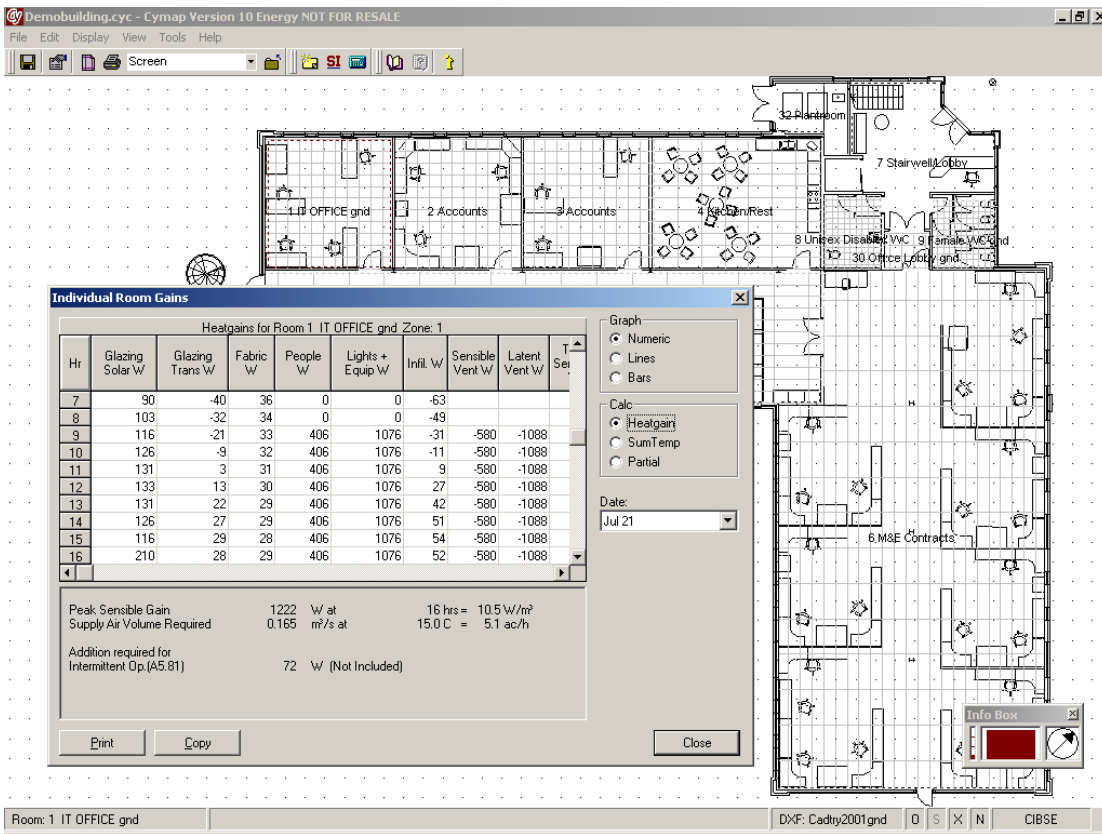


Energy Program

Once the Building Model has been completed the results for heat gains and losses to the space can be considered as well as the Summertime temperatures based on engineering assumptions made by the engineer. For example, the engineer can analyse the effect of pre-cooling the air to the space and the effect this has on any potential plant requirement. The engineer can also experiment with different glazing types and configurations to offer the optimum solution whether it be via natural infiltration, pre-cooled air or full air conditioning.



Heat gain calcs

Summertime temperatures in the spaces can be determined under various conditions.

