



# SustainableEnergy

Ecodan<sup>®</sup> air source heat pumps

*e.on*

## E.ON and Sustainable Energy

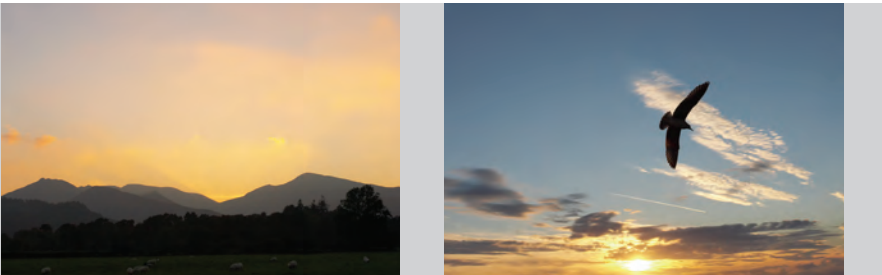


**Sustainable Energy is the low carbon, decentralised energy expert within E.ON. We have the capabilities that only come from being part of a major energy company. We are leaders in providing energy from sustainable sources and technologies - from small microgeneration systems to large, decentralised and Energy Service Company (ESCo) funded, community-based energy centres.**

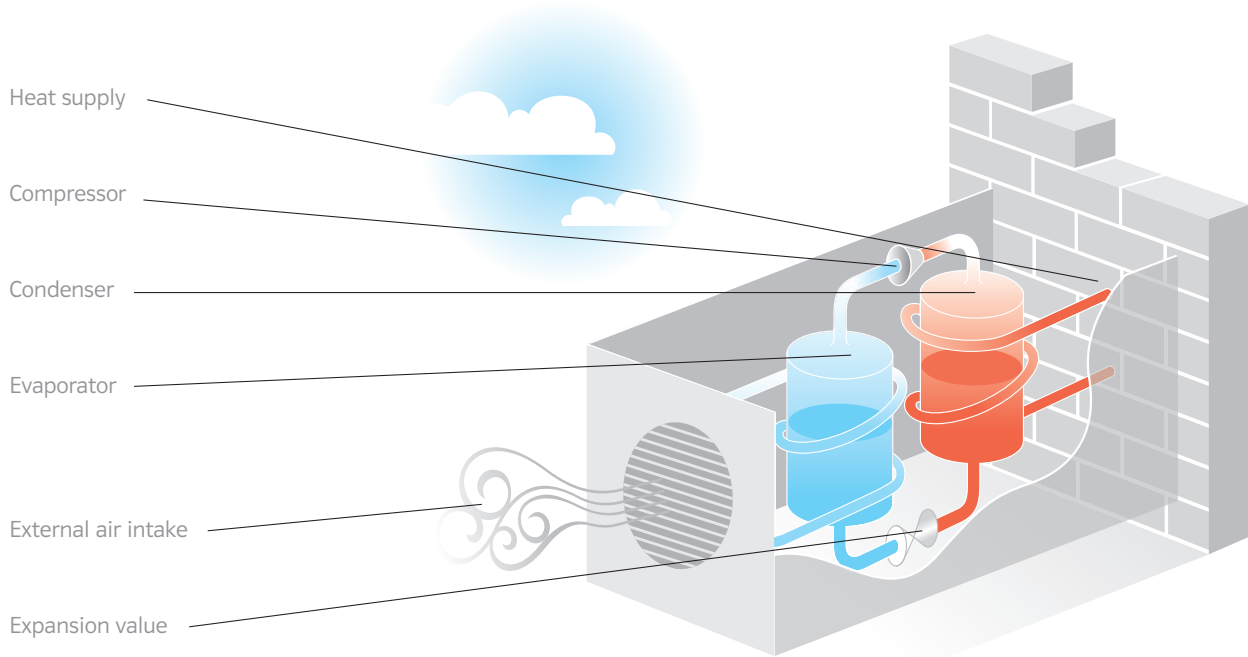
We're here to help you achieve your low carbon and energy reduction objectives in whatever way we can - from initial advice, planning and independent surveys to solution design, installation, maintenance, metering, billing and 24 hour support for you and your customers. We can also assist with funding by helping you to apply for Government grants, other financing opportunities and ESCo models for larger projects.

Our experience of implementing sustainable solutions in a wide range of situations gives us a unique insight into the problems and opportunities you face. Our knowledge, expertise and capabilities are switched on and ready for you now.

