



**RENEWABLE
SOLUTION PROVIDED**

Low carbon,
sustainable heating
and hot water in a
3m x 3m x 3m home!

Small home, big ideas!

Researchers at the University of Hertfordshire, led by Dr Mike Page, an engineer and Reader in Cognitive Psychology, have produced a tiny, carbon neutral eco-house which could point the way to buildings of the future.

The Cube is a three metre by three metre by three metre home (inside dimensions) which Dr Page says could accommodate one person. The heating and hot water for the building is supplied by a Mitsubishi Electric 5kW Ecodan Air Source Heat Pump (ASHP) and the unit is packed with other sustainable technologies.



Air Conditioning | Heating
Ventilation | Controls



ecodan[®]
Renewable Heating Technology

Heating

Case Study

The Cube Hertfordshire

Making a
World of
Difference



The Ecodan ASHP delivers an average of 3kW of heating energy for every 1kW of electricity used to power the system.

Located at the University's College Lane Campus in Hatfield, the Cube is designed to provide comfortable living, with minimum impact on the environment. Its claim of being 'carbon neutral' relates to its average performance across the year. The assumptions and calculations on which the claim is made are carefully explained by the team on their website – www.cubeproject.org.uk.

The Cube focuses on 'compressed living' but none of the technologies involved are solely applicable to small buildings and all can be scaled-up and applied to residential or commercial buildings of any shape and size. This includes the Ecodan ASHP, so whether the property is a tiny Cube or a palatial detached house, Ecodan can provide all of its heating and hot water requirements.

The heat pump system includes an external box attached to the outside of the building which harvests latent heat from the air. This is linked to a fan coil to supply the Cube's heating requirements.

The Ecodan also supplies the Cube's hot water requirements. Water is stored in a 100-litre pressurized cylinder which fits under the shower area and water usage is kept to a minimum by the installation of low-flow, high performance showers and taps.

The Ecodan is extremely energy efficient and for every 1kW of electricity used to run the outdoor unit, an average of 3kW of heating energy is produced.*



Telephone: 01707 278666
email: heating@meuk.mee.com
web: www.heating.mitsubishielectric.co.uk

UNITED KINGDOM Mitsubishi Electric Europe Living Environmental Systems Division
Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, England General Enquiries Telephone: 01707 282880
IRELAND Mitsubishi Electric Europe Westgate Business Park, Ballymount, Dublin 24, Ireland
Telephone: Dublin (01) 419 8800 Fax: Dublin (01) 419 8890 International code: (003531)

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Certificate Number: MCS HP0002
Product Reference: PUHZ-W50VHA-(BS)
PUHZ-WB5VHA2-(BS)
PUHZ-HW140VHA2/YHA2-(BS)



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Ecodan ASHP's can be used to heat any building however large, small, or unusual.

Although the building is tiny, the University team have incorporated everything required for a single person to live comfortably. This includes storage space, a larger-than-average single bed, a large TV and many other prerequisites for modern living.

The lighting and large-screen TV use highly efficient LED technology, cork flooring is fitted throughout for warmth and insulation and space-saving stairs have been installed.

The toilet collects solid waste for composting and can dispose of liquid waste via a reed bed and soak-away. The Cube even boasts a full-sized 800mm by 800mm shower.

Triple glazing in the door and windows and polyisocyanurate (PIR) insulation in the floor and ceiling combine to ensure that the Ecodan heat pump performs at maximum efficiency.

Working on the basis that the total heat demand for water and space-heating is 8.6kWh, and given that the coefficient of performance of the heat pump is equal to 3, the Cube will use just 2.9kWh of electrical energy per day to meet the this demand.

The kitchen features a highly efficient induction hob which heats the pan but not the air around it, which saves energy and reduces the risk of fire.



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Energy saving technology and water conservation equipment has been fitted to the kitchen.

Also fitted to the kitchen is a recirculating cooker hood, a heat recovery ventilator and an energy-efficient refrigerator rated A++.

The unit has storage space for hanging clothes and Dr Page and his team have even added a Samsung Ecobubble washing machine to the lounge.

The Cube is built on specially designed foundations which use less concrete than a traditional slab. The foundations are re-usable but can also be recycled, and will leave little or no trace when removed.

The only services required by the building are connections to The National Grid and a cold water supply.

Full details of this project can be found at www.thecubeproject.org.uk, including videos and photography.

For further information on Ecodan visit www.heating.mitsubishielectric.co.uk

* Overall system efficiency and energy savings will depend on satisfactory system design and installation, operational settings and how the heating system is used

Installation Summary

3m x 3m x 3m home

5 kW Ecodan ASHP to supply heating and hot water

No mains gas connection



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