

The Renewable Solutions Provider

Making a World of Difference

Domestic Heating



Air Conditioning | Commercial Heating
Domestic Heating | Photovoltaics



The Ecodan range of
air source heat pumps
deliver efficient, renewable
heating for your home



Harnessing renewable energy to heat UK homes more efficiently

Increasing energy bills, the need to reduce carbon emissions and the raft of challenging legislation are driving the demand for alternative forms of domestic heating to improve energy efficiency.

Mitsubishi Electric has used its expertise and pivotal technology to develop renewable solutions to address these issues head on.

Why use Mitsubishi Electric's Ecodan air source heat pumps for your heating?

The MCS approved, award-winning Ecodan range has been specifically designed for the UK's conditions. With a UK-built cylinder and self-learning controls, the system is available as a packaged or component solution, optimised to provide all the heating and hot water a home needs, whatever the weather.

The name Mitsubishi is synonymous with excellence

Founded in 1921, Mitsubishi Electric is now a global, market leading environmental technologies manufacturer. In the UK, the Living Environmental Systems Division provides proven solutions that heat, cool, ventilate and power our buildings in some of the most energy efficient ways possible.

Mitsubishi Electric has specifically designed the Ecodan range for UK homes. Ecodan air source heat pumps provide renewable energy to challenge traditional heating methods, whilst meeting the energy and carbon reduction demands of today and beyond.

We believe that global climate challenges need local solutions. Our aim is to help individuals and businesses reduce the energy consumption of their buildings and their running costs.

At Mitsubishi Electric we have evolved and today we offer advanced environmental systems that really can make a world of difference.

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The Energy and Climate Change Committee recognises that heat pumps could meet up to 75% of residential heating demand in the UK¹



Why air source heat pumps and why now?



With space heating and hot water accounting for almost three quarters of the total energy consumed in UK homes, domestic heating is an obvious area to target to help combat rising energy bills.

Increasingly tough legislation is driving the demand for improved energy efficiency in the home, with the UK Government committed to reducing CO₂ emissions by 80% from 1990 levels, by 2050². This means a reduction of at least 34% in greenhouse gas emissions by 2020.

It's clear that to achieve these ambitious goals, our approach to energy use and the way we heat our homes has to change. Pivotal to this change is improved energy efficiency and a greater use of renewable energy.

Air source heat pumps use free renewable energy from the outside air and upgrade it for use in the home.

Why Ecodan air source heat pumps are an ideal alternative to traditional heating

Recognised as a renewable technology by both UK and EU Governments, heat pumps provide an effective, energy efficient alternative to traditional heating systems. Ecodan uses advanced technology to heat homes and hot water using energy absorbed from the outdoor air.

As perhaps the single most important renewable solution, heat pumps are an established, proven technology, supported by Government incentives, economically viable and flexible in their application for domestic heating.

Significantly, the Committee on Climate Change recognise that heat pumps could meet up to 75% of the total residential heat demand in the UK¹.

Over the last decade continual developments and major advances such as the introduction of variable capacity control have helped to position Ecodan air source heat pumps as the market leader.

Mitsubishi Electric has now introduced self-learning controls to ease use along with a quality-assured, British-built cylinder which can reduce installation time and costs.

¹ The Renewable Energy Review, May 2011, DECC / Committee on Climate Change

² Pathways 2050

The benefits of Ecodan



Heating UK homes with Ecodan air source heat pumps is now a viable and credible alternative to traditional methods and can help to combat rising energy bills through greater efficiency.

By using an Ecodan to provide space heating and hot water, it is possible to reduce a home's CO₂ emissions and running costs.

Ecodan uses inverter-driven heat pump technology to harvest and upgrade free, renewable energy from the outdoor air to deliver heating and hot water, even in temperatures as low as -20°C.

For every 1kW of input electrical energy, Ecodan harvests and upgrades renewable heat from the outdoor air to provide the home with an average of at least 3kW of heat output.*³

Outstanding benefits:

- Achieves level 4 of the Code for Sustainable Homes with no additional measures and can be even higher when used in conjunction with other improvements
- Improves energy use leading to lower running costs and CO₂ emissions
- Qualifies for the current Renewable Heating Premium Payments (RHPP) and upcoming renewable heating incentives planned by the Government
- 5% VAT rating on capital and install costs
- Self-contained outdoor unit only requiring water and electric connections
- No gas supply, flues or ventilation required, therefore poses no carbon monoxide risk
- Low noise levels - Ecodan has achieved the Noise Abatement Society's Quiet Mark
- MCS approved



*³ The overall system efficiency and energy savings will depend on the comparison with your current heating system, satisfactory system design and installation, and operational settings i.e. how you use the heating system.

Ecodan - suitable for both new and existing homes



Ecodan 8.5kW air source heat pump

The Government is focused on the need for housing growth as an ideal opportunity to cut energy use in homes and continues to introduce legislation and guidelines to support this.

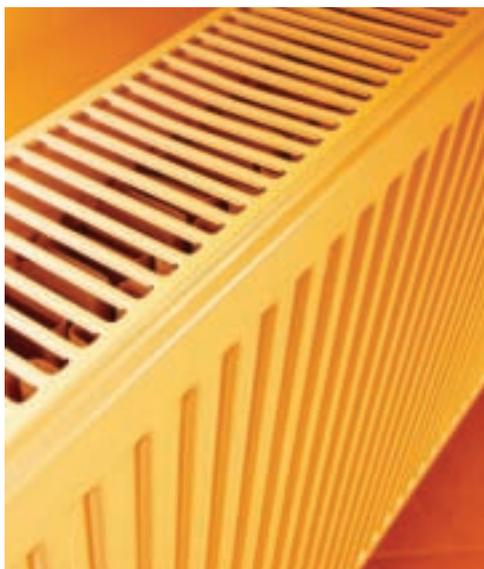
Buildings account for 44% of all UK CO₂ emissions (more than industry or transport)⁴. As a nation we are now creating new low carbon houses, yet around 75% of existing homes will still be in use in 2050, so to a large extent our future housing stock is already built. If we can find ways of easily improving the efficiency of existing buildings we can make a dramatic difference to both CO₂ emissions and energy use.

Ecodan provides a proven, efficient way of heating homes. It can achieve level 4 of the Code for Sustainable Homes, and even higher when used in conjunction with other improvements such as Photovoltaics.

Air source heat pumps are now covered by Permitted Development legislation because they can improve the efficiency of existing buildings although noise levels must be taken into account. Ecodan is recognised by the Noise Abatement Society and has received its prestigious Quiet Mark accreditation.