## How an air source heat pump works

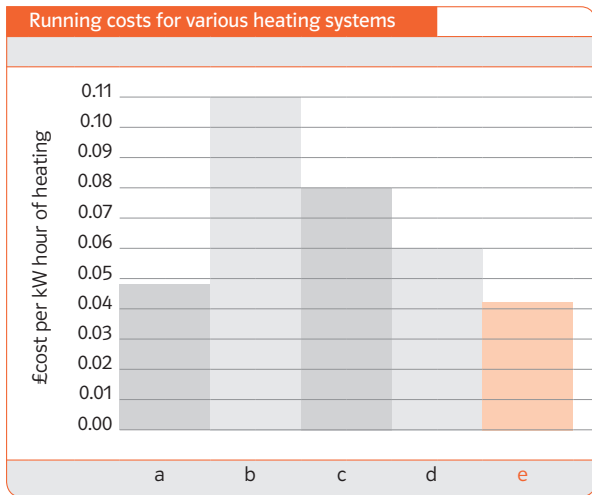


Air source heat pumps (ASHPs) work by extracting heat energy from the air and concentrating it before transferring it into water to supply heat and hot water into a building. This is called the vapour compression cycle. By extracting and compressing the heat from surrounding air, the heat energy released at the end of the compression cycle can be three to four times greater than the energy required to operate the ASHP. This makes an air source heat pump a very efficient means of heating both space and water.

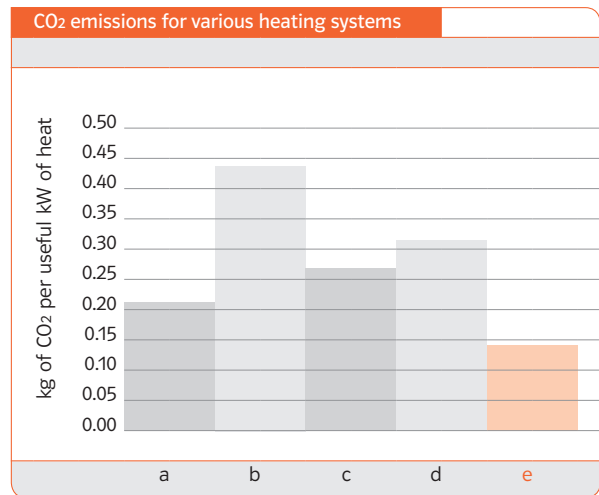


## The benefits of air source heat pumps

- More heat is supplied than electricity consumed by the pump. An ASHP with a Co-efficient of Performance (COP) of 3 will supply 3 kW of heat energy from 1 kW of electricity
- Significant carbon and running costs savings over electric and solid fuel heating with typical carbon savings around 30-50%
- Helps achieve Code 3 of the Code for Sustainable Homes alone and Code 4 when used in conjunction with energy saving methods such as insulation
- Ideal for non-mains gas applications
- No flue or ventilation requirements make it easy to install and it requires only a water and electrical connection
- Avoids the need for expensive groundwork associated with ground source heat pumps
- Reliable proven technology with a long life expectancy of up to 15 years
- Low maintenance costs with no need for gas safety certificates as with a traditional boiler
- Can be used for space heating and domestic hot water
- Up to 50% funding available through the Government's Low Carbon Buildings Programme
- Can be used to reduce fuel poverty in off-gas areas

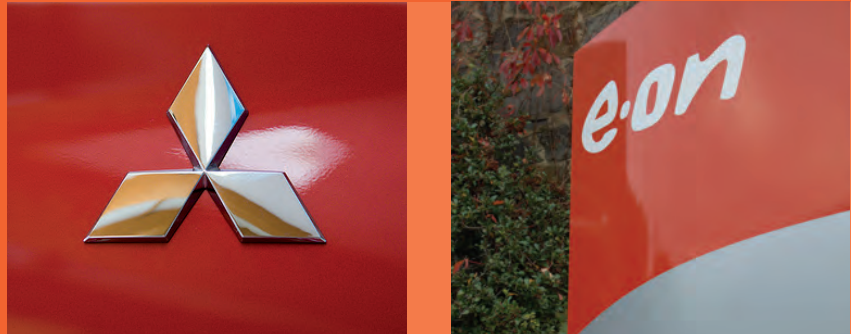


- a Gas boiler with efficiency of 0.93
- b Direct electric with efficiency of 0.99
- c LPG boiler with efficiency of 0.91
- d Oil boiler with efficiency of 0.86
- e Heat pump with COP of 3.3



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## Ecodan® air source heat pumps



Created by the engineering specialist Mitsubishi Electric and installed by Sustainable Energy, the low carbon decentralised energy expert within E.ON

All technical specifications, performance illustrations, characteristics and energy saving claims have been sourced from Mitsubishi Electric's Ecodan literature V3 published September 2008

## Delivering low carbon, efficient heat



The Ecodan® air source heat pump from Mitsubishi Electric. With a seasonal Co-efficient of Performance (COP) of 3.3\* and, at it's heart, a modern inverter-driven compressor so that heat output matches the heat required, using only the energy needed to deliver low carbon, efficient heat.

