
	Design of a heat pump heating system with Aquarea Designer	
	Project: test1	Date: 12.08.2022
Created by:	?, (no data provided), (no data provided) Phone: (no data provided) Email: (no data provided)	

Hausdaten

Address	Test22 rue XY Birmingham
Location	Birmingham (GB) (from database)
Building area	100 m ²
Standard heating requirement	6.0 kW
Cooling	-- kW
Internal gains	3000 kWh/year
Solar gains (windows)	1800 kWh/year
Indoor design temperature	20 °C
Outdoor temp. limit for heating 'on'	15 °C
Heat distribution	Underfloor heating by 100 % Radiator heating by -- % Wall heating by -- %
Max. flow water temperature	35 °C
Max. return water temperature	28 °C
Solar collector area	-- m ²

Service hot water

Type of service	Hot water with heat pump
Tank volume	300 litre
Average daily need	200 litre
Cold water inlet temperature	10 °C
Target tank temperature	50 °C
Exchange losses	5 K

Electrical auxiliary heating necessary	no
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Rate data

Description	UK default_ (from database)	
Shut off times total	0.0 h/day	
Weekends with shut off times	yes	
Daytime rate of heat pump	Time for daytime rate 5 - 19 o'clock	16.0 Ct/kWh
Nighttime rate of heat pump	Time for nighttime rate 19 - 5 o'clock	16.0 Ct/kWh
Heat circulation pump(s)	like heat pump: yes	-- Ct/kWh
Heating element for monoenergetic operation	like heat pump: yes	-- Ct/kWh
Heating element for post heating of hot water	like heat pump: yes	-- Ct/kWh

Climatic data

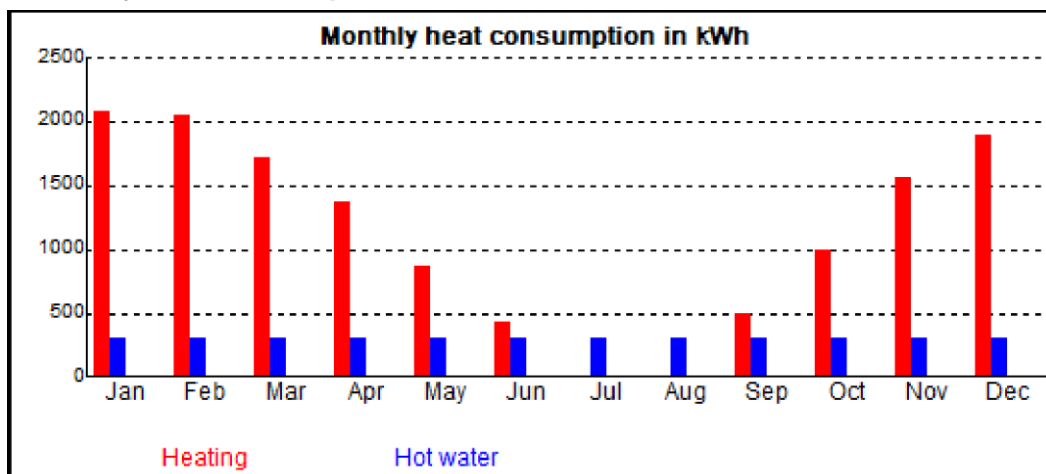
Climatic location	Birmingham (GB) (from database)			
Monthly average temperatures in °C				
	Jan	3.4	Jul	16.0
	Feb	3.6	Aug	15.9
	Mar	5.7	Sep	13.7
	Apr	8.0	Okt	10.4
	May	11.2	Nov	6.7
	Jun	14.1	Dec	4.6

Used Panasonic heat pump

Description	WH-SDC07H3E5
Sanitary tank	Fresh water station
Heat pump type	air / water
Wattage at 2/35	heat: 6.9 kW, electric: 2.0 kW
Recommended flow-through of air	2760.0 m ³ /h
Max. flow temperature	55 °C
Mode of operation	monoenergetic (parallel)
Design/Bivalent temperature	-4 °C
Number of heat pumps used	1
Wattage of fan (included in heat pump performance data: yes)	60 W
Wattage of heat circulation pump(s)	60 W

