	(OF)
60.74	53.29	55.39	48.85	47.29	41.42	38.99	43.88	44.15	50.70	54.61	59.01	(65)

_	-					
F	In	+0	rn	3 <i>1</i> ^	เวเท	•
IJ.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	LE	IIIC	11 U	ain	-

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabolic gains, Watts											
140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11	140.11
Lighting gains											
27.41	24.34	19.80	14.99	11.20	9.46	10.22	13.28	17.83	22.64	26.42	28.17
Appliances gains											
268.65	271.44	264.41	249.46	230.58	212.84	200.98	198.19	205.22	220.18	239.05	256.80
Cooking gains											
37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01	37.01
Pumps a	and fans	gains									
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Losses	e.g. evap	oration (negative	values)		•	•				
-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09	-112.09
Water h	eating ga	ains									
81.64	79.30	74.45	67.85	63.56	57.53	52.40	58.97	61.31	68.14	75.85	79.31
Total int	ernal gai	ns									
445.73	443.12	426.69	400.33	373.38	347.85	331.64	338.49	352.40	378.99	409.36	432.31

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28		0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

	n interna						(0 -)				
	rature du g system i			ods in the	e living a	rea, Th1	(°C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
au		1	1 '	1							
57.36	57.58	57.80	58.85	59.05	60.01	60.01	60.19	59.64	59.05	58.65	58.23
alpha	_	-			1						
4.82	4.84	4.85	4.92	4.94	5.00	5.00	5.01	4.98	4.94	4.91	4.88
Jtilisati	on factor	for gains	for livin	g area							
1.00	1.00	0.99	0.98	0.93	0.79	0.63	0.70	0.91	0.99	1.00	1.00
Mean ir	nternal te	mperatui	e in livin	g area T	1	•	•	1	l		
19.60	19.74	20.00	20.36	20.69	20.91	20.98	20.96	20.79	20.37	19.93	19.58
Гетре	rature du	ring heat	ing peric	ds in res	st of dwe	lling Th2			•	•	
19.91	19.92	19.92	19.94	19.94	19.95	19.95	19.96	19.95	19.94	19.93	19.93
Jtilisati	on factor	for gains	for rest	of dwelli	ing				•	•	
1.00	1.00	0.99	0.97	0.89	0.71	0.50	0.56	0.86	0.98	1.00	1.00
Mean ir	nternal te	mperatui	e in the	rest of d	welling T	2	•	•		•	
18.03	18.25	18.62	19.16	19.61	19.89	19.95	19.94	19.76	19.18	18.54	18.03
	area fracti										0.19
	nternal te										
18.32	18.52	18.88	19.38	19.81	20.08	20.14	20.13	19.95	19.40	18.79	18.31
	djustmen										
18.32	18.52	18.88	19.38	19.81	20.08	20.14	20.13	19.95	19.40	18.79	18.31
8. Spac	ce heatin	a reauir	ement								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	on factor		•		• • • • • • • • • • • • • • • • • • •	-	7 14.9				
1.00											
	11.00	0.99	0.96	0.89	0.72	0.52	0.59	0.86	0.98	1.00	1.00
Jseful	1.00 gains	0.99	0.96	0.89	0.72	0.52	0.59	0.86	0.98	1.00	1.00
Useful (551.00	gains				627.75	0.52	0.59		0.98 586.78	1.00 536.62	1.00 521.23
551.00	gains 632.90	712.10	785.01	784.81							
551.00 Monthly	gains	712.10 externa	785.01 I tempera	784.81	627.75	432.99		591.03	586.78	536.62	521.23
551.00 Monthly 4.30	gains 632.90 y average 4.90	712.10 externa 6.50	785.01 I tempera 8.90	784.81 ature 11.70	627.75		448.88				
551.00 Monthly 4.30 Heat lo	gains 632.90 y average 4.90 ss rate fo	712.10 externa 6.50 r mean i	785.01 I tempera 8.90 nternal te	784.81 ature 11.70 emperati	627.75 14.60 ure	432.99	448.88 16.40	591.03	586.78	536.62 7.10	521.23
551.00 Monthly 4.30 Heat lo: 1833.7	gains 0 632.90 y average 4.90 ss rate fo	712.10 externa 6.50 r mean i	785.01 I tempera 8.90 nternal te	784.81 ature 11.70 emperati	627.75 14.60 ure	432.99 16.60	448.88 16.40	591.03	586.78	536.62 7.10	521.23
551.00 Monthly 4.30 Heat los 1833.7 Fraction	gains 0 632.90 y average 4.90 ss rate for 2 1774.68 n of mont	712.10 externa 6.50 r mean i 1606.08 h for hea	785.01 I tempera 8.90 nternal te 1335.27	784.81 ature 11.70 emperatu 1030.24	627.75 14.60 ure	432.99 16.60	448.88 16.40	591.03	586.78 10.60 1118.00	536.62 7.10 1495.40	521.23 4.20 1817.84
551.00 Monthly 4.30 Heat los 1833.7 Fraction	gains 0 632.90 y average 4.90 ss rate for 21774.68 n of mont 1.00	712.10 externa 6.50 r mean i 1606.08 h for hea	785.01 I tempera 8.90 nternal te 1335.27 ating	784.81 ature 11.70 emperato 1030.24	627.75 14.60 ure 684.59	432.99 16.60 442.02	448.88 16.40 464.84	591.03 14.10 736.31	586.78	536.62 7.10	521.23
551.00 Monthly 4.30 Heat los 1833.7 Fraction 1.00 Space I	gains 0 632.90 y average 4.90 ss rate for 21774.68 n of mont 1.00 heating re	712.10 externa 6.50 r mean i 1606.08 h for hea 1.00 equireme	785.01 I tempera 8.90 Internal te 1335.27 Inting 1.00 Internal terms 1.00 Internal terms 1.00 Internal terms In	784.81 ature 11.70 emperatu 1030.24 1.00 ach mont	627.75 14.60 ure 684.59 - h, kWh/r	432.99 16.60 442.02	448.88 16.40 464.84	591.03 14.10 736.31	586.78 10.60 1118.00	7.10 1495.40 1.00	521.23 4.20 1817.84 1.00
551.00 Monthly 4.30 Heat los 1833.7 Fraction 1.00 Space I	gains 0 632.90 y average 4.90 ss rate for 21774.68 n of mont 1.00	712.10 externa 6.50 r mean i 1606.08 h for hea 1.00 equireme	785.01 I tempera 8.90 Internal te 1335.27 Inting 1.00 Internal te 396.19	784.81 ature 11.70 emperate 1030.24 1.00 ach mont 182.60	627.75 14.60 ure 684.59 - h, kWh/r	432.99 16.60 442.02 - month	448.88 16.40 464.84 -	591.03	586.78 10.60 1118.00	7.10 1495.40 1.00	521.23 4.20 1817.84

8c. Space cooling requirement - not applicable

9a. Energy requirements

9a. Ene	rgy requ	uremen	ts								kWh/year	
Fraction	of spac	eating sy e heat fro in heating	om main	system((s)				1.0000 2.90%		•	(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	neating re	equireme			1	1			1	1		
954.34	767.28	665.12	396.19	182.60	-	-	-	-	395.22	690.32	964.68	(98)
Append	ix Q - mo	onthly en	ergy sav	ed (mair	heating	system	1)	1	1	1		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	neating fu	uel (main	heating	system	1)	-	-		1	1		
1027.28	8825.92	715.95	426.47	196.56	-	-	-	-	425.43	743.08	1038.40	(211)
Append	ix Q - mo	onthly en	ergy sav	ed (mair	heating	system	2)		1	1		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space h	neating fu	uel (main	heating	system	2)	-	1		1			
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Append	ix Q - mo	onthly en	ergy sav	ed (seco	ndary h	eating sy	stem)	1	1			
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space h	neating fu	uel (seco	ndary)		1				1			
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water h	eating		1		1		-		1	1		
Water h	eating re	equireme	nt									
188.71	165.72	172.61	152.73	148.21	130.34	123.21	137.93	138.56	158.48	170.08	183.50	(64)
Efficiend	cy of wat	er heate	r								86.60	(216)
89.34	89.30	89.20	88.96	88.39	86.60	86.60	86.60	86.60	88.93	89.23	89.36	(217)
Water h	eating fu	ıel										
211.23	185.59	193.51	171.69	167.67	150.50	142.27	159.27	160.00	178.21	190.61	205.36	(219)
Space h	neating funeating fu	uel used, uel (seco		stem 1							kWh/year 5399.09 0.00	(211) (215)
Electrici central boiler v Total ele Electrici	Water heating fuel 2115.93 Electricity for pumps, fans and electric keep-hot central heating pump 30.00 boiler with a fan-assisted flue 45.00 Total electricity for the above, kWh/year 75.00 Electricity for lighting (100.00% fixed LEL) 484.02									30.00 45.00 75.00	(219) (230c) (230e) (231) (232)	
PVs 0 PVs 0 PVs 0	Energy saving/generation technologies PVs 0.80 x 1.000 x 1029.187 x 1.000 PVs 0.80 x 0.000 x 0.000 x 0.500 PVs 0.80 x 0.000 x 0.000 x 0.500 0.000 823.349										0.000 0.000	(233)
		or gener):	ated ():								0.000 0.000	(236a) (237a)
Total de	elivered e	energy fo	r all uses	3							7250.69	(238)

10a. Does not apply

11a. Does not apply

12a. Carbon dioxide emissions

	Energy	Emission factor	Emission	S
	kWh/year	kg CO2/kWh	kg CO2/ye	ear
Space heating, main system 1	5399.09	0.216	1166.20	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2115.93	0.216	457.04	(264)
Space and water heating			1623.24	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	484.02	0.519	251.21	(268)
Electricity generated - PVs	-823.35	0.519	-427.32	(269)
Electricity generated - μCHP	0.00	0.000	0.00	(269)
Appendix Q -				, ,
Ėnergy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1486.06	(272)
			kg/m²/yea	ır

13.76

(273)

Dwelling Carbon Dioxide Emission Rate (DER)

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury BS32 4AB

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.05.063, printed on 02/06/2022 at 06:58:51

New dwelling as designed

1 TER and DER

Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate TER = 18.35 Dwelling Carbon Dioxide Emission Rate DER = 13.76

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

TFEE = 58.3

DFEE = 51.1

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element Highest <u>Average</u> Wall OK 0.19 (max. 0.30) 0.19 (max. 0.70) Floor 0.14 (max. 0.25) 0.14 (max. 0.70) OK 0.10 (max. 0.20) Roof 0.10 (max. 0.35) OK Openings 1.20 (max. 2.00) 1.20 (max. 3.30) OK

3 Air permeability

Air permeability at 50 pascals: 5.00 Maximum: 5.00

4 Heating efficiency

Main heating system:

Boiler and radiators, mains gas

Worcester 2000

Source of efficiency: from boiler database

Worcester 2000 GC2000iW 30 C NG

Efficiency: 89.0% SEDBUK2009

Minimum: 88.0%

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls

Time and temperature zone control

OK

Hot water controls No cylinder

Boiler Interlock Yes OK

Hot water controls No cylinder

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0%

OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Severn Valley):

OK

Not significant

OK

Based on:

Thermal mass parameter: 250.00

Overshading: Average or unknown (20-60 % sky blocked)

Orientation: SouthWest

Ventilation rate: 8.00

Blinds/curtains:

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Pitched roofs insulated between joists U-value 0.10 W/m²K

Photovoltaic array

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 06:58 AM

Type A pv

Type A

Oaklands Drive Almondsbury BS32 4AB

Located in: England
Region: Severn Valley
Postcode: BS32 4AB

UPRN:

Date of assessment: 2022-06-01 Date of certificate: 2022-06-02

Assessment type: New dwelling as designed

Tenure: Unknown
Transaction type: New dwelling
Related party disclosure: No related party

PCDF revision number: 495

Property description

Dwelling type: Detached house

Ground floor (1) area = 54.00m² storey height = 2.35m storey height = 2.65m storey height = 2.65m

Living area: 20.00 (fraction 0.185)

Front of dwelling faces: SouthWest

Doors

Solid door area = 1.89 U = 1.20

Full glazed door area = 5.04 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Windows

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Page 19 of 23

Project InformationBuilding type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 06:58 AM

Type A pv

Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	red)
Rooflights			
Opaque Elements Roofs Walls Ground floors	area = 54.00 area = 131.80 area = 54.00	U = 0.10, k = 9.0 U = 0.19, k = 60.0 U = 0.14, k = 110.0	Brick and block cavity wall, full fill
Thermal bridges: E10 Eaves (insulation at ceiling level) [A]	Htb = 14.00 0.060	0.060	14.100
E12 Gable (insulation at ceiling level) [A]	0.240	0.240	23.900
E16 Corner (normal) [A] E17 Corner (inverted – internal area greater than	0.090 -0.090	0.090 -0.090	27.400 5.000
external area) [A] E2 Other lintels (including other steel lintels) [A] Openings lintels	0.300	0.300	21.850
E3 Sill [A] Openings sills	0.040	0.040	21.850
E4 Jamb [A] Openings jambs	0.050	0.050	43.500
E5 Ground floor (normal) [A]	0.160	0.160	38.900
E6 Intermediate floor within a dwelling [A]	0.070	0.070	38.900

Building type Detached house

Reference Date

Project Type A

> Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 06:58 AM

Type A pv

Thermal mass: User defined - 250.00

Pressure test: Yes (q50 - 5.00): measured in this dwelling: No Ventilation: Natural ventilation with intermittent extract fans

Number of chimneys: Number of open flues: 0 Number of intermittent 4

fans:

Number of passive stacks: Number of sides sheltered: 2.00 Measured/design q50: 5.00

Main heating system: Central heating systems with radiators or underfloor heating

Gas boilers (including LPG) 1998 or later Condensing combi with automatic ignition

Index: 18687

Eff 86.60% / 89.90% Worcester 2000 GC2000iW 30 C NG

Radiators

Pump in heated space: Yes

Boiler has load or weather compensator: Yes

Boiler Interlock: Yes

Design flow temperature: Unknown Central heating pump 2013 or later

Gas (mains)

Time and temperature zone control Main heating controls:

Boiler has load Nο

compensator:

Yes Boiler has weather

compensator:

Boiler has emhanced load No

compensator:

Boiler interlock: Yes

Secondary heating system: None

Water heating: Combination boiler

Combination boiler type: Instantaneous

Solar panel: no

Page 21 of 23

Building type Detached house

Reference Date

Project Type A

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 06:58 AM

Type A pv

Water use <= 125 Yes

litres/person/day:

Low energy lights: 100.0% of fixed lighting outlets

Total fixed lighting outlets: 30

Electricity tariff: Standard tariff
Photovoltaics 1: Peak kW: 1.00
30 degrees

SE/SW

None or very little (<20 % sky blocked)

Photovoltaics 2: Peak kW: 0.00

Heavy (>80 % sky blocked)

Photovoltaics 3: Peak kW: 0.00

Heavy (>80 % sky blocked)

Conservatory: No Fixed air conditioning: No

Smoke Control Area: Not specified Additional allowable electricity generation :

0.00kg/m²/year

Predicted Energy Assessment

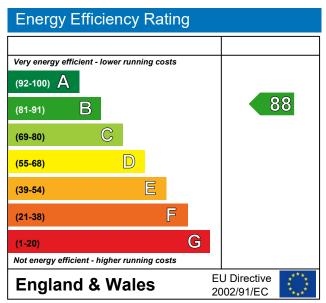
Type A Oaklands Drive Almondsbury BS32 4AB Dwelling type: Detached house
Date of assessment: 2 June 2022
Dradical day: Complete Foreign

Produced by Complete Energy Consultancy Ltd

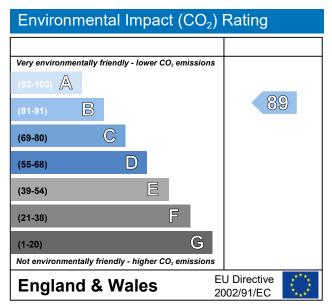
Total floor area: 108 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Project InformationBuilding type Detached house

Reference Date

Project

Type B Oaklands Drive Almondsbury BS32 4AB

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	42.00	2.35	98.70	(3a)
First floor	42.00	2.65	111.30	(3b)
	84.00			(4)
			210.00	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondar	y + othe	r	-	
	er of chin						0 + 0 + 0		< 40		0.00	(6a)
	er of ope						0 + 0 + 0		〈 20		0.00	(6b)
	er of inter						4		< 10		40.00	(7a)
	er of pass						0		< 10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	>	< 40		0.00	(7c)
											Air chan	ges per hour
											0.19	(8)
Pressu	ıre test, r	esult q50)						7.00			(17)
Air per	meability	,									0.54	(18)
											2.00	(19)
											0.85	(20)
	ion rate i ion rate i										0.46	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor				•	•			-	•	52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
											13.13	(22a)
Adjuste	ed infiltra	tion rate	(allowing	g for she	lter and	wind spe	eed)					
0.59	0.57	0.56	0.51	0.49	0.44	0.44	0.42	0.46	0.49	0.52	0.54	
											6.03	(22b)
	ition : nat ve air cha		,	ntermitte	nt extrac	ct fans						
0.67	0.66	0.66	0.63	0.62	0.60	0.60	0.59	0.61	0.62	0.63	0.65	(25)
										-		

3. Heat losses and heat	loss paramete	r					
Element Gross	Openings	Net area	U-value	AxU	kappa-valu	еАхК	
area, m²	m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1	1,						
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1	1,						
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1	1,						
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1	1,						
soft coat (SouthWest)							
. dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1	1,						
soft coat (SouthWest)							
. dg							()
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1	1,						
soft coat (SouthWest)							
dg				4.04			(07)
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.	1,						
soft coat (SouthWest)							
dg				0.07			(00)
Solid door		1.890	1.20	2.27			(26)
dg		5.040	4.00	0.05			(00)
Full glazed door -	_1	5.040	1.20	6.05			(26)
Double-glazed, argon fille	a,						
low-E, En=0.1, soft coat							
(NorthEast)							
dg Ditabad reefs insulated be	stugen leiete	42.00	0.40	4.20	0.00	270.00	(20)
Pitched roofs insulated be	etween joists	42.00	0.10	4.20 21.24	9.00	378.00	(30)
Walls	oll full fill	111.80	0.19	21.24	60.00	6708.00	(29)
Brick and block cavity was Ground floors	ali, Iuli IIII	42.00	0.14	5.88	110.00	4620.00	(20)
Ground noors		42.00	0.14	5.66	110.00	4020.00	(28)

	r heating		/ require	ements							kWh/yea
	d occupa										2.53
	average				er day V		-				94.39
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot wate	er usage	in litres	per day t	or each	month						
103.83	100.06	96.28	92.50	88.73	84.95	84.95	88.73	92.50	96.28	100.06	103.83
Energy	content c	f hot wa	ter used	•			•		•		
153.98	134.67	138.97	121.16	116.25	100.32	92.96	106.67	107.94	125.80	137.32	149.12
0,	content (annual)	•	•	•	•	•		•	•	1485.15
Distribut	tion loss										
23.10	20.20	20.85	18.17	17.44	15.05	13.94	16.00	16.19	18.87	20.60	22.37
,	volume,					•	150.00				
	cturer's d		cylinder	loss fact	or (kWh/		1.86				
	ature Fa		م ام مرازات م	/I-\A/I-/	d = \ \		0.5400				4.00
	lost from orage los		er Cyllride	er (KVVII/	uay)						1.00
31.14	28.12	31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
•	age loss		30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
31.14	28.12	31.14	30.13	24.44	20.42	31.14	31.14	30.13	24.44	20.42	24.44
		31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
Primary		00.00	00.54	00.00	00.54	00.00	00.00	00.54	00.00	00.54	00.00
23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26
	at requir								ı	•	
	183.80						161.07	160.59	180.20	189.96	203.52
Output f	rom wate	er heatei	for each	n month,	kWh/mo	onth					
208.38	183.80	193.37	173.80	170.65	152.96	147.36	161.07	160.59	180.20	189.96	203.52
	•	•	•		•	•	•	•		•	2125.65
Heat ga	ins from	water he	eating, k\	Wh/mont	:h						
94.72	84.09	89.73	82.40	82.17	75.47	74.43	78.99	78.01	85.35	87.77	93.10
	•	•				•		•			

_				-
_	Int	arn.	າ <i>!</i> ~	ainc
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		11 LJ	ains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metaboli	ic gains,	Watts							•		
152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06
Lighting	gains								•		
54.93	48.79	39.68	30.04	22.45	18.96	20.48	26.62	35.74	45.37	52.96	56.46
Applianc	es gains	;									
339.70	343.22	334.34	315.43	291.56	269.12	254.13	250.61	259.49	278.40	302.27	324.71
Cooking	gains										
52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74
Pumps a	and fans	gains									
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Losses 6	e.g. evap	oration (negative	values)							
-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38
Water h	eating ga	ains									
127.31	125.13	120.60	114.44	110.45	104.82	100.04	106.17	108.34	114.71	121.91	125.14
Total into	ernal gai	ns									
625.36	620.57	598.04	563.34	527.89	496.33	478.08	486.83	507.00	541.92	580.57	609.73

6. Solar gains (calculation for January)

	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
dg				
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
dg				
Window - Double-glazed, argon filled,	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
low-E, En=0.1, soft coat (NorthEast) dg				
Window - Double-glazed, argon filled,	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
low-E, En=0.1, soft coat (SouthWest) dg				
Window - Double-glazed, argon filled,	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
low-E, En=0.1, soft coat (SouthWest) dg				
Window - Double-glazed, argon filled,	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
low-E, En=0.1, soft coat (SouthWest) dg				
Window - Double-glazed, argon filled,	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
low-E, En=0.1, soft coat (SouthWest) dg				
Solid door	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
dg	0.0 5.040.44.00	0.00 - 0.70	0.77	47.0700
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)	0.9 x 5.040 11.28	0.63 X 0.70	0.77	17.3790
dg				

Lighting calculations

FF x Shading Area g

	interna										
	ature du system			ods in the	e living a	rea, Th1	(°C)				21.00 0.75
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau			1 -						I		
51.59	51.80	52.01	53.01	53.20	54.12	54.12	54.29	53.76	53.20	52.82	52.42
alpha	•	1	1	•	•	'	•	•	•	•	
4.44	4.45	4.47	4.53	4.55	4.61	4.61	4.62	4.58	4.55	4.52	4.49
Utilisatio	on factor	for gains	s for livin	g area	1	•	•	1	1	1	
0.99	0.98	0.97	0.92	0.81	0.63	0.48	0.53	0.77	0.94	0.98	0.99
Tweekd	lay	1	1	•	•	•		1	•		
19.86	19.99	20.22	20.53	20.77	20.89	20.92	20.92	20.84	20.54	20.15	19.84
Tweeke	nd	•	•	•	•	•		•	,		
20.35	20.43	20.56	20.73	20.87	20.94	20.96	20.95	20.91	20.74	20.52	20.34
24 inste	ad of 16	1	1.	•	1	•	•	1	•	1	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 inste	ad of 9								1		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16 inste	ad of 9	1		•	•			1	•		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean in	ternal te	mperatu	re in livin	ig area T	1			1	•		
20.00	20.12	20.32	20.58	20.80	20.91	20.93	20.93	20.86	20.60	20.25	19.99
Temper	ature du	ring heat	ing perio	ds in res	st of dwe	lling Th2	<u>)</u>	1	1	1	
19.80	19.81	19.81	19.83	19.84	19.85	19.85	19.86	19.85	19.84	19.83	19.82
Utilisatio	n factor	for gains	s for rest	of dwell	ing			1	1		
0.99	0.98	0.96	0.89	0.75	0.54	0.36	0.40	0.68	0.91	0.98	0.99
Tweekd	lay								1		
18.49	18.67	18.96	19.35	19.62	19.75	19.77	19.77	19.70	19.37	18.89	18.49
Tweeke	nd								1		
18.49	18.67	18.96	19.35	19.62	19.75	19.77	19.77	19.70	19.37	18.89	18.49
Mean in	ternal te	mperatu	re in the	rest of d	welling 1	2	•	1	1		
18.49	18.67	18.96	19.35	19.62	19.75	19.77	19.77	19.70	19.37	18.89	18.49
	rea fract							-	1		0.18
Mean in	iternal te	mperatu	re (for th	e whole	dwelling)			_	_	
18.76	18.93	19.21	19.57	19.83	19.95	19.97	19.97	19.91	19.59	19.13	18.76
	djustmer										
18.76	18.93	19.21	19.57	19.83	19.95	19.97	19.97	19.91	19.59	19.13	18.76

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisatio	n factor	for gains	5						•		
0.98	0.97	0.95	0.89	0.75	0.55	0.37	0.42	0.69	0.91	0.97	0.99
Useful g	ains										
720.28	792.14	847.14	865.63	780.68	558.38	361.29	379.96	577.73	692.03	690.06	690.28
Monthly	average	external	tempera	ature		•				•	
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
Heat los	s rate fo	r mean ii	nternal te	emperati	ire		•			•	
1635.43	1580.09	1425.26	1174.30	891.14	577.16	363.70	384.10	630.13	985.83	1329.24	1619.89
Fraction	of mont	h for hea	iting		•	•	•		•	•	
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space h	eating re	quireme	nt for ea	ch mont	h, kWh/r	nonth					
680.87	529.51	430.13	222.25	82.18	-	-	-	-	218.59	460.21	691.63
	ace heat					ar) (Oct	ober to N	lay)		•	3315.36
Space h	eating re	equireme	nt per m	² (kWh/r	n²/year)						39.47