Before considering any heat pump, Mitsubishi Electric strongly recommends that basic thermal improvements are undertaken in these properties to provide the highest levels of thermal efficiency. These can include cavity wall insulation, loft insulation and double glazing.

In recognition of Ecodan's status as a low carbon technology, the cost of VAT is reduced to 5% as opposed to the standard rate of VAT applicable on all traditional heating systems.



⁴ BRE Digest of UK Energy Statistics

Renewable heating solutions for Homeowners & Selfbuilders

“We always intended to use an air source heat pump and my M&E consultant pointed me towards Ecodan because it has developed such an impressive reputation.

We built-in a small plant room on the top floor and this links straight to the Ecodan units on the external balcony.”

Andrew Critchlow, property owner and Director, AEW Architects



Ecodan is suitable for the vast majority of homes, so whether you live in a small flat, or a large detached house, Ecodan provides reliable and efficient space heating and hot water all year round.

Like any heating system, Ecodan works effectively in properties with high levels of thermal efficiency. Where possible we recommend undertaking basic improvements in existing properties such as cavity wall insulation, loft insulation and double glazing, before installing a heat pump.

The Ecodan range has received full accreditation for the Government's Microgeneration Certification Scheme (MCS). Please visit their website for further details:

www.microgenerationcertification.org

In recognition of Ecodan's status as a low carbon technology, the cost of VAT is reduced to 5% capital and associated install costs as opposed to the standard rate of VAT applicable on all traditional heating systems.

For new-build properties, renewable technologies such as Ecodan are also eligible for zero VAT. Please visit the following website for further details:

www.hmrc.gov.uk/sectors/consumers/energy-saving.htm

Living with Ecodan

Mitsubishi Electric's latest generation controller uses a simple graphical interface and features an advanced room temperature control mode. By using room temperature as well as outdoor temperature, the system responds faster, creating a more stable and comfortable home while maintaining system efficiency.

The self-learning control requires no pre-setting for room temperature control mode, resulting in hassle-free space heating.

Refurbishment

The Ecodan range comes as a complete packaged solution and is also available as a stand-alone unit. This provides more choice and flexibility and allows Ecodan to be used with a greater array of cylinders, making it immediately suitable for the majority of UK properties that meet modern levels of thermal insulation.

It also means that unlike many other air source heat pump systems, Ecodan can be properly retro-fitted to the majority of houses from the 1950s onwards.

The system is also working effectively in a 200 year old house in Marlborough, which has been insulated to match the Building Regulations of 2000. Air source heat pumps are now covered by Permitted Development legislation because they can improve the efficiency of existing buildings although noise levels must be taken into account.

Ecodan is recognised by the Noise Abatement Society and has received its prestigious Quiet Mark accreditation.

Selfbuilders

Ecodan is a perfect solution for selfbuilders who need to adhere to Building Regulations and any renewable energy targets set by the local authority.

With Ecodan only requiring electricity, it is ideal for the many areas of the UK not on the National Gas Grid.

Government incentives

Ecodan is designed to be eligible for financial incentives planned by the Government, such as the Renewable Heat Incentive. The only condition is that the equipment and the installer be registered under the Microgeneration Certification Scheme.

Ideal for off-gas areas

Ecodan can be used to replace any existing heating system, and offers those in off-gas areas a viable, low carbon alternative to oil. Ecodan also offers significant reductions in installation and running costs compared to oil and with a professionally maintained Ecodan heat pump unit offering an average lifespan of 15 - 20 years, you'll save on annual maintenance costs too.

Installing Ecodan

You can only buy Ecodan through an Accredited Ecodan Installer (AEI). This helps to ensure that your system is optimised to suit your individual property and consistently delivers the highest possible performance. AEIs are independent contractors and plumbers who have demonstrated that they are appropriately qualified, have attended the Mitsubishi Electric Ecodan training days and have met the qualifying criteria.

The Governments 4th Carbon Plan sees direct carbon emissions in buildings significantly reduced by 2030 as a result of improvements in energy efficiency^{*5}.



“Ecodan is the ideal solution for us: no fuss, no mess, and very economical, I am really pleased with their performance. They are also virtually maintenance free, all that is required is an annual check by a qualified tradesman to make sure the units are working properly and the vents are clear of debris.”

Keith Maddison, Homeowner

^{*5} Source DECC

Renewable heating solutions for Housebuilders & Developers

The need for sustainable homes

There is currently a substantial under supply of housing stock in the UK. In order to meet the demand for new homes, the housing sector is set to increase its build rate.

This means that by the year 2050, over a third of the UK's housing stock will have been built inside of four decades.

The Government is therefore focused on using this growth as the ideal opportunity to cut energy use in homes and is introducing legislation and guidelines in support of this.

In line with the Government's aim to significantly improve energy efficiency and reduce CO₂ emissions, legislation is in place to make sure this happens.

Ecodan provides a proven, efficient way of heating homes. It can achieve level 4 of the Code for Sustainable Homes, and even higher when used in conjunction with other improvements such as Photovoltaics.



A simple solution

The Ecodan range is suitable for the vast majority of homes, so whether you are building small flats or large detached houses, Ecodan provides reliable and efficient space heating and hot water all year round.

Ecodan has received full accreditation for the Government's Microgeneration Certification Scheme (MCS). Please visit the following website for further details:

www.microgenerationcertification.org

For new-build properties, renewable technologies such as Ecodan are also eligible for zero VAT. Please visit this website for further details:

www.hmrc.gov.uk/sectors/consumers/energy-saving.htm

SAP Appendix Q

SAP Appendix Q allows you to enter performance data specific to Ecodan rather than using the default ASHP data in SAP. SAP Appendix Q generates a saving in kWh/year rather than a set COP. An information video is available on our website:

www.domesticheating.mitsubishielectric.co.uk

Ideal for off-gas areas

With Ecodan only requiring electricity, it is ideal for the many areas of the UK not on the National Gas Grid. This removes the need to create the infrastructure required for gas on a new development.

Maintenance on an Ecodan system is easier than gas, oil, LPG or biomass as well, and with a professionally maintained Ecodan air source heat pump unit offering an average lifespan of 15 - 20 years, annual maintenance costs are kept to a minimum.

All new build or refurbishment projects throughout the UK must now demonstrate the use of renewable energy or face planning refusal.



“The inclusion of renewable technology was one of the reasons we got planning permission in what is a green belt area and was also a major selling feature when we put the property on the market.”

Nick Bareham, Landsberry Ltd

Renewable heating solutions for Housing Associations



These Cottsway Housing Association tenants saved enough from their reduced heating bills for a family holiday in the sun.