Individual Room Gains

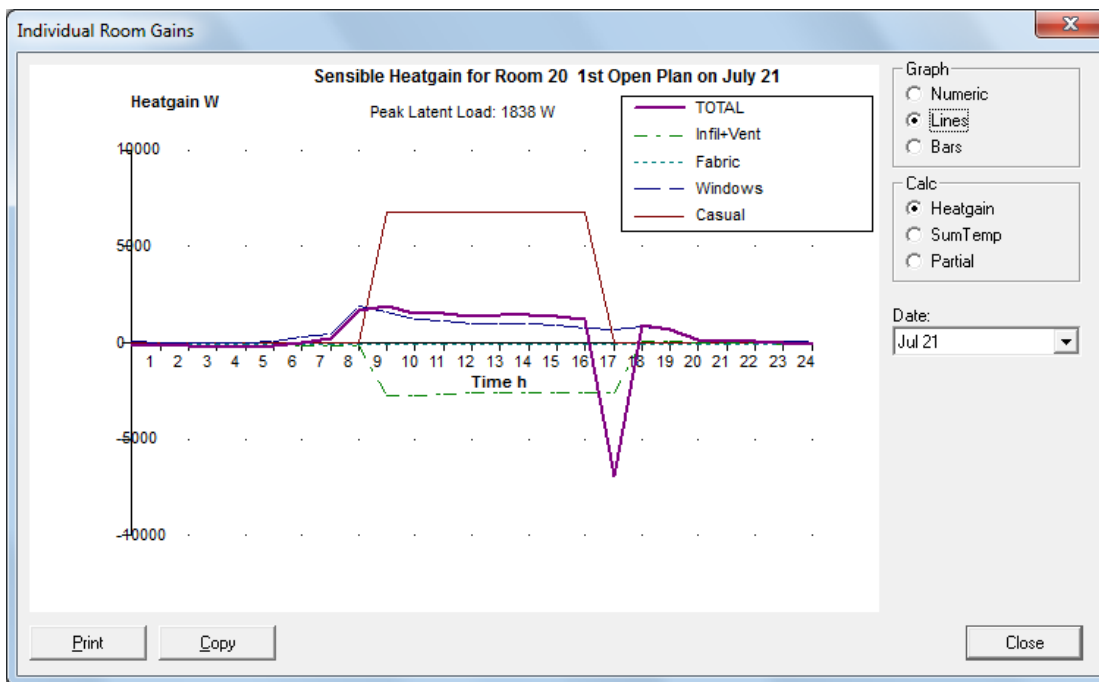
Summer Temperatures for Room 25 1st Open Plan

hr	Glazing W	Fabric W	Casual W	Infil. W	Mech. Vent. W	Air Temp °C	Outside °C
7	3674	3146	0	-314	-6506	17.2	14.6
8	4300	2746	0	-177	-6869	17.5	16.0
9	3987	-6020	17792	-732	-15027	24.1	17.9
10	4140	-6235	17792	-507	-15189	24.2	19.9
11	4046	-6333	17792	-271	-15234	24.2	21.9
12	3769	-6307	17792	-52	-15202	24.2	23.8
13	4303	-6661	17792	90	-15524	24.5	25.2
14	4525	-6829	17792	186	-15673	24.6	26.2
15	4542	-6860	17792	222	-15695	24.6	26.5
16	4341	-6755	17792	212	-15591	24.5	26.3
17	4300	-6661	17792	90	-15524	24.5	25.2

Peak Summertime Temp 24.6 °C at 15 hrs
 Requested Peak Temp 25.0 °C
 Average Room Temp 19.3 °C
 Requested Infiltration 0.20 ac/h
 Necessary Infiltration As Requested

Graph: Numeric, Lines, Bars
 Calc: Heatgain, SumTemp, Partial
 Date: Jul 21

Print Copy Close



The building model is a wholly dynamic model where room temperature profiles and room positions interact to give gains and losses across partitions if necessary, as well as the effects of cross flow ventilation on gains and losses to internal spaces and zones.

Using imported profiles from the building program, these casual gains such as lighting, occupancy and equipment are considered as part of the core calculation used in the energy results.

Room Profile: 25 1st Open Plan

General | **Ventilation** | People | Lights | Equipment | Part L

Natural Ventilation

Infiltration: ac/h Calculate...