\* Based on a Mitsubishi Electric case study of a 4 bed house of standard construction, built in 2000 with an 80% efficient 'A' rated gas boiler

## Ecodan® W50

Ideal for use in new build applications due to contemporary thermal efficiencies. This model is capable of working at various capacities between 1.5kW and 5.2kW. Ideal for smaller existing homes or flats through to medium sized newly built homes.



## Ecodan® W85

Ideal for new build and existing homes. This model works at capacities between 3kW and 9kW, offering the widest scope to cater for the majority of new and existing applications.



## Ecodan® HW140

A powerful unit with the potential to operate between 5kW and 14kW. This model is suited to the provision of effective heating and hot water for larger, existing homes that do not benefit from the thermal efficiencies of today's homes. Also available as a 3 phase option.

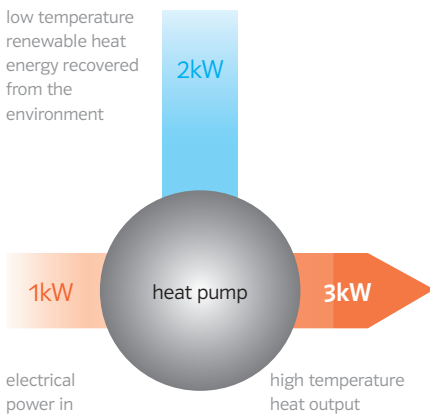


### Award Winner

Winner of the coveted Environment Energy Product/Service category, judges agreed that, while air source technology is not new, the company has 'packaged Ecodan into a neat unit that could prove acceptable to the environmentally savvy domestic user who wants to do their bit to cut carbon emissions'.

## The advantages of a unique technology

At the heart of Ecodan® is a modern, inverter-driven heat pump compressor converting energy from the air and upgrading it to higher temperatures suitable for heating. The inverter control regulates the system so that heat output modulates to match the capacity required. This means that the ASHP will only consume the exact energy required at any given time.



### Flow temperature control

Ecodan with flow temperature control avoids the on/off approach to heating, enabling the system to vary the flow temperature of water depending on the demand for heat and reacting quickly to outdoor weather temperatures.

### Control system features

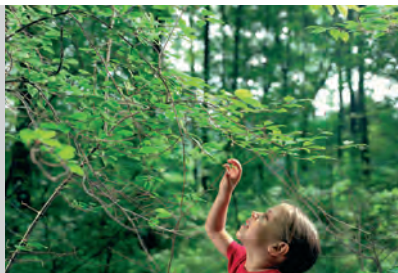
- Outside weather compensator
- Programmable flow set point temperatures
- Inverter-driven compressor

### Advantages

- Low starting current
- Single phase power supply with a 3 phase 14kW option available
- Low noise levels
- Easy to install
- Highest efficiency - reduces running costs by an average of 23% compared to a traditional gas boiler with a 93% efficiency
- Lower running costs and CO<sub>2</sub> emissions when used with underfloor heating
- Reduced energy consumption
- Improved comfort levels



