Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.5.58
Printed on 29 November 2022 at 15:06:47

Project Information:

Assessed By: Liam Mason (STRO033679)
Building Type: Semi-detached House

Dwelling Details:

NEW DWELLING DESIGN STAGE
Total Floor Area: 93.48m²
Site Reference : Bell Road, Bottisham
Plot Reference: Plot 39
Address : Plot 39

Client Details:

Name:
Address :

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas		
Fuel factor: 1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	16.46 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	7.29 kg/m²	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	46.4 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	41.8 kWh/m²	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.19 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.11 (max. 0.25)	0.11 (max. 0.70)	OK
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	OK
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system: Database: (rev 508, product index 018403):
Boiler systems with radiators or underfloor heating - mains gas
Brand name: Vaillant
Model: ecoFIT sustain 615
Model qualifier: VU 156/6-3 (H-GB)
(Regular)
Efficiency 89.8 % SEDBUK2009
Minimum 88.0 % — OK

Secondary heating system: None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage:	Measured cylinder loss: 1.32 kWh/day	
	Permitted by DBSCG: 2.30 kWh/day	**OK**
Primary pipework insulated:	Yes	**OK**

6 Controls

Space heating controls	TTZC by plumbing and electrical services	**OK**
Hot water controls:	Cylinderstat	**OK**
	Independent timer for DHW	**OK**
Boiler interlock:	Yes	**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 (East Anglia):	Slight	**OK**

Based on:

Overshading:	Average or unknown
Windows facing: South West	1.35m²
Windows facing: North East	0.86m²
Windows facing: North East	1.48m²
Windows facing: North East	1.4m²
Windows facing: South West	3.33m²
Windows facing: South West	0.99m²
Windows facing: South East	0.5m²
Windows facing: South East	0.5m²
Windows facing: South West	1.46m²
Ventilation rate:	4.00
Blinds/curtains:	Dark-coloured curtain or roller blind Closed 100% of daylight hours

10 Key features

Roofs U-value	0.11 W/m²K
Party Walls U-value	0 W/m²K
Floors U-value	0.11 W/m²K
Photovoltaic array	

Predicted Energy Assessment

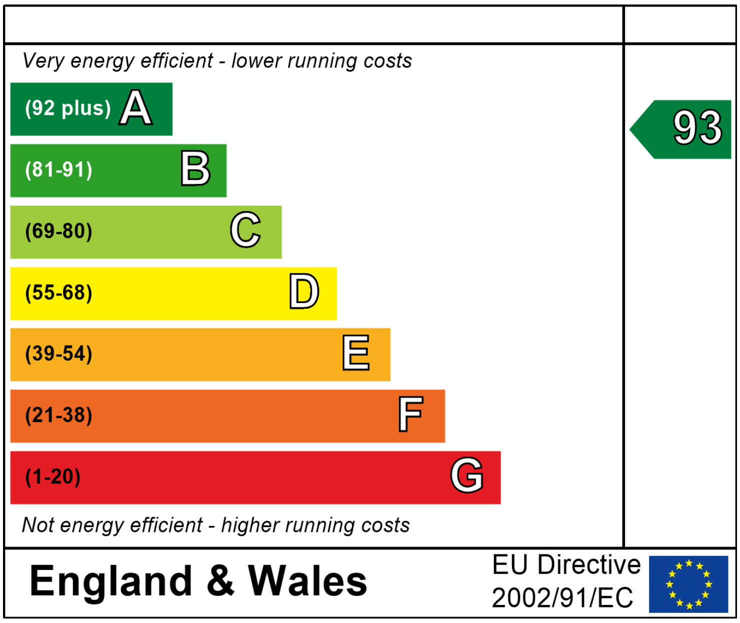
Plot 39

Dwelling type:	Semi-detached House
Date of assessment:	03 November 2022
Produced by:	Liam Mason
Total floor area:	93.48 m²

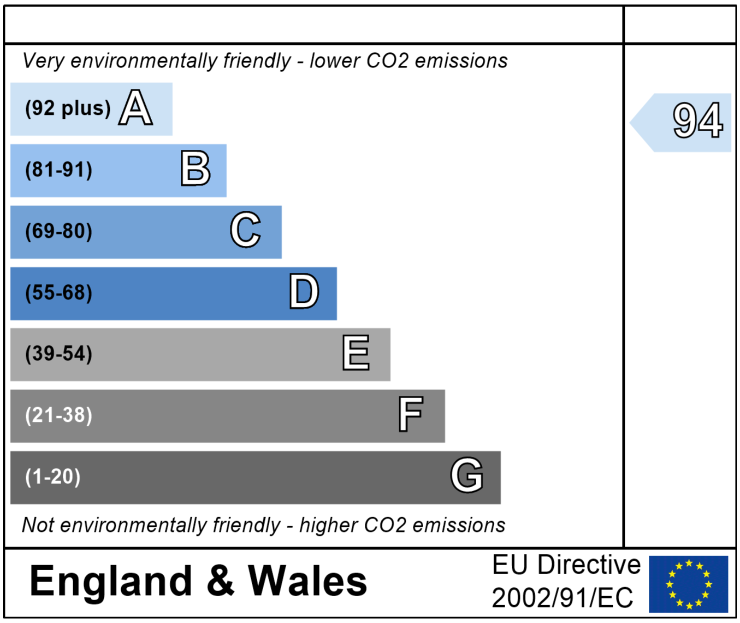
This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about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

Energy Efficiency Rating



Environmental Impact (CO_2) Rating



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.