8c. Space cooling requirement - not applicable

9a. Energy requirements

9a. ⊑⊓e	rgy requ	ın emem	.5								kWh/yea	ar
Fraction	of spac	eating sy e heat fro in heating	om main	system((s)				1.0000 94.21%			(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space h	eating re	equireme	nt								I	
680.87	529.51	430.13	222.25	82.18	-	-	-	-	218.59	460.21	691.63	(98)
Appendi	ix Q - mo	onthly en	ergy sav	ed (mair	heating	system	1)		ı			
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	eating fu	uel (main	heating	system	1)							
172.72	134.32	109.11	56.38	20.85	-	-	-	-	55.45	116.74	175.45	(211)
Appendi	ix Q - mo	onthly en	ergy sav	ed (mair	heating	system	2)	!	II.		!	
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space h	eating fu	uel (main	heating	system	2)		ļ.	!	Į.	ı		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendi	ix Q - mo	onthly en	ergy sav	ed (seco	ndary he	eating sy	stem)	ļ.	Į.			
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space h	eating fu	iel (seco	ndary)	-	1		1	1			· · · · · · · · · · · · · · · · · · ·	
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water h Water h		equireme	nt									
208.38	183.80	193.37	173.80	170.65	152.96	147.36	161.07	160.59	180.20	189.96	203.52	(64)
Efficience	y of wat	er heate	Γ								295.93	(216)
295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	(217)
Water h	eating fu	iel										
70.42	62.11	65.34	58.73	57.67	51.69	49.80	54.43	54.27	60.89	64.19	68.77	(219)
Annual t		00.04	30.73	37.07	31.03	49.00	34.43	34.21	00.03	04.13	kWh/yea	, ,
		uel used,		stem 1							841.01	(211)
		uel (seco	ndary)								0.00	` '
Water h		ıeı mps, fan	s and ale	octric ka	an hot						718.31	(219)
		or the ab			5p-110t						0.00	(231)
Electricit	ty for ligh	nting (10	0.00% fix	κeď LEL))						388.03	
		eneration										(22.7)
Appendi		ated - μC	HP/heat	pump							0.00	(235)
		or genera	ated ()·								0.000	(236a)
	y used ()		().								0.000	
Total de	livered e	energy fo	r all uses	3							1947.34	(238)

10a. Fuel costs using Table 12 prices

,	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	841.008	13.190	110.93	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
High-rate percentage	100.000%			(243)
Low-rate percentage	0.000%			(244)
High-rate cost	718.31	13.190	94.74	(245)
Low-rate	0.00	13.190	0.00	(246)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	0.000	13.190	0.00	(249)
Energy for lighting	388.029	13.190	51.18	(250)
Additional standing charges			0.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			256.85	(255)
11a. SAP rating				
			0.42	(256)
			0.84	(257)
SAP value			88.33	
			88	(258)
SAP band			В	

12a. Carbon dioxide emissions

	Energy	Emission factor	Emission	S
	kWh/year	kg CO2/kWh	kg CO2/ye	ear
Space heating, main system 1	841.01	0.519	436.48	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	718.31	0.519	372.80	(264)
Space and water heating			809.28	(265)
Electricity for pumps and fans	0.00	0.519	0.00	(267)
Electricity for lighting	388.03	0.519	201.39	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - µCHP	0.00	0.519	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1010.67	(272)
			kg/m²/yea	ır
CO2 emissions per m ²			12.03	(273)
El value			89.50	(273a)
El rating			90	(274)
El band			В	

Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

 $(13.19 / 3.9421) \times (1 + (0.29 \times 0.25)) = 3.5885$, stars = 5 $(0.5190 / 3.9421) \times (1 + (0.29 \times 0.25)) = 0.1412$, stars = 5 13.19 / 2.9593 = 4.4572, stars = 4 $0.52 / + (0.00 \times 0.52) = 0.1754$, stars = 5

Project Information

Building type Detached house

Reference Date

Project Type B

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 worksheet for New dwelling as designed - calculation of dwelling emissions

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	\ 42.00	2.35	` 98.70	(3a)
First floor	42.00	2.65	111.30	(3b)
	84.00			(4)
			210.00	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondary	y + othe	r	-	
	er of chim						0 + 0 + 0		40		0.00	(6a)
	er of ope						0 + 0 + 0	X	20		0.00	(6b)
		mittent f					4		(10		40.00	(7a)
		sive vent					0		(10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	×	40		0.00	(7c)
											Air chan	ges per hour
											0.19	(8)
Pressu	ire test, r	esult q50)						5.00			(17)
Air peri	meability	,									0.54	(18)
											2.00	(19)
											0.85	(20)
		ncorpora modified									0.46	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor				1		-			-	52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
	ļ			ļ	-1			-	I		13.13	(22a)
		tion rate	•	for she		wind spe	eed)					
0.59	0.57	0.56	0.51	0.49	0.44	0.44	0.42	0.46	0.49	0.52	0.54	
		ural vent	,	ntermitte	nt extrac	t fans					6.03	(22b)
		ange rate		1	1		1	1		1		()
0.67	0.66	0.66	0.63	0.62	0.60	0.60	0.59	0.61	0.62	0.63	0.65	(25)

3. Heat losses and heat	t loss paramete	r					
Element Gross	Openings	Net area	U-value	AxU	kappa-value	∍ A x K	
area, m ²	² m ²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-glazed		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0	.1,						
soft coat (SouthWest)							
dg							
Window - Double-glazed		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0	.1,						
soft coat (SouthWest)							
dg							(a=)
Window - Double-glazed		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0	.1,						
soft coat (SouthWest)							
dg William Davidson	•	4.040	4.4.7.4.00\	4.04			(07)
Window - Double-glazed		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0	. 1,						
soft coat (SouthWest)							
dg Window - Double-glazed	İ	1.610	1 15 (1 20)	1.84			(27)
argon filled, low-E, En=0		1.610	1.15 (1.20)	1.04			(27)
soft coat (NorthEast)	. 1 ,						
dg							
Window - Double-glazed	1	1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0		1.010	1.13 (1.20)	1.04			(21)
soft coat (NorthEast)	,						
dg							
Window - Double-glazed	l <u>.</u>	1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0			()				()
soft coat (NorthEast)	,						
dg							
Solid door		1.890	1.20	2.27			(26)
dg							
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argon fille							
low-E, En=0.1, soft coat							
(NorthEast)							
dg							
Pitched roofs insulated b	etween joists	42.00	0.10	4.20	9.00	378.00	(30)
Walls		111.80	0.19	21.24	60.00	6708.00	(29)
Brick and block cavity v	wall, full fill	40.00	0.44	= 05	440.00	4000.00	(00)
Ground floors		42.00	0.14	5.88	110.00	4620.00	(28)

Assumed occupancy, N Annual average hot water usage in litres per day Vd,average Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov De	2.53								
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov De	94.39								
	ec								
Hot water usage in litres per day for each month									
103.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103	3.83								
Energy content of hot water used									
153.98 134.67 138.97 121.16 116.25 100.32 92.96 106.67 107.94 125.80 137.32 149.12									
Energy content (annual) 1. Distribution loss	485.15								
23.10 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.	.37								
Cylinder volume, I 150.00									
Manufacturer's declared cylinder loss factor (kWh/day) 1.86									
Temperature Factor 0.5400									
Energy lost from hot water cylinder (kWh/day) Total storage loss	1.00								
31.14 28.12 31.14 30.13 31.14 30.13 31.14 31.14 30.13 31.14 30.13 31.	.14								
Net storage loss									
31.14 28.12 31.14 30.13 31.14 30.13 31.14 31.14 30.13 31.14 30.13 31.	.14								
Primary loss									
23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26	.26								
Total heat required for water heating calculated for each month									
208.38 183.80 193.37 173.80 170.65 152.96 147.36 161.07 160.59 180.20 189.96 203	3.52								
Output from water heater for each month, kWh/month									
208.38 183.80 193.37 173.80 170.65 152.96 147.36 161.07 160.59 180.20 189.96 203	3.52								
Heat gains from water heating, kWh/month	125.65								
94.72 84.09 89.73 82.40 82.17 75.47 74.43 78.99 78.01 85.35 87.77 93	.10								

_	-				-
F	In	+~	rna	1 ^	ains
IJ.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	LEI	IIIa	ιu	iaiiis

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metaboli	c gains,	Watts										
126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	(60
Lighting gains												
21.97	19.52	15.87	12.02	8.98	7.58	8.19	10.65	14.29	18.15	21.18	22.58	(6
Appliand	es gains	,										
227.60	229.96	224.01	211.34	195.34	180.31	170.27	167.91	173.86	186.53	202.52	217.55	(68
Cooking	gains											
35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	(69
Pumps a	and fans	gains										
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(70
Losses e	e.g. evap	oration (negative	values)								
-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	(7
Water he	eating ga	ains										
127.31	125.13	120.60	114.44	110.45	104.82	100.04	106.17	108.34	114.71	121.91	125.14	(7
Total internal gains												
437.89	435.62	421.49	398.81	375.79	353.73	339.52	345.74	357.51	380.41	406.63	426.29	(7

6. Solar gains (calculation for January)

	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

	interna			l		Th. 4	(%C)				04.00
	ature du system			oas in the	e iiving a	rea, ini	(30)				21.00 0.75
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	1		1 -		ı	ı	1 -		1		
51.59	51.80	52.01	53.01	53.20	54.12	54.12	54.29	53.76	53.20	52.82	52.42
alpha	1		1	I	I	1					
4.44	4.45	4.47	4.53	4.55	4.61	4.61	4.62	4.58	4.55	4.52	4.49
Utilisatio	n factor	for gains	s for livin	g area	1	•	•	1		1	
1.00	0.99	0.99	0.96	0.87	0.71	0.55	0.61	0.85	0.97	0.99	1.00
Tweekd	ay		•				•	•	•		
19.69	19.83	20.08	20.42	20.70	20.87	20.92	20.91	20.78	20.42	20.00	19.67
Tweeke	nd										
20.26	20.34	20.48	20.67	20.83	20.93	20.95	20.95	20.88	20.67	20.43	20.25
24 inste	ad of 16		_								
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 inste	ad of 9		•				•				
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16 inste	ad of 9		,								
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean in	ternal te	mperatu	re in livir	ig area T	1						
19.85	19.98	20.19	20.48	20.74	20.89	20.93	20.92	20.81	20.49	20.12	19.84
Temper	ature du	ring heat	ting perio	ods in res	st of dwe	elling Th2	2				
19.80	19.81	19.81	19.83	19.84	19.85	19.85	19.86	19.85	19.84	19.83	19.82
	on factor				ing						
1.00	0.99	0.98	0.94	0.82	0.61	0.41	0.47	0.78	0.96	0.99	1.00
Tweekd											
18.28	18.47	18.78	19.22	19.55	19.73	19.76	19.76	19.66	19.23	18.70	18.28
Tweeke	nd					_		_			
18.28	18.47	18.78	19.22	19.55	19.73	19.76	19.76	19.66	19.23	18.70	18.28
Mean in	ternal te				welling 1	Γ2					
18.28	18.47	18.78	19.22	19.55	19.73	19.76	19.76	19.66	19.23	18.70	18.28
	rea fract ternal te				dwelling)					0.18
18.56	18.74	19.03	19.45	19.77	19.94	19.97	19.97	19.86	19.45	18.95	18.56
Apply a	djustmer	t to the i	mean int	ernal ten	nperatur	e, where	appropr	riate	1	1	1
18.56	18.74	19.03	19.45	19.77	19.94	19.97	19.97	19.86	19.45	18.95	18.56

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation factor for gains												
0.99	0.99	0.98	0.93	0.82	0.62	0.43	0.49	0.78	0.95	0.99	1.00	
Useful gains												
541.43	621.63	697.50	756.57	725.41	544.53	359.00	375.74	537.79	573.50	530.55	513.88	
Monthly average external temperature												
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20	
Heat los	s rate fo	r mean ii	nternal te	emperati	ire							
1612.56	1558.24	1406.00	1160.43	884.35	575.54	363.41	383.59	625.31	970.81	1309.06	1597.64	
Fraction	of mont	h for hea	iting									
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	
Space h	eating re	quireme	nt for ea	ch mont	h, kWh/r	nonth						
796.92	629.40	527.12	290.78	118.25	-	-	-	-	295.59	560.53	806.32	
	ace heat					ar) (Octo	ber to N	lay)			4024.91	
Space h	eating re	equireme	nt per m	² (kWh/r	n²/year)						47.92	2 (

8c. Space cooling requirement - not applicable

9a. Energy requirements

9a. ⊑⊓e	rgy requ	ın emem	15								kWh/ye	ar
Fraction	of spac	eating sy e heat fro in heating	om main	system((s)				1.0000 94.21%			(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space h	eating re	equireme	ent									
796.92	629.40	527.12	290.78	118.25	-	-	-	-	295.59	560.53	806.32	(98)
Appendi	x Q - mo	onthly en	ergy sav	ed (mair	heating	system	1)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	eating fu	uel (main	heating	system	1)	•					-	
202.15	159.66	133.72	73.76	30.00	-	-	-	-	74.98	142.19	204.54	(211)
Appendi	x Q - mo	onthly en	ergy sav	ed (mair	heating	system	2)	!			· · · · · · · · · · · · · · · · · · ·	
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space h	eating fu	iel (main	heating	system	2)	•	·	!	Į.	ı	· · · · · · · · · · · · · · · · · · ·	
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendi	x Q - mo	onthly en	ergy sav	ed (seco	ndary he	eating sy	stem)	ļ.	Į.		· · · · · · · · · · · · · · · · · · ·	
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space h	eating fu	iel (seco	ndary)	-	•	•	1	1				
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water h		equireme	ent			•						
208.38	183.80	193.37	173.80	170.65	152.96	147.36	161.07	160.59	180.20	189.96	203.52	(64)
Efficience	y of wat	er heate	r								295.93	(216)
295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	(217)
Water h	eating fu	iel	•		•		•			•		
70.42	62.11	65.34	58.73	57.67	51.69	49.80	54.43	54.27	60.89	64.19	68.77	(219)
Annual t	totals	1				10100					kWh/yea	ar
		uel used, uel (seco		stem 1							1021.00 0.00	` '
Water h			iluai y)								718.31	
		mps, fan	s and ele	ectric ke	ep-hot						7 10.01	(=:0)
		or the ab									0.00	
		nting (100 eneration)						388.03	(232)
	ty genera	ated - µC									0.00	(235)
		or genera	ated ():								0.000	(236a)
	y used ()		•								0.000	
Total de	livered e	energy fo	r all uses	5							2127.33	(238)

10a. Does not apply

11a. Does not apply

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions	_
Space heating, main system 1	1021.00	0.519	529.90	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	718.31	0.519	372.80	(264)
Space and water heating			902.70	(265)
Electricity for pumps and fans	0.00	0.519	0.00	(267)
Electricity for lighting	388.03	0.519	201.39	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - µCHP	0.00	0.519	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1104.09	(272)
			kg/m²/yea	r
Dwelling Carbon Dioxide Emission Rate (DER)			13.14	(273)

Project Information

Building type Detached house

Reference Date

Project Type B

Oaklands Drive Almondsbury BS32 4AB

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.05.063, printed on 02/06/2022 at 06:59:08

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate
Dwelling Carbon Dioxide Emission Rate

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)
Dwelling Fabric Energy Efficiency (DFEE)

TFEE = 61.4 DFEE = 53.3

TER = 28.77

DER = 13.14

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element Highest <u>Average</u> Wall OK 0.19 (max. 0.30) 0.19 (max. 0.70) Floor 0.14 (max. 0.25) 0.14 (max. 0.70) OK 0.10 (max. 0.20) Roof 0.10 (max. 0.35) OK Openings 1.20 (max. 2.00) 1.20 (max. 3.30) OK

3 Air permeability

Air permeability at 50 pascals: 5.00 Maximum: 10.00

OK

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric

Mitsubishi Electric Ecodan 6.0 kW

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulationHot water storage No cylinder

Page 20 of 26

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls 2207 Time and temperature zone control OK

Hot water controls No cylinder

Boiler Interlock No OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Severn Valley):

OK

Not significant

OK

Based on:

Thermal mass parameter: 250.00

Overshading: Average or unknown (20-60 % sky blocked)

Orientation : SouthWest

Ventilation rate: 8.00

Blinds/curtains:

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Pitched roofs insulated between joists U-value 0.10 W/m²K

Project Information

Building type Detached house

Reference Date

Project Type B

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 06:59 AM

Type B ASHP

Type B

Oaklands Drive Almondsbury BS32 4AB

Located in: England
Region: Severn Valley
Postcode: BS32 4AB

UPRN:

Date of assessment: 2022-06-01 Date of certificate: 2022-06-02

Assessment type: New dwelling as designed

Tenure: Unknown
Transaction type: New dwelling
Related party disclosure: No related party

PCDF revision number: 495

Property description

Dwelling type: Detached house

Ground floor (1) area = 42.00m² storey height = 2.35m storey height = 2.65m storey height = 2.65m

Living area: 15.00 (fraction 0.179)

Front of dwelling faces: SouthWest

Doors

Solid door area = 1.89 U = 1.20

Full glazed door area = 5.04 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Windows

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

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Project InformationBuilding type Detached house

Reference Date

Project Type B

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 06:59 AM

Type B ASHP

Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	 Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	 Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	 Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unkno	wn (20-60 % sky block	(ed)
Rooflights			
Opaque Elements Roofs Walls Ground floors	area = 42.00 area = 111.80 area = 42.00	U = 0.10, k = 9.0 U = 0.19, k = 60.0 U = 0.14, k = 110.0	Brick and block cavity wall, full fill
Thermal bridges: E10 Eaves (insulation at ceiling level) [A]	Htb = 14.00 0.060	0.060	14.100
E12 Gable (insulation at ceiling level) [A]	0.240	0.240	23.900
E16 Corner (normal) [A] E17 Corner (inverted – internal area greater than external area) [A]	0.090 -0.090	0.090 -0.090	27.400 5.000
E2 Other lintels (including other steel lintels) [A] Openings lintels	0.300	0.300	21.850
E3 Sill [A] Openings sills	0.040	0.040	21.850
E4 Jamb [A] Openings jambs	0.050	0.050	43.500
E5 Ground floor (normal) [A]	0.160	0.160	38.900
E6 Intermediate floor within a dwelling [A]	0.070	0.070	38.900

Project Information

Building type Detached house

Reference Date

Project Type B

> Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 06:59 AM

Type B ASHP

Thermal mass: User defined - 250.00

Pressure test: Yes (q50 - 5.00): measured in this dwelling: No Ventilation: Natural ventilation with intermittent extract fans

Number of chimneys: Number of open flues: 0 Number of intermittent 4

fans:

Number of passive stacks: Number of sides sheltered: 2.00 Measured/design q50: 5.00

Main heating system: Central heating systems with radiators or underfloor heating

Heat pumps

Electric Air source heat pump with flow temperature <= 35°C

Index: 104634

Mitsubishi Electric Ecodan 6.0 kW PUZ-WM60VAA

Underfloor, pipes in screed above insulation

Pump in heated space: No

Boiler has load or weather compensator: Yes

Boiler Interlock: No

Design flow temperature: Unknown Central heating pump 2013 or later

Not MCS Approved Installer

Standard tariff

Main heating controls: 2207 Time and temperature zone control

Boiler has load

compensator:

Boiler has weather

Yes

No

compensator:

Boiler has emhanced load

No

compensator:

Boiler interlock: No

Secondary heating system: None

Water heating: MicroCHP or Heat Pump

Manufacturer's declared cylinder loss factor (kWh/day) 1.86

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Project Information

Building type Detached house

Reference Date

Project Type B

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 06:59 AM

Type B ASHP

Cylinder volume: 150.00 Insulation type: Factory Insulation thickness: -1.00 Cylinder heater: n/a

Cylinder in heated space: Yes

Insulated primary: Yes Cylinder thermostat: Yes

Separate timer for domestic hot water: Yes

Solar panel: no

Water use <= 125 Yes

litres/person/day:

Low energy lights: 100.0% of fixed lighting outlets

Total fixed lighting outlets: 30

Electricity tariff: Standard tariff
Photovoltaics 1: Peak kW: 0.00
Photovoltaics 2: Peak kW: 0.00
Photovoltaics 3: Peak kW: 0.00

Conservatory: No Fixed air conditioning: No

Smoke Control Area: Not specified Additional allowable electricity generation:

0.00kg/m²/year

Predicted Energy Assessment

Type B Oaklands Drive Almondsbury BS32 4AB Dwelling type: Detached house
Date of assessment: 2 June 2022

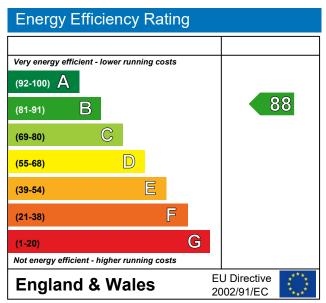
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Produced by Complete Energy Consultancy Ltd

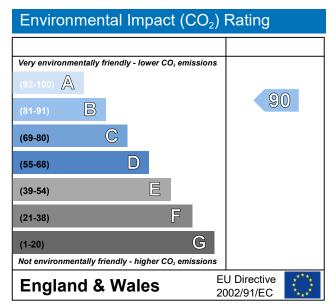
Total floor area: 84 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Project InformationBuilding type Detached house

Reference Date

Project

Type B Oaklands Drive Almondsbury BS32 4AB

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	42.00	2.35	98.70	(3a)
Ground floor (1) First floor	42.00	2.65	111.30	(3b)
	84.00			(4)
			210.00	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondar	y + othe	r	-	
	er of chin						0 + 0 + 0		< 40		0.00	(6a)
	er of ope						0 + 0 + 0		〈 20		0.00	(6b)
	er of inter						4		< 10		40.00	(7a)
	er of pass						0		< 10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	>	< 40		0.00	(7c)
											Air chan	ges per hour
											0.19	(8)
Pressu	ıre test, r	esult q50)						7.00			(17)
Air per	meability	,									0.54	(18)
											2.00	(19)
											0.85	(20)
	ion rate i ion rate i										0.46	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor				•	•			-	•	52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
											13.13	(22a)
Adjuste	ed infiltra	tion rate	(allowing	g for she	lter and	wind spe	eed)					
0.59	0.57	0.56	0.51	0.49	0.44	0.44	0.42	0.46	0.49	0.52	0.54	
											6.03	(22b)
	ition : nat ve air cha		,	ntermitte	nt extrac	ct fans						
0.67	0.66	0.66	0.63	0.62	0.60	0.60	0.59	0.61	0.62	0.63	0.65	(25)
										-		

3. Heat losses and heat	t loss paramete	r					
Element Gross	Openings	Net area	U-value	AxU	kappa-value	∍ A x K	
area, m ²	² m ²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-glazed		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0	.1,						
soft coat (SouthWest)							
dg							
Window - Double-glazed		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0	.1,						
soft coat (SouthWest)							
dg							(a=)
Window - Double-glazed		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0	.1,						
soft coat (SouthWest)							
dg William Davidson	•	4.040	4.4.7.4.00\	4.04			(07)
Window - Double-glazed		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0	. 1,						
soft coat (SouthWest)							
dg Window - Double-glazed	İ	1.610	1 15 (1 20)	1.84			(27)
argon filled, low-E, En=0		1.610	1.15 (1.20)	1.04			(27)
soft coat (NorthEast)	. 1 ,						
dg							
Window - Double-glazed	1	1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0		1.010	1.13 (1.20)	1.04			(21)
soft coat (NorthEast)	,						
dg							
Window - Double-glazed	l <u>.</u>	1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0			()				()
soft coat (NorthEast)	,						
dg							
Solid door		1.890	1.20	2.27			(26)
dg							
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argon fille							
low-E, En=0.1, soft coat							
(NorthEast)							
dg							
Pitched roofs insulated b	etween joists	42.00	0.10	4.20	9.00	378.00	(30)
Walls		111.80	0.19	21.24	60.00	6708.00	(29)
Brick and block cavity v	wall, full fill	40.00	0.44	= 05	440.00	4000.00	(00)
Ground floors		42.00	0.14	5.88	110.00	4620.00	(28)

	r heating		/ require	ements							kWh/year
	ed occupa average		r usane i	in litres r	er day \	/d avera	ne e				2.53 94.39
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	er usage		•			Jour	/ tug	ССР	001	1407	Воо
	100.06		92.50	88.73	84.95	84.95	88.73	92.50	96.28	100.06	103.83
	content c			00.70	0 1.00	000	00.10	02.00	00.20	100.00	100.00
	134.67			116.25	100.32	92.96	106.67	107.94	125.80	137.32	149.12
Energy	content (1485.15
23.10	20.20	20.85	18.17	17.44	15.05	13.94	16.00	16.19	18.87	20.60	22.37
Energy l Fotal sto	ature fac lost from orage los ∫∩ ∩∩	store (k	,	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	age loss										
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Primary		1	1	I	1		1	1	1	1	1
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	oss calcu				00.00	00.00	04.04	00.07	04.44	00.40	04.00
24.30	21.93 at requir	24.20	23.33	24.05	23.20	23.93	24.01	23.27	24.14	23.46	24.28
								121 22	140.04	160.70	172 10
178.28	rom wate		144.49				130.68	131.22	149.94	160.78	173.40
178.28						116.89	130.68	131.22	149.94	160.78	173.40
170.20	130.00	103.17	144.49	140.30	123.32	110.09	130.00	131.22	149.94	100.76	1769.24
Heat ga	ins from	water he	eating, k\	Wh/mont	:h						1100.24
57.27	50.26	52.26	46.12	44.67	39.16	36.89	41.47	41.71	47.86	51.52	55.65
										1	