Housing Associations are under increased pressure to adhere to legislation covering both new-build properties and refurbishments. There is also a very real need to improve energy efficiency throughout their portfolio of homes.

Ecodan can help reduce a properties' carbon footprint, combat fuel poverty^{*6} by helping to reduce household running costs and for new social housing stock, assist in meeting the demands made in the Code for Sustainable Homes.

Increasingly some local authorities also require Code for Sustainable Homes standards to be met as a condition of planning approval. Easy to install Ecodan can help a property achieve Level 4 of the Code for Sustainable Homes and helps to lower household running costs.

Fuel Poverty

Ecodan can immediately help reduce running costs to alleviate fuel poverty. By extracting renewable energy from the outdoor air the system maximises the energy provided to the household. It offers a reduction in running costs over gas, LPG and even more over oil, and direct electric.^{*7}

Mitsubishi Electric is proud to be a supporter of National Energy Action (NEA) and its efforts to tackle fuel poverty. In particular, we are committed to working with NEA's Technical Team to highlight the difference that the new generation of air source heat pumps can make to vulnerable householders who are struggling to pay their fuel bills, particularly for those people living in off-gas areas.

The relationship with NEA is helping us to have a better understanding of the individual needs of particular types of low income households, and the steps required to make our technology the most easy to use and cost effective for fuel poor households.

“We knew that tenants would see a cut in their fuel bills following the installation of Ecodan, but the level to which this has happened has really surprised us.”

Cottsway Housing

^{*6} A household is said to be in fuel poverty if it needs to spend more than 10% of its income on fuel to maintain a satisfactory heating regime* - DECC

^{*7} Potential low energy performance benefits will depend on satisfactory system design and installation, and operational settings, i.e. how you use the heating system.

Refurbishment

The Ecodan range comes as a complete packaged solution and is also available as a stand-alone unit.

This provides more choice and flexibility and allows Ecodan to be used with a greater array of cylinders, making it immediately suitable for the majority of UK properties that meet modern levels of thermal insulation.

It also means that unlike many other air source heat pump systems, Ecodan can be properly retro-fitted to the majority of houses from the 1950s onwards.

The system is also working effectively in a 200 year old house in Marlborough, which has been insulated to match the Building Regulations of 2000.

Air source heat pumps are now covered by Permitted Development legislation because they can improve the efficiency of existing buildings although noise levels must be taken into account.

Ecodan is recognised by the Noise Abatement Society and has received its prestigious Quiet Mark accreditation.

A versatile and renewable solution

Whether installed in small flats, or large detached properties, Ecodan can reduce running costs, lower CO₂ emissions and offer reliable, sustainable heating and hot water all year round for the majority of homes.

Ecodan can be retro-fitted to almost any property from the 1950's up to the present day, and older properties that have been thermally upgraded can also benefit from this low carbon alternative to traditional domestic hot water systems.

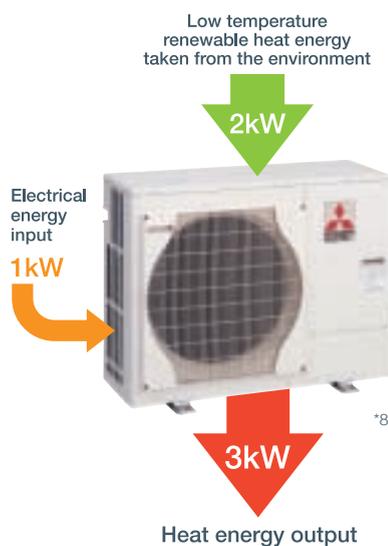
Maintenance on an Ecodan system is simpler than gas, and with a professionally maintained Ecodan air source heat pump unit offering an average lifespan of 15 to 20 years, you'll save on annual maintenance costs too.

“Reaction to the new technology has been extremely positive and tenants are reporting a better all-round heat in their homes, whilst experiencing a significant drop in their fuel costs.”

Vince Wedlock-Ward, Southern Housing Group

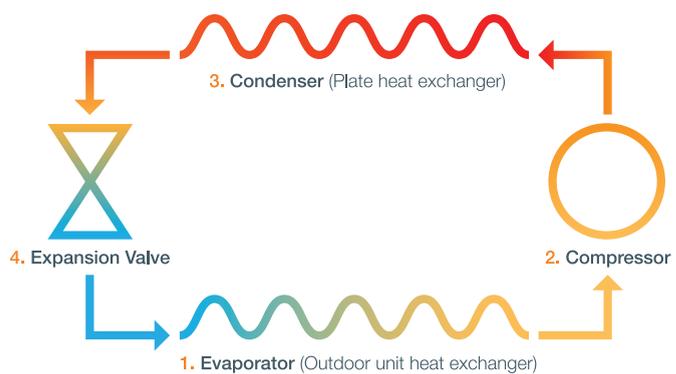


How Ecodan air source heat pumps work



Heat pumps take electrical energy and low grade heat energy from the outdoor air to heat refrigerant which in turn heats water for domestic use and space heating. The efficiency of a heat pump is known as the Coefficient of Performance or CoP. This is a ratio of the heat delivered to power consumed.

The operation of a heat pump is similar to a refrigerator - but in reverse. This process is known as the **vapour compression cycle** and the following is a more detailed explanation.



At the beginning of the first phase the refrigerant is a cold low pressure liquid.

1. The refrigerant passes into the evaporator and heat energy from the outside air passes over the evaporator causing the refrigerant to increase in temperature and change to a hot gas.
2. This hot gas then enters the compressor where its temperature increases further as a result of the compression process.
3. The hot refrigerant gas is then condensed as it passes across one side of a plate heat exchanger. The heat is transferred to the cooler side (water side) of the heat exchanger, and this is transferred via the primary water circuit to heat up the water tank inside the property. As the temperature of the refrigerant decreases the state changes from a gas back to a cool liquid.
4. Despite dropping in temperature, the cool liquid still has a high pressure and to reduce this pressure the liquid refrigerant passes through an expansion valve. This causes the pressure to drop and the temperature lowers, returning the refrigerant to its initial state of cool low pressure liquid.

This process is repeated.

It is only the refrigerant that passes through this cycle; the water is heated as it travels through the plate heat exchanger. The heat energy from the refrigerant passes through the plate heat exchanger to the cooler water which increases in temperature. This heated water enters the home heating circuit and can also be used to provide domestic hot water via a hot water cylinder.



Efficient, versatile and renewable

Ecodan air source heat pumps have been developed by Mitsubishi Electric specifically for the UK, bringing advanced, inverter-driven technology to residential properties of any size, whether refurbished or new build.