instant hot water



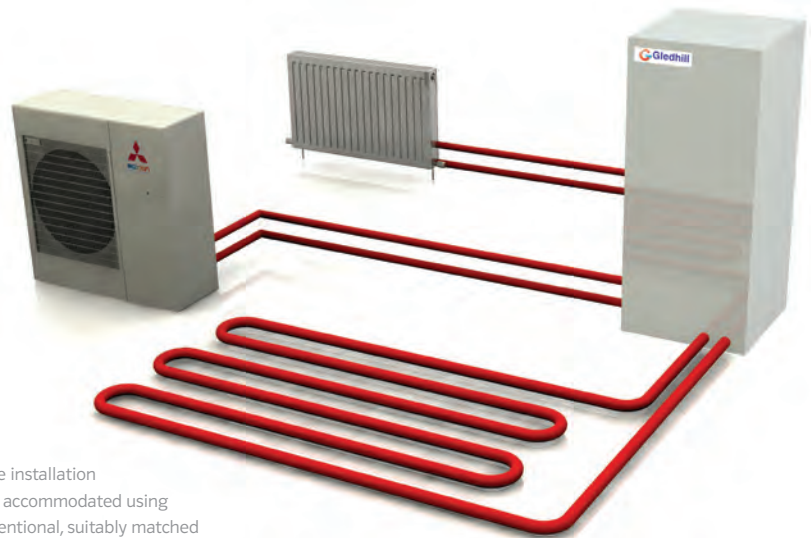
lower emissions



temperature controlled

## Lower consumption and emissions, higher performance

Reduced energy consumption, improved levels of comfort, low noise levels, lower carbon emissions, easy installation, 3 year warranty and BRE tested. Just some of the benefits of Ecodan® air source heat pumps



### Reduced energy consumption

Energy savings of over 30% could be achieved by using an Ecodan heat pump with a variable flow temperature as opposed to a fixed flow temperature.

When installing a heat pump with a fixed flow temperature of 55°C, annual running costs for a 3 bed house are comparable to a traditional gas boiler with a 93% efficiency. However, when a variable flow is employed, significant savings can be achieved.

Flexible installation can be accommodated using a conventional, suitably matched cylinder and separate controls

### Lower CO<sub>2</sub> emissions

Unlike a gas or oil-fired boiler that gives an on/off burst of heat in a bid to maintain desired room temperature, Ecodan uses lower flow temperatures to achieve consistent heat output, resulting in continuous levels of comfort. An additional benefit of this unique technology is that the Ecodan produces lower levels of CO<sub>2</sub> emissions than a traditional boiler.

### High performance

Ecodan operates on a single phase power supply with a starting current of just 5 amps. This reduces the operating energy requirement. Ecodan is designed to operate at optimum performance throughout the year, generating hot water up to 60°C and will continue to operate even when the outside air temperature is as low as -15°C.

### Warranties and guarantees

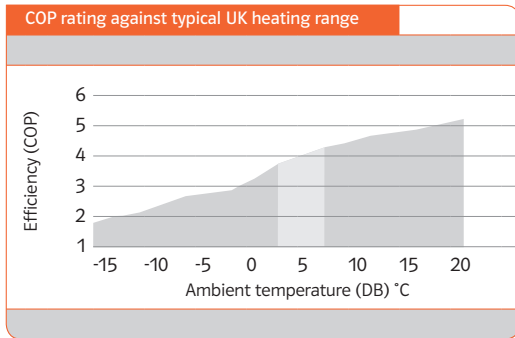
The Ecodan Advanced Heating System has a high value 3 year warranty if installed and serviced periodically.



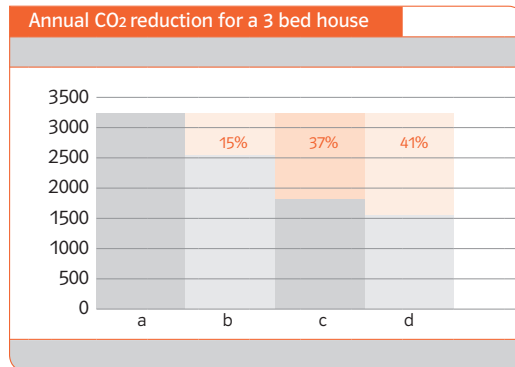
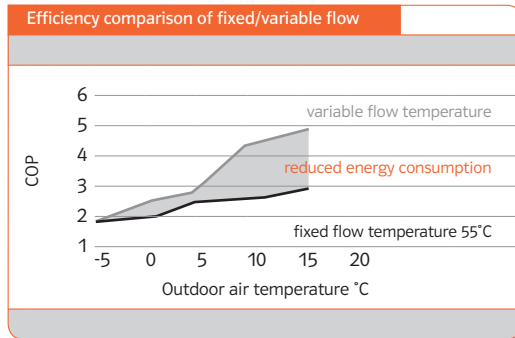
cost efficient



## Ecodan® performance



Ecodan efficiency against ambient temperature using average flow temperature of 45°C. Shaded area shows typical UK heating range (2°C - 7°C) at which COPs of 3.1 - 3.3 are achievable.