_			-
F	Inte	rnal	gains
IJ.	IIILE	:iiiai	uaiiis

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metaboli	ic gains,	Watts	,	•							
152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06
Lighting	gains		,	,							
54.93	48.79	39.68	30.04	22.45	18.96	20.48	26.62	35.74	45.37	52.96	56.46
Applianc	es gains	3									
339.70	343.22	334.34	315.43	291.56	269.12	254.13	250.61	259.49	278.40	302.27	324.71
Cooking	gains		•								
52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74
Pumps a	and fans	gains	•								
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Losses	e.g. evap	oration	negative	values)							
-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38
Water h	eating ga	ains									
76.98	74.79	70.24	64.05	60.03	54.38	49.58	55.74	57.93	64.33	71.56	74.80
Total int	ernal gai	ns									
578.04	573.23	550.68	515.95	480.47	448.89	430.63	439.40	459.59	494.54	533.22	562.39

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79		0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

	interna						(0.0)				
	ature dui system i		ting perio	ds in the	e living a	rea, Th1	(°C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
au	Len	IVIAI	Арі	iviay	Juli	Jui	Aug	Seb	OCI	INOV	Dec
	F4 00	FO 04	T2 04	F0 00	E4.40	E4.40	F4.00	F0.70	F0.00	F0 00	FO 40
51.59	51.80	52.01	53.01	53.20	54.12	54.12	54.29	53.76	53.20	52.82	52.42
alpha	T		T								T
4.44	4.45	4.47	4.53	4.55	4.61	4.61	4.62	4.58	4.55	4.52	4.49
			s for livin		1				1		
0.99	0.99	0.97	0.93	0.83	0.66	0.50	0.55	0.80	0.95	0.99	0.99
			re in livin	<u> </u>							
19.70	19.86	20.13	20.49	20.79	20.95	20.99	20.98	20.87	20.50	20.04	19.68
•			ting perio			lling Th2					
19.80	19.81	19.81	19.83	19.84	19.85	19.85	19.86	19.85	19.84	19.83	19.82
Utilisatio	on factor	for gains	s for rest	of dwelli	ing						
0.99	0.98	0.96	0.91	0.77	0.56	0.37	0.42	0.71	0.93	0.98	0.99
Mean in	ternal te	mperatu	re in the	rest of d	welling T	2					
18.10	18.34	18.74	19.26	19.64	19.82	19.85	19.85	19.75	19.28	18.63	18.09
			0 / 84.00				•				0.18
			re (for the								
18.39	18.61	18.99	19.48	19.84	20.02	20.05	20.05	19.95	19.50	18.88	18.37
			mean inte		nperatur	e, where	appropr	iate			
18.39	18.61	18.99	19.48	19.84	20.02	20.05	20.05	19.95	19.50	18.88	18.37
e Snac	e heatin	a roauir	romont								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	n factor			iviay	Juli	Jui	Aug	Seh	OCI	INOV	Dec
				0.77	0.50	0.40	0.45	0.70	0.00	0.00	0.00
0.99	0.98	0.96	0.90	0.77	0.58	0.40	0.45	0.72	0.92	0.98	0.99
Useful g		000.07	1005.00	707.00	504.04	000.00	000.70	F74 00	050.00	0.47.00	044.00
			835.09		561.04	368.93	386.78	571.06	658.82	647.00	644.88
			temper		14400	10.00	10.10	14440	10.00	I = 40	14.00
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
			nternal te						T	1	T
			31164.37	892.78	584.51	372.24	392.44	635.00	975.85	1301.2	51577.29
	of mont										
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space h	neating re	equireme	ent for ea	ch mont	h, kWh/i	month					
		I .	237.08		-	-	-	-	235.87	471.06	693.71
			irement			ear) (Oct	ober to N	Лау)	•	•	3390.55
Space h	neating re	equireme	ent per m	ı² (kWh/r	m²/year)						40.36

8c. Space cooling requirement - not applicable

9a. Energy requirements

a. Energy requirements	kWh/year	
No secondary heating system selected Fraction of space heat from main system(s) Efficiency of main heating system 1.0000 92.90%	•	(202) (206)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov I	Dec	
Space heating requirement		
682.96 534.89 441.61 237.08 93.37 - - - - 235.87 471.06 0	693.71	(98)
Appendix Q - monthly energy saved (main heating system 1)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	0.00	(210)
Space heating fuel (main heating system 1)		
735.16 575.77 475.36 255.20 100.51 - - - 253.89 507.06	746.73	(211)
Appendix Q - monthly energy saved (main heating system 2)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	0.00	(212)
Space heating fuel (main heating system 2)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	0.00	(214)
Space heating fuel (secondary)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	0.00	(215)
Water heating		
Water heating requirement		
	173.40	(64)
Efficiency of water heater	86.60	(216)
	89.22	(217)
Water heating fuel		
199.87 175.70 183.37 163.04 159.63 142.63 134.97 150.90 151.52 169.25 180.58	194.35	(219)
Annual totals Space heating fuel used, main system 1 Space heating fuel (secondary) Water heating fuel	kWh/year 3649.68 0.00 2005.80	(211) (215) (219)
Electricity for pumps, fans and electric keep-hot central heating pump boiler with a fan-assisted flue Total electricity for the above, kWh/year Electricity for lighting (100.00% fixed LEL) Energy saving/generation technologies Appendix Q -	30.00 45.00 75.00 388.03	(230c) (230e) (231) (232)
Energy saved or generated (): Energy used ():	0.000	(236a) (237a)
Total delivered energy for all uses	6118.51	(238)

,	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	3649.680	3.480	127.01	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	2005.80	3.480	69.80	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	388.029	13.190	51.18	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			377.88	(255)
11a. SAP rating				
-			0.42	(256)
			1.23	(257)
SAP value			82.84	
			83	(258)
SAP band			В	

12a. Carbon dioxide emissions

	Energy Emission factor		Emission	S
	kWh/year	kg CO2/kWh	kg CO2/y	ear
Space heating, main system 1	3649.68	0.216	788.33	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2005.80	0.216	433.25	(264)
Space and water heating			1221.58	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	388.03	0.519	201.39	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1461.90	(272)
			kg/m²/yea	
CO2 emissions per m ²			17.40	(273)
El value			84.81	(273a)
El rating			85	(274)
El band			В	

Calculation of stars for heating and DHW

Main heating energy efficiency Main heating environmental impact Water heating energy efficiency Water heating environmental impact

 $(3.48 / 0.8990) \times (1 + (0.29 \times 0.00)) = 3.8710$, stars = 4 (0.2160 / 0.8990) x $(1 + (0.29 \times 0.00)) = 0.2403$, stars = 4 3.48 / 0.8809 = 3.9506, stars = 4 0.2160 / 0.8809 = 0.2452, stars = 4

Project Information

Building type Detached house

Reference Date

Project Type B

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 worksheet for New dwelling as designed - calculation of dwelling emissions

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	42.00	2.35	98.70	(3a)
First floor	42.00	2.65	111.30	(3b)
	84.00			(4)
			210.00	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondary	y + othe	r	·	
	er of chin						0 + 0 + 0		40		0.00	(6a)
	er of ope						0 + 0 + 0		20		0.00	(6b)
		mittent f					4		(10		40.00	(7a)
		sive vent					0		(10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	×	40		0.00	(7c)
											Air chan	ges per hour
											0.19	(8)
Pressu	ıre test, r	esult q50)						5.00			(17)
Air per	meability	,									0.54	(18)
											2.00	(19)
											0.85	(20)
		ncorpora modified									0.46	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor	'		-1	-1				1		52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
											13.13	(22a)
Adjuste	ed infiltra	tion rate	(allowing	g for she	Iter and v	wind spe	eed)					,
0.59	0.57	0.56	0.51	0.49	0.44	0.44	0.42	0.46	0.49	0.52	0.54	
									•		6.03	(22b)
		ural vent ange rate		ntermitte	nt extrac	t fans						
0.67	0.66	0.66	0.63	0.62	0.60	0.60	0.59	0.61	0.62	0.63	0.65	(25)
								-			_	

3. Heat losses and heat loss parameter Element Net area U-value $A \times U$ kappa-value A x K Gross Openings area, m² A, m² W/m^2K W/K kJ/m²K kJ/K m² Window - Double-glazed, 1.610 1.15 (1.20) 1.84 (27)argon filled, low-E, En=0.1, soft coat (NorthEast) dg Window - Double-glazed, 1.610 1.84 (27)1.15 (1.20) argon filled, low-E, En=0.1, soft coat (NorthEast) dg Window - Double-glazed, 1.610 1.15 (1.20) 1.84 (27)argon filled, low-E, En=0.1, soft coat (NorthEast) dg Window - Double-glazed, 1.610 1.15 (1.20) 1.84 (27)argon filled, low-E, En=0.1, soft coat (SouthWest) Window - Double-glazed, 1.610 1.84 (27)1.15 (1.20) argon filled, low-E, En=0.1, soft coat (SouthWest) dg Window - Double-glazed, 1.610 1.84 (27)1.15 (1.20) argon filled, low-E, En=0.1, soft coat (SouthWest) dg Window - Double-glazed. 1.610 1.84 (27)1.15 (1.20) argon filled, low-E, En=0.1, soft coat (SouthWest) dg Solid door 1.890 1.20 2.27 (26)dq Full glazed door -5.040 1.20 6.05 (26)Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg 4.20 9.00 Pitched roofs insulated between joists 42.00 0.10 378.00 (30)111.80 0.19 21.24 60.00 6708.00 Walls (29)Brick and block cavity wall, full fill Ground floors 42.00 0.14 5.88 110.00 4620.00 (28)

Autorition Section S		r heating		/ require	ements							kWh/year	
an Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec ot water usage in litres per day for each month 03.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103.83 100.06 103.83 100.06 103.83 100.06 103.83 100.06 103.83 100.06 103.83 100.06 103.83 100.06 103.97 121.16 116.25 100.32 92.96 106.67 107.94 125.80 137.32 149.12 1485.15 100.06 100.0				r usage i	in litres p	er day V	/d,avera	ge					(42 (43
103.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103.83 103.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103.83 105.398 134.67 138.97 121.16 116.25 100.32 92.96 106.67 107.94 125.80 137.32 149.12 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 10.00 20.00	Jan							-	Sep	Oct	Nov	Dec	`
nergy content of hot water used 53.98 134.67 138.97 121.16 116.25 100.32 92.96 106.67 107.94 125.80 137.32 149.12 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 13.10 120.20 120.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 120.60 12.37 1485.15 13.10 120.20 120.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 120.60 12.37 1485.15 13.10 120.20 120.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 120.60 12.37 1485.15 149.14 15.05 13.94 16.00 16.19 18.87 120.60 120.	Hot wate	er usage	in litres	per day t	or each	month			-		I.		
138.97 138.97 121.16 116.25 100.32 92.96 106.67 107.94 125.80 137.32 149.12 1485.15 1485.1	103.83	100.06	96.28	92.50	88.73	84.95	84.95	88.73	92.50	96.28	100.06	103.83	(44
1485.15 15 15 15 15 15 15 15	Energy o	content c	f hot wa	ter used									
stribution loss 3.10 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 (4 store loss determined from EN 13203-2 tests, taken from boiler data record but water cylinder loss factor (kWh/day) 0.0000 (5 to twater cylinder loss factor (kWh/day) 0.0000 (5 to twater cylinder loss factor (kWh/day) 0.0000 (5 to twater cylinder loss factor (kWh/day) 0.000 (5 to twater cylinder loss factor (kWh/day) 0.000 (5 to twater cylinder loss factor (kWh/day) 0.00	153.98			121.16	116.25	100.32	92.96	106.67	107.94	125.80	137.32	149.12	
Store loss determined from EN 13203-2 tests, taken from boiler data record 0.00			annual)					,				1485.15	(45
to twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater lest from store (kWh/day) of twater loss of twater cylinder loss factor (kWh/day) of twater loss of twater cylinder loss factor (kWh/day) of twater loss factor (kWh/day) of twater loss of twater cylinder loss factor (kWh/day) of twater loss of twater cylinder loss factor (kWh/day) of twater loss of twater cylinder loss factor of twater loss of twater cylinder loss factor of twater loss of twater cylinder loss of twater loss of	23.10	20.20	20.85	18.17	17.44	15.05	13.94	16.00	16.19	18.87	20.60	22.37	(46
otal storage loss 1.00 0.0	olume empera	factor ature fac	tor	·	/h/day)							0.0000 0.0000 0.0000	(5) (5) (5)
et storage loss .00 0.00	otal sto			· · · · · · · · · · · · · · · · · · ·								0.00	(0
1.00 0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
imary loss 00 0.00													
1.00 0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
ombi loss calculated for each month 4.30 21.93 24.20 23.33 24.05 23.20 23.93 24.01 23.27 24.14 23.46 24.28 otal heat required for water heating calculated for each month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 utput from water heater for each month, kWh/month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 60 1769.24	•			1	ı		1		ı	ı			
4.30 21.93 24.20 23.33 24.05 23.20 23.93 24.01 23.27 24.14 23.46 24.28 otal heat required for water heating calculated for each month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 otal heat required for water heater for each month, kWh/month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 eat gains from water heating, kWh/month	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
otal heat required for water heating calculated for each month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 140.20 140.20 140.20 123.52 116.89 130.68 131.22 149.94 160.78 173.40 1769.24 176						T	T	T	T	I =	1	T	
78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 utput from water heater for each month, kWh/month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 (60.78 173.40									23.27	24.14	23.46	24.28	(6
utput from water heater for each month, kWh/month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 (6									T	T	1	T	,_
78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 (6 eat gains from water heating, kWh/month								130.68	131.22	149.94	160.78	173.40	(6
1769.24 (6 eat gains from water heating, kWh/month								T	T		1		,_
eat gains from water heating, kWh/month	178.28	156.60	163.17	144.49	140.30	123.52	116.89	130.68	131.22	149.94	160.78		•
	leat gai	ins from	water he	eating, k\	Wh/mont	:h						1769.24	(6
	57.27						36.89	41.47	41.71	47.86	51.52	55.65	(6

_	-				-
F	In	+~	rna	1 ^	ains
IJ.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	LEI	IIIa	ιu	iaiiis

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metaboli	c gains,	Watts							•		
126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72
Lighting gains											
21.97	19.52	15.87	12.02	8.98	7.58	8.19	10.65	14.29	18.15	21.18	22.58
Appliances gains											
227.60	229.96	224.01	211.34	195.34	180.31	170.27	167.91	173.86	186.53	202.52	217.55
Cooking gains											
35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67
Pumps a	and fans	gains							•		
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Losses	e.g. evap	oration (negative	values)					•		
-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38
Water h	eating ga	ains									
76.98	74.79	70.24	64.05	60.03	54.38	49.58	55.74	57.93	64.33	71.56	74.80
Total into	ernal gai	ns									
390.57	388.28	374.13	351.42	328.38	306.29	292.06	298.31	310.10	333.03	359.28	378.95

6. Solar gains (calculation for January)

3 (, ,	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dq	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

	n interna										
	rature du g system i			ds in the	living a	rea, Th1	(°C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
au	-	1			l	l					
51.59	51.80	52.01	53.01	53.20	54.12	54.12	54.29	53.76	53.20	52.82	52.42
alpha	-	1	1	1	l	<u> </u>	1	1		1	
4.44	4.45	4.47	4.53	4.55	4.61	4.61	4.62	4.58	4.55	4.52	4.49
Jtilisati	on factor	for gains	for livin	g area				•			
1.00	1.00	0.99	0.96	0.89	0.74	0.58	0.64	0.88	0.98	1.00	1.00
Mean ir	nternal te	mperatui	re in livin	g area T	1						
19.50	19.67	19.96	20.35	20.70	20.92	20.98	20.97	20.80	20.35	19.86	19.48
Tempe	rature du	ring heat	ing perio	ds in res	t of dwe	lling Th2		-			
19.80	19.81	19.81	19.83	19.84	19.85	19.85	19.86	19.85	19.84	19.83	19.82
Jtilisati	on factor	for gains	for rest	of dwell	ing	•	•		•		
1.00	0.99	0.98	0.95	0.84	0.64	0.44	0.50	0.81	0.97	0.99	1.00
Mean ir	nternal te	mperatui	re in the	rest of d	welling T	2		•			
17.82	18.07	18.49	19.07	19.54	19.80	19.85	19.84	19.68	19.08	18.37	17.80
_iving a	area fracti	on (15.0	0 / 84.00))				•			0.18
	nternal te										
18.12	18.35	18.75	19.30	19.75	20.00	20.05	20.04	19.88	19.31	18.63	18.10
	djustmen						<u> </u>				
18.12	18.35	18.75	19.30	19.75	20.00	20.05	20.04	19.88	19.31	18.63	18.10
8 Snac	ce heatin	a reauir	ement								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	on factor			may	l o a. i	l o a.	7 (49	СОР	001	1101	200
1.00	0.99	0.98	0.94	0.84	0.65	0.46	0.53	0.81	0.96	0.99	1.00
Jseful (0.00	0.01	0.01	0.00	0.10	0.00	0.01	0.00	0.00	1.00
	J										
494 91	575 87	653 79	719 67	704 24	543 06	365 59	380 64	522 02	533 42	484 86	467 19
	575.87 v average			704.24 ature	543.06	365.59	380.64	522.02	533.42	484.86	467.19
Monthly	y average	externa	l temper	ature							
Monthly 4.30	y average 4.90	externa 6.50	l tempera	ature 11.70	14.60	365.59 16.60	380.64 16.40	522.02 14.10	533.42 10.60	7.10	4.20
Monthly 4.30 Heat lo	y average 4.90 ss rate fo	externa 6.50 r mean i	l tempera 8.90 nternal te	ature 11.70 emperati	14.60 ure	16.60	16.40	14.10	10.60	7.10	4.20
Monthly 4.30 Heat los 1562.3	4.90 ss rate fo	externa 6.50 r mean i 1374.15	8.90 nternal to	ature 11.70 emperati	14.60	16.60	16.40		10.60	7.10	
Monthly 4.30 Heat los 1562.3 Fraction	4.90 ss rate fo 1514.90 n of mont	externa 6.50 r mean i 1374.15 h for hea	8.90 nternal to 1144.79	ature 11.70 emperati 882.63	14.60 ure	16.60	16.40 391.55	14.10	10.60	7.10	4.20
Monthly 4.30 Heat los 1562.3 Fraction 1.00	average 4.90 ss rate fo 391514.90 n of mont 1.00	externa 6.50 r mean i 1374.15 h for hea	8.90 nternal to 1144.79 ating	ature 11.70 emperato 882.63	14.60 ure 581.89	371.76	16.40	14.10	10.60	7.10	4.20
Monthly 4.30 Heat los 1562.3 Fraction 1.00 Space I	y average 4.90 ss rate fo 91514.90 n of mont 1.00 heating re	externa 6.50 r mean i 1374.15 h for hea 1.00 equireme	8.90 nternal to 1144.79 ating 1.00 ent for ea	ature 11.70 emperate 882.63 1.00 ach mont	14.60 ure 581.89 - h, kWh/r	371.76	16.40 391.55	14.10	10.60 954.61 1.00	7.10 1273.90 1.00	4.20)1547.38
Monthly 4.30 Heat los 1562.3 Fraction 1.00 Space I 794.20	average 4.90 ss rate fo 391514.90 n of mont 1.00	externa 6.50 r mean i 1374.15 h for hea 1.00 equireme 535.95	8.90 nternal te 1144.79 ating 1.00 ent for ea 306.08	11.70 emperate 882.63 1.00 ach mont	14.60 ure 581.89 - h, kWh/r	16.60 371.76 - month	16.40 391.55 -	14.10 627.38 -	10.60	7.10	4.20

8c. Space cooling requirement - not applicable

9a. Energy requirements

9a. Energy requirements							kWh/year	
No secondary heating system sele Fraction of space heat from main Efficiency of main heating system	system(s)				1.0000 2.90%		•	(202) (206)
Jan Feb Mar Apr	May Jun	n Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	•			•				
794.20 631.03 535.95 306.08	132.72 -	-	-	-	313.36	568.11	803.66	(98)
Appendix Q - monthly energy save	ed (main hea	ating system	1)	•		•		
0.00 0.00 0.00 0.00	0.00 -	-	-	-	0.00	0.00	0.00	(210)
Space heating fuel (main heating s	system 1)	'		1	1	•		
854.90 679.26 576.91 329.48	142.86 -	-	-	-	337.31	611.53	865.08	(211)
Appendix Q - monthly energy save	ed (main hea	ating system	12)	1				
0.00 0.00 0.00 0.00	0.00 -	-	-	-	0.00	0.00	0.00	(212)
Space heating fuel (main heating s	system 2)	'		1	Į.			
0.00 0.00 0.00 0.00	0.00 -	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - monthly energy save	ed (seconda	ry heating s	ystem)	•	Į.			
0.00 0.00 0.00 0.00	0.00 -	-	-	-	0.00	0.00	0.00	(214)
Space heating fuel (secondary)	-	· · · · · · · · · · · · · · · · · · ·	·	1				
0.00 0.00 0.00 0.00	0.00 -	-	-	-	0.00	0.00	0.00	(215)
Water heating	•	<u>'</u>	'	•		•		
Water heating requirement			_					
	140.30 123	3.52 116.89	130.68	131.22	149.94	160.78	173.40	(64)
Efficiency of water heater							86.60	(216)
	88.17 86.	60 86.60	86.60	86.60	88.80	89.15	89.30	(217)
Water heating fuel								
199.70 175.51 183.11 162.69	159.12 142	2.63 134.97	150.90	151.52	168.84	180.35	194.18	(219)
Annual totals Space heating fuel used, main sys Space heating fuel (secondary) Water heating fuel Electricity for pumps, fans and ele		ot					kWh/year 4397.33 0.00 2003.51	(211) (215) (219)
central heating pump boiler with a fan-assisted flue Total electricity for the above, kWh Electricity for lighting (100.00% fix Energy saving/generation technolo Appendix Q -	h/year ed LEL)	Ot.					30.00 45.00 75.00 388.03	(230c) (230e) (231) (232)
Energy saved or generated (): Energy used (): Total delivered energy for all uses							0.000 0.000 6863.87	(236a) (237a) (238)
Total dollycrod chorgy for all uses							5005.07	(200)

10a. Does not apply

11a. Does not apply

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions	_
Space heating, main system 1	4397.33	0.216	949.82	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2003.51	0.216	432.76	(264)
Space and water heating			1382.58	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	388.03	0.519	201.39	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - μCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1622.89	(272)
			kg/m²/yea	r
Dwelling Carbon Dioxide Emission Rate (DER)			19.32	(273)

Building type Detached house

Reference Date

Project Type B

Oaklands Drive Almondsbury BS32 4AB

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.05.063, printed on 02/06/2022 at 06:59:46

New dwelling as designed

1 TER and DER

Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate TER = 19.98
Dwelling Carbon Dioxide Emission Rate DER = 19.32

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 61.4

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 53.3

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element Highest <u>Average</u> Wall OK 0.19 (max. 0.30) 0.19 (max. 0.70) Floor 0.14 (max. 0.25) 0.14 (max. 0.70) OK 0.10 (max. 0.20) Roof 0.10 (max. 0.35) OK Openings 1.20 (max. 2.00) 1.20 (max. 3.30) OK

3 Air permeability

Air permeability at 50 pascals: 5.00 Maximum: 5.00

4 Heating efficiency

Main heating system:

Boiler and radiators, mains gas

Worcester 2000

Source of efficiency: from boiler database

Worcester 2000 GC2000iW 30 C NG

Efficiency: 89.0% SEDBUK2009

Minimum: 88.0%

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls Time and temperature zone control OK

No cylinder Hot water controls

Boiler Interlock Yes OK

Hot water controls No cylinder

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0%

OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

OK Overheating risk (Severn Valley): OK

Not significant

Based on:

Thermal mass parameter: 250.00

Overshading: Average or unknown (20-60 % sky blocked)

Orientation: SouthWest

Ventilation rate: 8.00

Blinds/curtains:

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Pitched roofs insulated between joists U-value 0.10 W/m²K

Building type Detached house

Reference Date

Project Type B

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 06:59 AM

Type B baseline

Type B

Oaklands Drive Almondsbury BS32 4AB

Located in: England
Region: Severn Valley
Postcode: BS32 4AB

UPRN:

Date of assessment: 2022-06-01 Date of certificate: 2022-06-02

Assessment type: New dwelling as designed

Tenure: Unknown
Transaction type: New dwelling
Related party disclosure: No related party

PCDF revision number: 495

Property description

Dwelling type: Detached house

Ground floor (1) area = 42.00m² storey height = 2.35m storey height = 2.65m storey height = 2.65m

Living area: 15.00 (fraction 0.179)

Front of dwelling faces: SouthWest

Doors

Solid door area = 1.89 U = 1.20

Full glazed door area = 5.04 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Windows

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

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Project InformationBuilding type Detached house

Reference Date

Project Type B

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 06:59 AM

Type B baseline

Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	red)
Rooflights			
Opaque Elements Roofs Walls Ground floors	area = 42.00 area = 111.80 area = 42.00	U = 0.10, k = 9.0 U = 0.19, k = 60.0 U = 0.14, k = 110.0	Brick and block cavity wall, full fill
Thermal bridges: E10 Eaves (insulation at ceiling level) [A]	Htb = 14.00 0.060	0.060	14.100
E12 Gable (insulation at ceiling level) [A]	0.240	0.240	23.900
E16 Corner (normal) [A] E17 Corner (inverted – internal area greater than	0.090 -0.090	0.090 -0.090	27.400 5.000
external area) [A] E2 Other lintels (including other steel lintels) [A] Openings lintels	0.300	0.300	21.850
E3 Sill [A] Openings sills	0.040	0.040	21.850
E4 Jamb [A] Openings jambs	0.050	0.050	43.500
E5 Ground floor (normal) [A]	0.160	0.160	38.900
E6 Intermediate floor within a dwelling [A]	0.070	0.070	38.900