SAP Input

Property Details: Plot 39

Address:	Plot 39
Located in:	England
Region:	East Anglia
UPRN:	
Date of assessment:	03 November 2022
Date of certificate:	29 November 2022
Assessment type:	New dwelling design stage
Transaction type:	New dwelling
Tenure type:	Unknown
Related party disclosure:	No related party
Thermal Mass Parameter:	Indicative Value Low
Water use <= 125 litres/person/day:	True
PCDF Version:	508

Property description:

Dwelling type:	House
Detachment:	Semi-detached
Year Completed:	2022

Floor Location:	Floor area:	Storey height:
Floor 0	46.74 m²	2.4 m
Floor 1	46.74 m²	2.4 m

Living area:	16.24 m² (fraction 0.174)
Front of dwelling faces:	North East

Opening types:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
D_12	Manufacturer	Solid			
W_97	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	
W_98	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	
W_99	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	
W_100	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	
W_101	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	
W_102	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	
W_103	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	
W_104	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	
W_105	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	

Name:	**Gap:**	**Frame Factor:**	**g-value:**	**U-value:**	**Area:**	**No. of Openings:**
D_12	mm	0	0	1.2	2.03	1
W_97	16mm or more	0.7	0.63	1.4	1.35	1
W_98	16mm or more	0.7	0.63	1.4	0.86	1
W_99	16mm or more	0.7	0.63	1.4	1.48	1
W_100	16mm or more	0.7	0.63	1.4	1.4	1
W_101	16mm or more	0.7	0.63	1.4	3.33	1
W_102	16mm or more	0.7	0.63	1.4	0.99	1
W_103	16mm or more	0.7	0.63	1.4	0.5	1
W_104	16mm or more	0.7	0.63	1.4	0.5	1
W_105	16mm or more	0.7	0.63	1.4	1.46	1

Name:	Type-Name:	Location:	Orient:	Width:	Height:
D_12	Doors	Wall 1	North East	2.03	1
W_97	Windows	Wall 1	South West	1.35	1
W_98	Windows	Wall 1	North East	0.86	1
W_99	Windows	Wall 1	North East	1.48	1
W_100	Windows	Wall 1	North East	1.4	1

W_101	Windows	Wall 1	South West	3.33	1
W_102	Windows	Wall 1	South West	0.99	1
W_103	Windows	Wall 1	South East	0.5	1
W_104	Windows	Wall 1	South East	0.5	1
W_105	Windows	Wall 1	South West	1.46	1

Overshading: Average or unknown

Opaque Elements:

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Kappa:
External Elements							
Wall 1	99.4	13.9	85.5	0.19	0	False	N/A
Roof 1	46.74	0	46.74	0.11	0		N/A
Floor 1	46.74			0.11			N/A
Internal Elements							
INT FLOOR	46.74						N/A
Party Elements							
Party Wall	43.5						N/A

Thermal bridges:

Thermal bridges: User-defined (individual PSI-values) Y-Value = 0.0744

Length	Psi-value		
10.51	0.3	E2	Other lintels (including other steel lintels)
7.89	0.04	E3	Sill
25.3	0.05	E4	Jamb
19.49	0.16	E5	Ground floor (normal)
19.49	0.07	E6	Intermediate floor within a dwelling
10.96	0.06	E10	Eaves (insulation at ceiling level)
10.43	0.24	E12	Gable (insulation at ceiling level)
10.2	0.09	E16	Corner (normal)
10.2	0.06	E18	Party wall between dwellings
0	0.3	E2	
0	0.04	E3	
0	0.05	E4	
0	0.16	E5	
0	0.07	E6	
0	0.06	E10	
0	0.24	E12	
0	0.09	E16	
0	-0.09	E17	
0	0.06	E18	
8.53	0	P2	Intermediate floor within a dwelling
0	0.16	P1	Ground floor
0	0.16	P1	
0	0	P2	
5.48	0.08	R4	Ridge (vaulted ceiling)
0	0.08	R4	

Ventilation:

Pressure test:	Yes (As designed)
Ventilation:	Natural ventilation (extract fans)
Number of chimneys:	0
Number of open flues:	0
Number of fans:	3
Number of passive stacks:	0
Number of sides sheltered:	2

SAP Input

Pressure test:	5
Main heating system:	
Main heating system:	Boiler systems with radiators or underfloor heating Gas boilers and oil boilers Fuel: mains gas Info Source: Boiler Database Database: (rev 508, product index 018403) Efficiency: Winter 80.1 % Summer: 90.8 Brand name: Vaillant Model: ecoFIT sustain 615 Model qualifier: VU 156/6-3 (H-GB) (Regular boiler) Systems with radiators Central heating pump : 2013 or later Design flow temperature: Design flow temperature<=45°C Unknown Boiler interlock: Yes Delayed start
Main heating Control:	
Main heating Control:	Time and temperature zone control by suitable arrangement of plumbing and electrical services Control code: 2110
Secondary heating system:	
Secondary heating system:	None
Water heating:	
Water heating:	From main heating system Water code: 901 Fuel :mains gas Hot water cylinder Cylinder volume: 210 litres Cylinder insulation: Measured loss, 1.32kWh/day Primary pipework insulation: True Cylinderstat: True Cylinder in heated space: True Solar panel: False
Others:	
Electricity tariff:	Standard Tariff
In Smoke Control Area:	Unknown
Conservatory:	No conservatory
Low energy lights:	100%
Terrain type:	Low rise urban / suburban
EPC language:	English
Wind turbine:	No
Photovoltaics:	Photovoltaic 1 Installed Peak power: 2 Tilt of collector: 45° Overshading: None or very little Collector Orientation: South West
Assess Zero Carbon Home:	No

SAP WorkSheet: New dwelling design stage

User Details:

Assessor Name:	Liam Mason	**Stroma Number:**	STRO033679
Software Name:	Stroma FSAP 2012	**Software Version:**	Version: 1.0.5.58

Property Address: Plot 39

Address : Plot 39

1. Overall dwelling dimensions:

	Area(m²)		Av. Height(m)		Volume(m³)	
Ground floor	46.74	(1a) x	2.4	(2a) =	112.18	(3a)
First floor	46.74	(1b) x	2.4	(2b) =	112.18	(3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+.....(1n)	93.48	(4)				
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)+.....(3n) =		224.35	(5)