Calculation results

Monthly heat consumption



Total heat consumption

Heat consumption supplied	Space heating	Service hot water	Cooling
by heat pump	13498 kWh	3765 kWh	-- kWh
by second heat source	0 kWh	2 kWh	

Power consumption

by heat pump	
for space heating	3957 kWh/year
for cooling	-- kWh/year
for service hot water	1231 kWh/year
By Heating elements (additional power for non-monovalent mode of operation)	
for space heating	0 kWh/year
for service hot water	2 kWh/year
By auxiliary components	
Fan (included in heat pump performance data: yes)	152 kWh/year
Heat circulation pump(s)	317 kWh/year

Operating time of heat pump

for space heating	1980 h/year
for cooling	-- h/year
for service hot water	555 h/year

Heat withdrawal from heat source**Annual energy costs****Caused by heat producers**

Heat pump	880 €
Heating elements	0 €

Caused by heat consumers

Space heating	634 €
Cooling	0 €
Service hot water	196 €
Heat circulation pump(s)	50 €

Total

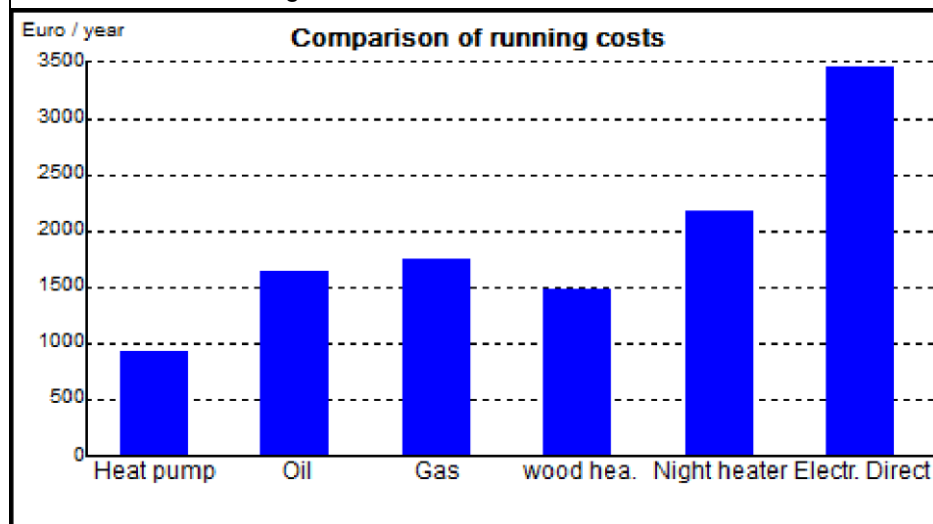
	880 €
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Annual C.O.P.

3.3	(auxiliary power included: Heating elements)
--	(with cooling)