Building type Detached house

Reference Date

Project Type B

> Oaklands Drive Almondsbury **BS32 4AB**

Printed on 2 Jun 2022 at 06:59 AM SAP 2012 input data

Type B baseline

Thermal mass: User defined - 250.00

Pressure test: Yes (q50 - 5.00): measured in this dwelling: No Ventilation: Natural ventilation with intermittent extract fans

Number of chimneys: Number of open flues: 0 Number of intermittent 4

fans:

Number of passive stacks: Number of sides sheltered: 2.00 Measured/design q50: 5.00

Main heating system: Central heating systems with radiators or underfloor heating

Gas boilers (including LPG) 1998 or later Condensing combi with automatic ignition

Index: 18687

Eff 86.60% / 89.90% Worcester 2000 GC2000iW 30 C NG

Radiators

Pump in heated space: Yes

Boiler has load or weather compensator: Yes

Boiler Interlock: Yes

Design flow temperature: Unknown Central heating pump 2013 or later

Gas (mains)

Time and temperature zone control Main heating controls:

Boiler has load

Nο

compensator:

Yes Boiler has weather

compensator:

Boiler has emhanced load No

compensator:

Boiler interlock: Yes

Secondary heating system: None

Water heating: Combination boiler

Combination boiler type: Instantaneous

Solar panel: no

Page 21 of 23

Building type Detached house

Reference Date

Project Type B

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 06:59 AM

Type B baseline

Water use <= 125 Yes

litres/person/day:

Low energy lights: Total fixed lighting outlets: 100.0% of fixed lighting outlets

30

Electricity tariff: Standard tariff Photovoltaics 1: Peak kW: 0.00 Photovoltaics 2: Peak kW: 0.00 Photovoltaics 3: Peak kW: 0.00

Conservatory: No Fixed air conditioning: No

Smoke Control Area: Not specified Additional allowable electricity generation:

0.00kg/m²/year

Predicted Energy Assessment

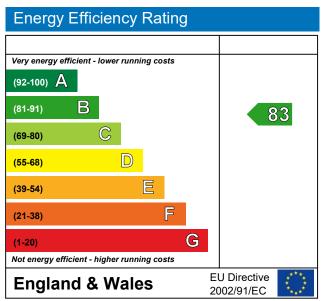
Type B Oaklands Drive Almondsbury BS32 4AB Dwelling type: Detached house Date of assessment: 2 June 2022

Produced by Complete Energy Consultancy Ltd

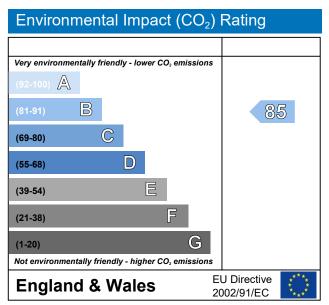
Total floor area: 84 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Project InformationBuilding type Semi-detached house

Reference Date

Project

Type C Oaklands Drive Almondsbury BS32 4AB

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	42.00	2.35	98.70	(3a)
First floor	42.00	2.65	111.30	(3b)
	84.00			(4)
			210.00	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondar	y + othe	r	-	
	er of chin						0 + 0 + 0		< 40		0.00	(6a)
	er of ope						0 + 0 + 0		〈 20		0.00	(6b)
	er of inter						4		< 10		40.00	(7a)
	er of pass						0		< 10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	>	< 40		0.00	(7c)
											Air chan	ges per hour
											0.19	(8)
Pressu	ıre test, r	esult q50)						7.00			(17)
Air per	meability	,									0.54	(18)
											2.00	(19)
											0.85	(20)
	ion rate i ion rate i										0.46	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor				•	•			-	•	52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
											13.13	(22a)
Adjuste	ed infiltra	tion rate	(allowing	g for she	lter and	wind spe	eed)					
0.59	0.57	0.56	0.51	0.49	0.44	0.44	0.42	0.46	0.49	0.52	0.54	
											6.03	(22b)
	ition : nat ve air cha		,	ntermitte	nt extrac	ct fans						
0.67	0.66	0.66	0.63	0.62	0.60	0.60	0.59	0.61	0.62	0.63	0.65	(25)
		-								-		

3. Heat losses and heat loss parameter										
Element Gross	Openings	Net area	U-value	AxU	kappa-valu					
area, m²	m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	(\)			
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)			
argon filled, low-E, En=0.1,										
soft coat (SouthWest)										
dg Window Double glazed		4 640	4 45 (4 20)	1.84			(27)			
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.04			(27)			
soft coat (SouthWest)										
dg										
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)			
argon filled, low-E, En=0.1,		1.010	1.13 (1.20)	1.04			(21)			
soft coat (SouthWest)										
dg										
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)			
argon filled, low-E, En=0.1,			()	-			()			
soft coat (SouthWest)										
dg										
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)			
argon filled, low-E, En=0.1,										
soft coat (NorthEast)										
dg										
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)			
argon filled, low-E, En=0.1,										
soft coat (NorthEast)										
dg		4.040	4.45 (4.00)	4.04			(07)			
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)			
argon filled, low-E, En=0.1,										
soft coat (NorthEast) dg										
Solid door		1.890	1.20	2.27			(26)			
dg		1.030	1.20	2.21			(20)			
Full glazed door -		5.040	1.20	6.05			(26)			
Double-glazed, argon filled,		0.0.0	•				()			
low-E, En=0.1, soft coat										
(NorthEast)										
` dg										
Pitched roofs insulated betw	een joists	42.00	0.10	4.20	9.00	378.00	(30)			
Walls		76.80	0.19	14.59	60.00	4608.00	(29)			
Brick and block cavity wall,	, full fill									
Ground floors		42.00	0.14	5.88	110.00	4620.00	(28)			
Party wall		35.00	0.00	0.00	70.00	2450.00				

	r heating		/ require	ements							kWh/yea
	d occupa										2.53
	average				er day V		-				94.39
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot wate	er usage	in litres	per day t	or each	month						
103.83	100.06	96.28	92.50	88.73	84.95	84.95	88.73	92.50	96.28	100.06	103.83
Energy	content c	f hot wa	ter used	•			•		•		
153.98	134.67	138.97	121.16	116.25	100.32	92.96	106.67	107.94	125.80	137.32	149.12
0,	content (annual)	•	•	•	•	•		•	•	1485.15
Distribut	tion loss										
23.10	20.20	20.85	18.17	17.44	15.05	13.94	16.00	16.19	18.87	20.60	22.37
,	volume,		•			•	150.00				
	cturer's d		cylinder	loss fact	or (kWh/		1.86				
	ature Fa		م ام مرازات م	/I-\A/I-/	d = \ \		0.5400				4.00
	lost from orage los		er Cyllride	er (KVVII/	uay)						1.00
31.14	28.12	31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
•	age loss		30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
31.14	28.12	31.14	30.13	24.44	20.42	31.14	31.14	30.13	24.44	20.42	24.44
		31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
Primary		00.00	00.54	00.00	00.54	00.00	00.00	00.54	00.00	00.54	00.00
23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26
	at requir								ı	•	
	183.80						161.07	160.59	180.20	189.96	203.52
Output f	rom wate	er heateı	for each	n month,	kWh/mo	onth					
208.38	183.80	193.37	173.80	170.65	152.96	147.36	161.07	160.59	180.20	189.96	203.52
	•	•	•		•	•	•	•		•	2125.65
Heat ga	ins from	water he	eating, k\	Wh/mont	:h						
94.72	84.09	89.73	82.40	82.17	75.47	74.43	78.99	78.01	85.35	87.77	93.10
	•	•				•		•			

_				-
_	Int	arn.	າ <i>!</i> ~	ainc
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		71 LJ	ains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabolic gains, Watts											
152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06
Lighting gains											
54.93	48.79	39.68	30.04	22.45	18.96	20.48	26.62	35.74	45.37	52.96	56.46
Appliances gains											
339.70	343.22	334.34	315.43	291.56	269.12	254.13	250.61	259.49	278.40	302.27	324.71
Cooking gains											
52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74
Pumps a	and fans	gains									
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Losses 6	e.g. evap	oration (negative	values)							
-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38
Water h	eating ga	ains									
127.31	125.13	120.60	114.44	110.45	104.82	100.04	106.17	108.34	114.71	121.91	125.14
Total into	ernal gai	ns									
625.36	620.57	598.04	563.34	527.89	496.33	478.08	486.83	507.00	541.92	580.57	609.73

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79		0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

		I tempe									
	ature du system			ds in the	e living a	rea, Th1	(°C)				21.00 0.75
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
au	•	1		'	•		•	•	•	•	
54.81	55.05	55.28	56.42	56.64	57.67	57.67	57.87	57.27	56.64	56.20	55.75
alpha											
4.65	4.67	4.69	4.76	4.78	4.84	4.84	4.86	4.82	4.78	4.75	4.72
Jtilisatio	on factor	for gains	s for livin	g area	•			1	•		
0.99	0.98	0.97	0.91	0.79	0.61	0.45	0.50	0.75	0.93	0.98	0.99
Tweekd	lay	1		'	1	•	•	1	1	1	
19.95	20.08	20.31	20.59	20.81	20.91	20.93	20.93	20.86	20.60	20.23	19.93
Tweeke	nd	1	·!	'	1	•	•	1	1	1	
20.40	20.48	20.61	20.77	20.89	20.95	20.96	20.96	20.92	20.77	20.57	20.40
24 inste	ad of 16		1				1	L	1		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 inste	ad of 9	1	1				1		1		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16 inste	ad of 9								1		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean in	ternal te	mperatu	re in livin	g area T	1		•	•	•	-	
20.08	20.20	20.39	20.64	20.83	20.92	20.94	20.94	20.88	20.65	20.32	20.07
Temper	ature du	ring heat	ting perio	ds in res	st of dwe	lling Th2	<u>)</u>	1	1	1	
19.87	19.87	19.88	19.90	19.90	19.92	19.92	19.92	19.91	19.90	19.89	19.88
Jtilisatio	on factor	for gains	s for rest	of dwell	ing				1		
0.99	0.98	0.95	0.88	0.73	0.51	0.34	0.39	0.66	0.91	0.98	0.99
Tweekd	lay								1		
18.66	18.83	19.11	19.48	19.71	19.82	19.83	19.84	19.78	19.49	19.04	18.65
Tweeke	nd		1				1		1		
18.66	18.83	19.11	19.48	19.71	19.82	19.83	19.84	19.78	19.49	19.04	18.65
Mean in	ternal te	mperatu	re in the	rest of d	welling 7	2		1	•		
18.66	18.83	19.11	19.48	19.71	19.82	19.83	19.84	19.78	19.49	19.04	18.65
	rea fract									•	0.18
	ternal te				dwelling						
18.91	19.08	19.34	19.69	19.91	20.02	20.03	20.03	19.98	19.70	19.27	18.91
	djustmer										
18.91	19.08	19.34	19.69	19.91	20.02	20.03	20.03	19.98	19.70	19.27	18.91

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains											
0.98	0.97	0.95	0.88	0.73	0.52	0.35	0.40	0.67	0.90	0.97	0.99
Useful g	ains						,				
720.04	791.29	844.36	856.37	760.86	535.20	345.51	363.50	559.96	686.52	689.16	690.13
Monthly average external temperature											
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
Heat loss rate for mean internal temperature											
1555.16	1502.34	1355.15	1115.33	845.91	547.90	347.00	366.12	598.80	937.17	1263.09	1538.87
Fraction	of mont	h for hea	iting								
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space h	eating re	quireme	nt for ea	ch mont	h, kWh/r	nonth	,				
621.33	477.82	380.03	186.45	63.28	-	-	-	-	186.48	413.23	631.46
Total space heating requirement per year (kWh/year) (October to May) Space heating requirement per m² (kWh/m²/year) 2960.00 35.20											
Space h	eating re	quireme	nt per m	r⁴ (kWh/r	n²/year)						35.24

8c. Space cooling requirement - not applicable

9a. Energy requirements

	kWh/year						
No secondary heating system selected Fraction of space heat from main system(s) Efficiency of main heating system 1.0000 368.90%		(202) (206)					
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov D	Оес						
Space heating requirement							
621.33 477.82 380.03 186.45 63.28 - - - - 186.48 413.23 6	31.46	(98)					
Appendix Q - monthly energy saved (main heating system 1)							
0.00 0.00 0.00 0.00 0.00 0.00 0	0.00	(210)					
Space heating fuel (main heating system 1)							
168.43 129.53 103.02 50.54 17.15 - - - - 50.55 112.02 1	71.17	(211)					
Appendix Q - monthly energy saved (main heating system 2)							
0.00 0.00 0.00 0.00 0.00 0.00 0	0.00	(212)					
Space heating fuel (main heating system 2)							
0.00 0.00 0.00 0.00 0.00 0.00 0	0.00	(213)					
Appendix Q - monthly energy saved (secondary heating system)							
0.00 0.00 0.00 0.00 0.00 0.00 0	0.00	(214)					
Space heating fuel (secondary)							
0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0	0.00	(215)					
Water heating							
Water heating requirement							
		(64)					
Efficiency of water heater		(216)					
	295.93	(217)					
Water heating fuel							
70.42 62.11 65.34 58.73 57.67 51.69 49.80 54.43 54.27 60.89 64.19 6	88.77	(219)					
	kWh/year						
Space heating fuel used, main system 1 Space heating fuel (secondary)		(211) (215)					
Water heating fuel (Secondary)		(219)					
Electricity for pumps, fans and electric keep-hot	7 10.01	(210)					
Total electricity for the above, kWh/year		(231)					
Electricity for lighting (100.00% fixed LEL)	388.03	(232)					
Energy saving/generation technologies Electricity generated - μCHP/heat pump Appendix Q -	0.00	(235)					
Energy saved or generated ():	0.000	(236a)					
Energy used ():		(237a)					
Total delivered energy for all uses	1908.75	(238)					

10a. Fuel costs using Table 12 prices

kWh/year	Fuel price p/kWh	£/year	
802.409	13.190	105.84	(240)
0.000	0.000	0.00	(241)
100.000%			(243)
0.000%			(244)
718.31	13.190	94.74	(245)
0.00	13.190	0.00	(246)
0.000	13.190	0.00	(249)
0.000	13.190	0.00	(249)
388.029	13.190	51.18	(250)
		0.00	(251)
0.000	0.000	0.00	(252)
0.000	0.000	0.00	(253)
0.000	0.000	0.00	(254)
		251.76	(255)
		0.42 0.82	(256) (257)
			(258)
			(200)
	802.409 0.000 100.000% 0.000% 718.31 0.00 0.000 0.000 388.029 0.000	p/kWh 802.409 13.190 0.000 0.000 100.000% 0.000% 718.31 13.190 0.00 13.190 0.000 13.190 0.000 13.190 388.029 13.190 0.000 0.000 0.000 0.000	No. No.

12a. Carbon dioxide emissions

	Energy	Emission factor	Emission	S
	kWh/year	kg CO2/kWh	kg CO2/y	ear
Space heating, main system 1	802.41	0.519	416.45	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	718.31	0.519	372.80	(264)
Space and water heating			789.25	(265)
Electricity for pumps and fans	0.00	0.519	0.00	(267)
Electricity for lighting	388.03	0.519	201.39	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - µCHP	0.00	0.519	0.00	(269)
Appendix Q -				, ,
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			990.64	(272)
			kg/m²/yea	ır
CO2 emissions per m ²			11.79	(273)
El value			89.71	(273a)
El rating			90	(274)
El band			В	

Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

 $(13.19 / 3.6890) \times (1 + (0.29 \times 0.25)) = 3.8347$, stars = 4 $(0.5190 / 3.6890) \times (1 + (0.29 \times 0.25)) = 0.1509$, stars = 5 13.19 / 2.9593 = 4.4572, stars = 4 $0.52 / + (0.00 \times 0.52) = 0.1754$, stars = 5

Building type Semi-detached house

Reference Date

Project Type C

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 worksheet for New dwelling as designed - calculation of dwelling emissions

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	42.00	2.35	98.70	(3a)
First floor	42.00	2.65	111.30	(3b)
	84.00			(4)
			210.00	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondary	y + othe	r	-	
	er of chim						0 + 0 + 0		40		0.00	(6a)
	er of ope						0 + 0 + 0	X	20		0.00	(6b)
		mittent f					4		(10		40.00	(7a)
		sive vent					0		(10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	×	40		0.00	(7c)
											Air chan	ges per hour
											0.19	(8)
Pressu	ire test, r	esult q50)						5.00			(17)
Air peri	meability	,									0.54	(18)
											2.00	(19)
											0.85	(20)
		ncorpora modified									0.46	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor				1		-			-	52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
	ļ			ļ	-1			-	I		13.13	(22a)
		tion rate	•	for she		wind spe	eed)					
0.59	0.57	0.56	0.51	0.49	0.44	0.44	0.42	0.46	0.49	0.52	0.54	
		ural vent	,	ntermitte	nt extrac	t fans					6.03	(22b)
		ange rate		1	1		1	1		1		()
0.67	0.66	0.66	0.63	0.62	0.60	0.60	0.59	0.61	0.62	0.63	0.65	(25)

3. Heat losses and heat loss parameter Element Net area U-value $A \times U$ kappa-value A x K Gross Openings area, m² A, m² W/m^2K W/K kJ/m²K kJ/K m² Window - Double-glazed, 1.610 1.15 (1.20) 1.84 (27)argon filled, low-E, En=0.1, soft coat (NorthEast) dg Window - Double-glazed, 1.610 1.84 (27)1.15 (1.20) argon filled, low-E, En=0.1, soft coat (NorthEast) dg Window - Double-glazed, 1.610 1.15 (1.20) 1.84 (27)argon filled, low-E, En=0.1, soft coat (NorthEast) dg Window - Double-glazed, 1.610 1.15 (1.20) 1.84 (27)argon filled, low-E, En=0.1, soft coat (SouthWest) Window - Double-glazed, 1.610 1.84 (27)1.15 (1.20) argon filled, low-E, En=0.1, soft coat (SouthWest) Window - Double-glazed, 1.610 1.84 (27)1.15 (1.20) argon filled, low-E, En=0.1, soft coat (SouthWest) dg Window - Double-glazed. 1.610 1.84 (27)1.15 (1.20) argon filled, low-E, En=0.1, soft coat (SouthWest) dg Solid door 1.890 1.20 2.27 (26)dq Full glazed door -5.040 1.20 6.05 (26)Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg 4.20 9.00 Pitched roofs insulated between joists 42.00 0.10 378.00 (30)76.80 0.19 14.59 60.00 4608.00 (29)Brick and block cavity wall, full fill Ground floors 42.00 0.14 5.88 110.00 4620.00 (28)Party wall 35.00 0.00 0.00 70.00 2450.00

Assumed occupancy, N Annual average hot water usage in litres per day Vd,average Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov De	2.53
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov De	94.39
	ec
Hot water usage in litres per day for each month	
103.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103	3.83
Energy content of hot water used	
153.98 134.67 138.97 121.16 116.25 100.32 92.96 106.67 107.94 125.80 137.32 149	9.12
Energy content (annual) 1. Distribution loss	485.15
23.10 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.	.37
Cylinder volume, I 150.00	
Manufacturer's declared cylinder loss factor (kWh/day) 1.86	
Temperature Factor 0.5400	1.00
Energy lost from hot water cylinder (kWh/day) Total storage loss	1.00
31.14 28.12 31.14 30.13 31.14 30.13 31.14 31.14 30.13 31.14 30.13 31.	.14
Net storage loss	
31.14 28.12 31.14 30.13 31.14 30.13 31.14 31.14 30.13 31.14 30.13 31.	.14
Primary loss	
23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26	.26
Total heat required for water heating calculated for each month	
208.38 183.80 193.37 173.80 170.65 152.96 147.36 161.07 160.59 180.20 189.96 203	3.52
Output from water heater for each month, kWh/month	
208.38 183.80 193.37 173.80 170.65 152.96 147.36 161.07 160.59 180.20 189.96 203	3.52
Heat gains from water heating, kWh/month	125.65
94.72 84.09 89.73 82.40 82.17 75.47 74.43 78.99 78.01 85.35 87.77 93	.10

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F	Inte	rnal	gains
IJ.	IIILE	:iiiai	uaiiis

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains, Watts												
126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	(
Lighting gains												
21.97	19.52	15.87	12.02	8.98	7.58	8.19	10.65	14.29	18.15	21.18	22.58	(
Appliances gains												
227.60		224.01	211.34	195.34	180.31	170.27	167.91	173.86	186.53	202.52	217.55	(
Cooking gains												
35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	(
Pumps a	and fans	gains										
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(
Losses 6	e.g. evap	oration ((negative	values)								
			-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	(
Water heating gains												
127.31	125.13	120.60	114.44	110.45	104.82	100.04	106.17	108.34	114.71	121.91	125.14	(
Total internal gains												
437.89	435.62	421.49	398.81	375.79	353.73	339.52	345.74	357.51	380.41	406.63	426.29	(

6. Solar gains (calculation for January)

Mindow Davids also I amon file I	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

Reating system responsiveness 0.75		n interna			مامات المام	- livina -	Th1	(°C)				24.00
Separation Sep					oas in the	e iiving a	rea, ini	(°C)				21.00 0.75
	Jan				May	Jun	Jul	Aug	Sep	Oct	Nov	
Ipha	tau	I	1			l	1					
	54.81	55.05	55.28	56.42	56.64	57.67	57.67	57.87	57.27	56.64	56.20	55.75
Itilisation factor for gains for living area 1.00 0.99 0.98 0.95 0.86 0.68 0.52 0.58 0.83 0.97 0.99 1.00 veekday 19.78 19.92 20.16 20.48 20.75 20.89 20.93 20.92 20.82 20.48 20.08 19.77 veekend 20.31 20.39 20.52 20.71 20.86 20.94 20.96 20.96 20.90 20.70 20.48 20.30 4 instead of 16 20.00 0.00	alpha			•	1			•		1	Į.	
1.00 0.99 0.98 0.95 0.86 0.68 0.52 0.58 0.83 0.97 0.99 1.00 0.00	4.65	4.67	4.69	4.76	4.78	4.84	4.84	4.86	4.82	4.78	4.75	4.72
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Mean internal temperature in the rest of dwelling T2 18.44 18.63 18.93 19.35 19.66 19.81 19.83 19.83 19.75 19.35 18.85 18.44 19.15	Tweeke	end	•	•			•	•		•	•	
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iving area fraction (15.00 / 84.00) 0.18 Mean internal temperature (for the whole dwelling) 18.71 18.88 19.17 19.57 19.86 20.01 20.03 20.03 19.94 19.57 19.08 18.70 Apply adjustment to the mean internal temperature, where appropriate	Mean ir	nternal te	mperatu	re in the	rest of d	welling 7	Γ2	•		•	•	
Mean internal temperature (for the whole dwelling) 18.71 18.88 19.17 19.57 19.86 20.01 20.03 20.03 19.94 19.57 19.08 18.70 18.79 19.70 1	18.44	18.63	18.93	19.35	19.66	19.81	19.83	19.83	19.75	19.35	18.85	18.44
18.71 18.88 19.17 19.57 19.86 20.01 20.03 20.03 19.94 19.57 19.08 18.70 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.57 19.08 19.94 19.94 19.57 19.08 19.94	J (/											
pply adjustment to the mean internal temperature, where appropriate	18.71						<u>, </u>	20.03	19.94	19.57	19.08	18.70
······································		djustmer	t to the i	mean int	ernal ten	nperatur	e, where		riate	1	-1	
	18.71								_	19.57	19.08	18.70

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation factor for gains												
0.99	0.99	0.97	0.93	0.80	0.60	0.41	0.47	0.76	0.95	0.99	1.00	(
Useful gains												
541.50	621.61	696.84	752.46	712.41	524.74	343.97	360.56	526.16	571.86	530.53	513.95	(
Monthly average external temperature												
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20	(
Heat loss rate for mean internal temperature												
1533.37	1481.58	1337.04	1102.78	840.28	546.73	346.81	365.78	594.94	923.34	1243.97	1517.68	(
Fraction	of mont	h for hea	iting									
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	
Space heating requirement for each month, kWh/month												
737.95	577.90	476.31	252.23	95.14	-	-	-	-	261.51	513.67	746.78	
Total space heating requirement per year (kWh/year) (October to May) Space heating requirement per m² (kWh/m²/year) 43.59									,			