2. Ventilation rate:

	main heating		secondary heating		other		total		m³ per hour	
Number of chimneys	0	+	0	+	0	=	0	x 40 =	0	(6a)
Number of open flues	0	+	0	+	0	=	0	x 20 =	0	(6b)
Number of intermittent fans							3	x 10 =	30	(7a)
Number of passive vents							0	x 10 =	0	(7b)
Number of flueless gas fires							0	x 40 =	0	(7c)

Air changes per hour

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	30	÷ (5) =	0.13	(8)

If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16)

Number of storeys in the dwelling (ns)		0	(9)
Additional infiltration	[(9)-1]x0.1 =	0	(10)
Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction		0	(11)
if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35			
If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0		0	(12)
If no draught lobby, enter 0.05, else enter 0		0	(13)
Percentage of windows and doors draught stripped		0	(14)
Window infiltration	0.25 - [0.2 x (14) ÷ 100] =	0	(15)
Infiltration rate	(8) + (10) + (11) + (12) + (13) + (15) =	0	(16)
Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area		5	(17)
If based on air permeability value, then	(18) = [(17) ÷ 20]+(8), otherwise (18) = (16)	0.38	(18)
Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used			
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.85	(20)
Infiltration rate incorporating shelter factor	(21) = (18) x (20) =	0.33	(21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average wind speed from Table 7												
(22)m=	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7

Wind Factor (22a)m = (22)m ÷ 4

(22a)m=	1.27	1.25	1.23	1.1	1.08	0.95	0.95	0.92	1	1.08	1.12	1.18

Adjusted infiltration rate (allowing for shelter and wind speed) = (21a) x (22a)m

0.42	0.41	0.4	0.36	0.35	0.31	0.31	0.3	0.33	0.35	0.37	0.38

Calculate effective air change rate for the applicable case

If mechanical ventilation: 0 (23a)

If exhaust air heat pump using Appendix N, (23b) = (23a) × Fmv (equation (N5)) , otherwise (23b) = (23a) 0 (23b)

If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) = 0 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR) (24a)m = (22b)m + (23b) × [1 – (23c) ÷ 100]

(24a)m=	0	0	0	0	0	0	0	0	0	0	0	0	(24a)

b) If balanced mechanical ventilation without heat recovery (MV) (24b)m = (22b)m + (23b)

(24b)m=	0	0	0	0	0	0	0	0	0	0	0	0	(24b)

c) If whole house extract ventilation or positive input ventilation from outside

if (22b)m < 0.5 × (23b), then (24c) = (23b); otherwise (24c) = (22b) m + 0.5 × (23b)

(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0	(24c)

d) If natural ventilation or whole house positive input ventilation from loft

if (22b)m = 1, then (24d)m = (22b)m otherwise (24d)m = 0.5 + [(22b)m² x 0.5]

(24d)m=	0.59	0.58	0.58	0.56	0.56	0.55	0.55	0.55	0.55	0.56	0.57	0.57	(24d)

Effective air change rate - enter (24a) or (24b) or (24c) or (24d) in box (25)

(25)m=	0.59	0.58	0.58	0.56	0.56	0.55	0.55	0.55	0.55	0.56	0.57	0.57	(25)

3. Heat losses and heat loss parameter:

ELEMENT	Gross area (m²)	Openings m²	Net Area A ,m²		U-value W/m2K		A X U (W/K)	k-value kJ/m²·K	A X k kJ/K	
Doors			2.03	x	1.2	=	2.436			(26)
Windows Type 1			1.35	x1/[1/(1.4)+ 0.04]		=	1.79			(27)
Windows Type 2			0.86	x1/[1/(1.4)+ 0.04]		=	1.14			(27)
Windows Type 3			1.48	x1/[1/(1.4)+ 0.04]		=	1.96			(27)
Windows Type 4			1.4	x1/[1/(1.4)+ 0.04]		=	1.86			(27)
Windows Type 5			3.33	x1/[1/(1.4)+ 0.04]		=	4.41			(27)
Windows Type 6			0.99	x1/[1/(1.4)+ 0.04]		=	1.31			(27)
Windows Type 7			0.5	x1/[1/(1.4)+ 0.04]		=	0.66			(27)
Windows Type 8			0.5	x1/[1/(1.4)+ 0.04]		=	0.66			(27)
Windows Type 9			1.46	x1/[1/(1.4)+ 0.04]		=	1.94			(27)
Floor			46.74	x	0.11	=	5.1414			(28)
Walls	99.4	13.9	85.5	x	0.19	=	16.25			(29)
Roof	46.74	0	46.74	x	0.11	=	5.14			(30)
Total area of elements, m²			192.88							(31)
Party wall			43.5	x	0	=	0			(32)
Internal floor			46.74							(32d)

** for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2*

*** include the areas on both sides of internal walls and partitions*

Fabric heat loss, W/K = S (A x U) (26)…(30) + (32) = 44.7 (33)

SAP WorkSheet: New dwelling design stage

Heat capacity Cm = S(A x k)	((28)…(30) + (32) + (32a)…(32e) =	20098.38	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K	Indicative Value: Low	100	(35)

For design assessments where the details of the construction are not known precisely the indicative values of TMP in Table 1f can be used instead of a detailed calculation.

