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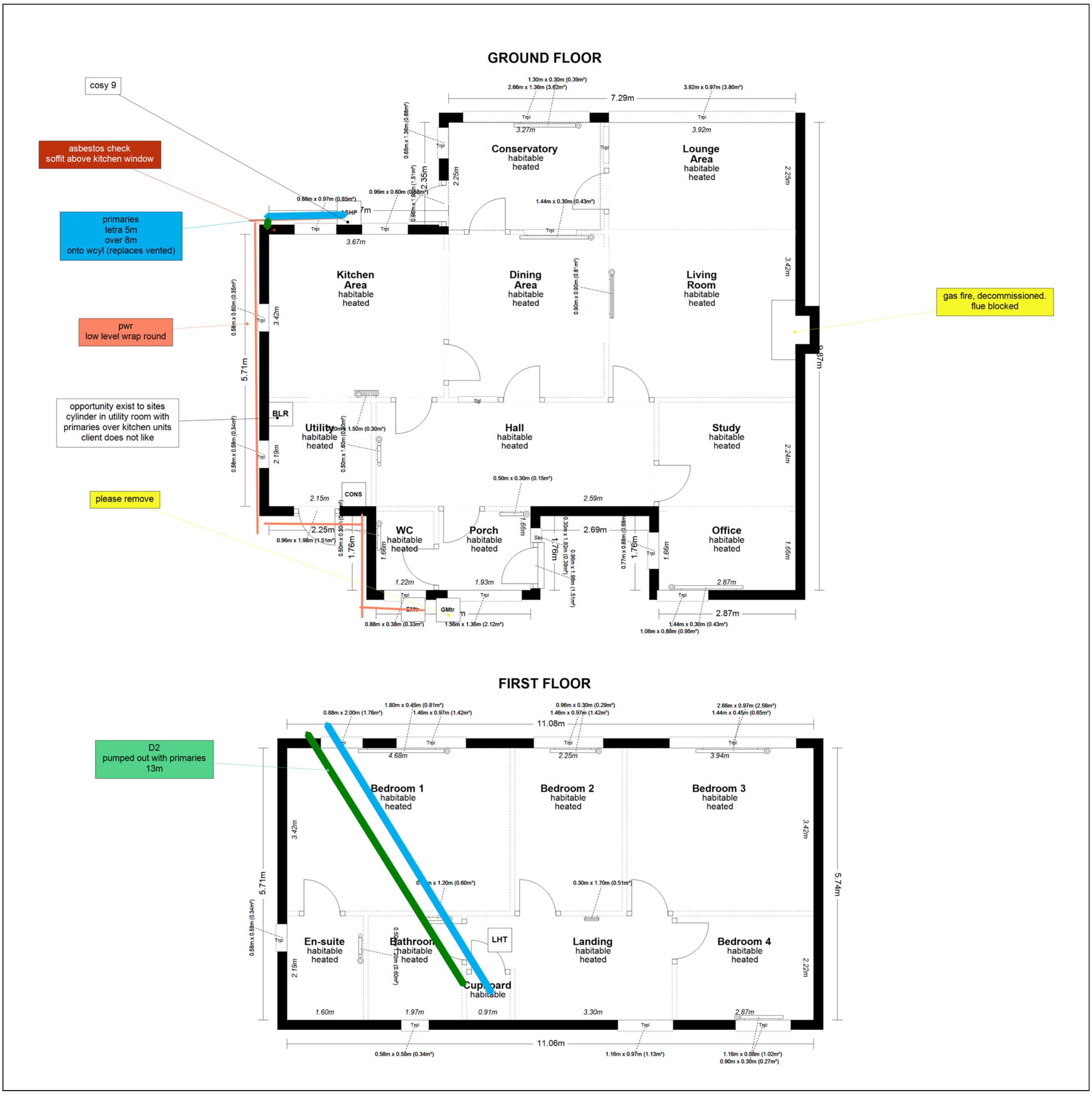
Total Radiator Output 8805
Design Flow Temperature 50
Design Outside Temperature -3.4