Inverter driven heat pumps offer significant energy savings over fixed-speed heat pumps because they regulate the heat output to exactly match the household requirements and therefore consume only the energy needed.

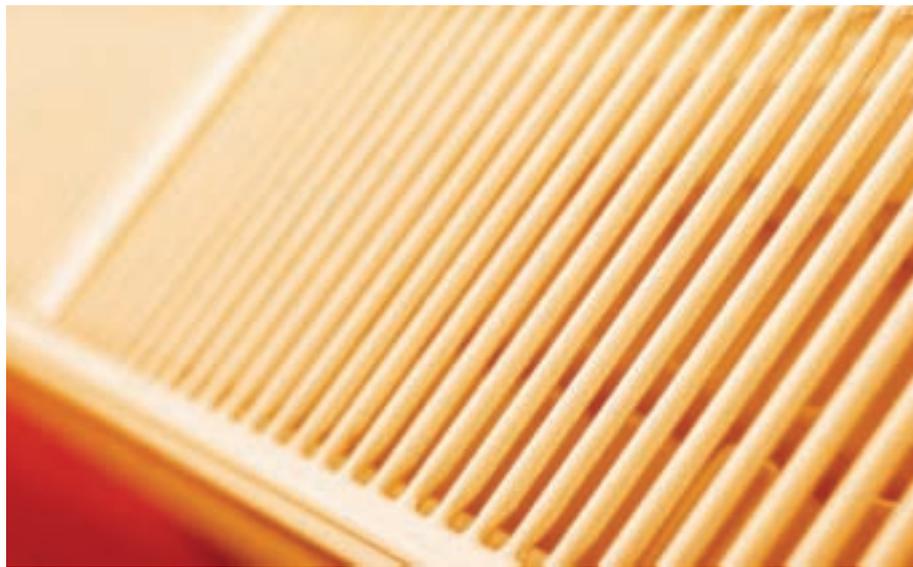
Recognised by the Noise Abatement Society as quiet to run (45dBA)^{*9}, Ecodan is quick to install, rivals traditional gas or oil heating systems in its ease of use and easily meets renewable energy targets.

Ecodan achieves high levels of efficiency because the system allows the lowest flow temperature to be targeted whilst still maintaining the desired room temperature.

It does this by using room temperature as well as outdoor temperature, making the system respond both faster and more accurately, creating a more stable and comfortable home while maintaining system efficiency.

*8 As independently tested by BSRIA based upon BSEN14511 Part 3 standard rating conditions. Due to the method of operation, the performance of heat pumps will vary based upon the temperature of the heat source and the requirements of the heat delivered. The BSEN14511 testing relates to the heat pump performance only and not the entire heating system.

*9 5kW unit measured at 1 metre



Ecodan winter trial results



Live trials of Ecodan over two of the coldest winters for decades (2009-10 and 2010-11) have demonstrated that the Ecodan low-carbon heating system is more than capable of dealing with the very worst of British weather.

All three models in the range were tested in four different locations. The properties included a newly built 3-bed terraced house, a 1950's 4-bed semi, a large 5-bed detached home, built in 1999, and the BRE Visitor's Centre in Watford.

During the trial period, temperatures dropped as low as -10°C , but Ecodan still delivered the performance necessary, proving that they will cope throughout the year in a variety of different properties and heating configurations.

The Ecodan units in the properties delivered COPs^{*10} ranging from 3.0 to 3.33, despite the low temperatures. A level of 3.33 shows that 2.33kW of renewable energy is being harvested from the surrounding air for every 1kW of electricity used.

The live trials showed that Ecodan air source heat pumps really are ready to become the most viable, mass-market alternative to gas and oil-fired heating.



^{*10} Coefficient of Performance (COP) is a measure of the useful energy a system can deliver compared to the energy it consumes.

Online 'real-time' performance data



A dedicated new website, the Ecodan dashboard has been designed to demonstrate the effectiveness of Ecodan in the UK.

The site shows real data gathered from properties around the country currently using the Ecodan system, along with details of the age and type of property.^{*11}

Visitors can find out how a unit is performing and see the running costs, CO₂ emissions and energy consumed, in comparison to gas, oil and direct electric systems.

They can drill down further and see how the unit is performing at any time of the day, week, month or year, and see the running costs, CO₂ emissions and energy consumed, when compared to gas, oil and direct electric systems.

The properties use a mixture of the three Ecodan models (5kW, 8.5kW and 14kW) working with both radiators and under-floor heating to demonstrate how the systems can work best.

Anyone can quickly see the annual performance of each property. In addition, the dashboard shows the average outdoor and indoor temperatures and the highest and lowest outdoor temperatures during any given period.

www.dashboard.mitsubishielectric.co.uk

^{*11} Many factors affect the performance of an Ecodan air source heat pump; and in turn the data displayed on this website. These figures should only be used as a guide to indicate how well an Ecodan air source heat pump can perform if the system incorporating that heat pump is designed, installed, commissioned and operated correctly.



Modern air source heat pumps are still new to many people, so this dashboard has been designed to be as open and transparent as possible so that homeowners can see the results for themselves.

www.dashboard.mitsubishielectric.co.uk

Ecodan is part of Mitsubishi Electric's whole house solution



Ecodan is part of Mitsubishi Electric's range of technically advanced renewable solutions designed to maximise the overall efficiency of a home whilst minimising running costs and carbon emissions.

In 2006, as part of the UK's growing legislation aimed at reducing CO₂ emissions, the Code for Sustainable Homes was introduced. Using a rating system of one to six stars, with one star being above the standard of the current Building Regulations, the Code awards a rating which depicts the overall sustainable performance of a house. Working in conjunction, Mitsubishi Electric's Ecodan air source heat pump, Photovoltaic's and Lossnay fresh air ventilation can help achieve Level 5 of the Code.

In order to achieve the highest levels of efficiency, basic thermal improvements can be undertaken by the homeowner. These include cavity wall insulation, loft insulation and double glazing.

Heat - Ecodan Air Source Heat Pumps

use the latest heat pump technology to provide low cost, low carbon heating and hot water for your home, all year round.

Power - Photovoltaic Systems (PV)

harvest the sun's energy to generate electricity for use in the home. To further encourage the use of PV, the UK Government has introduced a financial incentive scheme to reward homeowners, called the Feed-in Tariff (FiT).

Ventilate - Lossnay Fresh Air Ventilation

delivers efficient mechanical ventilation throughout the home. Providing clean, fresh air and ensuring a healthy living environment.