Thermal bridges : S (L x Y) calculated using Appendix K		14.35	(36)

if details of thermal bridging are not known (36) = 0.05 x (31)

Total fabric heat loss	(33) + (36) =	59.05	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m=	43.42	43.17	42.93	41.78	41.57	40.57	40.57	40.39	40.96	41.57	42	42.46	(38)

Heat transfer coefficient, W/K (39)m = (37) + (38)m

(39)m=	102.47	102.22	101.97	100.83	100.61	99.62	99.62	99.43	100	100.61	101.05	101.5	

Average = $Sum(39)_{1…12}$ /12= 100.83 (39)

Heat loss parameter (HLP), W/m²K (40)m = (39)m ÷ (4)

(40)m=	1.1	1.09	1.09	1.08	1.08	1.07	1.07	1.06	1.07	1.08	1.08	1.09	

Average = $Sum(40)_{1…12}$ /12= 1.08 (40)

Number of days in month (Table 1a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement: kWh/year:

Assumed occupancy, N — 2.67 (42)

if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA -13.9)2)] + 0.0013 x (TFA -13.9)

if TFA £ 13.9, N = 1

Annual average hot water usage in litres per day Vd,average = (25 x N) + 36 — 97.62 (43)

Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43)													
(44)m=	107.38	103.48	99.57	95.67	91.77	87.86	87.86	91.77	95.67	99.57	103.48	107.38	

Total = $Sum(44)_{1…12}$ = 1171.47 (44)

Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d)

(45)m=	159.25	139.28	143.72	125.3	120.23	103.75	96.14	110.32	111.64	130.1	142.02	154.22	

Total = $Sum(45)_{1…12}$ = 1535.98 (45)

If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61)

(46)m=	23.89	20.89	21.56	18.8	18.03	15.56	14.42	16.55	16.75	19.52	21.3	23.13	(46)

Water storage loss:

Storage volume (litres) including any solar or WWHRS storage within same vessel — 210 (47)

If community heating and no tank in dwelling, enter 110 litres in (47)

Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47)

Water storage loss:

a) If manufacturer's declared loss factor is known (kWh/day): — 1.32 (48)

Temperature factor from Table 2b — 0.54 (49)

Energy lost from water storage, kWh/year (48) x (49) = 0.71 (50)

b) If manufacturer's declared cylinder loss factor is not known:

SAP WorkSheet: New dwelling design stage

Hot water storage loss factor from Table 2 (kWh/litre/day)		0	(51)
If community heating see section 4.3			
Volume factor from Table 2a		0	(52)
Temperature factor from Table 2b		0	(53)
Energy lost from water storage, kWh/year	(47) x (51) x (52) x (53) =	0	(54)
Enter (50) or (54) in (55)		0.71	(55)

Water storage loss calculated for each month ((56)m = (55) × (41)m

(56)m=	22.1	19.96	22.1	21.38	22.1	21.38	22.1	22.1	21.38	22.1	21.38	22.1	(56)

If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) – (H11)] ÷ (50), else (57)m = (56)m where (H11) is from Appendix H

(57)m=	22.1	19.96	22.1	21.38	22.1	21.38	22.1	22.1	21.38	22.1	21.38	22.1	(57)

Primary circuit loss (annual) from Table 3 — 0 (58)

Primary circuit loss calculated for each month (59)m = (58) ÷ 365 × (41)m

(modified by factor from Table H5 if there is solar water heating and a cylinder thermostat)

(59)m=	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss calculated for each month (61)m = (60) ÷ 365 × (41)m

(61)m=	0	0	0	0	0	0	0	0	0	0	0	0	(61)

Total heat required for water heating calculated for each month (62)m = 0.85 × (45)m + (46)m + (57)m + (59)m + (61)m

(62)m=	204.61	180.25	189.08	169.2	165.59	147.65	141.5	155.68	155.53	175.46	185.92	199.58	(62)

Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating)

(add additional lines if FGHRS and/or WWHRS applies, see Appendix G)

(63)m=	0	0	0	0	0	0	0	0	0	0	0	0	(63)

Output from water heater

(64)m=	204.61	180.25	189.08	169.2	165.59	147.65	141.5	155.68	155.53	175.46	185.92	199.58	

Output from water heater (annual)1…12 — 2070.05 (64)

Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (45)m + (61)m] + 0.8 x [(46)m + (57)m + (59)m]

(65)m=	89.24	79.09	84.08	76.78	76.26	69.61	68.25	72.97	72.24	79.55	82.34	87.57	(65)

include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m=	160.23	160.23	160.23	160.23	160.23	160.23	160.23	160.23	160.23	160.23	160.23	160.23	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
(67)m=	59.94	53.24	43.29	32.78	24.5	20.68	22.35	29.05	38.99	49.51	57.79	61.6	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
(68)m=	366.17	369.97	360.4	340.01	314.28	290.1	273.94	270.14	279.72	300.1	325.83	350.02	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
(69)m=	53.69	53.69	53.69	53.69	53.69	53.69	53.69	53.69	53.69	53.69	53.69	53.69	(69)
Pumps and fans gains (Table 5a)													
(70)m=	3	3	3	3	3	3	3	3	3	3	3	3	(70)
Losses e.g. evaporation (negative values) (Table 5)													
(71)m=	-106.82	-106.82	-106.82	-106.82	-106.82	-106.82	-106.82	-106.82	-106.82	-106.82	-106.82	-106.82	(71)
Water heating gains (Table 5)													
(72)m=	119.94	117.69	113	106.64	102.51	96.69	91.74	98.08	100.33	106.92	114.36	117.7	(72)

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Total internal gains = (66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m

(73)m=	656.15	651	626.8	589.53	551.39	517.57	498.13	507.37	529.14	566.63	608.08	639.42	(73)

6. Solar gains:

Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.