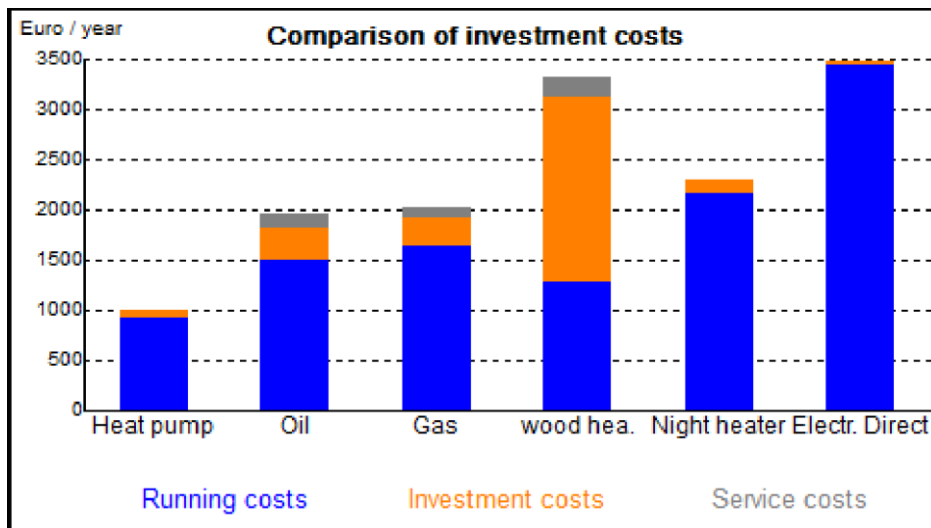
Operational costs

Type of heating	Price in Ct/kWh	Efficiency [%]	Additional costs in €/year	Total costs in €/year
Heat pump			50	930
Oil	6.5	85	265	1648
Gas	7.0	90	350	1755
Electric night storage heater	12.0	100	100	2171
Electric heating element	20.0	100	0	3452
wood heating	5.0	80	343	1485