CO₂ Emissions Reductions Targets

CO ₂ Emissions Code level (stars)	Percentage improvement on Part L 2006
1*	10%
2**	18%
3***	25%
4****	44%
5*****	100%
6*****	Zero Carbon

Mitsubishi Electric's whole house solution

Ventilate

Power

Heat





Ecodan
Case Studies



Energy efficient future for tenants

Installation Summary

42 warden-assisted flats

Ecodan chosen to lower the building's energy rating, improve efficiency and reduce tenants energy bills

Originally heated by electric heaters connected to an Economy 7 circuit

One 5kW unit installed for every 2 flats

14kW unit installed to service communal areas

Installed over a period of weeks with tenants in situ



The tenants of 42 warden-assisted flats owned by West Lancashire Borough Council, are looking forward to enjoying reliable, energy efficient heating thanks to the installation of a number of Ecodan air source heat pumps which provide them with low carbon, renewable energy.

In a move to increase the energy rating for the flats in Beechwood Court, Birkrig, Skelmersdale, the Council has replaced its old heating system which was run on a number of direct electric heaters connected to an 'Economy 7' circuit, with Mitsubishi Electric's energy efficient, Ecodan system.

Following a review of the old system the Council called in Accredited Ecodan Installers, Dalliam Ltd, to advise on an energy efficient, cost effective, low carbon replacement. Taking into account energy calculations from a survey of the building, Dalliam's Managing Director, Bill Tyrer, and his team set about designing a new system.

"We know that people are often afraid to use their heating because of the cost, but these residents are vulnerable and need to keep warm when the weather conditions are poor. Our priority was to provide them with a reliable, effective heating and hot water system that was also affordable," said Mr Tyrer.

"The new system not only provides that, but has also lowered both the energy rating and the carbon emissions for the building, thereby fulfilling the Council's brief."

One 5kW Ecodan unit was installed for every two flats, providing heat via a radiator circuit fitted with independent lockable heating stats and thermostatic radiator valves, further helping to save energy costs.

A 14kW Ecodan unit has also been installed to provide heating and domestic hot water to the warden's accommodation and the communal dining area, and hot water for use in the kitchen, hair salon and guest rooms.

The replacement project has been carried out over several weeks and some of the units that were installed towards the end of last winter have already been given a thorough testing with the onset of bitterly cold weather, which saw temperatures dipping down as far as -17°C . During this time, however, the tenants remained warm and cosy as the new system maintained a constant temperature of 24°C .

Councillor Val Hopley, portfolio holder for Landlord Services at West Lancashire Borough Council, said:

"We are incredibly impressed by the Ecodan system. In fact, during the very severe weather last year, when we compared Beechwood Court with other Council buildings using gas boilers, it was the only one that did not fail in some way in its heating and hot water."

Wiltshire village too remote for gas

Installation Summary

200 year old 4 bed detached cottage

Total living space approx. 170m²

Originally heated by an oil-fired system

Replaced with 8.5kW Ecodan unit and larger radiators

Installation took 2 days



Charles and Claire Fox live in a beautiful 200 year old cottage in the small village of Funton in Wiltshire. Whilst idyllic, the remote location of Funton means there is no mainline gas supply, so villagers need to look to other fuels to heat their homes.

When the ageing oil-fired heating system needed replacing in their 4 bed detached cottage, the couple wanted a system that was more economic to run than their oil system. As an environmentally aware family who recycle wherever possible and insulate their home to preserve energy, they were keen to find a heating system that was more efficient with less impact on the environment.

Unable to use gas, they considered 'greener' alternatives to oil, such as wood, solar thermal and biomass, but all of these seemed to prove either insufficient for their needs or too involved to install, run and maintain.

Replacing their old oil-fired heating system, which had become increasingly inefficient over the 15 years they'd had it, they found Ecodan to be much more efficient and effective to run.

Being able to get rid of all the old water tanks and pipes in the loft freed up a lot of space and having installed larger, more efficient radiators throughout, their home is now warm enough without the need to boost the heating with log fires, as they previously would have done.

Unlike other residents in the village, the Fox family no longer have to rely on increasingly expensive oil to heat their home and by converting to Ecodan, from their initial heating bill, they estimate an annual saving of £500.

In addition, with Ecodan they enjoy a more even temperature throughout the house. The new system also provides them with copious amounts of hot water - more than enough for even their two teenagers who live in the shower!

Ecodan solved this family's heating needs whilst reducing their CO₂ emissions and fuel bills

1955 home gets renewable energy heating

Installation Summary

1955 3 bed semi-detached house

Total living space 102m²

Mains gas supply available

1970's 60% efficient gas boiler removed

Replaced with 8.5kW Ecodan unit

Installed new, larger radiators fitted with TRV

140 litre indirect unvented cylinder

Installation took 2 days



With their existing gas boiler system reaching the end of it's useful life cycle and proving very inefficient, the family living in this 1950's house were looking for an effective replacement.

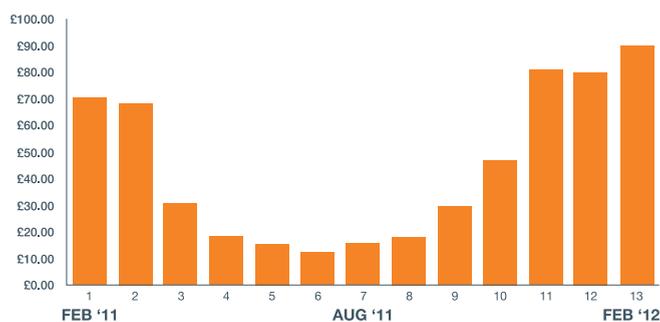
With diminishing effectiveness and poor carbon emissions, it was important to replace this ageing system with one that would provide an increase in performance and energy efficiency. Being environmentally aware, this family were keen to take advantage of a heating system using renewable energy. They needed to find a system that would readily satisfy the heating and hot water demands of a family of 5 whilst reducing running costs and carbon emissions. Other heating alternatives using renewable energy, such as solar thermal and biomass, were considered but discounted for proving either ineffective or too high maintenance. A powerful, renewable energy solution was required. With inconsistent levels of comfort coupled with escalating gas bills, this home stood to benefit substantially from a more efficient means of heating.

Unlike the ageing gas system that was previously installed, Ecodan uses the latest technology to harvest renewable energy from the outside air to provide central heating and hot water. Easy to install, the advanced efficiency of Ecodan, is perfect for this 1950's home.

Using Ecodan to replace the inefficient gas boiler and installing larger radiators to work with the lower flow temperatures, means this home enjoys constant comfort levels for a fraction of the cost of the old gas boiler. Able to supply all the heating and hot water this property needs, Ecodan is the ideal, low carbon replacement these homeowners needed. Changing to Ecodan has cut this homes carbon footprint by 45% and improved the efficiency to significantly reduce the annual running costs. Low cost, low noise and minimal maintenance make Ecodan a viable alternative to gas.