Orientation:	Access Factor Table 6d		Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
Northeast 0.9x	0.77	x	0.86	x	11.28	x	0.63	x	0.7	=	2.97	(75)
Northeast 0.9x	0.77	x	1.48	x	11.28	x	0.63	x	0.7	=	5.1	(75)
Northeast 0.9x	0.77	x	1.4	x	11.28	x	0.63	x	0.7	=	4.83	(75)
Northeast 0.9x	0.77	x	0.86	x	22.97	x	0.63	x	0.7	=	6.04	(75)
Northeast 0.9x	0.77	x	1.48	x	22.97	x	0.63	x	0.7	=	10.39	(75)
Northeast 0.9x	0.77	x	1.4	x	22.97	x	0.63	x	0.7	=	9.83	(75)
Northeast 0.9x	0.77	x	0.86	x	41.38	x	0.63	x	0.7	=	10.88	(75)
Northeast 0.9x	0.77	x	1.48	x	41.38	x	0.63	x	0.7	=	18.72	(75)
Northeast 0.9x	0.77	x	1.4	x	41.38	x	0.63	x	0.7	=	17.7	(75)
Northeast 0.9x	0.77	x	0.86	x	67.96	x	0.63	x	0.7	=	17.86	(75)
Northeast 0.9x	0.77	x	1.48	x	67.96	x	0.63	x	0.7	=	30.74	(75)
Northeast 0.9x	0.77	x	1.4	x	67.96	x	0.63	x	0.7	=	29.08	(75)
Northeast 0.9x	0.77	x	0.86	x	91.35	x	0.63	x	0.7	=	24.01	(75)
Northeast 0.9x	0.77	x	1.48	x	91.35	x	0.63	x	0.7	=	41.32	(75)
Northeast 0.9x	0.77	x	1.4	x	91.35	x	0.63	x	0.7	=	39.08	(75)
Northeast 0.9x	0.77	x	0.86	x	97.38	x	0.63	x	0.7	=	25.6	(75)
Northeast 0.9x	0.77	x	1.48	x	97.38	x	0.63	x	0.7	=	44.05	(75)
Northeast 0.9x	0.77	x	1.4	x	97.38	x	0.63	x	0.7	=	41.67	(75)
Northeast 0.9x	0.77	x	0.86	x	91.1	x	0.63	x	0.7	=	23.94	(75)
Northeast 0.9x	0.77	x	1.48	x	91.1	x	0.63	x	0.7	=	41.21	(75)
Northeast 0.9x	0.77	x	1.4	x	91.1	x	0.63	x	0.7	=	38.98	(75)
Northeast 0.9x	0.77	x	0.86	x	72.63	x	0.63	x	0.7	=	19.09	(75)
Northeast 0.9x	0.77	x	1.48	x	72.63	x	0.63	x	0.7	=	32.85	(75)
Northeast 0.9x	0.77	x	1.4	x	72.63	x	0.63	x	0.7	=	31.07	(75)
Northeast 0.9x	0.77	x	0.86	x	50.42	x	0.63	x	0.7	=	13.25	(75)
Northeast 0.9x	0.77	x	1.48	x	50.42	x	0.63	x	0.7	=	22.81	(75)
Northeast 0.9x	0.77	x	1.4	x	50.42	x	0.63	x	0.7	=	21.57	(75)
Northeast 0.9x	0.77	x	0.86	x	28.07	x	0.63	x	0.7	=	7.38	(75)
Northeast 0.9x	0.77	x	1.48	x	28.07	x	0.63	x	0.7	=	12.69	(75)
Northeast 0.9x	0.77	x	1.4	x	28.07	x	0.63	x	0.7	=	12.01	(75)
Northeast 0.9x	0.77	x	0.86	x	14.2	x	0.63	x	0.7	=	3.73	(75)
Northeast 0.9x	0.77	x	1.48	x	14.2	x	0.63	x	0.7	=	6.42	(75)
Northeast 0.9x	0.77	x	1.4	x	14.2	x	0.63	x	0.7	=	6.07	(75)
Northeast 0.9x	0.77	x	0.86	x	9.21	x	0.63	x	0.7	=	2.42	(75)

Northeast	0.9x	0.77	x	1.48	x	9.21	x	0.63	x	0.7	=	4.17	(75)
Northeast	0.9x	0.77	x	1.4	x	9.21	x	0.63	x	0.7	=	3.94	(75)
Southeast	0.9x	0.77	x	0.5	x	36.79	x	0.63	x	0.7	=	5.62	(77)
Southeast	0.9x	0.77	x	0.5	x	36.79	x	0.63	x	0.7	=	5.62	(77)
Southeast	0.9x	0.77	x	0.5	x	62.67	x	0.63	x	0.7	=	9.58	(77)
Southeast	0.9x	0.77	x	0.5	x	62.67	x	0.63	x	0.7	=	9.58	(77)
Southeast	0.9x	0.77	x	0.5	x	85.75	x	0.63	x	0.7	=	13.1	(77)
Southeast	0.9x	0.77	x	0.5	x	85.75	x	0.63	x	0.7	=	13.1	(77)
Southeast	0.9x	0.77	x	0.5	x	106.25	x	0.63	x	0.7	=	16.24	(77)
Southeast	0.9x	0.77	x	0.5	x	106.25	x	0.63	x	0.7	=	16.24	(77)
Southeast	0.9x	0.77	x	0.5	x	119.01	x	0.63	x	0.7	=	18.19	(77)
Southeast	0.9x	0.77	x	0.5	x	119.01	x	0.63	x	0.7	=	18.19	(77)
Southeast	0.9x	0.77	x	0.5	x	118.15	x	0.63	x	0.7	=	18.05	(77)
Southeast	0.9x	0.77	x	0.5	x	118.15	x	0.63	x	0.7	=	18.05	(77)
Southeast	0.9x	0.77	x	0.5	x	113.91	x	0.63	x	0.7	=	17.41	(77)
Southeast	0.9x	0.77	x	0.5	x	113.91	x	0.63	x	0.7	=	17.41	(77)
Southeast	0.9x	0.77	x	0.5	x	104.39	x	0.63	x	0.7	=	15.95	(77)
Southeast	0.9x	0.77	x	0.5	x	104.39	x	0.63	x	0.7	=	15.95	(77)
Southeast	0.9x	0.77	x	0.5	x	92.85	x	0.63	x	0.7	=	14.19	(77)
Southeast	0.9x	0.77	x	0.5	x	92.85	x	0.63	x	0.7	=	14.19	(77)
Southeast	0.9x	0.77	x	0.5	x	69.27	x	0.63	x	0.7	=	10.58	(77)
Southeast	0.9x	0.77	x	0.5	x	69.27	x	0.63	x	0.7	=	10.58	(77)
Southeast	0.9x	0.77	x	0.5	x	44.07	x	0.63	x	0.7	=	6.73	(77)
Southeast	0.9x	0.77	x	0.5	x	44.07	x	0.63	x	0.7	=	6.73	(77)
Southeast	0.9x	0.77	x	0.5	x	31.49	x	0.63	x	0.7	=	4.81	(77)
Southeast	0.9x	0.77	x	0.5	x	31.49	x	0.63	x	0.7	=	4.81	(77)
Southwest	0.9x	0.77	x	1.35	x	36.79		0.63	x	0.7	=	15.18	(79)
Southwest	0.9x	0.77	x	3.33	x	36.79		0.63	x	0.7	=	37.44	(79)
Southwest	0.9x	0.77	x	0.99	x	36.79		0.63	x	0.7	=	11.13	(79)
Southwest	0.9x	0.77	x	1.46	x	36.79		0.63	x	0.7	=	16.42	(79)
Southwest	0.9x	0.77	x	1.35	x	62.67		0.63	x	0.7	=	25.86	(79)
Southwest	0.9x	0.77	x	3.33	x	62.67		0.63	x	0.7	=	63.78	(79)
Southwest	0.9x	0.77	x	0.99	x	62.67		0.63	x	0.7	=	18.96	(79)
Southwest	0.9x	0.77	x	1.46	x	62.67		0.63	x	0.7	=	27.96	(79)
Southwest	0.9x	0.77	x	1.35	x	85.75		0.63	x	0.7	=	35.38	(79)
Southwest	0.9x	0.77	x	3.33	x	85.75		0.63	x	0.7	=	87.27	(79)
Southwest	0.9x	0.77	x	0.99	x	85.75		0.63	x	0.7	=	25.95	(79)
Southwest	0.9x	0.77	x	1.46	x	85.75		0.63	x	0.7	=	38.26	(79)
Southwest	0.9x	0.77	x	1.35	x	106.25		0.63	x	0.7	=	43.84	(79)
Southwest	0.9x	0.77	x	3.33	x	106.25		0.63	x	0.7	=	108.13	(79)
Southwest	0.9x	0.77	x	0.99	x	106.25		0.63	x	0.7	=	32.15	(79)

