DAIKIN

Daikin, your partner to boost your BREEAM project

Team up with us to achieve your BREEAM objectives, while staying within budget

Creating a sustainable future together

Air is something that surrounds us 24 hours a day. At Daikin, the future of the world's air is our greatest concern. We use our expertise about air, our feeling for innovation and our mastery of technology to improve the air we breathe. Aiming for sustainable growth, and a sustainable society through technological strength and outstanding human resources, guided by the United Nations Sustainable Development Goals (SDGs).

The Sustainable Development Goals, defined in 2015, are a set of 17 global development goals that aim to contribute to global sustainable development and to tackle broad topics such as poverty, health, education, energy, global warming and gender equality.

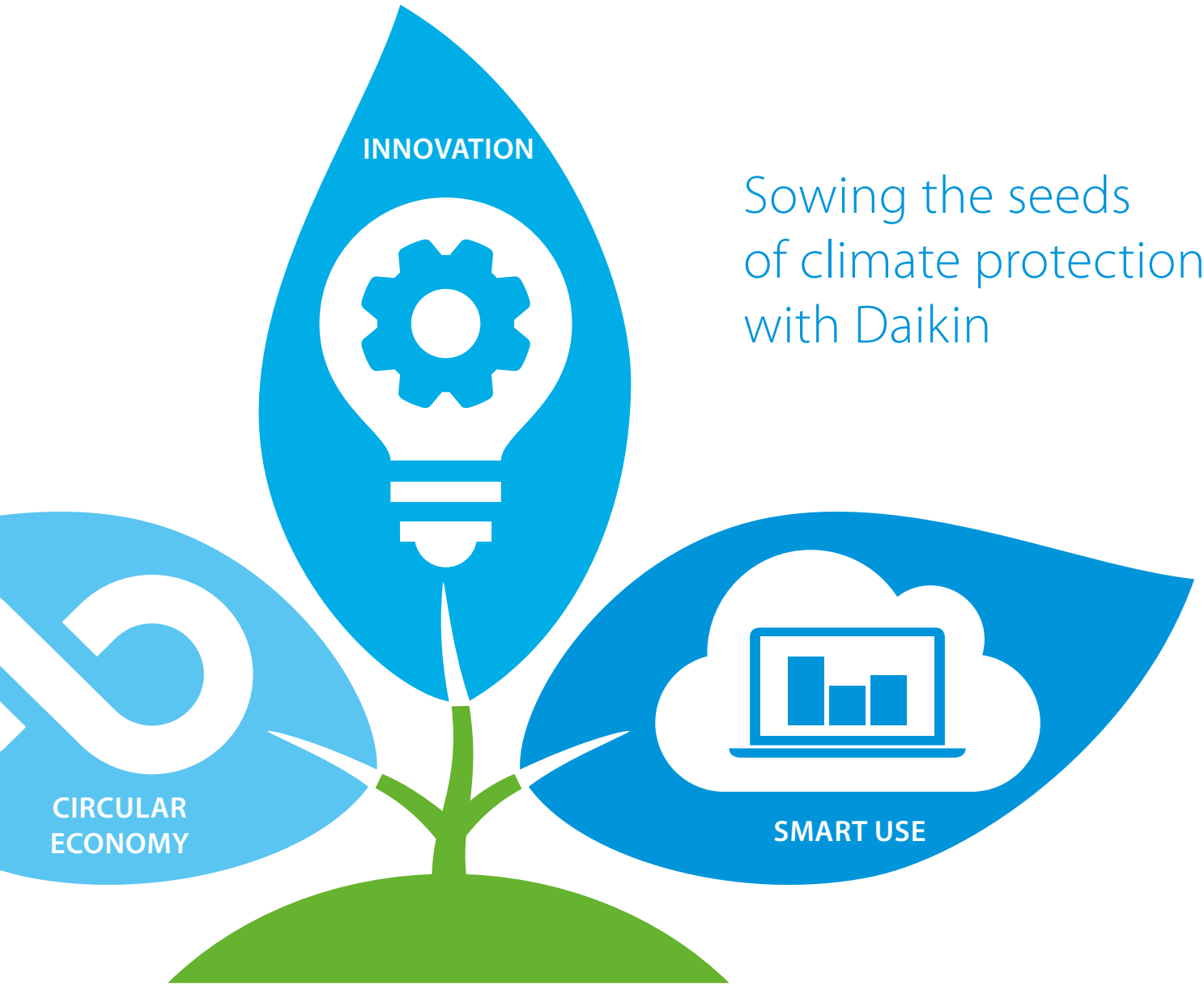
The target date set for the SDGs to be achieved is 2030. For more information on the Sustainable Development Goals, please visit: sdgs.un.org/goals

BREEAM®

If you're also commited to explore sustainable solutions that allow you to increase the market value and decrease the running costs of your building, BREEAM and this brochure is your ideal guidance. As a **BREEAM expert**, Daikin offers **advice** and the **solutions** to reach the **sustainable performance of your building** you want within the budget you foresee.