Room Description	No. of Radiators	Design Temperature (°C)	Room Heat Loss (Watts)	Current Radiator		Proposed Radiator				
				Description	Output at Design (Watts)	Description	Output at Design (Watts)	Final Room Output	New Total Room Output (all rads)	Coverage
Bathroom	1	22	455	TOWEL_RAIL H1200 x L500	230	White Towel Rail 1807H x 600W	406	406	406	89
Bedroom 1	1	18	597	K1 H450 x L1800	695	-	-	695	695	116
Bedroom 2	1	18	245	P1 H300 x L960	182	* CENTER 30SC120 2235BTU	330	330	330	135
Bedroom 3	1	18	507	K1 H450 x L1440	556	-	-	556	556	110
Bedroom 4	1	18	265	P1 H300 x L900	171	* CENTER 45SC90 2426BTU	357	357	357	135
Conservatory	1	16	847	K1 H300 x L1300	366	* CENTER 30DC160 5248BTU	839	839	839	99
Dining Area	1	21	551	P1 H300 x L1440	238	* CENTER 60DC120 6998BTU	878	878	878	159
En-suite	1	21	284	TOWEL_RAIL H1200 x L500	242	White Towel Rail 1807H x 500W	363	363	363	128
Hall	1	18	523	TOWEL_RAIL H1600 x L500	371	* CENTER 60DX80 3658BTU	533	533	533	102
Kitchen Area	1	18	661	COLUMN_3 H1500 x L200	325	K2 Vert 1800H x 600W	1177	1177	1177	178
Landing	1	18	464	DESIGNER H1700 x L300	0	* CENTER 75DX60 3289BTU	477	477	477	103
Living Room	0	21	591	DESIGNER H900 x L900	0	-	-	0	0	0
Lounge Area	1	21	658	-	-	* CENTER 45DC140 6435BTU	814	814	814	124
Office	1	21	379	P1 H300 x L1440	238	* CENTER 45DC140 6435BTU	814	814	814	215
Porch	1	18	363	K1 H300 x L500	129	* CENTER 75SC60 2518BTU	368	368	368	101
WC	1	18	182	K1 H300 x L500	129	* CENTER 45SC50 1348BTU	198	198	198	109

Appendix 2 - Floor Plan



Heat Pump System Performance Estimate

Energy Performance Certificate (EPC) Information

Does this estimate relate to a new build or proposal for extension or reduction in size of an existing building?	No
EPC No. for building	0000-0000-0000-0000
Energy required to heat property	10000 kWh
Energy required for hot water	2000 kWh

New Renewable System Information

Type of System [1]	Air Source Heat Pump
Manufacturer Name	Octopus Energy
Manufacturer Model	Octopus Energy Cosy 9kW Heat Pump (0101200001100)
MCS Certification Number [2]	MCS HP0255/04
Flow Temperature [3]	50
MCS SCOP Heating [4]	3.61
MCS SCOP Hot Water [5]	2.9155
Renewable System Provides	Heating and Hot Water
Hot Water Immersion Use [6]	Once per week
Size of Hot Water Cylinder	250 Ltr

Existing System

Existing heating system fuel [7]	Gas
Hot Water heated by [7]	Gas
Age of existing system	Post 2007
Efficiency of existing system	92%

1 This calculator is not designed to be used for Solar Assisted Heat Pumps
2 Available from the MCS Product Directory
3 Determined by the temp. of the water leaving the HP when supplying space heating at the external design temp.
4 SCoP - Seasonal Coefficient of Performance. This value is based on the MCS HP SCoP Table below
5 If providing space heating and DHW then default value from SAP2012. If DHW only see methodology in MIS3005
6 based on 50C up to 60C, 3kW
7 If new build model the most likely alternative fuel