Southwest	0.9x	0.77	x	1.46	x	106.25	0.63	x	0.7	=	47.41	(79)
Southwest	0.9x	0.77	x	1.35	x	119.01	0.63	x	0.7	=	49.1	(79)
Southwest	0.9x	0.77	x	3.33	x	119.01	0.63	x	0.7	=	121.12	(79)
Southwest	0.9x	0.77	x	0.99	x	119.01	0.63	x	0.7	=	36.01	(79)
Southwest	0.9x	0.77	x	1.46	x	119.01	0.63	x	0.7	=	53.1	(79)
Southwest	0.9x	0.77	x	1.35	x	118.15	0.63	x	0.7	=	48.75	(79)
Southwest	0.9x	0.77	x	3.33	x	118.15	0.63	x	0.7	=	120.24	(79)
Southwest	0.9x	0.77	x	0.99	x	118.15	0.63	x	0.7	=	35.75	(79)
Southwest	0.9x	0.77	x	1.46	x	118.15	0.63	x	0.7	=	52.72	(79)
Southwest	0.9x	0.77	x	1.35	x	113.91	0.63	x	0.7	=	47	(79)
Southwest	0.9x	0.77	x	3.33	x	113.91	0.63	x	0.7	=	115.92	(79)
Southwest	0.9x	0.77	x	0.99	x	113.91	0.63	x	0.7	=	34.46	(79)
Southwest	0.9x	0.77	x	1.46	x	113.91	0.63	x	0.7	=	50.83	(79)
Southwest	0.9x	0.77	x	1.35	x	104.39	0.63	x	0.7	=	43.07	(79)
Southwest	0.9x	0.77	x	3.33	x	104.39	0.63	x	0.7	=	106.24	(79)
Southwest	0.9x	0.77	x	0.99	x	104.39	0.63	x	0.7	=	31.58	(79)
Southwest	0.9x	0.77	x	1.46	x	104.39	0.63	x	0.7	=	46.58	(79)
Southwest	0.9x	0.77	x	1.35	x	92.85	0.63	x	0.7	=	38.31	(79)
Southwest	0.9x	0.77	x	3.33	x	92.85	0.63	x	0.7	=	94.49	(79)
Southwest	0.9x	0.77	x	0.99	x	92.85	0.63	x	0.7	=	28.09	(79)
Southwest	0.9x	0.77	x	1.46	x	92.85	0.63	x	0.7	=	41.43	(79)
Southwest	0.9x	0.77	x	1.35	x	69.27	0.63	x	0.7	=	28.58	(79)
Southwest	0.9x	0.77	x	3.33	x	69.27	0.63	x	0.7	=	70.49	(79)
Southwest	0.9x	0.77	x	0.99	x	69.27	0.63	x	0.7	=	20.96	(79)
Southwest	0.9x	0.77	x	1.46	x	69.27	0.63	x	0.7	=	30.91	(79)
Southwest	0.9x	0.77	x	1.35	x	44.07	0.63	x	0.7	=	18.18	(79)
Southwest	0.9x	0.77	x	3.33	x	44.07	0.63	x	0.7	=	44.85	(79)
Southwest	0.9x	0.77	x	0.99	x	44.07	0.63	x	0.7	=	13.33	(79)
Southwest	0.9x	0.77	x	1.46	x	44.07	0.63	x	0.7	=	19.66	(79)
Southwest	0.9x	0.77	x	1.35	x	31.49	0.63	x	0.7	=	12.99	(79)
Southwest	0.9x	0.77	x	3.33	x	31.49	0.63	x	0.7	=	32.04	(79)
Southwest	0.9x	0.77	x	0.99	x	31.49	0.63	x	0.7	=	9.53	(79)
Southwest	0.9x	0.77	x	1.46	x	31.49	0.63	x	0.7	=	14.05	(79)