Ecodan has more than halved their heating bills and emissions

2011 Monthly Run Costs



View live data from this home at www.dashboard.mitsubishielectric.co.uk

First home couple want efficient heating

Installation Summary

3 bed semi-detached house built in 2008

Total living space 85m²

Mains gas supply available

New build, no previous heating system

Installed 5kW Ecodan unit

210 litre indirect unvented cylinder

Radiators with TRV fitted throughout

Installation took 2 days

Moving into their first home in Bedfordshire, this young couple were keen to have a comfortable, yet affordable home for them and their new baby. They needed a heating system that would heat their home and hot water efficiently and help control their annual running costs.

Being environmentally aware, they were looking for a heating system to rival conventional gas boilers and help minimise their carbon footprint. Brick built and double glazed, the house boasts a high level of thermal efficiency that you'd expect from a new build. The use of an advanced, modern system to provide heating and hot water would maximise the homes efficiency and compliment it perfectly.

Ecodan provides the most efficient means of heating this home. Using free energy from the outside air to provide central heating and hot water, the advanced efficiency of Ecodan provides the perfect, modern heating system to suit this young couples needs.

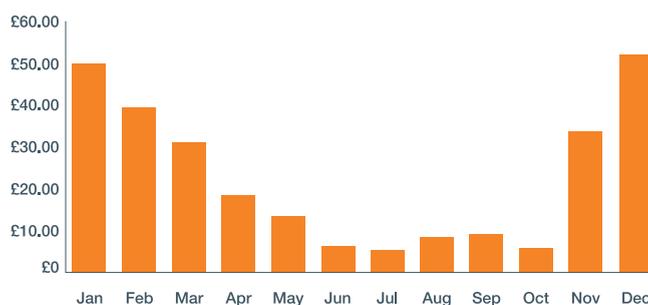
For those looking for high performance and lower running costs, Ecodan provides a welcome and effective alternative to the more traditional heating systems on the market.

By installing Ecodan, this new home is kept warm and comfortable by a high performance system that offers low running costs and low maintenance. Ecodan's high efficiency also keeps carbon emissions to a minimum, satisfying this young couples aim to reduce their carbon footprint.

Ecodan heating minimises running costs and carbon emissions for this couple



2010 Monthly Run Costs



View live data from this home at www.dashboard.mitsubishielectric.co.uk



Technical
Specifications



Air Source Heat Pumps



■ PUAZ-W50VHA



Manufactured in the UK

■ PUAZ-W85VHA2



■ PUAZ-HW140VHA2 / YHA2

Simple to install, cost effective for the homeowner and with outstanding energy efficiency, Ecodan is ideal for designers, installers and users.

Key Features

- Inverter-driven technology
- Self contained unit only requiring water and electric connections
- No need for gas supply, flues, ventilation
- Single phase power supply with a low starting current (3 phase available for 14kW)
- Low maintenance
- Reduced VAT to 5% for domestic applications (Zero VAT for new build)
- Helps achieve Level 4 of the Code for Sustainable Homes
- Operates with outside temperatures as low as -20°C
- Available as a stand alone or complete packaged system
- Market leading capacity performance at low outdoor temperatures
- Recognised by the Noise Abatement Society for industry leading low noise levels



Certificate Number: MCS HP0002
Product References: PUAZ-W50VHA-BS, PUAZ-W85VHA2-BS, PUAZ-HW140VHA2/YHA2-BS



www.ecolabel.eu
Licence Number:
UK/31001 - PUAZ-W50VHA-BS
UK/31002 - PUAZ-W85VHA2-BS
UK/31003 - PUAZ-HW140VHA2/YHA2-BS



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MODEL		PUHZ-W50VHA	PUHZ-W85VHA2	PUHZ-HW140VHA2	PUHZ-HW140YHA2
Heating*1	Capacity (kW)	5.0 (1.5-5.0)	8.5 (2.6-8.5)	14.0 (4.2-14.0)	14.0 (4.2-14.0)
	COP	3.13	3.17	3.11	3.11
	Power Input (kW)	1.60	2.68	4.52	4.52
	Nominal flow rate (L/min)	14.3	25.8	40.1	40.1
Heating*2	Capacity (kW)	5.0 (1.5-5.0)	9.0 (2.7-9.0)	14.0 (4.2-14.0)	14.0 (4.2-14.0)
	COP	4.10	4.18	4.25	4.25
	Power Input (kW)	1.22	2.15	3.31	3.31
	Nominal flow rate (L/min)	14.3	25.8	40.1	40.1
Dimensions (mm)	Width	950	950	1020	1020
	Depth	330+30*	330+30*	330+30*	330+30*
	Height	740	943	1350	1350
Weight (kg)	64	77	134	148	
Airflow (m³/min)	50	55	100	100	
Nominal Sound Pressure Level (dBA)*3	45▲	48▲	53▲	53▲	
Low Noise Mode (dBA) @ 7°C	40	42	46	46	
Guaranteed Operating Range (Outdoor)	-15~+35°C	-20~+35°C	-25~+35°C	-25~+35°C	
Electrical Supply	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	380-415v, 50Hz	
Phase	Single	Single	Single	3	
Running Current [Max] (A)	5.4 [13]	10.3 [23]	14.9 [35]	5.1 [13]	
Fuse Rating (MCB sizes BS EN 60898-2) (A)	16	25	40	16	

*Grille ▲At distance of 1m from outdoor unit

Nominal operating condition:

Nominal operating condition as tested to BS EN14511:

*1 Heating (A2/W35) Outside air temperature (dry) +2°C
Outside air temperature (humid) +1°C
Water temperature (inlet/outlet) +30/+35°C

*2 Heating (A7/W35) Outside air temperature (dry) +7°C
Outside air temperature (humid) +6°C
Water temperature (inlet/outlet) +30/+35°C

*3 Sound power level of the W50 is 61dBA, W85 is 62.5dBA, HW140V is 65.5dBA and HW140Y is 67.5dBA. Tested to BS EN12102.



CAHV Monobloc System



■ CAHV-P500YA-HPB



Certificate Number: MCS HP0002
Product Reference: CAHV-P500YA-HPB



Specifically designed for large applications, the Ecodan CAHV air source heat pump monobloc system can operate singularly, or form part of a multiple unit system. The CAHV also comes equipped with a wide range of controller features as standard.

A multiple unit system has the ability to cascade available units on and off to meet the load from a building. As an example of this modulation, a 16 unit system allows 0.5kW increments of capacity, from 18kW all the way up to 688kW.