Mechanical Ventilation

Ventilation: l/s/p + m³/s
 m³/s
 ac/h

Crossflow Ventilation

Flow 1 From: m³/s

Flow 2 From: m³/s

Flow 3 From: m³/s

OK Cancel

Heat loss calculations can also be performed on a building or zonal basis, the zoning of the rooms being undertaken by simply marking the room profile with the appropriate zone. These can be presented as either a tabular format or each room can be displayed individually taking into consideration internal gains, losses etc.

Room Losses

Room No.	Room Name	Total Loss W	Fabric Loss W	Infil + Vent W	Mean W/m ² K	W/m ²	W/m ²	Zone	Glaze %	Floor Area m ²
1	1 Male WC Gnd	138	91	47	0.00	6.04	2.20	1	0	22.9
2	2 Female WC Gnd	167	124	43	0.24	7.91	2.88	1	0	21.1
3	Office 1 1st	214	0	214	0.00	13.70	4.98	3	0	15.6
4	Office 2 1st	269	66	204	0.00	18.15	6.60	3	0	14.8
5	Office 3 1st	213	0	213	0.00	13.70	4.98	3	0	15.5
6	Server	231	9	222	0.21	14.27	5.19	3	0	16.2
7	7 Male WC 1st	10	-36	46	0.00	0.43	0.16	1	0	22.7
8	8 Female WC 1st	0	-43	43	0.00	0.00	0.00	1	0	21.2
9	Gnd Open Plan	13306	7400	5906	0.38	30.40	8.69	1	33	437.7
10	11 Male WC 2nd	246	-36	282	0.00	10.71	3.89	1	0	23.0
11	12 Female WC 2nd	250	-28	278	0.00	11.93	4.34	1	0	21.0
12	IT 2nd	507	84	423	0.33	20.56	7.48	1	14	24.7
13	Manager 2nd	387	72	315	0.37	21.08	7.67	1	18	18.4
14	MDir 2nd	799	147	652	0.37	21.02	7.64	1	18	38.0
15	2nd Open Plan	10985	4546	6439	0.58	22.92	6.55	1	41	479.3
16	1 duct	10	5	5	0.22	4.81	1.37	1	0	2.2
17	19 wc duct	21	13	7	0.21	6.69	1.91	1	0	3.1
18	21 wc duct2	13	6	7	0.21	4.36	1.24	1	0	3.1
19	Proposed office	2270	906	1364	0.27	20.31	7.39	1	15	111.8
20	Kitchen/Prep	1218	469	749	0.30	19.28	5.51	2	11	63.2
21	Refectory	15718	5674	10043	0.47	50.26	12.56	2	62	312.7

Details... Close



Room Losses

Room No.	Room Name	Total Loss W	Fabric Loss W	Infil + Vent W	Mean W/m ² K	W/m ²	W/m ²	Zone	Glaze %	Floor Area m ²
1	1 Male W/C Gnd	138	91	47	0.00	6.04	2.20	1	0	22.9
2	2 Female W/C Gnd	167	124	43	0.24	7.91	2.88	1	0	21.1
						13.70	4.98	3	0	15.6
						18.15	6.60	3	0	14.8
						13.70	4.98	3	0	15.5
						14.27	5.19	3	0	16.2
						0.43	0.16	1	0	22.7
						0.00	0.00	1	0	21.2
						30.40	8.69	1	33	437.7
						10.71	3.89	1	0	23.0
						11.93	4.34	1	0	21.0
						20.56	7.48	1	14	24.7
						21.08	7.67	1	18	18.4
						21.02	7.64	1	18	38.0
						22.92	6.55	1	41	479.3
						4.81	1.37	1	0	2.2
						6.69	1.91	1	0	3.1
						4.36	1.24	1	0	3.1
						20.31	7.39	1	15	111.8
						19.28	5.51	2	11	63.2
						50.26	12.56	2	62	312.7