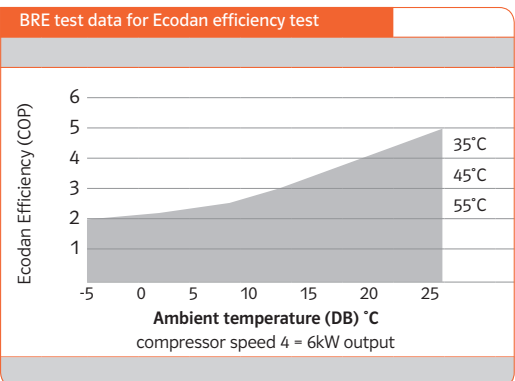
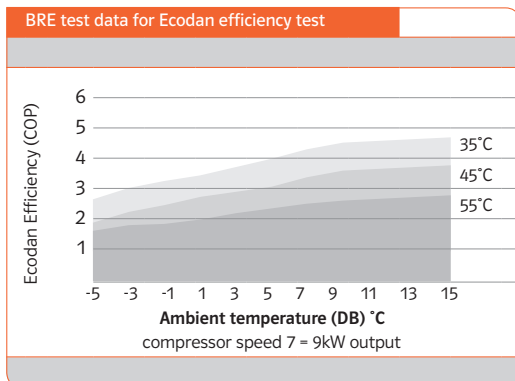
- a Gas boiler fixed flow temperature 70°C efficiency 0.93
- b Heat pump boiler fixed flow temperature 70°C
- c Heat pump boiler variable flow temperature 45°C
- d Heat pump boiler underfloor heating temperature 35°C

### Independent testing

Independent testing on the Ecodan system has been carried out by BRE, a world leading testing, training and certification organisation specialising in the testing and certification of construction related products.

Performance tests on an 8.5kW Ecodan air to water heat pump were carried out at BRE for Mitsubishi Electric according to the requirements of BS EN 14511. The tests were carried out in the environmental chamber at

BRE's HVAC test facility. The testing method involved heating 180L of water from 12°C to 55°C confirming heating performance down to -5°C. The test findings were excellent.



## Ecodan® specifications

Ecodan models and specifications				
	PUHZ-W50VHA	PUHZ-W85VHA	PUHZ-W140VHA	PUHZ-W140YHA
<b>Dimensions (mm)</b>				
width	950	950	1020	1020
depth	330+30 <sup>1</sup>	330+30 <sup>1</sup>	330+30 <sup>1</sup>	330+30 <sup>1</sup>
height	740	943	1350	1350
<b>Weight (kg)</b>				
	64	77	134	148
<b>Airflow (m<sup>3</sup>/min)</b>				
	50	55	100	100
<b>Normal sound level (dBa)</b>				
	45 <sup>2</sup>	48 <sup>2</sup>	53 <sup>2</sup>	53 <sup>2</sup>
<b>Low noise mode (dBa) at 7°C</b>				
	40	42	46	46
<b>Guaranteed operating range (outdoor)</b>				
	-15~+35°C	-20~+35°C	-25~+35°C	-25~+35°C
<b>Electrical supply</b>				
	220-240v 50Hz	220-240v 50Hz	220-240v 50Hz	338-215v 50Hz
<b>Phase</b>				
	Single	Single	Single	3
<b>Running current (A) max</b>				
	5.4 (13)	10.3 (23)	14.9 (35)	5.1 (13)
<b>Fuse rating (MCB sizes BS EN 60947-2) (A)</b>				
	16	25	40	16
<b>Heating A2/W35</b>				
capacity (kW)	5.0	8.5	14.0	14.0
COP (static ratings)	3.13	2.95	2.69	2.69
power input (kW)	1.60	25.8	5.21	5.21
nominal flow rate (L/min)	14.3	25.8	40.1	40.1
<b>Heating A7/W35</b>				
capacity (kW)	5.0	9.0	14.0	14.0
COP (static ratings)	4.10	3.85	4.19	4.19
power input (kW)	1.22	2.34	3.34	3.34
nominal flow rate (L/min)	14.3	25.8	40.1	40.1

<sup>1</sup> Grille

<sup>2</sup> At distance of 1m from outdoor unit

Nominal operating condition Heating (A2/W35)  
 outside air temperature (dry) +2°C  
 outside air temperature (humid) +1°C  
 water temperature (inlet/outlet) +30/+35°C

Nominal operating condition Heating (A7/W35)  
 outside air temperature (dry) +7°C  
 outside air temperature (humid) +6°C  
 water temperature (inlet/outlet) +30/+35°C

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