MCS

Heat Pump System Performance Estimate

Installer Project Reference	Project 4.1
Client Name	Mr S Sample
Installation Address Line 1	Samle Road
Installation Address Line 2	
Installation Address Line 3	
Installation Address Line 4	
Installation Address Line 5	Smaple Town
Installation Postcode	DE11 $GF

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 8007 | 2584 | 2739 | 4527 | 0163

Energy required to heat property 3,010 kWh

Energy required for hot water 1,464 kWh

**If no EPC available, use figures from Heat Loss Summary*

New Renewable System Information

Type of System* Air Source Heat Pump — **This calculator is not designed to be used for Solar Assisted Heat Pumps*

Manufacturer Name Daikin EJHA04AAV3 Hybrid Monobloc 4.0kW

Manufacturer Model Daikin EJHA04AAV3 Hybrid Monobloc 4.0kW

MCS Certification Number* MCS HP0006/316 — **Available from the MCS Product Directory*

Flow Temperature* **50** °C — ** Determined by the temp. of the water leaving the HP when supplying space heating at the external design temp.*

MCS SCOP Heating* 3.02 — ** SCoP - Seasonal Coefficient of Performance. This value is based on the MCS HP SCoP Table below*

MCS SCOP Hot Water* 1.75 — ** If providing space heating and DHW then default value from SAP2012. If DHW only see methodology in MIS3005*

Renewable System Provides Heating and Hot Water

Hot Water Immersion Use* Once per week — ** based on 50C up to 60C, 3kW*

Size of Hot Water Cylinder 135 ltr

Existing Heating System

Existing heating system fuel* Gas — * If new build model the most likely alternative fuel

Hot Water heated by* Gas — * If new build model the most likely alternative fuel

Age of existing system Post-2007

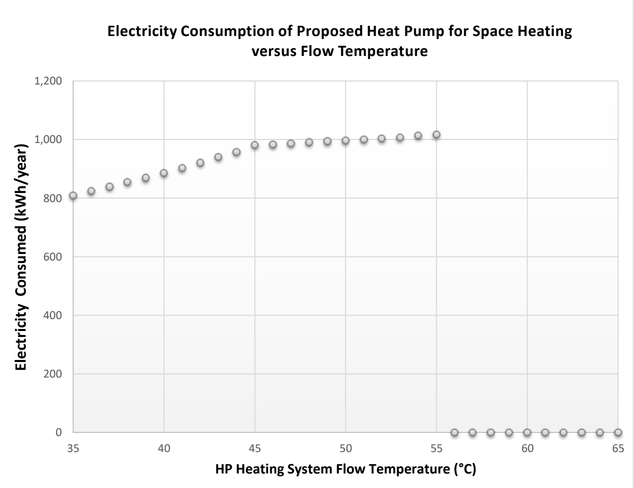
Efficiency of existing system 92 %

Estimated System Performance / Comparison

Energy Requirement for the building

	Heating	Hot water	Total	
Net Energy required to heat property	3,010	1,464	4,474	kWh
Existing System Consumption	3,272	1,768	5,040	kWh
New HP System Estimated Consumption				
Full Heat Pump System (if selected above)				
HP System Electricity Consumption	**997**	**918**	**1,915**	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	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.



Flow temperature	SCOP
35°C	3.72
36°C	3.65
37°C	3.59
38°C	3.52
39°C	3.46
40°C	3.4
41°C	3.33
42°C	3.27
43°C	3.2
44°C	3.14
45°C	3.07
46°C	3.06
47°C	3.05
48°C	3.04
49°C	3.03
50°C	3.02
51°C	3.01
52°C	3
53°C	2.99
54°C	2.97
55°C	2.96
56°C	0
57°C	0
58°C	0
59°C	0
60°C	0
61°C	0
62°C	0
63°C	0
64°C	0
65°C	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 efficency losses due to controls and brine pumps (for a GSHP). As a guide a heat pump with a MCS SCoP of 3 generates 3 kWh of heat energy for every 1 kWh of electrical energy it consumes.

This also means that 2/3rds of the heat output could be eligible for RHI payments. MCS SCoP is based on stringent factory based tests for equipment but does not specifically include the energy consumption of heating circulating pump(s) nor does it model the transient conditions typically experienced in practice in the consumers home and hence the overall final system efficiency is likely to be different from the MCS SCoP.

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.

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.

<u>Seasonal Coefficient of Performance:</u>
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.

<u>Energy Performance Certificate</u>
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.

<u>Identifying the uncertainties of energy predictions for heating systems</u>
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.

Factor	Impact
'Fixed' which include:	
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.

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).