Heatloss Breakdown for Room 9 Gnd Open Plan

Face No.	Element	Area m ²	U Value W/m ² K	Temperature Drop C	Fabric Loss Watts
4	50 Project Wall	6.65	0.21	24.0	34
5	50 Project Wall	3.90	0.21	24.0	19
6	6 Suncool/Optiwhite 50/27N Arg	5.28	1.1	24.0	139
6	6 Suncool/Optiwhite 50/27N Arg	5.28	1.1	24.0	139
6	50 Project Wall	0.96	0.21	24.0	5
7	50 Project Wall	4.33	0.21	24.0	22
8	50 Project Wall	11.36	0.21	24.0	57
9	5 13mm plaster, 100l/w block, 13 To: 2 Female W/C Gnd	13.29	1.05	2.0	28

Losses Summary

Exposed Loss	7450 W	Infiltration Loss	2480 W
F1 Correction	-189 W	F2 Correction	48 W
Internal Loss	138 W	Ventilation Loss	3378 W
Fabric Loss	7400 W	Infil / Vent Loss	5906 W
Total Loss		13306 W	

Individual space details

Part L checks on the efficiency of the building can be carried out to analyse whether the building considered will pass the Part L2B check calculation as well as looking at the CPR rating of offices etc. Any departures from Part L will be listed enabling the engineer to advise the client or rectify as necessary.

The program also incorporates the solar overheating calculation whether in accordance with CIBSE guide H or the Part L calculation. You can decide which methodology to use.

Part L2B Elemental Compliance Check

General | Controls | Lighting | Mechanical Ventilation | Air Conditioning | Report

General

Building Type: Office | Project Type: Refurbishment

Heating Plant Fuel (table 5): Natural Gas

Maximum Carbon Intensity of Heating System: a) 0.038 KgC/kW

Carbon Intensity at 30% of Maximum for Heating System: b) 0.03 KgC/kW

Are there any Mechanical Ventilation or Air Conditioning Systems serving more than 200 m²?

Roof Construction: Flat roof with integral insulation

Window/Door Frame Material: Timber

Insulation

Insulation to Ductwork to BS5422?

Insulation to HWS Pipework_Vessels to BS5422?

Insulation to Heating Pipework to BS5422? Is Heating Pipework used for Space Heating?

Sun Spaces

Are there any Sun Spaces? Are Sun Spaces separated from main building? Heating/cooling equipment?

On/Off temperature controls?

ACMV Selection

OK Cancel

The Cymap program also enables engineers involved in domestic and residential energy efficiency to undertake SAP2009 analysis based on the pre-determined building model.

SAP 2005 (9.81) Calculation

General | Dimensions | Ventilation | Construction | Primary Htg | Boiler | Water Htg | Secondary Htg | New Technology | Results

SAP Report Section	Description	Value	SAP Line
	Overall Dwelling Volume	629.4224	(6)
1	Ventilation Rate	0.5540	(25)
2	Heat Losses & HLP	1.3482	(38)
3	WH energy requirements	1,587.9510	(52)
4	Internal Gains	1,280.1582	(55)
5	Solar Gains	1,951.1435	(63)
6	Mean internal temperature	19.7505	(77)
8	Degree Days	1,842.2290	(80)
10	Total Energy Cost	309.9105	(97)
	SAP Rating	88.5981	
	SAP Band	B	
	Carbon Dioxide Emissions (Tonnes/m ²)	3.1000	(112)
	EI Value	86.6366	
	EI Band	B	
	SAP Fuel Cost	£309.9105	
	Primary Energy (kWh/m ² /year)	78.5010	(113)
	DER Rating	13.8093	
	TER Rating	20.5216	

Generating preview... Solar Overheating Save Calculate Reports... Close

Energy Performance Certificate

Action House

Drilling type: Detached house
 Date of assessment: 18 March 2010
 Date of certificate: 18 March 2010
 Reference number: 0000-0000-0000-0000
 Total floor area: 204 m²

The home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on full costs, and environmental impact based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating

Energy efficient - best buying costs	Current	Potential
Very energy efficient (A)	89	89
Energy efficient (B)		
Decent (C)		
Needs improvement (D)		
Needs more improvement (E)		
Very poor (F)		
Extremely poor (G)		

England & Wales

Environmental Impact (CO₂) Rating

Very environmentally friendly - lower CO ₂ emissions	Current	Potential
Very environmentally friendly (A)	87	87
Environmentally friendly (B)		
Decent (C)		
Needs improvement (D)		
Needs more improvement (E)		
Very poor (F)		
Extremely poor (G)		

England & Wales

Estimated energy use, carbon dioxide (CO₂) emissions and fuel costs of this home

	Current	Potential
Energy use	72 kWh/m ² per year	72 kWh/m ² per year
Carbon dioxide emissions	3.1 tonnes per year	3.1 tonnes per year
Lighting	£745 per year	£745 per year
Heating	£745 per year	£745 per year
Hot water	£101 per year	£101 per year

Based on standardised assumptions about occupancy, heating patterns and geographical location, the above table provides an indication of how much it will cost to provide lighting, heating and hot water to the home. The fuel costs only take into account the cost of fuel and not any associated service, maintenance or safety inspection. This certificate has been provided for comparative purposes only and enables one home to be compared with another. Always check the date the certificate was issued, because fuel prices can increase over time and energy saving recommendations will evolve.

To see how this home can achieve its potential rating please see the recommended measures.

Remember to look for the energy saving recommended logo when buying energy efficient products. It's a quick and easy way to identify the most energy efficient products on the market. For advice on how to take action and to find out about offers available to help make your home more energy efficient call 0800 61 2 812 or visit www.energy-saving-trust.org.uk/myhome

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SAP 2005 Worksheet Calculation for Proposed Dwelling

Calculation of Dwelling SAP rating

Cymap

Ashton House As Designed SAP 2005 Worksheet (Version 9.6)