8c. Space cooling requirement - not applicable

9a. Energy requirements

ou. Liic	rgy requ	in chicin	.5								kWh/year	
Fraction	of space	eating systements of the second secon	om main	system((s)				1.0000 68.90%		-	(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space h	eating re	quireme	nt				'		1	1		
737.95	577.90	476.31	252.23	95.14	-	-	-	-	261.51	513.67	746.78	(98)
Appendi	ix Q - mo	nthly en	ergy sav	ed (mair	heating	system	1)		1	1		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	eating fu	iel (main	heating	system	1)				•			
200.04	156.66	129.12	68.37	25.79	-	-	-	-	70.89	139.25	202.43	(211)
Appendi	ix Q - mo	onthly en	ergy sav	ed (mair	heating	system	2)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space h	eating fu	iel (main	heating	system	2)							
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendi	ix Q - mo	onthly en	ergy sav	ed (seco	ndary h	eating sy	stem)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space h	eating fu	iel (seco	ndary)									
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water h				•	•	•	•					
		quireme		1			1	1				
		193.37		170.65	152.96	147.36	161.07	160.59	180.20	189.96	203.52	(64)
		er heatei									295.93	(216)
		295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	(217)
	eating fu		1	ı			1	1				
70.42	62.11	65.34	58.73	57.67	51.69	49.80	54.43	54.27	60.89	64.19	68.77	(219)
Space h Space h Water h	Annual totals Space heating fuel used, main system 1 Space heating fuel (secondary) Water heating fuel kWh/year 992.54 Space heating fuel (secondary) 0.00 718.31								992.54 0.00	(211) (215) (219)		
Total ele Electrici	Electricity for pumps, fans and electric keep-hot Total electricity for the above, kWh/year Electricity for lighting (100.00% fixed LEL) Energy saving/generation technologies									(231) (232)		
Electrici	Electricity generated - µCHP/heat pump Appendix Q -									0.00	(235)	
Energ		or genera :	ated ():								0.000 0.000	(236a) (237a)
Total de	livered e	nergy fo	r all uses	3							2098.88	(238)

10a. Does not apply

11a. Does not apply

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions	_
Space heating, main system 1	992.54	0.519	515.13	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	718.31	0.519	372.80	(264)
Space and water heating			887.93	(265)
Electricity for pumps and fans	0.00	0.519	0.00	(267)
Electricity for lighting	388.03	0.519	201.39	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - μCHP	0.00	0.519	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1089.32	(272)
			kg/m²/yea	r
Dwelling Carbon Dioxide Emission Rate (DER)		12.97	(273)	

Building type Semi-detached house

Reference Date

Project Type C

Oaklands Drive Almondsbury BS32 4AB

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.05.063, printed on 02/06/2022 at 07:00:03

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate TER = 27.39

Dwelling Carbon Dioxide Emission Rate DER = 12.97

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 56.7

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 49.0

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element Highest <u>Average</u> Wall OK 0.19 (max. 0.30) 0.19 (max. 0.70) Floor 0.14 (max. 0.25) 0.14 (max. 0.70) OK 0.10 (max. 0.20) Roof 0.10 (max. 0.35) OK Openings 1.20 (max. 2.00) 1.20 (max. 3.30) OK

3 Air permeability

Air permeability at 50 pascals: 5.00 Maximum: 10.00

OK

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric

Mitsubishi Electric Ecodan 6.0 kW

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls 2207 Time and temperature zone control OK

Hot water controls No cylinder

Boiler Interlock No OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Severn Valley):

OK

Not significant

OK

Based on:

Thermal mass parameter: 250.00

Overshading: Average or unknown (20-60 % sky blocked)

Orientation : SouthWest

Ventilation rate: 8.00

Blinds/curtains:

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Pitched roofs insulated between joists U-value 0.10 W/m²K

Building type Semi-detached house

Reference Date

Project Type C

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type C ASHP

Type C

Oaklands Drive Almondsbury BS32 4AB

Located in: England
Region: Severn Valley
Postcode: BS32 4AB

UPRN:

Date of assessment: 2022-06-01 Date of certificate: 2022-06-02

Assessment type: New dwelling as designed

Tenure: Unknown
Transaction type: New dwelling
Related party disclosure: No related party

PCDF revision number: 495

Property description

Dwelling type: Semi-detached house

Ground floor (1) $area = 42.00m^2$ storey height = 2.35m $area = 42.00m^2$ storey height = 2.65m

Living area: 15.00 (fraction 0.179)

Front of dwelling faces: SouthWest

Doors

Solid door area = 1.89 U = 1.20

Full glazed door area = 5.04 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Windows

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

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Building type Semi-detached house

Reference Date

Project Type C

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type C ASHP

Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)						
Overshading:	Average or unknown (20-60 % sky blocked)								
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)						
Overshading:	Average or unkno	wn (20-60 % sky block							
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1,						
Overshading:	Average or unkno	wn (20-60 % sky block	soft coat (SouthWest) red)						
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)						
Overshading:	Average or unkno	wn (20-60 % sky block							
Rooflights									
Opaque Elements Roofs Walls Ground floors	area = 42.00 area = 76.80 area = 42.00	U = 0.10, k = 9.0 U = 0.19, k = 60.0 U = 0.14, k = 110.0	Brick and block cavity wall, full fill						
Thermal bridges: E10 Eaves (insulation at ceiling level) [A]	Htb = 14.00 0.060	0.060	14.100						
E12 Gable (insulation at ceiling level) [A]	0.240	0.240	23.900						
E16 Corner (normal) [A] E17 Corner (inverted –	0.090 -0.090	0.090 -0.090	27.400 5.000						
internal area greater than	-0.090	-0.090	3.000						
external area) [A] E2 Other lintels (including other steel lintels) [A]	0.300	0.300	21.850						
Openings lintels E3 Sill [A] Openings sills E4 Jamb [A] Openings jambs	0.040 0.050	0.040 0.050	21.850 43.500						
E5 Ground floor (normal)	0.160	0.160	38.900						
[A] E6 Intermediate floor within a dwelling [A]	0.070	0.070	38.900						

Project Information

Building type Semi-detached house

Reference Date

Project Type C

> Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type C ASHP

Thermal mass: User defined - 250.00

Pressure test: Yes (q50 - 5.00): measured in this dwelling: No Ventilation: Natural ventilation with intermittent extract fans

Number of chimneys: Number of open flues: 0 Number of intermittent 4

fans:

Number of passive stacks: Number of sides sheltered: 2.00 Measured/design q50: 5.00

Main heating system: Central heating systems with radiators or underfloor heating

Heat pumps

Electric Air source heat pump with flow temperature <= 35°C

Index: 104634

Mitsubishi Electric Ecodan 6.0 kW PUZ-WM60VAA

Underfloor, pipes in screed above insulation

Pump in heated space: No

Boiler has load or weather compensator: Yes

Boiler Interlock: No

Design flow temperature: Unknown Central heating pump 2013 or later

Not MCS Approved Installer

Standard tariff

Main heating controls: 2207 Time and temperature zone control

Boiler has load

compensator:

No

Boiler has weather

Yes compensator:

Boiler has emhanced load

No

compensator:

Boiler interlock: No

Secondary heating system: None

Water heating: MicroCHP or Heat Pump

Manufacturer's declared cylinder loss factor (kWh/day) 1.86

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Project Information

Building type Semi-detached house

Reference Date

Project Type C

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type C ASHP

Cylinder volume: 150.00 Insulation type: Factory Insulation thickness: -1.00 Cylinder heater: n/a

Cylinder in heated space: Yes

Insulated primary: Yes Cylinder thermostat: Yes

Separate timer for domestic hot water: Yes

Solar panel: no

Water use <= 125 Yes

litres/person/day:

Low energy lights: 100.0% of fixed lighting outlets

Total fixed lighting outlets: 30

Electricity tariff: Standard tariff
Photovoltaics 1: Peak kW: 0.00
Photovoltaics 2: Peak kW: 0.00
Photovoltaics 3: Peak kW: 0.00

Conservatory: No Fixed air conditioning: No

Smoke Control Area: Not specified Additional allowable electricity generation:

0.00kg/m²/year

Predicted Energy Assessment

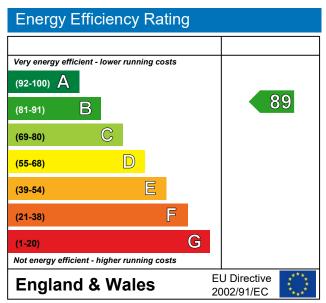
Type C Oaklands Drive Almondsbury BS32 4AB Dwelling type: Semi-detached house Date of assessment: 2 June 2022

Produced by Complete Energy Consultancy Ltd

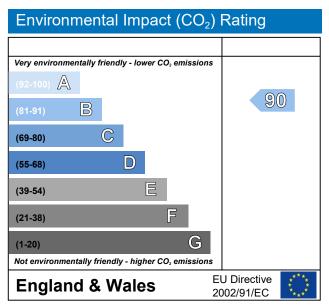
Total floor area: 84 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Project InformationBuilding type Semi-detached house

Reference Date

Project

Type C Oaklands Drive Almondsbury BS32 4AB

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	42.00	2.35	98.70	(3a)
First floor	42.00	2.65	111.30	(3b)
	84.00			(4)
			210.00	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondar	y + othe	r	-	
	er of chin						0 + 0 + 0		< 40		0.00	(6a)
	er of ope						0 + 0 + 0		〈 20		0.00	(6b)
	er of inter						4		< 10		40.00	(7a)
	er of pass						0		< 10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	>	< 40		0.00	(7c)
											Air chan	ges per hour
											0.19	(8)
Pressu	ıre test, r	esult q50)						7.00			(17)
Air per	meability	,									0.54	(18)
											2.00	(19)
											0.85	(20)
	ion rate i ion rate i										0.46	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor				•	•			-	•	52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
											13.13	(22a)
Adjuste	ed infiltra	tion rate	(allowing	g for she	lter and	wind spe	eed)					
0.59	0.57	0.56	0.51	0.49	0.44	0.44	0.42	0.46	0.49	0.52	0.54	
											6.03	(22b)
	ition : nat ve air cha		,	ntermitte	nt extrac	ct fans						
0.67	0.66	0.66	0.63	0.62	0.60	0.60	0.59	0.61	0.62	0.63	0.65	(25)
										-		

3. Heat losses and heat lo	ss paramete						
Element Gross	Openings	Net area	U-value	AxU	kappa-valu		
area, m²	m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	(a=)
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (NorthEast)							
dg Window - Double-glazed,		4 640	4 45 (4 20)	1.84			(27)
argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.04			(27)
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,		1.010	1.10 (1.20)	1.01			(21)
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,			, ,				,
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (SouthWest)							
dg							(a=)
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (SouthWest)							
dg Window Davible glazed		4 640	4.45 (4.00)	4.04			(27)
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.84			(27)
soft coat (SouthWest)							
dg							
Solid door		1.890	1.20	2.27			(26)
dg		1.000	1.20	2.21			(20)
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argon filled,		0.0.10					()
low-E, En=0.1, soft coat							
(NorthEast)							
dg							
Pitched roofs insulated bety	veen joists	42.00	0.10	4.20	9.00	378.00	(30)
Walls		76.80	0.19	14.59	60.00	4608.00	(29)
Brick and block cavity wal	l, full fill						
Ground floors		42.00	0.14	5.88	110.00	4620.00	(28)
Party wall		35.00	0.00	0.00	70.00	2450.00	

	r heating		/ require	ements							kWh/year
	ed occupa average		r usane i	in litres r	er day \	/d avera	ne e				2.53 94.39
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	er usage		•			Jour	/ tug	ССР	001	1407	Воо
	100.06		92.50	88.73	84.95	84.95	88.73	92.50	96.28	100.06	103.83
	content c			00.70	0 1.00	000	00.10	02.00	00.20	100.00	100.00
	134.67			116.25	100.32	92.96	106.67	107.94	125.80	137.32	149.12
Energy	content (1485.15
23.10	20.20	20.85	18.17	17.44	15.05	13.94	16.00	16.19	18.87	20.60	22.37
Energy l Fotal sto	ature fac lost from orage los ∫∩ ∩∩	store (k	,	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	age loss										
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Primary		1	1	I	1		1	1	1	1	1
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	oss calcu				00.00	00.00	04.04	00.07	04.44	00.40	04.00
24.30	21.93 at requir	24.20	23.33	24.05	23.20	23.93	24.01	23.27	24.14	23.46	24.28
								121 22	140.04	160.70	172 10
178.28	rom wate		144.49				130.68	131.22	149.94	160.78	173.40
178.28						116.89	130.68	131.22	149.94	160.78	173.40
170.20	130.00	103.17	144.49	140.30	123.32	110.09	130.00	131.22	149.94	100.76	1769.24
Heat ga	ins from	water he	eating, k\	Wh/mont	:h						1100.24
57.27	50.26	52.26	46.12	44.67	39.16	36.89	41.47	41.71	47.86	51.52	55.65
										1	

_			-
F	Inte	rnal	gains
IJ.	IIILE	:iiiai	uaiiis

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metaboli	ic gains,	Watts	,	•							
152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06	152.06
Lighting	gains		,	,							
54.93	48.79	39.68	30.04	22.45	18.96	20.48	26.62	35.74	45.37	52.96	56.46
Applianc	es gains	3									
339.70	343.22	334.34	315.43	291.56	269.12	254.13	250.61	259.49	278.40	302.27	324.71
Cooking	gains		•								
52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74	52.74
Pumps a	and fans	gains	•								
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Losses	e.g. evap	oration	negative	values)							
-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38
Water h	eating ga	ains									
76.98	74.79	70.24	64.05	60.03	54.38	49.58	55.74	57.93	64.33	71.56	74.80
Total int	ernal gai	ns									
578.04	573.23	550.68	515.95	480.47	448.89	430.63	439.40	459.59	494.54	533.22	562.39

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28		0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

5	04.00
Геmperature during heating periods in the living area, Th1 (°С) Heating system responsiveness	21.00
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov De	
au	
54.81 55.05 55.28 56.42 56.64 57.67 57.67 57.87 57.27 56.64 56.20 55.	75
	75
alpha	•
4.65 4.67 4.69 4.76 4.78 4.84 4.84 4.86 4.82 4.78 4.75 4.7	2
Utilisation factor for gains for living area	_
0.99 0.99 0.97 0.92 0.81 0.63 0.47 0.52 0.77 0.95 0.99 0.9	9
Mean internal temperature in living area T1	
19.80 19.96 20.22 20.57 20.83 20.96 20.99 20.99 20.90 20.57 20.13 19.	78
Temperature during heating periods in rest of dwelling Th2	
19.87 19.88 19.90 19.90 19.92 19.92 19.92 19.91 19.90 19.89 19.	88
Utilisation factor for gains for rest of dwelling	
0.99 0.98 0.96 0.90 0.76 0.54 0.36 0.41 0.69 0.92 0.98 0.9	9
Mean internal temperature in the rest of dwelling T2	
18.30 18.53 18.91 19.41 19.74 19.89 19.91 19.92 19.84 19.42 18.80 18.	28
Living area fraction (15.00 / 84.00)	0.18
Mean internal temperature (for the whole dwelling)	
18.57 18.79 19.15 19.62 19.94 20.09 20.11 20.11 20.03 19.62 19.04 18.	55
Apply adjustment to the mean internal temperature, where appropriate	
18.57 18.79 19.15 19.62 19.94 20.09 20.11 20.11 20.03 19.62 19.04 18.	55
8. Space heating requirement	
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov De	•
Utilisation factor for gains	
0.99 0.98 0.95 0.89 0.76 0.55 0.38 0.43 0.70 0.92 0.98 0.9	0
0.99 0.96 0.95 0.09 0.76 0.35 0.36 0.43 0.70 0.92 0.96 0.9 Useful gains	9
	1 00
	1.88
Monthly average external temperature	•
4.30 4.90 6.50 8.90 11.70 14.60 16.60 16.40 14.10 10.60 7.10 4.2	U
Heat loss rate for mean internal temperature	
1518.26 1471.61 1334.39 1107.90 848.40 554.78 354.69 373.67 603.79 929.37 1239.05 150)1.68
Fraction of month for heating	
1.00 1.00 1.00 1.00 - - - - 1.00 1.00 1.0	0
Space heating requirement for each month, kWh/month	
	7.46
	050.41
Space heating requirement per m² (kWh/m²/year)	36.31

8c. Space cooling requirement - not applicable

9a. Energy requirements

9a. Energy requirements								kWh/year		
No secondary heating system Fraction of space heat from m Efficiency of main heating system	ain system	(s)				1.0000 2.90%		•	(202) (206)	
Jan Feb Mar Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Space heating requirement	•	1	1	1	•					
627.27 486.25 393.82 201.	63 73.17	-	-	-	-	204.19	426.62	637.46	(98)	
Appendix Q - monthly energy	saved (mai	n heating	system	1)	•					
0.00 0.00 0.00 0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)	
Space heating fuel (main heat	ng system	1)	1	1	•					
675.21 523.41 423.92 217.	04 78.76	-	-	-	-	219.80	459.23	686.18	(211)	
Appendix Q - monthly energy	saved (mai	n heating	system	2)	•					
0.00 0.00 0.00 0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)	
Space heating fuel (main heat	ng system	2)	1	1	•					
0.00 0.00 0.00 0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)	
Appendix Q - monthly energy	saved (sec	ondary h	eating sy	/stem)	•					
0.00 0.00 0.00 0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)	
Space heating fuel (secondary	')	•	1		•		•			
0.00 0.00 0.00 0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)	
Water heating		•			•					
Water heating requirement										
178.28 156.60 163.17 144.	49 140.30	123.52	116.89	130.68	131.22	149.94	160.78	173.40	(64)	
Efficiency of water heater								86.60	(216)	
89.15 89.07 88.91 88.4	9 87.70	86.60	86.60	86.60	86.60	88.47	88.97	89.17	(217)	
Water heating fuel				1	1					
199.98 175.81 183.53 163.	28 159.97	142.63	134.97	150.90	151.52	169.47	180.71	194.45	(219)	
Space heating fuel (secondary Water heating fuel	Space heating fuel used, main system 1 3283.54 Space heating fuel (secondary) 0.00 Water heating fuel 2007.21									
Electricity for pumps, fans and central heating pump boiler with a fan-assisted flue Total electricity for the above, Electricity for lighting (100.00% Energy saving/generation tech Appendix Q -	kWh/year 5 fixed LEL							30.00 45.00 75.00 388.03	(230c) (230e) (231) (232)	
Energy saved or generated (Energy used ():	,							0.000 0.000	(236a) (237a)	
Total delivered energy for all u	5 6 5							5753.79	(238)	

,	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	3283.542	3.480	114.27	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	2007.21	3.480	69.85	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	388.029	13.190	51.18	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			365.19	(255)
11a. SAP rating				
Trai Orii Taanig			0.42	(256)
			1.19	(257)
SAP value			83.41	(==1)
			83	(258)
SAP band			В	()

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emission kg CO2/ye	-	
Space heating, main system 1	3283.54	0.216	709.25	(261)	
Space heating, main system 2	0.00	0.000	0.00	(262)	
Space heating, secondary	0.00	0.519	0.00	(263)	
Water heating	2007.21	0.216	433.56	(264)	
Space and water heating			1142.80	(265)	
Electricity for pumps and fans	75.00	0.519	38.93	(267)	
Electricity for lighting	388.03	0.519	201.39	(268)	
Electricity generated - PVs	0.00	0.519	0.00	(269)	
Electricity generated - µCHP	0.00	0.000	0.00	(269)	
Appendix Q -				, ,	
Energy saved ():	0.00	0.000	0.00	(270)	
Energy used ():	0.00	0.000	0.00	(271)	
Total CO2, kg/year			1383.12	(272)	
			kg/m²/yea	ır	
CO2 emissions per m ²			16.47	(273)	
El value			85.63	(273a)	
El rating			86	(274)	
El band			В		

Calculation of stars for heating and DHW

Main heating energy efficiency Main heating environmental impact Water heating energy efficiency Water heating environmental impact

 $(3.48 / 0.8990) \times (1 + (0.29 \times 0.00)) = 3.8710$, stars = 4 (0.2160 / 0.8990) x $(1 + (0.29 \times 0.00)) = 0.2403$, stars = 4 3.48 / 0.8803 = 3.9533, stars = 4 0.2160 / 0.8803 = 0.2454, stars = 4

Project Information

Building type Semi-detached house

Reference Date

Project Type C

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 worksheet for New dwelling as designed - calculation of dwelling emissions

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	\ 42.00	2.35	` 98.70	(3a)
First floor	42.00	2.65	111.30	(3b)
	84.00			(4)
			210.00	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondary	y + othe	r	·	
	er of chin						0 + 0 + 0		40		0.00	(6a)
	er of ope						0 + 0 + 0		20		0.00	(6b)
		mittent f					4		(10		40.00	(7a)
		sive vent					0		(10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	×	40		0.00	(7c)
											Air chan	ges per hour
											0.19	(8)
Pressu	ıre test, r	esult q50)						5.00			(17)
Air per	meability	,									0.54	(18)
											2.00	(19)
											0.85	(20)
		ncorpora modified									0.46	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor	'		1	1				1		52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
											13.13	(22a)
Adjuste	ed infiltra	tion rate	(allowing	g for she	Iter and v	wind spe	eed)					,
0.59	0.57	0.56	0.51	0.49	0.44	0.44	0.42	0.46	0.49	0.52	0.54	
									•		6.03	(22b)
		ural vent ange rate		ntermitte	nt extrac	t fans						
0.67	0.66	0.66	0.63	0.62	0.60	0.60	0.59	0.61	0.62	0.63	0.65	(25)
								-			-	

3. Heat losses and heat lo	ss paramete	r					
Element Gross	Openings	Net area	U-value	AxU	kappa-valu		
area, m²	m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	(a=)
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (SouthWest)							
dg Window - Double-glazed,		4 640	4 45 (4 20)	1.84			(27)
argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.04			(27)
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,		1.010	1.10 (1.20)	1.01			(21)
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,			` ,				,
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (NorthEast)							
dg							(a=)
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (NorthEast)							
dg Window Davible glazed		4 040	4.45 (4.00)	4.04			(27)
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.84			(27)
soft coat (NorthEast)							
dg							
Solid door		1.890	1.20	2.27			(26)
dg		1.000	1.20	2.21			(20)
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argon filled,		0.0.10					()
low-E, En=0.1, soft coat							
(NorthEast)							
dg							
Pitched roofs insulated bety	veen joists	42.00	0.10	4.20	9.00	378.00	(30)
Walls		76.80	0.19	14.59	60.00	4608.00	(29)
Brick and block cavity wal	l, full fill						
Ground floors		42.00	0.14	5.88	110.00	4620.00	(28)
Party wall		35.00	0.00	0.00	70.00	2450.00	

Autorition Section S		r heating		/ require	ements							kWh/year	
an Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec ot water usage in litres per day for each month 03.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103.83 100.06 103.83 100.06 103.83 100.06 103.83 100.06 103.83 100.06 103.83 100.06 103.83 100.06 103.97 121.16 116.25 100.32 92.96 106.67 107.94 125.80 137.32 149.12 1485.15 100.06 100.0				r usage i	in litres p	er day V	/d,avera	ge					(42 (43
103.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103.83 103.83 100.06 96.28 92.50 88.73 84.95 84.95 88.73 92.50 96.28 100.06 103.83 105.398 134.67 138.97 121.16 116.25 100.32 92.96 106.67 107.94 125.80 137.32 149.12 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 105.310 20.20 20.85 18.17 10.00 20.00	Jan							-	Sep	Oct	Nov	Dec	`
nergy content of hot water used 53.98 134.67 138.97 121.16 116.25 100.32 92.96 106.67 107.94 125.80 137.32 149.12 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 1485.15 13.10 120.20 120.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 120.60 12.37 1485.15 13.10 120.20 120.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 120.60 12.37 1485.15 13.10 120.20 120.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 120.60 12.37 1485.15 149.14 15.05 13.94 16.00 16.19 18.87 120.60 120.	Hot wate	er usage	in litres	per day t	or each	month			-		I.		
138.97 138.97 121.16 116.25 100.32 92.96 106.67 107.94 125.80 137.32 149.12 1485.15 1485.1	103.83	100.06	96.28	92.50	88.73	84.95	84.95	88.73	92.50	96.28	100.06	103.83	(44
1485.15 15 15 15 15 15 15 15	Energy o	content c	f hot wa	ter used									
stribution loss 3.10 20.20 20.85 18.17 17.44 15.05 13.94 16.00 16.19 18.87 20.60 22.37 (4 store loss determined from EN 13203-2 tests, taken from boiler data record but water cylinder loss factor (kWh/day) 0.0000 (5 to twater cylinder loss factor (kWh/day) 0.0000 (5 to twater cylinder loss factor (kWh/day) 0.0000 (5 to twater cylinder loss factor (kWh/day) 0.000 (5 to twater cylinder loss factor (kWh/day) 0.000 (5 to twater cylinder loss factor (kWh/day) 0.00 0	153.98			121.16	116.25	100.32	92.96	106.67	107.94	125.80	137.32	149.12	
Store loss determined from EN 13203-2 tests, taken from boiler data record 0.00			annual)					,				1485.15	(45
to twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater lest required loss of twater cylinder loss factor (kWh/day) of twater cylinder loss factor (kWh/day) of twater lest required loss of twater cylinder loss factor (kWh/day) of twater loss factor of twater loss fact	23.10	20.20	20.85	18.17	17.44	15.05	13.94	16.00	16.19	18.87	20.60	22.37	(46
otal storage loss 1.00 0.0	olume empera	factor ature fac	tor	•	/h/day)							0.0000 0.0000 0.0000	(5) (5) (5)
et storage loss .00 0.00	otal sto			· · · · · · · · · · · · · · · · · · ·								0.00	(0
1.00 0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
imary loss 00 0.00													
1.00 0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
ombi loss calculated for each month 4.30 21.93 24.20 23.33 24.05 23.20 23.93 24.01 23.27 24.14 23.46 24.28 otal heat required for water heating calculated for each month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 utput from water heater for each month, kWh/month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 60 1769.24	•		ı	1	ı		1		ı	ı			
4.30 21.93 24.20 23.33 24.05 23.20 23.93 24.01 23.27 24.14 23.46 24.28 otal heat required for water heating calculated for each month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 utput from water heater for each month, kWh/month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 60 1769.24 1769	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
otal heat required for water heating calculated for each month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 40 utput from water heater for each month, kWh/month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 60 utput from water heater for each month, kWh/month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 78.28 156.60 163.17 160.78 173.40 78.28 156.60 163.17 160.78 173.40 78.28 156.60 163.17 160.78 173.40 78.28 156.60 163.17 160.78 173.40 78.28 156.60 163.17 160.78 173.40 78.28 156.60 163.17 160						T	T	T	T	I =	1	T	
78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 utput from water heater for each month, kWh/month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 (60.78 173.40									23.27	24.14	23.46	24.28	(6
utput from water heater for each month, kWh/month 78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 (6 1769.24 eat gains from water heating, kWh/month									T	T	1	T	,_
78.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 173.40 (6 eat gains from water heating, kWh/month								130.68	131.22	149.94	160.78	173.40	(6
1769.24 (6 eat gains from water heating, kWh/month								T	T		1		,_
eat gains from water heating, kWh/month	178.28	156.60	163.17	144.49	140.30	123.52	116.89	130.68	131.22	149.94	160.78		•
	leat gai	ins from	water he	eating, k\	Wh/mont	:h						1769.24	(6
	57.27						36.89	41.47	41.71	47.86	51.52	55.65	(6

