


Heat pumps in renovation





Turning a family home into an energy-neutral home with Panasonic air-to-water
Detached house in The Netherlands - May 2019



House Background

Detached family house: 4 people 
Location: Oudemirdum - The Netherlands
Surface: 140m²



Power Source	Heating Generation	Heating demand
Natural Gas 	Gas boiler 25 kW 	 Underfloor heating  DHW
2200 m ³ /year 22900 kW/h Year	COP <0,9	20600 kW/h Year



90%
of house energy



Energy

- ✓ Energy Neutral Home
- ✓ Green Energy
- ✓ Minimise running cost
- ✓ Savings

Fears?

- ✓ Temperature comfort
- ✓ Quietness

Peace of mind

- ✓ Easy control
- ✓ Transparency
- ✓ Remote Maintenance
- ✓ Future upgrades
(cooling?)

Reduce the energy for heating keeping same comfort
Use renewable energy as much as possible



Combining PV Panels with Air to Water Heat Pump



Solar energy

New PV installation + Inverter
24 PV Panasonic HIT KURO 325WP
Installed capacity: 7,8kW
Expected production: 7568 kWh / year



Air energy

Heat Pump to replace 25kW Gas Boiler
Building requires: 9kW Heat Pump at
Design Temperature -9°C



25kW



9kW

Heat Pump
Flexibility in design



Air to Water Heat Pump

Panasonic Aquarea TCAP 9kW All in One

AQUAREA



TCAP Outdoor: WH-UQ09HE8

Dual pipe technology

Operation down to -28°C

Nominal capacity down to -20°C



All in One Indoor: WH-ADC0916H9E8

Inox Steel tank 185L with efficiency insulation U-Vacua

Includes CZ-TAW1 adapter for wifi or wired LAN

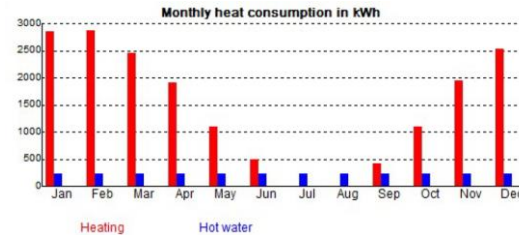
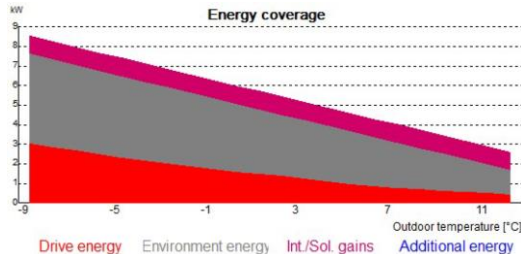
Smart Grid Ready

Piping connections at bottom



- ✓ Not need heater as the capacity is maintained.
- ✓ Capacity is stable even at -15 °C (not defrost)
- ✓ No need to oversize the Heat Pump.

- ✓ High efficiency DHW
- ✓ Remote maintenance possible
- ✓ Can use PV free power



Result - Efficient heating

Energy reduction

- ✓ Annual COP **5,06** for heating
- ✓ Annual COP **4,72** including DHW

Annual COP and energy kWh/y	HEAT PUMP			Heating demand	GAS BOILER		
	Annual COP	Power input	Green Energy		Wasted energy	Power input	COP
Space Heating	5,06	3501 +	14230	17731	-1970 +	19701	0,9
DHW	3,34	880 +	2062	2942	-327 +	3269	0,9
TOTAL	4,72	4381 +	16292	20673	-2297 +	22970	0,9

Power input reduced -18589 kWh/y

-81%



Result - Bill reduction

Energy Bill reduction

- ✓ Lower energy cost 936€/y in case HP uses full energy from the grid

	HEAT PUMP				GAS BOILER		
Annual COP and energy kW	COP	Power input	Green Energy	Heating demand	Wasted energy	Power input	COP
TOTAL	4,72	4381	+ 16292	≡ 20673	-2297	+ 22970	0,9
Yearly Power cost	1026€				1962€		



PV production can cover more than total electrical power needed

- ✓ Expected PV production: 7568 kWh / year
- ✓ Heat Pump power input + Other house covered

Heat Pump Power input		Other house power input		Total house power needs		Expected PV Production
4381 kWh/y	+	2200 kWh/y	=	6581 kWh/y	<	7568 kWh/y

Energy neutrality



Panasonic

heating & cooling solutions