Estimated System Performance / Comparison

Energy Requirement for the building

	Heatin g	Hot Water	Total	

Net Energy required to heat property	10000	2000	12000	kWh
Existing System Consumption	10869	2173	13043	kWh

New HP System Estimated Consumption

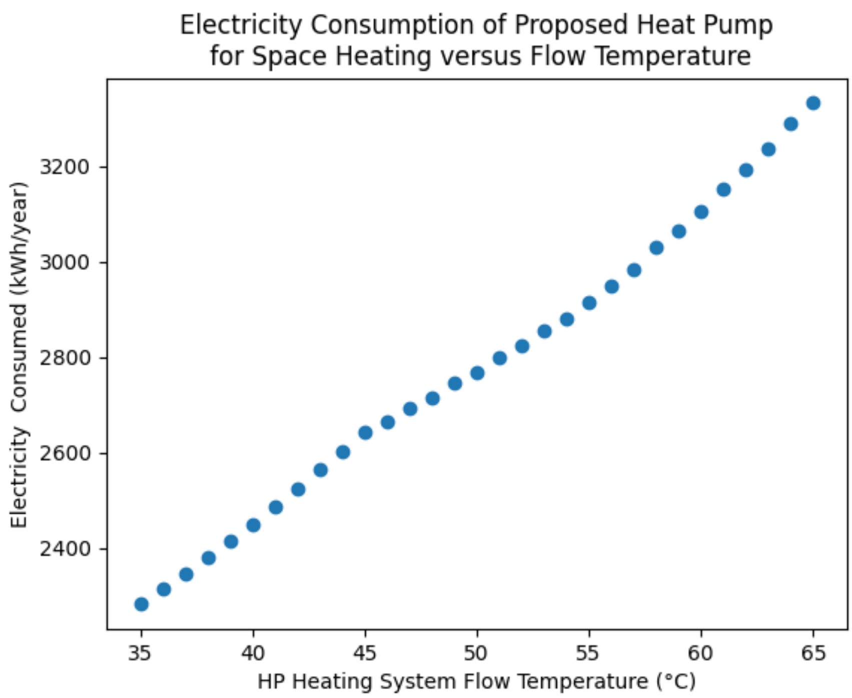
Full Heat Pump System (if selected above)

HP System Electricity Consumption	2771	837	3608	kWh

Hybrid System (if selected above)

HP System Electricity Consumption	0	0	0	kWh
Hybrid system other consumption	0	0	0	kWh
Hybrid Total Consumption	0	0	0	kWh

Note: There are different types of hybrid system. This calculation presumes a hybrid where both sources of heat supply the same hydraulic circuits (heating and hot water) according to the proportion selected above.



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Flow °C	ScOP
35	4.38
36	4.32
37	4.26
38	4.2
39	4.14
40	4.08
41	4.02
42	3.96
43	3.9
44	3.84
45	3.78
46	3.75
47	3.71
48	3.68
49	3.64
50	3.61
51	3.57
52	3.54
53	3.5
54	3.47
55	3.43
56	3.39
57	3.35
58	3.3
59	3.26
60	3.22
61	3.17
62	3.13
63	3.09
64	3.04
65	3.0

SCoP Definition

SCoP = Seasonal Coefficient of Performance:

MCS SCoP is a theoretical indication of the anticipated efficiency of a heat pump aggregated over a year using standard climate data across Europe. It indicates the units of total heat energy generated (output) for each unit of energy (electricity) consumed (input). It is slightly different to ErP SCoP as it contains efficiency losses due to controls and brine pumps (for a GSHP). As a guide a heat pump with an MCS SCoP of 3 generates 3 kWh of heat energy for every 1 kWh of electrical energy it consumes.

Important Information:

This performance estimate should be accomanied by the Key Facts which explain the factors that can affect the performance of a heat pump. Any technical variation to the specification could affect the performance of the Heat Pump System in which case the MCS Contractor MUST update and re-issue this document and advise the customer of their Consumer Rights.