Overall Energy Assessment

	Area (m ²)	As built (kWh)	As designed (kWh)	Value (kWh)
GROUND FLOOR				
Living Room	24.0	12.0	12.0	6.0
Dining Room	24.0	12.0	12.0	6.0
Kitchen	12.0	12.0	12.0	6.0
Living	12.0	12.0	12.0	6.0
Ground Ceiling	1.6	12.0	12.0	1.6
Stair	1.0	12.0	12.0	1.0
Party Wall	12.0	12.0	12.0	12.0
1ST FLOOR				
Living Room	24.0	12.0	12.0	6.0
Bedroom 1	12.0	12.0	12.0	6.0
Bedroom 2	12.0	12.0	12.0	6.0
Bedroom 3	12.0	12.0	12.0	6.0
Bedroom 4	12.0	12.0	12.0	6.0
Bedroom 5	12.0	12.0	12.0	6.0
Bedroom 6	12.0	12.0	12.0	6.0
Bedroom 7	12.0	12.0	12.0	6.0
Bedroom 8	12.0	12.0	12.0	6.0
Bedroom 9	12.0	12.0	12.0	6.0
Bedroom 10	12.0	12.0	12.0	6.0
Bedroom 11	12.0	12.0	12.0	6.0
Bedroom 12	12.0	12.0	12.0	6.0
Bedroom 13	12.0	12.0	12.0	6.0
Bedroom 14	12.0	12.0	12.0	6.0
Bedroom 15	12.0	12.0	12.0	6.0
Bedroom 16	12.0	12.0	12.0	6.0
Bedroom 17	12.0	12.0	12.0	6.0
Bedroom 18	12.0	12.0	12.0	6.0
Bedroom 19	12.0	12.0	12.0	6.0
Bedroom 20	12.0	12.0	12.0	6.0
Bedroom 21	12.0	12.0	12.0	6.0
Bedroom 22	12.0	12.0	12.0	6.0
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Bedroom 25	12.0	12.0	12.0	6.0
Bedroom 26	12.0	12.0	12.0	6.0
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Bedroom 28	12.0	12.0	12.0	6.0
Bedroom 29	12.0	12.0	12.0	6.0
Bedroom 30	12.0	12.0	12.0	6.0
Bedroom 31	12.0	12.0	12.0	6.0
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Bedroom 36	12.0	12.0	12.0	6.0
Bedroom 37	12.0	12.0	12.0	6.0
Bedroom 38	12.0	12.0	12.0	6.0
Bedroom 39	12.0	12.0	12.0	6.0
Bedroom 40	12.0	12.0	12.0	6.0
Bedroom 41	12.0	12.0	12.0	6.0
Bedroom 42	12.0	12.0	12.0	6.0
Bedroom 43	12.0	12.0	12.0	6.0
Bedroom 44	12.0	12.0	12.0	6.0
Bedroom 45	12.0	12.0	12.0	6.0
Bedroom 46	12.0	12.0	12.0	6.0
Bedroom 47	12.0	12.0	12.0	6.0
Bedroom 48	12.0	12.0	12.0	6.0
Bedroom 49	12.0	12.0	12.0	6.0
Bedroom 50	12.0	12.0	12.0	6.0
Bedroom 51	12.0	12.0	12.0	6.0
Bedroom 52	12.0	12.0	12.0	6.0
Bedroom 53	12.0	12.0	12.0	6.0
Bedroom 54	12.0	12.0	12.0	6.0
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Bedroom 57	12.0	12.0	12.0	6.0
Bedroom 58	12.0	12.0	12.0	6.0
Bedroom 59	12.0	12.0	12.0	6.0
Bedroom 60	12.0	12.0	12.0	6.0
Bedroom 61	12.0	12.0	12.0	6.0
Bedroom 62	12.0	12.0	12.0	6.0
Bedroom 63	12.0	12.0	12.0	6.0
Bedroom 64	12.0	12.0	12.0	6.0
Bedroom 65	12.0	12.0	12.0	6.0
Bedroom 66	12.0	12.0	12.0	6.0
Bedroom 67	12.0	12.0	12.0	6.0
Bedroom 68	12.0	12.0	12.0	6.0
Bedroom 69	12.0	12.0	12.0	6.0
Bedroom 70	12.0	12.0	12.0	6.0
Bedroom 71	12.0	12.0	12.0	6.0
Bedroom 72	12.0	12.0	12.0	6.0
Bedroom 73	12.0	12.0	12.0	6.0
Bedroom 74	12.0	12.0	12.0	6.0
Bedroom 75	12.0	12.0	12.0	6.0
Bedroom 76	12.0	12.0	12.0	6.0
Bedroom 77	12.0	12.0	12.0	6.0
Bedroom 78	12.0	12.0	12.0	6.0
Bedroom 79	12.0	12.0	12.0	6.0
Bedroom 80	12.0	12.0	12.0	6.0
Bedroom 81	12.0	12.0	12.0	6.0
Bedroom 82	12.0	12.0	12.0	6.0
Bedroom 83	12.0	12.0	12.0	6.0
Bedroom 84	12.0	12.0	12.0	6.0
Bedroom 85	12.0	12.0	12.0	6.0
Bedroom 86	12.0	12.0	12.0	6.0
Bedroom 87	12.0	12.0	12.0	6.0
Bedroom 88	12.0	12.0	12.0	6.0
Bedroom 89	12.0	12.0	12.0	6.0
Bedroom 90	12.0	12.0	12.0	6.0
Bedroom 91	12.0	12.0	12.0	6.0
Bedroom 92	12.0	12.0	12.0	6.0
Bedroom 93	12.0	12.0	12.0	6.0
Bedroom 94	12.0	12.0	12.0	6.0
Bedroom 95	12.0	12.0	12.0	6.0
Bedroom 96	12.0	12.0	12.0	6.0
Bedroom 97	12.0	12.0	12.0	6.0
Bedroom 98	12.0	12.0	12.0	6.0
Bedroom 99	12.0	12.0	12.0	6.0
Bedroom 100	12.0	12.0	12.0	6.0