Solar gains in watts, calculated for each month (83)m = Sum(74)m …(82)m

(83)m=	104.32	181.97	260.36	341.67	400.11	404.87	387.15	342.38	288.33	204.19	125.73	88.77	(83)

Total gains – internal and solar (84)m = (73)m + (83)m , watts

(84)m=	760.47	832.97	887.16	931.2	951.49	922.44	885.28	849.76	817.47	770.82	733.81	728.19	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (85)

Utilisation factor for gains for living area, h1,m (see Table 9a)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(86)m=	0.93	0.91	0.88	0.82	0.73	0.59	0.46	0.49	0.67	0.83	0.91	0.94	(86)

Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)

(87)m=	19.05	19.28	19.64	20.11	20.52	20.81	20.93	20.92	20.72	20.2	19.56	19.01	(87)

Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)

(88)m=	20	20.01	20.01	20.02	20.02	20.03	20.03	20.03	20.03	20.02	20.02	20.01	(88)

Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)

(89)m=	0.93	0.9	0.86	0.79	0.68	0.52	0.37	0.4	0.61	0.8	0.9	0.93	(89)

Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)

(90)m=	17.42	17.74	18.26	18.92	19.48	19.86	19.98	19.97	19.75	19.07	18.16	17.36	(90)

fLA = Living area ÷ (4) = 0.17 (91)

Mean internal temperature (for the whole dwelling) = fLA × T1 + (1 – fLA) × T2

(92)m=	17.7	18.01	18.5	19.13	19.66	20.02	20.15	20.13	19.92	19.27	18.4	17.65	(92)

Apply adjustment to the mean internal temperature from Table 4e, where appropriate

(93)m=	17.55	17.86	18.35	18.98	19.51	19.87	20	19.98	19.77	19.12	18.25	17.5	(93)

8. Space heating requirement

Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate the utilisation factor for gains using Table 9a

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation factor for gains, hm:													
(94)m=	0.9	0.87	0.83	0.76	0.66	0.51	0.36	0.4	0.59	0.77	0.86	0.9	(94)
Useful gains, hmGm , W = (94)m x (84)m													
(95)m=	680.73	724.88	736.77	709.65	626.23	470.08	323.02	336.56	480.82	592.58	633.47	657.88	(95)
Monthly average external temperature from Table 8													
(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)
Heat loss rate for mean internal temperature, Lm , W =[(39)m x [(93)m– (96)m]													
(97)m=	1358.06	1324.79	1208.73	1016.36	785.99	525.18	338.48	356.46	566.52	857.16	1126.87	1349.57	(97)
Space heating requirement for each month, kWh/month = 0.024 x [(97)m – (95)m] x (41)m													
(98)m=	503.93	403.13	351.14	220.83	118.87	0	0	0	0	196.85	355.25	514.62	

Total per year (kWh/year) = Sum(98)$_{1...5,9...12}$ = 2664.62 (98)

Space heating requirement in kWh/m²/year 28.5 (99)

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

Space heating:

Fraction of space heat from secondary/supplementary system		0	(201)
Fraction of space heat from main system(s)	(202) = 1 – (201) =	1	(202)
Fraction of total heating from main system 1	(204) = (202) × [1 – (203)] =	1	(204)
Efficiency of main space heating system 1		93.2	(206)
Efficiency of secondary/supplementary heating system, %		0	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/year
Space heating requirement (calculated above)													
	503.93	403.13	351.14	220.83	118.87	0	0	0	0	196.85	355.25	514.62	
(211)m = {[(98)m x (204)] } x 100 ÷ (206)													(211)
	540.7	432.55	376.76	236.94	127.54	0	0	0	0	211.21	381.17	552.17	

Total (kWh/year) =Sum(211)$_{1...5,10...12}$= 2859.04 (211)

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Space heating fuel (secondary), kWh/month
= {[(98)m x (201)] } x 100 ÷ (208)

(215)m=	0	0	0	0	0	0	0	0	0	0	0	0

Total (kWh/year) =Sum(215)$_{1...5,10...12}$= 0 (215)

Water heating

Output from water heater (calculated above)

204.61	180.25	189.08	169.2	165.59	147.65	141.5	155.68	155.53	175.46	185.92	199.58

Efficiency of water heater 80.1 (216)

(217)m=	87.43	87.2	86.74	85.83	84.25	80.1	80.1	80.1	80.1	85.42	86.82	87.53	(217)

Fuel for water heating, kWh/month
(219)m = (64)m x 100 ÷ (217)m

(219)m=	234.03	206.71	217.98	197.14	196.55	184.33	176.65	194.36	194.18	205.41	214.15	228.01

Total = Sum(219a)$_{1...12}$ = 2449.48 (219)

Annual totals		**kWh/year**	**kWh/year**	
Space heating fuel used, main system 1			2859.04	
Water heating fuel used			2449.48	
Electricity for pumps, fans and electric keep-hot				
central heating pump:		30		(230c)
boiler with a fan-assisted flue		45		(230e)
Total electricity for the above, kWh/year	sum of (230a)…(230g) =		75	(231)
Electricity for lighting			423.4	(232)
Electricity generated by PVs			-1606.39	(233)
Total delivered energy for all uses (211)...(221) + (231) + (232)...(237b) =			4200.53	(338)

10a. Fuel costs - individual heating systems:

	Fuel kWh/year	**Fuel Price** (Table 12)		**Fuel Cost** £/year	
Space heating - main system 1	(211) x	3.48	x 0.01 =	99.49	(240)
Space heating - main system 2	(213) x	0	x 0.01 =	0	(241)
Space heating - secondary	(215) x	13.19	x 0.01 =	0	(242)
Water heating cost (other fuel)	(219)	3.48	x 0.01 =	85.24	(247)
Pumps, fans and electric keep-hot	(231)	13.19	x 0.01 =	9.89	(249)
(if off-peak tariff, list each of (230a) to (230g) separately as applicable and apply fuel price according to Table 12a					
Energy for lighting	(232)	13.19	x 0.01 =	55.85	(250)
Additional standing charges (Table 12)				120	(251)
	one of (233) to (235) x)	13.19	x 0.01 =	-211.88	(252)

Appendix Q items: repeat lines (253) and (254) as needed

Total energy cost (245)...(247) + (250)…(254) = 158.59 (255)

11a. SAP rating - individual heating systems

Energy cost deflator (Table 12) 0.42 (256)

SAP WorkSheet: New dwelling design stage

Energy cost factor (ECF)	[(255) x (256)] ÷ [(4) + 45.0] =		0.48	(257)
SAP rating (Section 12)			93.29	(258)

12a. CO2 emissions – Individual heating systems including micro-CHP

	Energy kWh/year	**Emission factor** kg CO2/kWh		**Emissions** kg CO2/year	
Space heating (main system 1)	(211) x	0.216	=	617.55	(261)
Space heating (secondary)	(215) x	0.519	=	0	(263)
Water heating	(219) x	0.216	=	529.09	(264)
Space and water heating	(261) + (262) + (263) + (264) =			1146.64	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519	=	38.93	(267)
Electricity for lighting	(232) x	0.519	=	219.74	(268)
Energy saving/generation technologies Item 1		0.519	=	-833.72	(269)
Total CO2, kg/year		sum of (265)…(271) =		571.59	(272)
CO2 emissions per m²		(272) ÷ (4) =		6.11	(273)
EI rating (section 14)				94	(274)

13a. Primary Energy

	Energy kWh/year	**Primary** factor		**P. Energy** kWh/year	
Space heating (main system 1)	(211) x	1.22	=	3488.02	(261)
Space heating (secondary)	(215) x	3.07	=	0	(263)
Energy for water heating	(219) x	1.22	=	2988.37	(264)
Space and water heating	(261) + (262) + (263) + (264) =			6476.39	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	=	230.25	(267)
Electricity for lighting	(232) x	0	=	1299.84	(268)
Energy saving/generation technologies Item 1		3.07	=	-4931.63	(269)
‘Total Primary Energy		sum of (265)…(271) =		3074.85	(272)
Primary energy kWh/m²/year		(272) ÷ (4) =		32.89	(273)

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 29 November 2022

Property Details: Plot 39

Dwelling type:	Semi-detached House
Located in:	England
Region:	East Anglia
Cross ventilation possible:	Yes
Number of storeys:	2
Front of dwelling faces:	North East
Overshading:	Average or unknown
Overhangs:	None
Thermal mass parameter:	Indicative Value Low
Night ventilation:	False
Blinds, curtains, shutters:	Dark-coloured curtain or roller blind
Ventilation rate during hot weather (ach):	4 (Windows open half the time)

Overheating Details:

Summer ventilation heat loss coefficient:	296.14	**(P1)**
Transmission heat loss coefficient:	59	
Summer heat loss coefficient:	355.19	**(P2)**

Overhangs:

Orientation:	**Ratio:**	**Z_overhangs:**
South West (W_97)	0	1
North East (W_98)	0	1
North East (W_99)	0	1
North East (W_100)	0	1
South West (W_101)	0	1
South West (W_102)	0	1
South East (W_103)	0	1
South East (W_104)	0	1
South West (W_105)	0	1

Solar shading:

Orientation:	**Z blinds:**	**Solar access:**	**Overhangs:**	**Z summer:**	
South West (W_97)	0.85	0.9	1	0.76	**(P8)**
North East (W_98)	0.85	0.9	1	0.76	**(P8)**
North East (W_99)	0.85	0.9	1	0.76	**(P8)**
North East (W_100)	0.85	0.9	1	0.76	**(P8)**
South West (W_101)	0.85	0.9	1	0.76	**(P8)**
South West (W_102)	0.85	0.9	1	0.76	**(P8)**
South East (W_103)	0.85	0.9	1	0.76	**(P8)**
South East (W_104)	0.85	0.9	1	0.76	**(P8)**
South West (W_105)	0.85	0.9	1	0.76	**(P8)**

Solar gains:

Orientation		**Area**	**Flux**	**g_**	**FF**	**Shading**	**Gains**
South West (W_97)	0.9 x	1.35	122.31	0.63	0.7	0.76	50.14
North East (W_98)	0.9 x	0.86	100.04	0.63	0.7	0.76	26.12
North East (W_99)	0.9 x	1.48	100.04	0.63	0.7	0.76	44.96
North East (W_100)	0.9 x	1.4	100.04	0.63	0.7	0.76	42.53
South West (W_101)	0.9 x	3.33	122.31	0.63	0.7	0.76	123.67
South West (W_102)	0.9 x	0.99	122.31	0.63	0.7	0.76	36.77

SAP 2012 Overheating Assessment

South East (W_103)	0.9 x	0.5	122.31	0.63	0.7	0.76	18.57	
South East (W_104)	0.9 x	0.5	122.31	0.63	0.7	0.76	18.57	
South West (W_105)	0.9 x	1.46	122.31	0.63	0.7	0.76	54.22	
						Total	415.54	**(P3/P4)**

Internal gains:

	June	July	August	
Internal gains	514.57	495.13	504.37	
Total summer gains	953.61	910.67	874.08	**(P5)**
Summer gain/loss ratio	2.68	2.56	2.46	**(P6)**
Mean summer external temperature (East Anglia)	15.4	17.6	17.6	
Thermal mass temperature increment	1.3	1.3	1.3	
Threshold temperature	19.38	21.46	21.36	**(P7)**
Likelihood of high internal temperature	**Not significant**	**Slight**	**Slight**	

Assessment of likelihood of high internal temperature: Slight