_		
_	Intorna	il anınc
IJ.	IIILEI II a	ıl gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabol	ic gains,	Watts							•		
126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72	126.72
Lighting	gains								•		
21.97	19.52	15.87	12.02	8.98	7.58	8.19	10.65	14.29	18.15	21.18	22.58
Appliand	ces gains	;									
227.60	229.96	224.01	211.34	195.34	180.31	170.27	167.91	173.86	186.53	202.52	217.55
Cooking	gains										
35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67	35.67
Pumps a	and fans	gains									
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Losses	e.g. evap	oration (negative	values)					•		
-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38	-101.38
Water h	eating ga	ains									
76.98	74.79	70.24	64.05	60.03	54.38	49.58	55.74	57.93	64.33	71.56	74.80
Total int	ernal gai	ns									
390.57	388.28	374.13	351.42	328.38	306.29	292.06	298.31	310.10	333.03	359.28	378.95

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79		0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

	n interna						(0.0)				04.00
	rature du ı system ı			ds in the	e living a	rea, Th1	(°C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau		1									
54.81	55.05	55.28	56.42	56.64	57.67	57.67	57.87	57.27	56.64	56.20	55.75
alpha		1		1	1	1	1	<u> </u>		l	
4.65	4.67	4.69	4.76	4.78	4.84	4.84	4.86	4.82	4.78	4.75	4.72
Utilisatio	on factor	for gains	for livin	g area		I	I.			I.	
1.00	1.00	0.99	0.96	0.88	0.71	0.55	0.61	0.86	0.98	1.00	1.00
Mean ir	nternal te	mperatu	re in livin	g area T	1	I	I.			I.	
19.60	19.76	20.05	20.43	20.75	20.94	20.99	20.98	20.84	20.42	19.95	19.58
Temper	rature du	ring heat	ing perio	ds in res	st of dwe	lling Th2)			I.	
19.87	19.87	19.88	19.90	19.90	19.92	19.92	19.92	19.91	19.90	19.89	19.88
Utilisatio	on factor	for gains	for rest	of dwelli	ing	1	1	1	1	1	
1.00	0.99	0.98	0.94	0.83	0.62	0.42	0.48	0.79	0.97	0.99	1.00
Mean ir	nternal te	mperatu	re in the	rest of d	welling T	2	1	1	1	1	
18.01	18.25	18.66	19.23	19.66	19.88	19.91	19.91	19.78	19.22	18.53	18.00
	rea fracti					•	1	1	ı	•	0.18
	nternal te										
18.29	18.52	18.91	19.44	19.85	20.07	20.10	20.10	19.97	19.43	18.79	18.28
	djustmen										
18.29	18.52	18.91	19.44	19.85	20.07	20.10	20.10	19.97	19.43	18.79	18.28
8 Spac	e heatin	a reauir	ement								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	on factor			may	l o u	G G,	7 (49	СОР	001	1101	200
1.00	0.99	0.98	0.94	0.83	0.63	0.44	0.51	0.80	0.96	0.99	1.00
Useful g		1 3.00	3.0 .	1 3.00	1 3.00	1 3	3.0 .	13.00	1 3.00	1 3.00	
3											
495.00	575.93	653.47	716.80	693.74	524.74	350.34	365.65	512.77	532.51	484.92	467.28
	575.93 v average				524.74	350.34	365.65	512.77	532.51	484.92	467.28
Monthly	/ average	externa	l temper	ature							
Monthly 4.30	4.90	externa 6.50	l tempera	ature 11.70	14.60	350.34 16.60	365.65 16.40	512.77	532.51	7.10	4.20
Monthly 4.30 Heat los	4.90 ss rate fo	externa 6.50 r mean i	temper 8.90 nternal te	ature 11.70 emperati	14.60 ure	16.60	16.40	14.10	10.60	7.10	4.20
Monthly 4.30 Heat los 1488.9	4.90 ss rate fo	externa 6.50 r mean i 1309.50	8.90 nternal to	ature 11.70 emperati	14.60 ure		16.40		10.60	7.10	
Monthly 4.30 Heat los 1488.9 Fractior	4.90 ss rate for 1443.50	externa 6.50 r mean i 1309.50 h for hea	8.90 nternal to 1090.03	ature 11.70 emperatu 839.85	14.60 ure	16.60	16.40 373.06	14.10	10.60	7.10	4.20
Monthly 4.30 Heat los 1488.9 Fraction 1.00	average 4.90 ss rate fo 11443.50 n of mont 1.00	externa 6.50 r mean i 1309.50 h for hea	8.90 nternal to 1090.03 ating	ature 11.70 emperatu 839.85	14.60 ure 552.86	354.37	16.40	14.10	10.60	7.10	4.20
Monthly 4.30 Heat los 1488.9 Fraction 1.00 Space h	v average 4.90 ss rate fo 11443.50 n of mont 1.00 heating re	externa 6.50 r mean i 1309.50 h for hea 1.00 equireme	8.90 nternal to 1090.03 ating 1.00 ent for ea	ature 11.70 emperatu 839.85 1.00 ach mont	14.60 ure 552.86 - h, kWh/r	354.37	16.40 373.06	14.10	10.60 909.67 1.00	7.10	4.20 31473.18 1.00
Monthly 4.30 Heat los 1488.9 Fractior 1.00 Space I	v average 4.90 ss rate fo 11443.50 n of mont 1.00 heating re	externa 6.50 r mean i 1309.50 h for hea 1.00 equireme	1 tempers 8.90 1090.03 1.00 1.00 268.72	11.70 emperatu 839.85 1.00 ech mont	14.60 ure 552.86 - h, kWh/r	16.60 354.37 - month	16.40 373.06 -	14.10 597.56 -	10.60	7.10	4.20

8c. Space cooling requirement - not applicable

9a. Energy requirements

9a. Energy requirements	kWh/year	
No secondary heating system selected Fraction of space heat from main system(s) Efficiency of main heating system 1.0000 92.90%		(202) (206)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov D	Dec	
Space heating requirement		
739.47 583.00 488.09 268.72 108.71 - - - 280.61 524.28 7	748.39	(98)
Appendix Q - monthly energy saved (main heating system 1)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0	0.00	(210)
Space heating fuel (main heating system 1)		
795.98 627.56 525.39 289.26 117.02 - - - 302.05 564.35 8	805.59	(211)
Appendix Q - monthly energy saved (main heating system 2)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0	0.00	(212)
Space heating fuel (main heating system 2)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0	0.00	(214)
Space heating fuel (secondary)		
0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0	0.00	(215)
Water heating Water heating requirement		
178.28 156.60 163.17 144.49 140.30 123.52 116.89 130.68 131.22 149.94 160.78 1	173.40	(64)
Efficiency of water heater	86.60	(216)
89.24 89.18 89.05 88.72 88.01 86.60 86.60 86.60 86.60 88.72 89.10 8	89.26	(217)
Water heating fuel		
199.78 175.60 183.23 162.86 159.41 142.63 134.97 150.90 151.52 169.00 180.44 1	194.26	(219)
Annual totals Space heating fuel used, main system 1 Space heating fuel (secondary) Water heating fuel Electricity for pumps, fans and electric keep-hot	kWh/year 4027.19 0.00 2004.60	(211) (215) (219)
central heating pump boiler with a fan-assisted flue Total electricity for the above, kWh/year Electricity for lighting (100.00% fixed LEL)	30.00 45.00 75.00 388.03	(230c) (230e) (231) (232)
Energy saving/generation technologies Appendix Q - Energy saved or generated (): Energy used (): Total delivered energy for all uses	0.000 0.000	(236a) (237a) (238)

10a. Does not apply

11a. Does not apply

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	4027.19	0.216	869.87	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2004.60	0.216	432.99	(264)
Space and water heating			1302.87	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	388.03	0.519	201.39	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1543.18	(272)
			kg/m²/yea	r
Dwelling Carbon Dioxide Emission Rate (DER)			18.37	(273)

Project Information

Building type Semi-detached house

Reference Date

Project Type C

Oaklands Drive Almondsbury BS32 4AB

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.05.063, printed on 02/06/2022 at 07:00:19

New dwelling as designed

1 TER and DER

Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate TER = 19.09
Dwelling Carbon Dioxide Emission Rate DER = 18.37

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 56.7

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 49.0

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element Highest <u>Average</u> Wall OK 0.19 (max. 0.30) 0.19 (max. 0.70) Floor 0.14 (max. 0.25) 0.14 (max. 0.70) OK 0.10 (max. 0.20) Roof 0.10 (max. 0.35) OK Openings 1.20 (max. 2.00) 1.20 (max. 3.30) OK

3 Air permeability

Air permeability at 50 pascals: 5.00 Maximum: 10.00

4 Heating efficiency

Main heating system:

Boiler and radiators, mains gas

Worcester 2000

Source of efficiency: from boiler database

Worcester 2000 GC2000iW 30 C NG

Efficiency: 89.0% SEDBUK2009

Minimum: 88.0% OK

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls Time and temperature zone control

OK

Hot water controls No cylinder

Boiler Interlock Yes OK

Hot water controls No cylinder

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0%

OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Severn Valley):

OK

Not significant

OK

Based on:

Thermal mass parameter: 250.00

Overshading: Average or unknown (20-60 % sky blocked)

Orientation: SouthWest

Ventilation rate: 8.00

Blinds/curtains:

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Pitched roofs insulated between joists U-value 0.10 W/m²K

Project Information

Building type Semi-detached house

Reference Date

Project Type C

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type C baseline

Type C

Oaklands Drive Almondsbury BS32 4AB

Located in: England
Region: Severn Valley
Postcode: BS32 4AB

UPRN:

Date of assessment: 2022-06-01 Date of certificate: 2022-06-02

Assessment type: New dwelling as designed

Tenure: Unknown
Transaction type: New dwelling
Related party disclosure: No related party

PCDF revision number: 495

Property description

Dwelling type: Semi-detached house

Ground floor (1) $area = 42.00m^2$ storey height = 2.35m First floor $area = 42.00m^2$ storey height = 2.65m

Living area: 15.00 (fraction 0.179)

Front of dwelling faces: SouthWest

Doors

Solid door area = 1.89 U = 1.20

Full glazed door area = 5.04 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Windows

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

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Project InformationBuilding type Semi-detached house

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Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type C baseline

Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unknow	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unknow	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unknown	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unknown	wn (20-60 % sky block	ed)
Rooflights			
Opaque Elements Roofs Walls Ground floors	area = 42.00 area = 76.80 area = 42.00	U = 0.10, k = 9.0 U = 0.19, k = 60.0 U = 0.14, k = 110.0	Brick and block cavity wall, full fill
Thermal bridges: E10 Eaves (insulation at ceiling level) [A]	Htb = 14.00 0.060	0.060	14.100
E12 Gable (insulation at ceiling level) [A]	0.240	0.240	23.900
E16 Corner (normal) [A]	0.090	0.090	27.400
E17 Corner (inverted – internal area greater than external area) [A]	-0.090	-0.090	5.000
E2 Other lintels (including other steel lintels) [A] Openings lintels	0.300	0.300	21.850
E3 Sill [A] Openings sills	0.040	0.040	21.850
E4 Jamb [A] Openings jambs	0.050	0.050	43.500
E5 Ground floor (normal) [A]	0.160	0.160	38.900
E6 Intermediate floor within a dwelling [A]	0.070	0.070	38.900

Project Information

Building type Semi-detached house

Reference Date

Project Type C

> Oaklands Drive Almondsbury **BS32 4AB**

Printed on 2 Jun 2022 at 07:00 AM SAP 2012 input data

Type C baseline

User defined - 250.00 Thermal mass:

Pressure test: Yes (q50 - 5.00): measured in this dwelling: No Ventilation: Natural ventilation with intermittent extract fans

Number of chimneys: Number of open flues: 0 Number of intermittent 4

fans:

Number of passive stacks: Number of sides sheltered: 2.00 Measured/design q50: 5.00

Main heating system: Central heating systems with radiators or underfloor heating

> Gas boilers (including LPG) 1998 or later Condensing combi with automatic ignition

Index: 18687

Eff 86.60% / 89.90% Worcester 2000 GC2000iW 30 C NG

Radiators

Pump in heated space: Yes

Boiler has load or weather compensator: Yes

Boiler Interlock: Yes

Design flow temperature: Unknown Central heating pump 2013 or later

Gas (mains)

Time and temperature zone control Main heating controls:

Boiler has load Nο

compensator:

Yes Boiler has weather

compensator:

Boiler has emhanced load No

compensator:

Boiler interlock: Yes Secondary heating system: None

Water heating: Combination boiler

Combination boiler type: Instantaneous

Solar panel: no

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Project Information

Building type Semi-detached house

Reference Date

Project Type C

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type C baseline

Water use <= 125 Yes

litres/person/day:

Low energy lights: Total fixed lighting outlets: 100.0% of fixed lighting outlets

30

Electricity tariff: Standard tariff Photovoltaics 1: Peak kW: 0.00 Photovoltaics 2: Peak kW: 0.00 Photovoltaics 3: Peak kW: 0.00

Conservatory: No Fixed air conditioning: No

Smoke Control Area: Not specified Additional allowable electricity generation:

0.00kg/m²/year

Predicted Energy Assessment

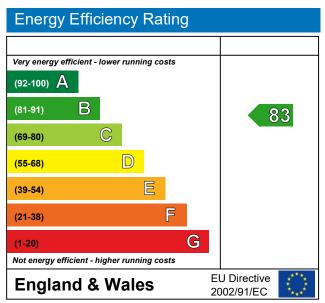
Type C Oaklands Drive Almondsbury BS32 4AB Dwelling type: Semi-detached house Date of assessment: 2 June 2022

Produced by Complete Energy Consultancy Ltd

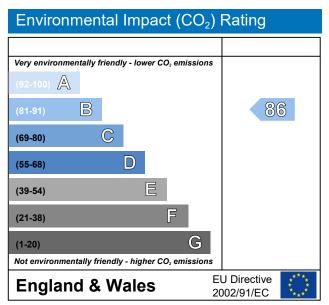
Total floor area: 84 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Project InformationBuilding type Semi-detached house

Reference Date

Project

Type D Oaklands Drive Almondsbury BS32 4AB

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	35.50	2.35	83.42	(3a)
First floor	35.50	2.65	94.08	(3b)
	71.00			(4)
			177.50	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondar	y + othe	r		
	er of chin						0 + 0 + 0		< 40		0.00	(6a)
	er of ope						0 + 0 + 0		〈 20		0.00	(6b)
	er of inter						4		< 10		40.00	(7a)
	er of pass						0		< 10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	>	< 40		0.00	(7c)
											Air chan	ges per hour
											0.23	(8)
Pressu	ıre test, r	esult q50)						7.00			(17)
Air per	meability	,									0.58	(18)
											2.00	(19)
											0.85	(20)
	ion rate i ion rate i										0.49	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
\^/: al [52.50	(22)
Wind F 1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
1.21	1.23	1.23	1.10	1.07	0.95	0.93	0.93	1.00	1.07	1.13		(00)
Adjuste	ed infiltra	tion rate	(allowing	g for she	Iter and	wind spe	eed)				13.13	(22a)
0.62	0.61	0.60	0.54	0.53	0.46	0.46	0.45	0.49	0.53	0.55	0.57	
	_				_			1	<u>'</u>	<u> </u>	6.42	(22b)
	ition : nat ve air cha		,	ntermitte	nt extrac	ct fans						
0.69	0.69	0.68	0.64	0.64	0.61	0.61	0.60	0.62	0.64	0.65	0.67	(25)

3. Heat losses and heat los	ss paramete	r					
Element Gross	Openings	Net area	U-value	AxU	kappa-valu		
area, m²	m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (NorthEast)							
dg Window Double glazed		4 640	4 45 (4 20)	1.84			(27)
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.04			(27)
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,		1.010	1.10 (1.20)	1.01			(21)
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,			- (/				,
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (SouthWest)							
_dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (SouthWest)							
dg Window Double dezed		4 640	4 45 (4 20)	1 0 1			(27)
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.84			(27)
soft coat (SouthWest)							
dg							
Solid door		1.890	1.20	2.27			(26)
dg		1.000	1.20	2.21			(20)
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argon filled,		0.0.0	•				()
low-E, En=0.1, soft coat							
(NorthEast)							
` dg							
Pitched roofs insulated betw	een joists	35.50	0.10	3.55	9.00	319.50	(30)
Walls		66.80	0.19	12.69	60.00	4008.00	(29)
Brick and block cavity wall,	, full fill						
Ground floors		35.50	0.14	4.97	110.00	3905.00	(28)
Party wall		35.00	0.00	0.00	70.00	2450.00	

	r heating		/ require	ements							kWh/yea
	ed occupa		,			, ,					2.27
	average						1	1			88.12
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot wate	er usage	in litres	per day f	for each	month						
96.93	93.40	89.88	86.35	82.83	79.30	79.30	82.83	86.35	89.88	93.40	96.93
Energy	content o	of hot wa	ter used		•		•				
143.74	125.72	129.73	113.10	108.52	93.65	86.78	99.58	100.77	117.44	128.19	139.21
0,	content (annual)	•	•				•	•	•	1386.41
	tion loss										
21.56	18.86	19.46	16.97	16.28	14.05	13.02	14.94	15.12	17.62	19.23	20.88
,	volume						150.00				
	cturer's c		cylinder	loss fact	or (kWh		1.86				
	ature Fa		ar avlinda	sr /lc\A/b/	day)		0.5400				1.00
	lost from orage los		er Cyllride	er (KVVII/	uay)						1.00
31.14	28.12	31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
•	age loss		30.13	01.14	30.13	101.14	01.14	30.13	01.14	30.13	31.14
31.14	28.12	31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
		31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
Primary		00.00	00.54	00.00	00.54	00.00	00.00	00.54	00.00	00.54	00.00
23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26
	at requir										T
	174.85						153.98	153.41	171.83	180.83	193.60
Output f	rom wate	er heater	for each	n month,	kWh/m	onth					
198.14	174.85	184.13	165.74	162.92	146.29	141.18	153.98	153.41	171.83	180.83	193.60
						,				-	2026.91
	ins from										
91.31	81.11	86.65	79.72	79.60	73.25	72.37	76.63	75.62	82.57	84.74	89.80
									-	-	

_				-
_	Int	arn.	າ <i>!</i> ~	ainc
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		71 LJ	ains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabol	ic gains,	Watts	•	•	•		•	•	•		
136.21	136.21	136.21	136.21	136.21	136.21	136.21	136.21	136.21	136.21	136.21	136.21
Lighting	gains	•	•		•	•			•		
46.49	41.29	33.58	25.42	19.00	16.04	17.34	22.53	30.24	38.40	44.82	47.78
Appliand	ces gains	3				•	•				
297.94	301.03	293.24	276.65	255.72	236.04	222.89	219.80	227.59	244.18	265.12	284.79
Cooking	gains	•	•			•	•				
50.89	50.89	50.89	50.89	50.89	50.89	50.89	50.89	50.89	50.89	50.89	50.89
Pumps a	and fans	gains									
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Losses	e.g. evap	oration	negative	values)							
-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81
Water h	eating ga	ains	•	•	•		•		•	•	
122.73	120.70	116.47	110.72	106.99	101.74	97.27	103.00	105.03	110.98	117.69	120.71
Total int	ernal gai	ns	•	•	•		•				
563.46	559.31	539.59	509.10	478.01	450.12	433.80	441.63	459.16	489.85	523.92	549.58

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28		0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

	n interna										
	rature du ı system			ods in the	e living a	rea, Th1	(°C)				21.00 0.75
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	1	1	1. 4.		1	1	19			1	
50.77	51.01	51.24	52.34	52.56	53.57	53.57	53.76	53.17	52.56	52.13	51.69
alpha			1						1		
4.38	4.40	4.42	4.49	4.50	4.57	4.57	4.58	4.54	4.50	4.48	4.45
Utilisatio	on factor	for gains	s for livin	g area							
0.99	0.98	0.96	0.89	0.76	0.58	0.43	0.48	0.72	0.92	0.98	0.99
Tweekd	day	1	1	1	•	1	· I	1	1	1	
19.88	20.04	20.28	20.58	20.80	20.91	20.93	20.92	20.86	20.58	20.19	19.87
Tweeke	end	•	1	•		1	1	•	•		
20.37	20.45	20.59	20.76	20.89	20.95	20.96	20.96	20.92	20.76	20.54	20.36
24 inste	ad of 16	1	1	•		1	1	•	•		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 inste	ad of 9	•		•	•	-		•	•		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16 inste	ad of 9			•			-	•	•		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean in	nternal te	mperatu	re in livin	ig area T	1			•			
20.02	20.15	20.37	20.63	20.83	20.92	20.94	20.93	20.88	20.63	20.28	20.01
Temper	rature du	ring heat	ting perio	ds in res	st of dwe	lling Th2	2	•		•	
19.79	19.79	19.80	19.82	19.82	19.84	19.84	19.85	19.84	19.82	19.82	19.81
Utilisatio	on factor	for gains	s for rest	of dwell	ing	•		•		•	
0.98	0.97	0.94	0.86	0.70	0.48	0.32	0.36	0.63	0.89	0.97	0.99
Tweekd	lay	•		•	•	•		•		•	
18.52	18.71	19.01	19.40	19.64	19.74	19.76	19.76	19.70	19.41	18.93	18.51
Tweeke	end			•	•	1		•	•		
18.52	18.71	19.01	19.40	19.64	19.74	19.76	19.76	19.70	19.41	18.93	18.51
Mean in	nternal te	mperatu	re in the	rest of d	welling 7	2		•	•	•	
18.52	18.71	19.01	19.40	19.64	19.74	19.76	19.76	19.70	19.41	18.93	18.51
	rea fract						-		•	•	0.21
	nternal te					<u>, </u>					
18.84	19.02	19.30	19.66	19.89	19.99	20.00	20.01	19.95	19.67	19.21	18.83
	djustmer							,			
18.84	19.02	19.30	19.66	19.89	19.99	20.00	20.01	19.95	19.67	19.21	18.83

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisatio	n factor	for gains	•						•		
0.98	0.97	0.93	0.85	0.70	0.50	0.33	0.38	0.64	0.88	0.96	0.98
Useful g	ains				•				•	•	
656.25	726.40	778.65	788.27	694.68	484.87	311.95	328.24	507.93	627.90	629.63	628.41
Monthly	average	external	tempera	ature		•	•	•		•	
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
Heat los	s rate fo	r mean ii	nternal te	emperati	ire	•	•	•	•	•	
1411.48	1364.51	1231.80	1013.59	768.09	496.18	313.37	330.73	542.57	850.49	1145.71	1395.57
Fraction	of mont	h for hea	ting			•	•	•	•	•	
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space h	eating re	quireme	nt for ea	ch mont	h, kWh/r	month	•	•	•	•	
561.89	428.82	337.15	162.23	54.62	-	-	-	-	165.61	371.58	570.76
	ace heat					ar) (Oct	ober to N	lay)		1	2652.6
Space h	eating re	equireme	nt per m	² (kWh/r	n²/year)						37.3

8c. Space cooling requirement - not applicable

9a. Energy requirements

		unemen									kWh/year	
Fraction	of spac	eating sy e heat fro in heating	om main	system((s)				1.0000 34.23%			(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	,
Space h	eating r	equireme	ent					-	I			
561.89	428.82	337.15	162.23	54.62	-	-	-	-	165.61	371.58	570.76	(98)
Append	ix Q - m	onthly en	ergy sav	ed (mair	heating	system	1)		I			
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	eating f	uel (main	heating	system	1)							
168.11	128.30	100.87	48.54	16.34	-	-	-	-	49.55	111.18	170.77	(211)
Append	ix Q - m	onthly en	ergy sav	ed (mair	heating	system	2)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space h	eating f	uel (main	heating	system	2)							
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Append	ix Q - m	onthly en	ergy sav	ed (seco	ndary he	eating sy	stem)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space h	eating f	uel (seco	ndary)									
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water h		1		'	•			1	l			
		equireme										
		184.13	165.74	162.92	146.29	141.18	153.98	153.41	171.83	180.83	193.60	(64)
		ter heate									295.93	(216)
		295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	295.93	(217)
	eating fu						1				1	
66.96	59.09	62.22	56.01	55.05	49.44	47.71	52.03	51.84	58.07	61.11	65.42	(219)
Space h Water h	neating for neating for neating for	uel used, uel (seco uel mps, fan	ndary) [*]		on hot						kWh/year 793.66 0.00 684.94	(211) (215) (219)
Total ele Electrici	ectricity f ty for ligi	for the ab hting (10 eneratior	ove, kW 0.00% fix	/h/year xed LEL)	•						0.00 328.41	(231) (232)
	ty gener	ated - µC									0.00	(235)
Energ		or gener):	ated ():								0.000 0.000	(236a) (237a)
Total de	elivered e	energy fo	r all uses	5							1807.01	(238)