This level of modulation is unprecedented within the heating industry and with cascade and rotation built in as standard, the Ecodan CAHV system is perfectly suited to a wide range of commercial applications.

Key Features

- Multiple unit cascade control of up to 688kW capacity
- Split refrigerant circuits within each CAHV provide 50% back up
- Ability to rotate units based on accumulated run hours
- Provides from 25°C up to 70°C water flow temperatures without boost heaters
- Low maintenance, hermetically-sealed monobloc design
- Low on-site refrigerant volume
- HIC (Zubadan) technology delivers 43kW at -3°C with minimal drop off down to -20°C

MODEL		CAHV-P500YA-HPB
Heating*1 (A7/W35)	Capacity (kW)	45
	Power Input (kW)	10.9
	Running Current [MAX] (A)	17.6 [52.9]
	COP	4.13
Heating*2 (A-3/W35)	Capacity (kW)	43
	Power Input (kW)	15.2
	Running Current [MAX] (A)	24.58 [52.9]
	COP	2.80
Water Pressure Drop*1 *2 (kPa)		18
Temperature Range	Outlet Water Temperature	25-70°C
	Outdoor Temperature D.B	-20-40°C
Circulating Water Volume Range		7.5m ³ /h - 15.0m ³ /h
Sound Pressure Level (measured in anechoic room)*1 at 1m (dBA)*3		59
Sound Pressure Level (measured in anechoic room)*1 at 10m (dBA)*3		51
Diameter of Water Pipe Connection mm(in)	Inlet	38.1 (Rc 1 1/2") screw
	Outlet	38.1 (Rc 1 1/2") screw
External Finish		Acrylic painted steel plate - MUNSELL 5Y 6/1 or similar
Dimensions (mm)	Width	1978
	Depth	759
	Height	1710 (1650 without legs)
Weight (kg)		526
Electrical Supply		380-415v, 50Hz
Phase		3
Compressor		Inverter scroll hematic compressor
Refrigerant	Type x original charge	R407c x (5.5kg) x 2
	Control	LEV and HIC circuit

*1 Under normal heating conditions at outdoor temp; 7°CDB / 6°CWB, outlet water temp 35°C, inlet water temp 30°C as tested to BS EN14511.

*2 Under normal heating conditions at outdoor temp; -3°CDB / -4°CWB, outlet water temp 35°C, inlet water temp 30°C.

*3 Sound power level 70.7dBA tested to BS EN12102.

■ Please don't use the steel material for the water piping material. ■ Please always make water circulate or pull out the circulation water completely when not using it.
■ Please do not use groundwater or well water. ■ Install the unit in an environment where the wet bulb temperature will not exceed 32°C. ■ The water circuit must be a closed circuit.



Packaged Cylinder Unit



EHPT20XVM2HA



The Packaged Cylinder Unit is the latest generation hot water tank with integrated hydraulic components and advanced user friendly controls.

Designed specifically by Mitsubishi Electric to integrate with the Ecodan air source heat pumps, the packaged cylinder unit provides improved performance with simplified graphical user interface control.

Key Features

- Simple graphical control
- Energy efficient space heating control
- Back-up electrical heaters
- Compatible with Mitsubishi Electric wireless room controllers
- Sleek modern design
- Pre-plumbed and wired for faster installation



Self learning controller

Mitsubishi Electric's third-generation controller includes intelligent, self-learning room temperature control as standard, with an advanced weather compensation system, which ensures the central heating delivers a comfortable temperature regardless of the season.

MODEL		EHPT20XVM2HA	
Nominal domestic hot water volume		200L	
Overall unit dimensions		1600 x 595 x 680 mm (HxWxD)	
Weight (empty/full)		119kg/332kg	
Unvented expansion vessel		Nominal volume 12L	
Safety Device	Water circuit	Charge pressure 1 bar	
		Control thermistor 25 - 60°C	
		Pressure relief valve 0.3MPa (3bar)	
		Flow switch Min flow 5.5l/min	
Booster heater	Control thermistor 80°C		
	Manual reset thermostat 90°C		
	Thermal cut off 121°C		
DHW tank	Control thermistor 40-70°C		
	Temp & pressure relief valve 90C/0.7MPa (7bar)		
Primary circuit circulating pump		Grundfos UPSO 25-70 180	
Connections		Water Primary circuit 28mm/DHW circuit 22mm	
Operating ambient condition		0 - 35°C (<80%)	
Electrical data	Control board	Power supply (phase, voltage frequency) ~/N, 230V, 50 Hz	
		Breaker (*when powered from independent source) 10A	
Booster heater	Power supply (phase, voltage frequency) ~/N, 230V, 50 Hz		
	Capacity 2kW		
	Current 9A		
	Breaker 16A		
Immersion heater	Power supply (phase, voltage frequency) ~/N, 230V, 50 Hz		
	Capacity 3kW		
	Current 13A		
	Breaker 16A		



Packaged Hydrobox



■ EHPX-VM2A

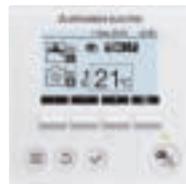


The Packaged Hydrobox offers a highly adaptable heating solution for retro-fit or new build.

Designed specifically by Mitsubishi Electric to integrate with the Ecodan air source heat pump range and a third party cylinder if required, the Packaged Hydrobox provides hydraulic components with a simplified graphical user interface.

Key Features

- Simple graphical control
- Energy efficient space heating control
- Sleek modern design
- Compatible with Mitsubishi Electric wireless room controllers
- Pre-plumbed and wired for faster installation



Self learning controller

Mitsubishi Electric's third-generation controller includes intelligent, self-learning room temperature control as standard, with an advanced weather compensation system, which ensures the central heating delivers a comfortable temperature regardless of the season.

MODEL		EHPX-VM2A	
Overall unit dimensions		800 x 520 x 360 mm (HxWxD)	
Weight (empty/full)		39kg/44kg	
Unvented expansion vessel		Nominal volume	10Ltr
Primary Circuit		Charge pressure	1 bar
Safety Device	Water circuit	Control thermistor	1 - 80°C
		Pressure relief valve	0.3MPa (3bar)
		Flow switch	Min flow 5.5l/min
	Booster heater	Control thermistor	80°C
	Manual reset thermostat	90°C	
Primary circuit circulating pump		Thermal cut off	121°C
Connections		Water	Grundfos UPSO 25-70 180
Operating ambient condition		Primary circuit 28mm	
Electrical data	Control board	0 - 35°C (<80%)	
		Power supply (phase, voltage frequency)	~/N, 230V, 50 Hz
	Booster heater	Breaker (*when powered from independent source)	10A
		Power supply (phase, voltage frequency)	~/N, 230V, 50 Hz
		Capacity	2kW
		Current	9A
Breaker	16A		

Quality assured manufacturing



Validated mark of approval
noise abatement society



Mitsubishi Electric's manufacturing facility in Livingston, Scotland produces Ecodan air source heat pumps, controls and cylinders for the UK and European markets.