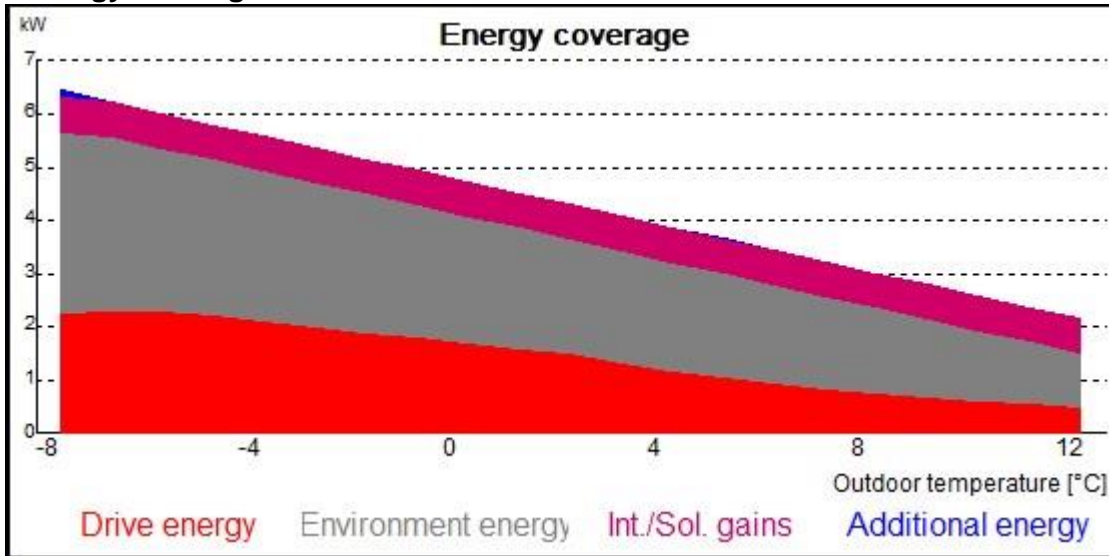


Investment costs

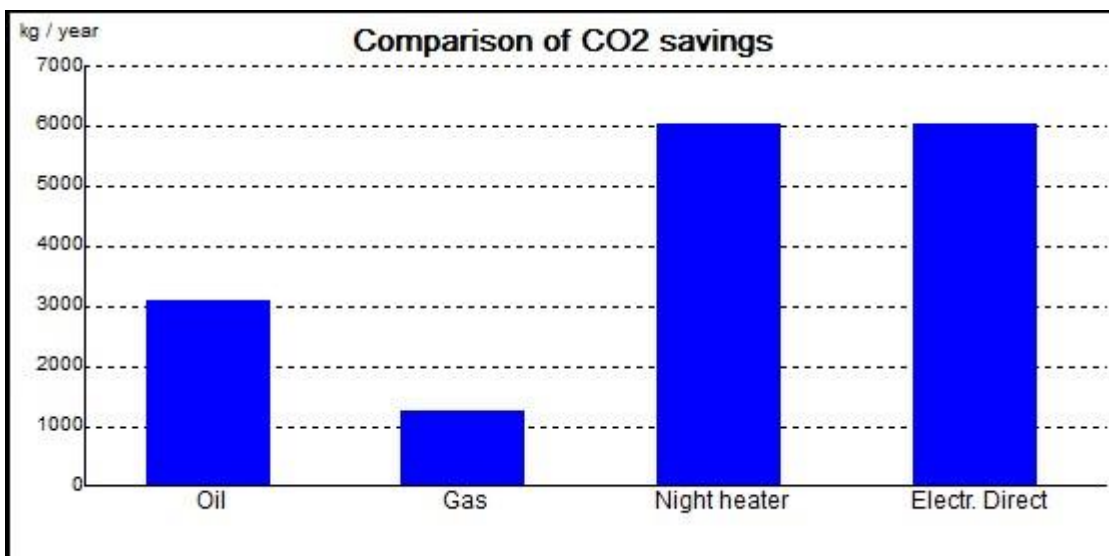
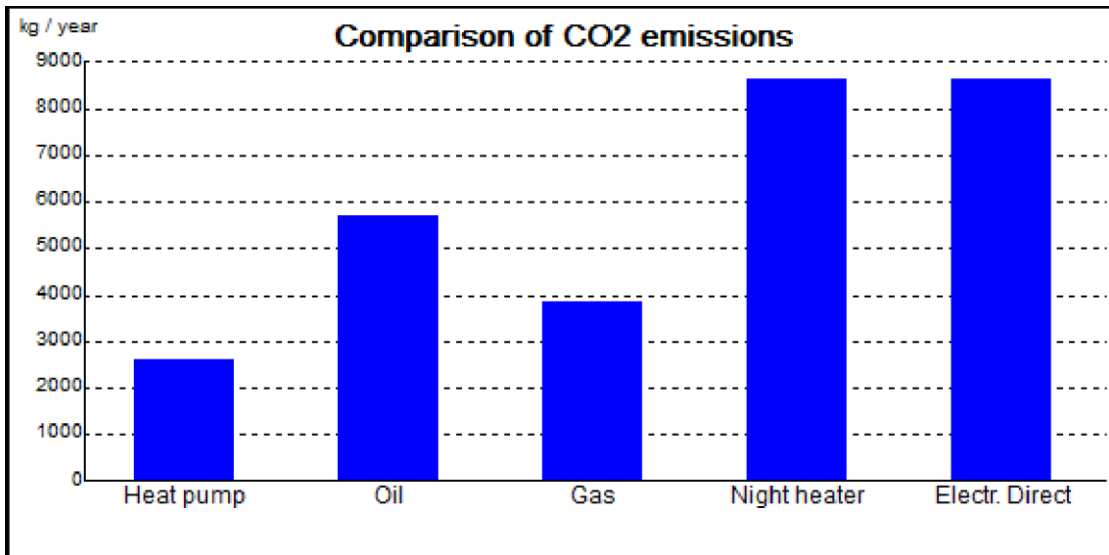
Reference period: 20 years				
Rate of interest: 6.0 %				
Type of heating	Sum of investment costs in €	Operational costs in €/year	Investment costs in €/year	Total costs in €/year
Heat pump	1000	930	87	1017
Oil	4000	1648	319	1967
Gas	3700	1755	276	2031
Electric night storage heater	1500	2171	130	2301
Electric heating element	500	3452	43	3495
wood heating	21500	1485	1845	3330



Energy coverage



Comparison of CO₂-Emissions



This calculation is based on user values and valid for normal meteorological conditions. The correct adjustment of the heat pump heating system is assumed. This calculation cannot guarantee that the calculated values are fulfilled in practical operation.