10a. Fuel costs using Table 12 prices

, ,	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	793.657	13.190	104.68	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
High-rate percentage	100.000%			(243)
Low-rate percentage	0.000%			(244)
High-rate cost	684.94	13.190	90.34	(245)
Low-rate	0.00	13.190	0.00	(246)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	0.000	13.190	0.00	(249)
Energy for lighting	328.407	13.190	43.32	(250)
Additional standing charges			0.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			238.34	(255)
11a. SAP rating				
-			0.42	(256)
			0.86	(257)
SAP value			87.96	
			88	(258)
SAP band			В	

12a. Carbon dioxide emissions

Energy		Emission	S
kWh/year	kg CO2/kWh	kg CO2/y	ear
793.66	0.519	411.91	(261)
0.00	0.000	0.00	(262)
0.00	0.519	0.00	(263)
684.94	0.519	355.48	(264)
		767.39	(265)
0.00	0.519	0.00	(267)
328.41	0.519	170.44	(268)
0.00	0.519	0.00	(269)
0.00	0.519	0.00	(269)
			, ,
0.00	0.000	0.00	(270)
0.00	0.000	0.00	(271)
		937.84	(272)
		kg/m²/yea	ır
		13.21	(273)
		89.17	(273a)
		89	(274)
		В	•
	793.66 0.00 0.00 684.94 0.00 328.41 0.00 0.00	kWh/year kg CO2/kWh 793.66 0.519 0.00 0.000 0.00 0.519 684.94 0.519 0.00 0.519 328.41 0.519 0.00 0.519 0.00 0.519 0.00 0.519 0.00 0.519	kWh/year kg CO2/kWh kg CO2/y 793.66 0.519 411.91 0.00 0.000 0.00 0.00 0.519 0.00 684.94 0.519 355.48 767.39 0.00 0.519 0.00 328.41 0.519 170.44 0.00 0.00 0.00 0.519 0.00 0.00 0.00 0.519 0.00 0.00 0.00 0.000 0.00 937.84 kg/m²/yea 13.21 89.17 89

Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

(13.19 / 3.3423) x (1 + (0.29 x 0.25)) = 4.2325, stars = 4 (0.5190 / 3.3423) x (1 + (0.29 x 0.25)) = 0.1665, stars = 5 13.19 / 2.9593 = 4.4572, stars = 4 0.52 / + (0.00 x 0.52) = 0.1754, stars = 5

Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 worksheet for New dwelling as designed - calculation of dwelling emissions

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	35.50	2.35	83.42	(3a)
First floor	35.50	2.65	94.08	(3b)
	71.00			(4)
			177.50	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondar	y + othe	r		
	er of chin						0 + 0 + 0		< 40		0.00	(6a)
	er of ope						0 + 0 + 0		〈 20		0.00	(6b)
	er of inter						4		< 10		40.00	(7a)
	er of pass						0		< 10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	>	< 40		0.00	(7c)
											Air chan	ges per hour
											0.23	(8)
Pressu	ıre test, r	esult q50)						5.00			(17)
Air per	meability	,									0.58	(18)
											2.00	(19)
											0.85	(20)
	ion rate i ion rate i										0.49	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
			-			-		-			52.50	(22)
Wind F	actor											
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
Adiuste	ed infiltra	tion rate	(allowing	g for she	Iter and	wind spe	eed)				13.13	(22a)
0.62	0.61	0.60	0.54	0.53	0.46	0.46	0.45	0.49	0.53	0.55	0.57	
	10.00	10100	10.0	10.00	1 - 1 - 1		1 - 1 - 1	1	1 - 1 - 1	10.00	6.42	(22b)
	ition : nat		,	ntermitte	nt extrac	t fans					0.42	(225)
0.69	0.69	0.68	0.64	0.64	0.61	0.61	0.60	0.62	0.64	0.65	0.67	(25)

3. Heat losses and heat los	ss paramete	r					
Element Gross	Openings	Net area	U-value	AxU	kappa-valu		
area, m²	m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	(a=)
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (SouthWest)							
dg Window Double glozed		4 640	4.45 (4.20)	1.84			(27)
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.04			(27)
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,		1.010	1.10 (1.20)	1.01			(21)
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,			- (/				()
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (NorthEast)							
dg Window Double dezed		4 640	4.45 (4.20)	1 0 1			(27)
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.84			(27)
soft coat (NorthEast)							
dg							
Solid door		1.890	1.20	2.27			(26)
dg		1.000	1.20	2.21			(20)
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argon filled,		0.0.0	•				()
low-E, En=0.1, soft coat							
(NorthEast)							
` dg							
Pitched roofs insulated betw	een joists	35.50	0.10	3.55	9.00	319.50	(30)
Walls		66.80	0.19	12.69	60.00	4008.00	(29)
Brick and block cavity wall,	, full fill						/ - - :
Ground floors		35.50	0.14	4.97	110.00	3905.00	(28)
Party wall		35.00	0.00	0.00	70.00	2450.00	

	r heating		require	ements							kWh/yea
	d occupa average		r usage i	in litres p	er day V	/d,avera	ge				2.27 88.12
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot wate	er usage	in litres	per day t	or each	month		!	!			
96.93	93.40	89.88	86.35	82.83	79.30	79.30	82.83	86.35	89.88	93.40	96.93
Energy	content o	f hot wa	ter used	ļ				ļ			
143.74	125.72	129.73	113.10	108.52	93.65	86.78	99.58	100.77	117.44	128.19	139.21
	content (annual)	•			•				•	1386.41
21.56	18.86	19.46	16.97	16.28	14.05	13.02	14.94	15.12	17.62	19.23	20.88
,	volume,						150.00	•			
	cturer's d		cylinder	loss fact	or (kWh/		1.86				
	ature Fa		ar avlinda	or (Id\A/b/	day)		0.5400				1.00
	lost from orage los		er Cyllride	er (KVVII/G	uay)						1.00
31.14	28.12	31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
Net stor	age loss	•			•	•	•		•	•	
31.14	28.12	31.14	30.13	31.14	30.13	31.14	31.14	30.13	31.14	30.13	31.14
Primary	loss	•			•	•	•		•	•	
23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26
Total he	at requir	ed for wa	ater heat	ing calcu	lated fo	r each m	onth		•	•	
198.14	174.85	184.13	165.74	162.92	146.29	141.18	153.98	153.41	171.83	180.83	193.60
Output f	rom wate	er heater	for each	month,	kWh/mo	onth	•		•	•	
198.14	174.85	184.13	165.74	162.92	146.29	141.18	153.98	153.41	171.83	180.83	193.60
Heat ga	ins from	water he	eating, k\	Vh/mont	h						2026.91
91.31	81.11	86.65	79.72	79.60	73.25	72.37	76.63	75.62	82.57	84.74	89.80
	l .	I	l	L	l	L	L	1	l	L	

_		
_	Intorna	il anınc
IJ.	IIILEI II a	ıl gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabolic gains, Watts											
113.51	113.51	113.51	113.51	113.51	113.51	113.51	113.51	113.51	113.51	113.51	113.51
Lighting	gains		,								
18.60	16.52	13.43	10.17	7.60	6.42	6.93	9.01	12.10	15.36	17.93	19.11
Appliand	ces gains	3									
199.62	201.69	196.47	185.36	171.33	158.15	149.34	147.27	152.49	163.60	177.63	190.81
Cooking	gains										
34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35
Pumps a	and fans	gains									
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Losses	e.g. evap	oration	negative	values)			,	,			
-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81
Water h	eating ga	ains									
122.73	120.70	116.47	110.72	106.99	101.74	97.27	103.00	105.03	110.98	117.69	120.71
Total int	ernal gai	ns									
398.00	395.96	383.43	363.30	342.98	323.36	310.60	316.33	326.67	346.99	370.30	387.68

6. Solar gains (calculation for January)

W. I. B. II. I. S. II. I	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
dg				
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
dg Window - Double-glazed, argon filled,	0.9 x 1.610 36.79	0 63 v 0 70	0.77	18.1039
low-E, En=0.1, soft coat (SouthWest)	0.9 X 1.010 30.79	0.03 x 0.70	0.77	10.1039
Window - Double-glazed, argon filled,	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
low-E, En=0.1, soft coat (SouthWest)				
Window - Double-glazed, argon filled,	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
low-E, En=0.1, soft coat (NorthEast) dg				
Window - Double-glazed, argon filled,	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
low-E, En=0.1, soft coat (NorthEast) dg				
Window - Double-glazed, argon filled,	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
low-E, En=0.1, soft coat (NorthEast) dg				
Solid door	0.9 x 1.890 0.00	0.00×0.70	0.77	0.0000
dg				
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790
				

Lighting calculations

FF x Shading Area g

	interna			1	D. J.	T I. 4	(00)				04.00
	ature du system			oas in the	e living a	rea, ini	(30)				21.00 0.75
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau		1									
50.77	51.01	51.24	52.34	52.56	53.57	53.57	53.76	53.17	52.56	52.13	51.69
alpha	-		-	1							
4.38	4.40	4.42	4.49	4.50	4.57	4.57	4.58	4.54	4.50	4.48	4.45
Utilisatio	on factor	for gains	s for livin	g area	•	1		1	1	1	
1.00	0.99	0.98	0.93	0.83	0.65	0.49	0.55	0.81	0.96	0.99	1.00
Tweekd	lay	•	•	•				•	•		
19.71	19.87	20.13	20.48	20.75	20.89	20.92	20.92	20.81	20.46	20.03	19.70
Tweeke	end										
20.27	20.36	20.51	20.70	20.86	20.94	20.96	20.95	20.89	20.69	20.45	20.26
24 inste	ad of 16										
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 inste	ad of 9	•	•			•	•		•		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16 inste	ad of 9	•	•			•	•		•		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean in	iternal te	mperatu	re in livir	ig area T	1		,				
19.87	20.01	20.24	20.54	20.78	20.90	20.93	20.93	20.84	20.53	20.15	19.86
Temper	ature du	ring heat	ting perio	ds in res	st of dwe	iling Th2	2				
19.79	19.79	19.80	19.82	19.82	19.84	19.84	19.85	19.84	19.82	19.82	19.81
Utilisatio	on factor	for gains	s for rest	of dwell	ing				•		
0.99	0.99	0.97	0.91	0.77	0.55	0.37	0.42	0.72	0.94	0.99	1.00
Tweekd											
18.30	18.50	18.84	19.28	19.59	19.73	19.75	19.76	19.67	19.27	18.73	18.30
Tweeke	end										
18.30	18.50	18.84	19.28	19.59	19.73	19.75	19.76	19.67	19.27	18.73	18.30
Mean in	ternal te			rest of d	welling 7	2					
18.30	18.50	18.84	19.28	19.59	19.73	19.75	19.76	19.67	19.27	18.73	18.30
	rea fract iternal te				dwellina)					0.21
18.63	18.82	19.13	19.55	19.84	19.98	20.00	20.00	19.92	19.54	19.03	18.63
	djustmer								1 -	1	
18.63	18.82	19.13	19.55	19.84	19.98	20.00	20.00	19.92	19.54	19.03	18.63

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains											
0.99	0.99	0.97	0.90	0.77	0.56	0.38	0.44	0.73	0.94	0.99	0.99
Useful gains											
500.68	579.78	653.40	703.41	656.97	476.82	310.70	325.87	481.27	532.05	492.49	474.62
Monthly	average	externa	tempera	ature		•			•		
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
Heat loss rate for mean internal temperature											
1391.52	1345.65	1215.65	1002.88	763.55	495.25	313.21	330.44	539.41	838.39	1128.34	1376.14
Fraction	of mont	h for hea	iting								
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space h	eating re	quireme	nt for ea	ch mont	h, kWh/r	nonth					
662.79	514.67	418.31	215.62	79.30	-	-	-	-	227.92	457.81	670.73
Total space heating requirement per year (kWh/year) (October to May) 3247.13											
Space h	eating re	equireme	nt per m	² (kWh/r	n²/year)						45.73

8c. Space cooling requirement - not applicable

9a. Energy requirements

	Wh/year
No secondary heating system selected Fraction of space heat from main system(s) Efficiency of main heating system 1.0000 334.23%	(202) (206)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	С
Space heating requirement	
662.79 514.67 418.31 215.62 79.30 - - - - 227.92 457.81 670	0.73 (98)
Appendix Q - monthly energy saved (main heating system 1)	
0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0.0	00 (210)
Space heating fuel (main heating system 1)	
198.30 153.99 125.16 64.51 23.72 - - - 68.19 136.97 200	0.68 (211)
Appendix Q - monthly energy saved (main heating system 2)	
0.00 0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0.0	00 (212)
Space heating fuel (main heating system 2)	
0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0.0	00 (213)
Appendix Q - monthly energy saved (secondary heating system)	
0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0.0	00 (214)
Space heating fuel (secondary)	
0.00 0.00 0.00 0.00 - - - - 0.00 0.00 0.0	00 (215)
Water heating	
Water heating requirement	(2.1)
	3.60 (64)
	295.93 (216)
	5.93 (217)
Water heating fuel	
66.96 59.09 62.22 56.01 55.05 49.44 47.71 52.03 51.84 58.07 61.11 65.	.42 (219)
Space heating fuel used, main system 1 Space heating fuel (secondary)	Wh/year 971.52 (211) 0.00 (215) 684.94 (219)
Total electricity for the above, kWh/year	0.00 (231) 328.41 (232)
Electricity generated - µCHP/heat pump Appendix Q -	0.00 (235)
Energy saved or generated (): Energy used ():	0.000 (236a) 0.000 (237a)
Total delivered energy for all uses	984.87 (238)

10a. Does not apply

11a. Does not apply

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions	_
Space heating, main system 1	971.52	0.519	504.22	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	684.94	0.519	355.48	(264)
Space and water heating			859.70	(265)
Electricity for pumps and fans	0.00	0.519	0.00	(267)
Electricity for lighting	328.41	0.519	170.44	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - μCHP	0.00	0.519	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1030.15	(272)
			kg/m²/yea	r
Dwelling Carbon Dioxide Emission Rate (DER)			14.51	(273)

Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury BS32 4AB

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.05.063, printed on 02/06/2022 at 07:00:35

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate
Dwelling Carbon Dioxide Emission Rate

TER = 29.44

DER = 14.51 OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)
Dwelling Fabric Energy Efficiency (DFEE)

TFEE = 60.1

DFEE = 51.8

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element Highest <u>Average</u> Wall OK 0.19 (max. 0.30) 0.19 (max. 0.70) Floor 0.14 (max. 0.25) 0.14 (max. 0.70) OK 0.10 (max. 0.20) Roof 0.10 (max. 0.35) OK Openings 1.20 (max. 2.00) 1.20 (max. 3.30) OK

3 Air permeability

Air permeability at 50 pascals: 5.00 Maximum: 5.00

10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric

Mitsubishi Electric Ecodan 6.0 kW

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

Page 20 of 26

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls 2207 Time and temperature zone control OK

Hot water controls No cylinder

Boiler Interlock No OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Severn Valley):

OK

Not significant

OK

Based on:

Thermal mass parameter: 250.00

Overshading: Average or unknown (20-60 % sky blocked)

Orientation : SouthWest

Ventilation rate: 8.00

Blinds/curtains:

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Pitched roofs insulated between joists U-value 0.10 W/m²K

Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type D ASHP

Type D

Oaklands Drive Almondsbury BS32 4AB

Located in: England
Region: Severn Valley
Postcode: BS32 4AB

UPRN:

Date of assessment: 2022-06-01 Date of certificate: 2022-06-02

Assessment type: New dwelling as designed

Tenure: Unknown
Transaction type: New dwelling
Related party disclosure: No related party

PCDF revision number: 495

Property description

Dwelling type: Semi-detached house

Ground floor (1) area = 35.50m² storey height = 2.35m storey height = 2.65m

Living area: 15.00 (fraction 0.211)

Front of dwelling faces: SouthWest

Doors

Solid door area = 1.89 U = 1.20

Full glazed door area = 5.04 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Windows

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (SouthWest)

Overshading: Average or unknown (20-60 % sky blocked)

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Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type D ASHP

Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unkno	wn (20-60 % sky block	
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast)
Overshading:	Average or unkno	wn (20-60 % sky block	
Rooflights			
Opaque Elements Roofs Walls Ground floors	area = 35.50 area = 66.80 area = 35.50	U = 0.10, k = 9.0 U = 0.19, k = 60.0 U = 0.14, k = 110.0	Brick and block cavity wall, full fill
Thermal bridges: E10 Eaves (insulation at ceiling level) [A]	Htb = 14.00 0.060	0.060	14.100
E12 Gable (insulation at ceiling level) [A]	0.240	0.240	23.900
E16 Corner (normal) [A]	0.090	0.090	27.400
E17 Corner (inverted – internal area greater than	-0.090	-0.090	5.000
external area) [A] E2 Other lintels (including other steel lintels) [A] Openings lintels	0.300	0.300	21.850
E3 Sill [A] Openings sills	0.040	0.040	21.850
E4 Jamb [A] Openings jambs	0.050	0.050	43.500
E5 Ground floor (normal) [A]	0.160	0.160	38.900
E6 Intermediate floor within a dwelling [A]	0.070	0.070	38.900

Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type D ASHP

Thermal mass: User defined - 250.00

Pressure test: Yes (q50 - 5.00): measured in this dwelling: No Ventilation: Natural ventilation with intermittent extract fans

Number of chimneys: 0 Number of open flues: 0 Number of intermittent 4

fans:

Number of passive stacks: 0 Number of sides sheltered: 2.00 Measured/design q50: 5.00

Main heating system: Central heating systems with radiators or underfloor heating

Heat pumps

Electric Air source heat pump with flow temperature <= 35°C

Index: 104634

Mitsubishi Electric Ecodan 6.0 kW PUZ-WM60VAA

Underfloor, pipes in screed above insulation

Pump in heated space: No

Boiler has load or weather compensator: Yes

Boiler Interlock: No

Design flow temperature : Unknown Central heating pump 2013 or later

Not MCS Approved Installer

Standard tariff

Main heating controls: 2207 Time and temperature zone control

Boiler has load

compensator:

No

Boiler has weather

compensator:

Boiler has emhanced load

Yes

compensator:

No

Boiler interlock: No

Secondary heating system: None

Water heating: MicroCHP or Heat Pump

Manufacturer's declared cylinder loss factor (kWh/day) 1.86

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Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type D ASHP

Cylinder volume: 150.00 Insulation type: Factory Insulation thickness: -1.00 Cylinder heater: n/a

Cylinder in heated space: Yes

Insulated primary: Yes
Cylinder thermostat: Yes

Separate timer for domestic hot water: Yes

Solar panel: no

Water use <= 125 Yes

litres/person/day:

Low energy lights: 100.0% of fixed lighting outlets

Total fixed lighting outlets: 30

Electricity tariff: Standard tariff
Photovoltaics 1: Peak kW: 0.00
Photovoltaics 2: Peak kW: 0.00
Photovoltaics 3: Peak kW: 0.00

Conservatory: No Fixed air conditioning: No

Smoke Control Area: Not specified Additional allowable electricity generation:

0.00kg/m²/year

Predicted Energy Assessment

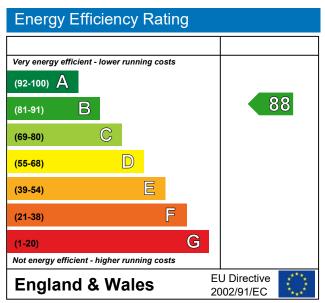
Type D Oaklands Drive Almondsbury BS32 4AB Dwelling type: Semi-detached house Date of assessment: 2 June 2022

Produced by Complete Energy Consultancy Ltd

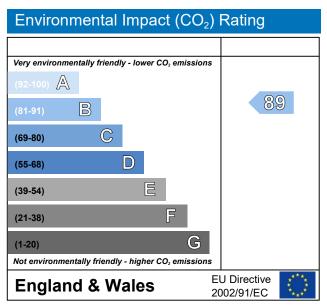
Total floor area: 71 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Project InformationBuilding type Semi-detached house

Reference Date

Project

Type D Oaklands Drive Almondsbury BS32 4AB

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	35.50	2.35	83.42	(3a)
First floor	35.50	2.65	94.08	(3b)
	71.00			(4)
			177.50	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondar	y + othe	r		
	er of chin						0 + 0 + 0		< 40		0.00	(6a)
	er of ope						0 + 0 + 0		<i>(</i> 20		0.00	(6b)
		mittent f					4		< 10		40.00	(7a)
		sive vent					0		< 10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	>	< 40		0.00	(7c)
											Air chan	ges per hour
											0.23	(8)
Pressu	ıre test, r	esult q50)						7.00			(17)
Air per	meability	1									0.58	(18)
											2.00	(19)
											0.85	(20)
		incorpora modified									0.49	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
\								-			52.50	(22)
Wind F					_			_				
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
A direct	od infiltra	tion rate	(allowing	a for cho	ltor and	wind en	20d)		•		13.13	(22a)
			<u> </u>	-				T	1	T		
0.62	0.61	0.60	0.54	0.53	0.46	0.46	0.45	0.49	0.53	0.55	0.57	
Ventila	ıtion : nat	tural vent	ilation, ii	ntermitte	nt extrac	ct fans					6.42	(22b)
Effectiv	ve air cha	ange rate	•									
0.69	0.69	0.68	0.64	0.64	0.61	0.61	0.60	0.62	0.64	0.65	0.67	(25)

3. Heat losses and heat los	ss paramete	r					
Element Gross	Openings	Net area	U-value	AxU	kappa-valu		
area, m²	m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	(a=)
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (SouthWest)							
dg Window Double glozed		4 640	4 45 (4 20)	1.84			(27)
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.04			(27)
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,		1.010	1.10 (1.20)	1.01			(21)
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,			- (/				()
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (NorthEast)							
dg Window Double dezed		4 640	4 45 (4 20)	1 0 1			(27)
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.84			(27)
soft coat (NorthEast)							
dg							
Solid door		1.890	1.20	2.27			(26)
dg		1.000	1.20	2.21			(20)
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argon filled,		0.0.0	•				()
low-E, En=0.1, soft coat							
(NorthEast)							
` dg							
Pitched roofs insulated betw	een joists	35.50	0.10	3.55	9.00	319.50	(30)
Walls		66.80	0.19	12.69	60.00	4008.00	(29)
Brick and block cavity wall,	, full fill						/ - - :
Ground floors		35.50	0.14	4.97	110.00	3905.00	(28)
Party wall		35.00	0.00	0.00	70.00	2450.00	

			y require	ements							kWh/year
	d occupa		r usage i	in litres r	er day \	/d avera	ne				2.27 88.12
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			per day 1	_		100	7 15.9	100		1.151	
96.93	93.40	89.88	86.35	82.83	79.30	79.30	82.83	86.35	89.88	93.40	96.93
Energy o	content c	f hot wa	ter used								
143.74	125.72	129.73	113.10	108.52	93.65	86.78	99.58	100.77	117.44	128.19	139.21
Energy o	content (ion loss	annual)	1								1386.41
21.56	18.86	19.46	16.97	16.28	14.05	13.02	14.94	15.12	17.62	19.23	20.88
	ost from rage los 0.00		Wh/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net stora		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00 Primary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combi lo	ss calcu	lated for	r each m	onth				•			
24.23	21.84	24.12	23.26	23.98	23.14	23.88	23.94	23.21	24.06	23.37	24.21
	•		ater heat								
			136.36				123.52	123.98	141.50	151.56	163.41
Output fr	rom wate		for each				•				
167.97	147.56	153.84	136.36	132.50	116.79	110.65	123.52	123.98	141.50	151.56	163.41
Heat gai	ns from	water he	eating, k\	Wh/mont	:h						1669.65
53.85	47.26	49.16	43.42	42.08	36.92	34.82	39.10	39.31	45.06	48.47	52.34
			1				1	1		1	

_		
_	Intorna	il anınc
IJ.	IIILEI II a	ıl gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metaboli	ic gains,	Watts	,				,				
136.21	136.21	136.21	136.21	136.21	136.21	136.21	136.21	136.21	136.21	136.21	136.21
Lighting	gains	•				•					
46.49	41.29	33.58	25.42	19.00	16.04	17.34	22.53	30.24	38.40	44.82	47.78
Applianc	es gains	3									
297.94	301.03	293.24	276.65	255.72	236.04	222.89	219.80	227.59	244.18	265.12	284.79
Cooking	gains		•			•	•				
50.89	50.89	50.89	50.89	50.89	50.89	50.89	50.89	50.89	50.89	50.89	50.89
Pumps a	and fans	gains	•			•	•				
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Losses	e.g. evap	oration (negative	values)		•	•				
-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81
Water he	eating ga	ains	•	•		•	•				
72.38	70.33	66.08	60.31	56.56	51.28	46.80	52.55	54.59	60.57	67.31	70.35
Total into	ernal gai	ns	•			•	•				
516.10	511.95	492.20	461.68	430.57	402.66	386.33	394.18	411.73	442.44	476.55	502.22