The production facility, custom-built by the company in 1994, currently employs 420 staff and includes specially adapted and scalable production lines for Ecodan air source heat pumps, a new cylinder and a purpose built Ecodan testing facility.

Mitsubishi Electric's manufacturing plants are all ISO14001 and ISO9001 registered, an international benchmark ensuring we meet and continually improve upon quality and environmental standards.

Mitsubishi Electric is committed to lowering its own production emissions levels and those generated by its equipment during the product's lifetime. Our Green Gateway philosophy strives to improve energy efficiency throughout the UK, encouraging businesses to take a more responsible approach to energy use, in order achieve climate goals. We also partner with Sustainable Energy Europe, whose aim is to raise awareness of energy use within Europe.

Quiet Mark

The Ecodan range is the first air source heat pump to receive the official backing of the Noise Abatement Society which has awarded it the new 'Quiet Mark' of approval.

www.quietmark.co.uk

The Microgeneration Certification Scheme

The MCS certifies microgeneration technologies used to produce electricity and heat from renewable sources. It is also linked to financial incentives which include the Renewable Heat Incentive (RHI). The complete range of Ecodan air source heat pumps has received full MCS accreditation.

www.microgenerationcertification.org

The European Eco-label

The European Eco-label also known as "the Flower" denotes products and services with superior environmental performance. Products bearing the label are certified to meet EU-wide environmental criteria, and compliance is independently verified by an approved body.

The Eco-label scheme is voluntary and represents products with market leading environmental performance. It is available for many consumer and commercial product groups and now includes heat pumps. The Ecodan PUHZ range of products meets the schemes criteria.



We are committed
to lowering our own
production emissions
levels and those
generated by
our equipment



Responsible, sustainable manufacturing

As a leading provider of environmental technologies, Mitsubishi Electric prides itself on using responsible, sustainable manufacturing processes that take energy use, efficiency and the impact on the environment very seriously.

Our production facilities are committed to sustainable business practices such as energy and resource efficiency, minimising ecological impacts and reducing greenhouse gas emissions.

In line with our aim to improve all round performance and energy efficiency throughout all our operations, we set and adhere to the highest environmental standards to protect the world in which we live.

Global Environmental Vision 2021

Mitsubishi Electric's Global Environmental Vision 2021 sets a goal for a lower emission future that influences all our policy decisions.

www.mitsubishielectric.com/eco

Green Gateway

Green Gateway is Mitsubishi Electric Living Environmental System's commitment to the environment. It strives to instill positive changes in Mitsubishi Electric's own operations as well as seeking to influence those of its customers.

www.greengateway.mitsubishielectric.co.uk



Micropower Council

The Micropower Council is a body that concentrates on all issues that surround microgeneration, which are defined as those technologies that produce renewable heat and power on a domestic and small business scale.

All technologies are represented, such as solar thermal, PV, heat pumps, micro combined heat and power and biomass. Members also include utility companies such as British Gas, EON and EDF to name but a few.

www.micropower.co.uk



Green Building Council

The UK Green Building Council is part of a worldwide network of green building councils looking to radically improve the sustainability of the built environment, by transforming the way it is planned, designed, constructed, maintained and operated.

Mitsubishi Electric is a member of the UK Green Building Council and has a permanent exhibition stand in the Council's headquarters, at The Building Centre in London, where it showcases a range of products.

www.ukgbc.org

We set and adhere to the highest environmental standards to protect the world in which we live



Make a world of difference with Ecodan



Ecodan has the high level of pre-sales and after sales service you'd expect from a leading manufacturer such as Mitsubishi Electric.

As the demand for renewable solutions grows, we recognise that our continued success relies on our satisfied customers experiencing high performance systems that are efficient, effective and reliable. By investing 5% of our total turnover in research and development, we aim to deliver renewable solutions that will do just that.

Accredited Ecodan Installers

Mitsubishi Electric operates a Partner Programme designed to raise industry standards and ensure customers receive a consistent, professional service on which they can rely. Accordingly, Ecodan can only be installed by one of our Accredited Ecodan Installer partners who have undergone our specific training.

For further information and to find your nearest Accredited Ecodan Installers please visit:

www.domesticheating.mitsubishielectric.co.uk

In depth training

Mitsubishi Electric provides high level training at state-of-the-art facilities across the UK. The in-depth programme covers all aspects of design, installation and maintenance to ensure its installers are fully qualified to gain optimum performance from every Ecodan system.

Ecodan is offered with a full warranty

Every Ecodan air source heat pump and Ecodan packaged cylinder benefits from a 3 year warranty as standard, subject to the following conditions:

- The Ecodan purchase and installation is registered with Mitsubishi Electric
- The Ecodan must be installed and commissioned by an Accredited Ecodan Installer
- Annual maintenance must be carried out and reports made available to Mitsubishi Electric upon request

Choosing Ecodan from Mitsubishi Electric can help make a world of difference to your energy use today and beyond

Award winning Ecodan from Mitsubishi Electric

Professional Heating and Plumbing Installer Awards 2012 - Top Product 2011 - Ecodan (Winner)

National Heat Pump Awards 2011 - Installation of the Year, Domestic Air Source Heat Pump (Winner)

Scottish VIBES Awards 2010 - M-ACE and Ecodan (Winner)

Sustain Magazine Awards 2010 - Ecodan (Finalist for Product of the Year)

European Eco-Label - November 2009

Micropower Awards 2009 - Highly Commended

Rushlight Awards 2009 - Ground & Air Source Power Award

Energy Institute Awards 2008 - Technology Award

Interbuild Awards 2008 - Building Services Product Award

Environment & Energy Awards 2008 - The Environment Energy Product/Service Award

Mitsubishi Electric are committed to promoting the use of renewable energy technologies throughout the industry and are pleased to support the following organisations:

- Federation of Environmental Trade Associations (FETA)
- Micropower Council
- Heating and Hot Water Industry Council (HHIC)
- Heat Pump Association (HPA)
- Heating and Ventilating Contractors' Association (HVCA)
- National Energy Action (NEA)
- Chartered Institute of Building Services Engineers (CIBSE)
- Building Services research and Information Association (BSRIA)
- Association of Plumbing and Heating Contractors (APHC)
- National Self Build Association (NaSBA)