Technical Data

Number of bedrooms: 40 = 40 * 0.02 = 0.80 (1)

Number of ground floors: 20 = 20 * 0.02 = 0.40 (2)

Number of intermediate floors and ground floors: 10 = 10 * 0.02 = 0.20 (3)

Number of ground floor flats: 40 = 40 * 0.02 = 0.80 (4)

Indication due to electricity, gas and coal: (1) + (2) + (3) + (4) = 1.60 / 0.80 = 2.00 (5)

If a proportion can be determined, use the (1) to (4) = 0.80 (6)

Number of flats: 40 = 40 * 0.02 = 0.80 (7)

Additional indicator: 0.20 for flat or duplex form or 0.20 for average or minimum = 0.20 (8)

Unweighted indicator sum: 0.80 + 0.20 = 1.00 (9)

Indicator weightable area 0.02, also area 0 = 0.00 (10)

Percentage of windows and doors (unweighted) = 100 (11)

Area 100 in the (11) for new dwellings and in energy use Building Regulation = 0.20 * 0.20 = 0.04 (12)

Indicator rate: (10) + (12) = 0.80 + 0.04 = 0.84 (13)

Indicator on possibility indicator (100 / 100) = (10) in term (13), indicator (13) = 0.84 (14)

Weighted design g10 = 7.00 (15)

At present the value after a proportion can be determined a design weightable g10 and = 1.00 (16)

Number of flats in this category = 1.00 (17)

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The program also has an accredited interface with the Governments latest SBEM program which entails transferring building geometric and constructional data information into the freely downloadable industry standard iSBEM interface. This enables production of EPCs to the various standards and jurisdictions involved as set by the various legislative bodies in the UK.

SBEM Main Calculation Output Document

Fri Mar 12 15:51:21 2010

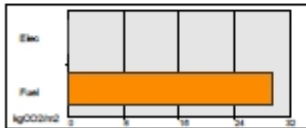
Building name

Cadline HQ

Building type: Office

SBEM is an energy calculation tool for the purpose of assessing and demonstrating compliance with Building Regulations (Part L for England and Wales, Section 6 for Scotland, Part F for Northern Ireland, Part L for Republic of Ireland and Building Bye-laws Jersey Part 11) and to produce Energy Performance Certificates and Building Energy Ratings. Although the data produced by the tool may be of use in the design process, **SBEM is not intended as a building design tool.**

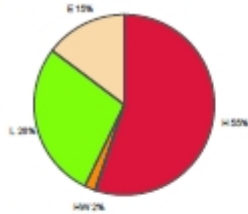
Building Energy Performance and CO2 emissions



0 kgCO2/m2 displaced by the use of renewable sources.
Building area is 2517.49m2

Annual Energy Consumption

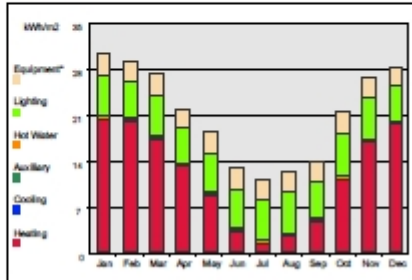
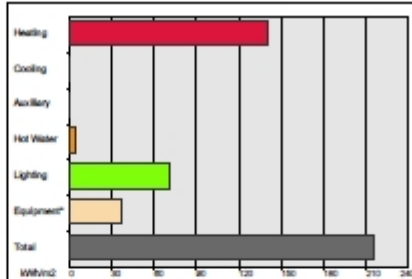
(Pie chart including Equipment end-use)



(Pie chart excluding Equipment end-use)



(*) Although energy consumption by equipment is shown in the graphs, the CO2 emissions associated with this end-use have not been taken into account when producing the rating.



Energy consumption of buildings can also be undertaken to calculate the cooling, heating, lighting and equipment costs based on plant efficiencies, building and plant operating times as well as diversity of occupation.