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79		0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

	n interna					T I 4	(0.0)				04.00
	rature du system			ods in the	e living a	rea, Th1	(°C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	lı en	IVIAI	Αρι	iviay	Juli	Jui	Aug	Зер	OCI	INOV	Dec
	E4 04	E4 04	50.24	E0 E6	E2 E7	E2 E7	E2 7C	E2 47	E0 E6	EQ 42	E4 CO
50.77	51.01	51.24	52.34	52.56	53.57	53.57	53.76	53.17	52.56	52.13	51.69
alpha	1.40	4.40	1.40	4.50	4.53	4.57	4.50	4.54	4.50	4.40	1.45
4.38	4.40	4.42	4.49	4.50	4.57	4.57	4.58	4.54	4.50	4.48	4.45
	on factor				1	1	1	T	1	1	
0.99	0.98	0.96	0.91	0.79	0.60	0.45	0.50	0.75	0.94	0.98	0.99
	ternal te			·					1		
19.72	19.90	20.19	20.56	20.83	20.96	20.99	20.99	20.90	20.55	20.08	19.70
•	rature du										
19.79	19.79	19.80	19.82	19.82	19.84	19.84	19.85	19.84	19.82	19.82	19.81
	on factor	for gains		of dwell	ing						
0.99	0.98	0.95	0.88	0.72	0.51	0.34	0.38	0.66	0.91	0.98	0.99
Mean in	nternal te	mperatu	re in the	rest of d	welling T	2					
18.13	18.39	18.80	19.33	19.67	19.82	19.84	19.84	19.76	19.33	18.67	18.12
	rea fracti										0.21
	ternal te)					
18.47	18.71	19.10	19.59	19.92	20.06	20.08	20.08	20.00	19.59	18.97	18.45
Apply a	djustmen	it to the r	mean inte	ernal ten	nperatur	e, where	appropr	iate			
18.47	18.71	19.10	19.59	19.92	20.06	20.08	20.08	20.00	19.59	18.97	18.45
e Snac	e heatin	a roauir	romont								
Jan	Feb	Mar	Apr	May	lun	Jul	Λια	Sep	Oct	Nov	Dec
	on factor			iviay	Jun	Jui	Aug	Seh	OCI	INOV	Dec
				0.70	0.50	0.00	0.44	0.00	0.00	0.07	0.00
0.98	0.97	0.94	0.87	0.73	0.53	0.36	0.41	0.68	0.90	0.97	0.99
Useful o		740.70	704.00	005.40	400.04	040.74	004.44	500.00	507.00	507.00	500.00
	683.93				488.34	318.71	334.44	503.96	597.86	587.80	583.60
	average				1					I =	
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
	ss rate fo										
	31335.00			770.71	502.75	320.69	337.90	547.36	843.11	1122.52	1359.55
	of mont						,				
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space h	neating re	equireme	ent for ea	ch mont	h, kWh/ı	month					
568.31	437.52	350.76	176.46	63.46	-	-	-	-	182.47	385.00	577.31
	ace heat					ar) (Oct	ober to N	Лау)	1	1	2741.28
Space h	neating re	equireme	ent per m	ı² (kWh/ı	m²/year)						38.61

8c. Space cooling requirement - not applicable

9a. Energy requirements

		urement									kWh/year	
Fraction	of spac	e heat fro	stem sel om main g system	system((s)				1.0000 2.90%			(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space h	eating re	equireme	ent	•	•		1	•				
568.31	437.52	350.76	176.46	63.46	-	-	-	-	182.47	385.00	577.31	(98)
Appendi	ix Q - mo	onthly en	ergy sav	ed (mair	heating	system	1)	1				
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	eating fu	iel (main	heating	system	1)							
611.74	470.96	377.57	189.94	68.31	-	-	-	-	196.41	414.42	621.43	(211)
Appendi	ix Q - mo	nthly en	ergy sav	ed (mair	heating	system	2)			I.	1	
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space h	eating fu	iel (main	heating	system	2)		1			I.	1	
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendi	ix Q - mo	nthly en	ergy sav	ed (seco	ndary he	eating sy	stem)			I.	1	
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space h	eating fu	iel (seco	ndary)				1					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water h Water h		quireme	ent		•	•	1	1	1	1		
167.97	147.56	153.84	136.36	132.50	116.79	110.65	123.52	123.98	141.50	151.56	163.41	(64)
Efficience	by of wat	er heate	r				l			I.	86.60	(216)
89.13	89.04	88.87	88.43	87.64	86.60	86.60	86.60	86.60	88.43	88.94	89.15	(217)
Water h	eating fu	iel					1					
188.47	165.71	173.12	154.20	151.19	134.86	127.78	142.64	143.16	160.01	170.40	183.30	(219)
Space h Water h	eating fu eating fu eating fu	uel (seco uel	main sy ndary) s and ele		ep-hot						kWh/year 2950.78 0.00 1894.84	(211) (215) (219)
central boiler v	heating with a far	pump n-assiste			- -						30.00 45.00 75.00	(230c) (230e) (231)
Electrici Energy s Appendi	ty for ligh saving/g ix Q -	nting (100 eneratior	0.00% fix n technol	(eď LEL))						328.41	(232)
	y saved y used ()	or genera):	ated ():								0.000 0.000	(236a) (237a)
Total de	livered e	energy fo	r all uses	3							5249.02	(238)

10a. Fuel costs using Table 12 prices	10a. Fue	costs	usina	Table	12	prices
---------------------------------------	----------	-------	-------	-------	----	--------

· ·	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	2950.781	3.480	102.69	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	1894.84	3.480	65.94	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	328.407	13.190	43.32	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			341.84	(255)
11a. SAP rating				
			0.42	(256)
			1.24	(257)
SAP value			82.73	` '
			83	(258)
SAP band			В	, ,

12a. Carbon dioxide emissions

	Energy	Emission factor	Emission	S	
	kWh/year	kg CO2/kWh	kg CO2/y	ear	
Space heating, main system 1	2950.78	0.216	637.37	(261)	
Space heating, main system 2	0.00	0.000	0.00	(262)	
Space heating, secondary	0.00	0.519	0.00	(263)	
Water heating	1894.84	0.216	409.28	(264)	
Space and water heating			1046.65	(265)	
Electricity for pumps and fans	75.00	0.519	38.93	(267)	
Electricity for lighting	328.41	0.519	170.44	(268)	
Electricity generated - PVs	0.00	0.519	0.00	(269)	
Electricity generated - µCHP	0.00	0.000	0.00	(269)	
Appendix Q -				, ,	
Energy saved ():	0.00	0.000	0.00	(270)	
Energy used ():	0.00	0.000	0.00	(271)	
Total CO2, kg/year			1256.02	(272)	
			kg/m²/yea	ır	
CO2 emissions per m ²			17.69	(273)	
El value			85.49	(273a)	
El rating			85	(274)	
El band			В		

Calculation of stars for heating and DHW

Main heating energy efficiency Main heating environmental impact Water heating energy efficiency Water heating environmental impact

 $(3.48 / 0.8990) \times (1 + (0.29 \times 0.00)) = 3.8710$, stars = 4 (0.2160 / 0.8990) x $(1 + (0.29 \times 0.00)) = 0.2403$, stars = 4 3.48 / 0.8800 = 3.9544, stars = 4 0.2160 / 0.8800 = 0.2454, stars = 4

Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 worksheet for New dwelling as designed - calculation of dwelling emissions

1. Overall dwelling dimensions

	Area (m²)	Av. Storey height (m)	Volume (m³)	
Ground floor (1)	35.50	2.35	83.42	(3a)
First floor	35.50	2.65	94.08	(3b)
	71.00			(4)
			177.50	(5)

2. Ventilation rate

											m³ per h	our
							main + s heating	eondary	/ + othe	r		
	er of chin						0 + 0 + 0		40		0.00	(6a)
	er of ope						0 + 0 + 0		20		0.00	(6b)
		mittent f					4		: 10		40.00	(7a)
		sive vent					0		: 10		0.00	(7b)
Numbe	er of fluel	ess gas	fires				0	Х	40		0.00	(7c)
											Air chan	ges per hour
											0.23	(8)
Pressu	ıre test, r	esult q50)						5.00			(17)
Air per	meability	1									0.58	(18)
											2.00	(19)
											0.85	(20)
		incorpora modified									0.49	(21)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70	
Wind F	actor		•				•		•	•	52.50	(22)
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
A !! .			, II :				1)				13.13	(22a)
		tion rate	(allowing	for she		wind spe	eed)					
0.62	0.61	0.60	0.54	0.53	0.46	0.46	0.45	0.49	0.53	0.55	0.57	
											6.42	(22b)
		tural vent ange rate		ntermitte	nt extrac	t fans						
0.69	0.69	0.68	0.64	0.64	0.61	0.61	0.60	0.62	0.64	0.65	0.67	(25)
						-	-	-	.			

3. Heat losses and heat los	ss paramete	r					
Element Gross	Openings	Net area	U-value	AxU	kappa-valu		
area, m²	m²	A, m²	W/m²K	W/K	kJ/m²K	kJ/K	
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (NorthEast)							
dg Window Double glazed		4 640	4 45 (4 20)	1.84			(27)
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.04			(27)
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,		1.010	1.10 (1.20)	1.01			(21)
soft coat (NorthEast)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,			- (/				,
soft coat (SouthWest)							
dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (SouthWest)							
_dg							
Window - Double-glazed,		1.610	1.15 (1.20)	1.84			(27)
argon filled, low-E, En=0.1,							
soft coat (SouthWest)							
dg Window Double slazed		4 640	4 45 (4 20)	1 0 1			(27)
Window - Double-glazed, argon filled, low-E, En=0.1,		1.610	1.15 (1.20)	1.84			(27)
soft coat (SouthWest)							
dg							
Solid door		1.890	1.20	2.27			(26)
dg		1.000	1.20	2.21			(20)
Full glazed door -		5.040	1.20	6.05			(26)
Double-glazed, argon filled,		0.0.0	•				()
low-E, En=0.1, soft coat							
(NorthEast)							
` dg							
Pitched roofs insulated betw	een joists	35.50	0.10	3.55	9.00	319.50	(30)
Walls		66.80	0.19	12.69	60.00	4008.00	(29)
Brick and block cavity wall,	, full fill						
Ground floors		35.50	0.14	4.97	110.00	3905.00	(28)
Party wall		35.00	0.00	0.00	70.00	2450.00	

	r heating		/ require	ements							kWh/year	
	d occupa			: I:4		/-l					2.27	(4
	average								l a .		88.12	(4
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage in litres per day for each month												
96.93	93.40	89.88	86.35	82.83	79.30	79.30	82.83	86.35	89.88	93.40	96.93	(4
Energy	content c	of hot wa	ter used									
143.74	125.72	129.73	113.10	108.52	93.65	86.78	99.58	100.77	117.44	128.19	139.21	
Energy content (annual) 1386.41 Distribution loss										1386.41	(4	
21.56	18.86	19.46	16.97	16.28	14.05	13.02	14.94	15.12	17.62	19.23	20.88	(4
store I	oss dete	rmined f	rom EN	13203-2	tests, ta	ken from	boiler d	ata reco	rd	1	1	
Energy l	ature factori ature factori lost from orage los	store (k	Wh/day)								0.0000 0.0000 0.00	(! (! (!
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
Vet stor	age loss		I.			1	I.			1		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(!
Primary	loss											
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(!
Combi l	oss calcu	lated for	each m	onth								
24.23	21.84	24.12	23.26	23.98	23.14	23.88	23.94	23.21	24.06	23.37	24.21	(6
Total he	at requir	ed for wa	ater heat	ing calcu	lated fo	r each m	onth			1		
167.97	147.56	153.84	136.36	132.50	116.79	110.65	123.52	123.98	141.50	151.56	163.41	(6
Output f	rom wate	er heater	for each	month,	kWh/m	onth	1	1	l	1		
167.97	147.56	153.84	136.36	132.50	116.79	110.65	123.52	123.98	141.50	151.56	163.41	(6
		1	I			1	I	1		1	1669.65	(6
Heat ga	ins from	water he	eating, k\	Wh/mont	:h							•
53.85	47.26	49.16	43.42	42.08	36.92	34.82	39.10	39.31	45.06	48.47	52.34	(6
								-			1	

_		
_	Intorna	il anınc
IJ.	IIILEI II a	ıl gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabolic gains, Watts											
113.51	113.51	113.51	113.51	113.51	113.51	113.51	113.51	113.51	113.51	113.51	113.51
Lighting	gains		,	•			,				
18.60	16.52	13.43	10.17	7.60	6.42	6.93	9.01	12.10	15.36	17.93	19.11
Applianc	es gains	;									
199.62	201.69	196.47	185.36	171.33	158.15	149.34	147.27	152.49	163.60	177.63	190.81
Cooking gains											
34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35
Pumps a	and fans	gains	•		•	•	•				
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Losses	e.g. evap	oration (negative	values)		•	•				
-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81	-90.81
Water h	eating ga	ains	•	•		•	•	•			
72.38	70.33	66.08	60.31	56.56	51.28	46.80	52.55	54.59	60.57	67.31	70.35
Total into	ernal gai	ns	•			•	•				
350.65	348.59	336.04	315.89	295.54	275.90	263.13	268.88	279.23	299.58	322.92	340.32

6. Solar gains (calculation for January)

o. Solar gams (calculation for Sandary)	Area & Flux	g & FF	Shading	Gains
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28		0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 1.610 11.28	0.63 x 0.70	0.77	5.5516
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest) dg	0.9 x 1.610 36.79	0.63 x 0.70	0.77	18.1039
Solid door dg	0.9 x 1.890 0.00	0.00 x 0.70	0.77	0.0000
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (NorthEast) dg	0.9 x 5.040 11.28	0.63 x 0.70	0.77	17.3790

Lighting calculations

FF x Shading Area g

7. Mean internal temperature												
	Temperature during heating periods in the living area, Th1 (°C) Heating system responsiveness 21.00 1.00								(85)			
											1.00	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	1	1	1	1	1	T	1	1	1	1	T 1	
50.77	51.01	51.24	52.34	52.56	53.57	53.57	53.76	53.17	52.56	52.13	51.69	
alpha												
4.38	4.40	4.42	4.49	4.50	4.57	4.57	4.58	4.54	4.50	4.48	4.45	
	on factor		s for livin	g area							,	
1.00	0.99	0.98	0.95	0.85	0.68	0.52	0.58	0.84	0.97	0.99	1.00	(86)
Mean in	iternal te	mperatu		g area T	1							
19.52	19.70	20.01	20.43	20.76	20.94	20.99	20.98	20.84	20.40	19.89	19.50	(87)
Temper	ature du	ring heat	ing peric	ds in res	st of dwe	lling Th2	<u> </u>					
19.79	19.79	19.80	19.82	19.82	19.84	19.84	19.85	19.84	19.82	19.82	19.81	(88)
Utilisation	on factor	for gains	for rest	of dwell	ing	•	•		•	•	-	
1.00	0.99	0.98	0.93	0.80	0.58	0.39	0.45	0.76	0.96	0.99	1.00	(89)
Mean in	ternal te	mperatu	re in the	rest of d	welling T	2	•			•		
17.83	18.11	18.56	19.16	19.60	19.81	19.84	19.84	19.71	19.13	18.40	17.82	(90)
									(91)			
Mean in	ternal te		`		dwelling)						
18.19	18.45	18.86	19.43	19.84	20.05	20.08	20.08	19.95	19.40	18.72	18.18	(92)
Apply adjustment to the mean internal temperature, where appropriate												
18.19	18.45	18.86	19.43	19.84	20.05	20.08	20.08	19.95	19.40	18.72	18.18	(93)
							•			•		
0 Cnoo	a baatin	~ ~~~	amant									
	e heatin	· ·	Ι.	Max	1	Lini	Δ	C	Oct	Nev	Dea	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	on factor			10.00	10.00	To 40	10.40	I a ==		10.00	T. 00	(0.4)
0.99	0.99	0.97	0.92	0.80	0.60	0.42	0.48	0.77	0.95	0.99	1.00	(94)
Useful		044.00	070.45	044.00	1	040.05	000.00	100.00	101.11	14-10	100.10	(0.5)
	534.65			641.00	477.58	316.85	330.90	469.90	494.41	447.42	428.18	(95)
	average				T		1	T	T	1	T	
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20	(96)
	ss rate fo			-								
	61309.34			763.73	501.21	320.42	337.39	542.20	825.67	1098.8	01333.34	(97)
Fraction	of mont	h for hea	ating									
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	
	neating re				h, kWh/ı	month						
	520.59	1	I .		-	-	-	-	246.45	468.99	673.44	
	ace hea						ober to N	/lay)	•	•	3328.02	(98)
Space h	Space heating requirement per m² (kWh/m²/year) 46.87									(99)		

8c. Space cooling requirement - not applicable

9a. Energy requirements

sa. Energy requirements	kWh/year							
No secondary heating system selected Fraction of space heat from main system(s) Efficiency of main heating system 1.0000 92.90%		202) 206)						
Jan Feb Mar Apr May Jun Jul Aug Sep Oct N	lov Dec							
Space heating requirement								
665.36 520.59 430.49 231.39 91.31 - - - - 246.45 40	68.99 673.44 (9	98)						
Appendix Q - monthly energy saved (main heating system 1)								
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	.00 0.00 (2	210)						
Space heating fuel (main heating system 1)								
716.21 560.38 463.39 249.08 98.29 - - - - 265.29 50	04.84 724.91 (2	211)						
Appendix Q - monthly energy saved (main heating system 2)								
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	.00 0.00 (2	212)						
Space heating fuel (main heating system 2)								
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	.00 0.00 (2	213)						
Appendix Q - monthly energy saved (secondary heating system)								
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	.00 0.00 (2	214)						
Space heating fuel (secondary)								
0.00 0.00 0.00 0.00 - - - - 0.00 0.00	.00 0.00 (2	215)						
Water heating								
Water heating requirement								
	,	54)						
Efficiency of water heater		216)						
	9.07 89.24 (2	217)						
Water heating fuel								
188.28 165.52 172.84 153.83 150.72 134.86 127.78 142.64 143.16 159.58 1	70.16 183.12 (2	219)						
Annual totals Space heating fuel used, main system 1 Space heating fuel (secondary) Water heating fuel Electricity for pumps, fans and electric keep-hot	0.00 (2	211) 215) 219)						
central heating pump boiler with a fan-assisted flue Total electricity for the above, kWh/year Electricity for lighting (100.00% fixed LEL) Energy saving/generation technologies Appendix Q -								
Energy saved or generated (): Energy used (): Total delivered energy for all uses	0.000 (2	236a) 237a) 238)						
5,	(-	/						

10a. Does not apply

11a. Does not apply

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions	_
Space heating, main system 1	3582.37	0.216	773.79	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	1892.48	0.216	408.78	(264)
Space and water heating			1182.57	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	328.41	0.519	170.44	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - μCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1391.94	(272)
			kg/m²/yea	
Dwelling Carbon Dioxide Emission Rate (DER)			19.60	(273)

Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury BS32 4AB

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.05.063, printed on 02/06/2022 at 07:00:52

New dwelling as designed

1 TER and DER

Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate

TER = 20.39

Dwelling Carbon Dioxide Emission Rate

DER = 19.60

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

TFEE = 60.1

DFEE = 51.8

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element Highest <u>Average</u> Wall OK 0.19 (max. 0.30) 0.19 (max. 0.70) Floor 0.14 (max. 0.25) 0.14 (max. 0.70) OK 0.10 (max. 0.20) Roof 0.10 (max. 0.35) OK Openings 1.20 (max. 2.00) 1.20 (max. 3.30) OK

3 Air permeability

Air permeability at 50 pascals: 5.00 Maximum: 5.00

OK

4 Heating efficiency

Main heating system:

Boiler and radiators, mains gas

Worcester 2000

Source of efficiency: from boiler database

Worcester 2000 GC2000iW 30 C NG

Efficiency: 89.0% SEDBUK2009

Minimum: 88.0% OK

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls Time and temperature zone control

OK

Hot water controls No cylinder

Boiler Interlock Yes OK

Hot water controls No cylinder

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0%

OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Severn Valley):

OK

Not significant

OK

Based on:

Thermal mass parameter: 250.00

Overshading: Average or unknown (20-60 % sky blocked)

Orientation: SouthWest

Ventilation rate: 8.00

Blinds/curtains:

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Pitched roofs insulated between joists U-value 0.10 W/m²K

Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type D baseline

Type D

Oaklands Drive Almondsbury BS32 4AB

Located in: England
Region: Severn Valley
Postcode: BS32 4AB

UPRN:

Date of assessment: 2022-06-01 Date of certificate: 2022-06-02

Assessment type: New dwelling as designed

Tenure: Unknown
Transaction type: New dwelling
Related party disclosure: No related party

PCDF revision number: 495

Property description

Dwelling type: Semi-detached house

Ground floor (1) area = 35.50m² storey height = 2.35m storey height = 2.65m

Living area: 15.00 (fraction 0.211)

Front of dwelling faces: SouthWest

Doors

Solid door area = 1.89 U = 1.20

Full glazed door area = 5.04 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Windows

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

Window area = 1.61 U = 1.20 - Double-glazed, argon filled, low-E, En=0.1,

soft coat (NorthEast)

Overshading: Average or unknown (20-60 % sky blocked)

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Project InformationBuilding type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type D baseline

Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1, soft coat (SouthWest)						
Overshading:	Average or unkno	wn (20-60 % sky block							
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1,						
Overshading:	Average or unkno	soft coat (SouthWest) verage or unknown (20-60 % sky blocked)							
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1,						
Overshading:	Average or unkno	wn (20-60 % sky block	soft coat (SouthWest) ed)						
Window	area = 1.61	U = 1.20	- Double-glazed, argon filled, low-E, En=0.1,						
Overshading:	Average or unkno	soft coat (SouthWest) Average or unknown (20-60 % sky blocked)							
Rooflights									
Opaque Elements Roofs Walls Ground floors	area = 35.50 area = 66.80 area = 35.50	U = 0.10, k = 9.0 U = 0.19, k = 60.0 U = 0.14, k = 110.0	Brick and block cavity wall, full fill						
Thermal bridges: E10 Eaves (insulation at ceiling level) [A]	Htb = 14.00 0.060	0.060	14.100						
E12 Gable (insulation at ceiling level) [A]	0.240	0.240	23.900						
E16 Corner (normal) [A] E17 Corner (inverted – internal area greater than	0.090 -0.090	0.090 -0.090	27.400 5.000						
external area) [A] E2 Other lintels (including other steel lintels) [A] Openings lintels	0.300	0.300	21.850						
E3 Sill [A] Openings sills E4 Jamb [A] Openings jambs	0.040 0.050	0.040 0.050	21.850 43.500						
E5 Ground floor (normal) [A]	0.160	0.160	38.900						
E6 Intermediate floor within a dwelling [A]	0.070	0.070	38.900						

Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury BS32 4AB

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type D baseline

Thermal mass: User defined - 250.00

Pressure test: Yes (q50 - 5.00): measured in this dwelling: No Ventilation: Natural ventilation with intermittent extract fans

Number of chimneys: 0 Number of open flues: 0 Number of intermittent 4

fans:

Number of passive stacks: 0 Number of sides sheltered: 2.00 Measured/design q50: 5.00

Main heating system: Central heating systems with radiators or underfloor heating

Gas boilers (including LPG) 1998 or later Condensing combi with automatic ignition

Index: 18687

Eff 86.60% / 89.90% Worcester 2000 GC2000iW 30 C NG

Radiators

Pump in heated space: Yes

Boiler has load or weather compensator: Yes

Boiler Interlock: Yes

Design flow temperature: Unknown Central heating pump 2013 or later

Gas (mains)

Main heating controls: Time and temperature zone control

Boiler has load No

compensator:

Boiler has weather Yes

compensator:

Boiler has emhanced load No

compensator:

Boiler interlock: Yes

Secondary heating system: None

Water heating: Combination boiler

Combination boiler type: Instantaneous

Solar panel: no

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Building type Semi-detached house

Reference Date

Project Type D

Oaklands Drive Almondsbury **BS32 4AB**

SAP 2012 input data Printed on 2 Jun 2022 at 07:00 AM

Type D baseline

Water use <= 125 Yes

litres/person/day:

Low energy lights: Total fixed lighting outlets: 100.0% of fixed lighting outlets

30

Electricity tariff: Standard tariff Photovoltaics 1: Peak kW: 0.00 Photovoltaics 2: Peak kW: 0.00 Photovoltaics 3: Peak kW: 0.00

Conservatory: No Fixed air conditioning: No

Smoke Control Area: Not specified Additional allowable electricity generation:

0.00kg/m²/year

Predicted Energy Assessment

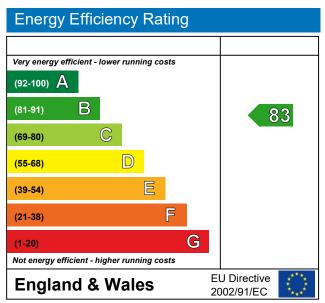
Type D Oaklands Drive Almondsbury BS32 4AB Dwelling type: Semi-detached house Date of assessment: 2 June 2022

Produced by Complete Energy Consultancy Ltd

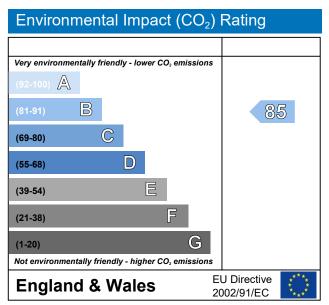
Total floor area: 71 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.