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Key Facts

Predicting the heat demand of a building, and therefore the performance and running costs of heating systems, is difficult to predict with certainty due to the variables discussed here. These variables apply to all types of heating systems, although the efficiency of heat pumps is more sensitive to good system design and installation.

For these reasons your estimate is given as guidance only and should not be considered as a guarantee.

Seasonal Coefficient of Performance

MCS Seasonal Coefficient of Performance (SCoP) is derived from the EU ErP labelling requirements, and is a theoretical indication of the anticipated efficiency of a heat pump over a whole year using standard (i.e. not local) climate data for 3 locations in Europe. It is used to compare the relative performance of heat pumps under fixed conditions and indicates the units of total heat energy generated (output) for each unit of electricity consumed (input). As a guide, a heat pump with a MCS SCoP of 3 indicates that 3 kWh of heat energy would be generated for every 1 kWh of electrical energy it consumes over a 'standard' annual cycle.

Energy Performance Certificate

An Energy Performance Certificate (EPC) is produced in accordance with a methodology approved by the government. As with all such calculations, it relies on the accuracy of the information input. Some of this information, such as the insulating and air tightness properties of the building may have to be assumed and this can affect the final figures significantly leading to uncertainty especially with irregular or unusual buildings.

Identifying the uncertainties of energy predictions for heating systems

We have identified 3 key types of factor that can affect how much energy a heating system will consume and how much energy it will deliver into a home. These are 'Fixed', 'Variable' and 'Random'. Most factors are common to ALL heating systems regardless of the type (e.g oil, gas, solid fuel, heat pump etc.) although the degree of effect varies between different types of heating system as given in the following table.

The combined effect of these factors on energy consumption and the running costs makes overall predictions difficult however an accuracy + 25-30% would not be unreasonable in many instances. Under some conditions even this could be exceeded (e.g. considerable opening of windows). Therefore, it is advised that when making choices based on mainly financial criteria (e.g. payback based on capital cost verses net benefits such as fuel savings and financial incentives) this variability is taken into account as it could extend paybacks well beyond the period of any incentives received, intended occupancy period, finance agreement period etc.

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Factor	Impact
Fixed which includes:	
Equipment Selection Performance figures (SCoP) from ErP data	System Efficiency
Energy Assessment via the EPC (e.g. assumptions as to fabric construction and levels of insulation; the variation in knowledge and experience of Energy Assessors)	Energy Required
Variable which are affected by the system design and include:	
Accuracy of sizing of heat pump- i.e. closeness of unit output selection (kW) to demand heat requirement (kW)	System Efficiency
Design space and ambient (external) temperatures	Energy Required
Design flow /return water temperatures, and weather compensation	System Efficiency
Type of Heat emitter (e.g. Under-floor; natural convector (e.g. 'radiator'), fan convector etc.)	System Efficiency
Random which cannot be anticipated and include:	
User behaviour:	
• Room temperature settings	Energy Required
• Hot water usage and temperature settings	Energy Required
• Occupancy patterns/times	Energy Required
• Changing the design HP flow temperatures	System Efficiency
• Ventilation (i.e. opening windows)	Energy Required
Annual climatic variations (i.e. warmer and colder years than average)	Energy Required

Key

The statement at the end of each item indicates the major factor affected as follows:

Energy Required:	The heat energy output requirement of the system which directly impacts on running costs. This requirement exists regardless of the heating system chosen as it is the heat required to keep the space comfortable. Opening windows or increasing room temperatures will demand more heat output, which means more energy input but this would NOT directly affect the efficiency. Thus increased energy demand does NOT automatically mean reduced efficiency.

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System Efficiency:	The efficiency of the system has been directly affected and will therefore demand more input energy to achieve the same heat output thus increasing running costs. However, increased energy input does NOT necessarily mean lower system efficiency (see above).