Determined to reduce our environmental footprint and the one of our customers, we aim to be CO_2-neutral by 2050. A circular economy, innovation and smart use – these are the stepping stones on our path.

For more information visit: daikin.eu/building-a-circular-economy



Sowing the seeds of climate protection with Daikin

Through a circular economy

- Re-use refrigerants through L∞P by Daikin
- Enable customers to create their own circular economy of refrigerants through the recover-reclaim-reuse program

Through innovation

- Introducing the lower GWP refrigerant R-32
- Offer high seasonal efficiencies
- Maximise efficiency 24/7 by deploying unique auto cleaning filters
- Adapted systems for well insulated or passive buildings

Through smart use

- Rigorously follow up on energy consumption via the Daikin Cloud Service
- Factor in expert advice to continuously optimise system efficiency
- Enable predictive maintenance to ensure optimum operation and uptime
- Prevent energy waste with smart key cards and sensors

What is BREEAM?

BREEAM (British Research Establishment Environmental Assessment Method) is **a certification system that recognises sustainable buildings that exceed national standards**. As an internationally leading quality label, it provides investors and building owners the guidelines to focus sustainability in building design as well as the environmental impact of products in buildings.

The BREEAM label assesses the overall building concept in **10 different categories**. **Credits** are awarded and weighted for each category in order to generate the **final score for the building**, in levels from 'pass' to 'outstanding'. The final BREEAM building score recognises the effort the investor or building owner have done and result in increased property, leasing or renting value.

Daikin contributes in 6 BREEAM categories:


Management


Health & Wellbeing


Energy


Materials


Waste


Pollution


Land Use


Transport


Water


Innovation

Why BREEAM?

BREEAM offers many advantages for project developers, building tenants and building owners:

Highly improved quality of life for the building user

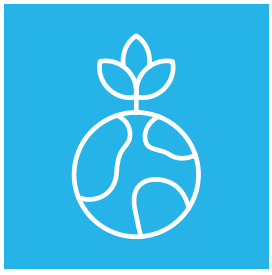
- Improved comfort
- Easier to attract talent
- Higher work efficiency
- Lower sick rates

High building value for the developer and owner

- Higher selling and rental prices (up to 20%!)
- Fast sale or rent out
- Higher project ROI

Lower operational, maintenance and refurbishment costs

- Lower running costs thanks to highly efficient building technologies
- Lower renovation costs thanks to building flexibility and longer compliancy with legislation



Lower environmental impact of the building

- Lower CO2 footprint of the building
- Cleaner technologies for better health and pollution reduction
- Better waste management
- Efficient use of land and resources

Daikin, your partner for your green project

Choosing the sustainable path is no longer a matter of choice, it's an obligation. As every building is unique, it requires a different solution to match its unique properties. It is essential to have an **HVAC-R partner** like Daikin, with knowledge and portfolio **to achieve your BREEAM objectives while staying within budget**.

Our HVAC-R total solutions increase the environmental value of buildings and enhance the working environment of tenants. Integration of Daikin technologies will therefore contribute to the overall sustainability level of the building and enable you to **to reach a BREAAM Excellent or Outstanding score**.

Daikin heat pumps can contribute in

6 out of 10 BREEAM categories

and achieve

up to **30** BREEAM credits*

*The feasibility to obtain these credits were analysed and

confirmed by an independent and qualified expert

engineering company: ENCON

Scan the code to download

Save time by using our in-depth BREEAM assessment sheet, created by our team of experts, as base of evidence towards assessors when applying for BREEAM credits.

Why Daikin?

to maximize your BREEAM rating

1. Team up with our own **accredited professionals (AP's)** assisting you to achieve your green building certification.
2. A global leader with local manufacturing service infrastructure and resources to provide **oustanding aftercare support**, advanced commissioning and hand-over.
3. Daikin Cloud Service ensures a **pro-active aftercare,** by detecting excessive energy use or potential issues before they occur to maximise system lifetime and minimize operational costs.
4. **First class Indoor Air Quality** thanks to low VOC emission, optimal thermal zoning and a low acoustic performance.
5. **Responsible sourcing and waste reduction**: BES6001 and ISO14001 certification delivers extra credits for the project.
6. Low carbon heating, cooling, ventilation and refrigeration thanks to **market-leading seasonal efficiency**.
7. Reduced environmental impact thanks to **refrigerant leak detection** systems and reuse of existing refrigerant through the **L∞P by Daikin** program.
8. High quality and performant products result in a **positive life cycle analysis**.
9. Our system are designed to be **easily adaptable** and upgradable to meet future building demands

Find out in which categories Daikin gains credits in the BREEAM International NC 2016 on the next pages.

Detailed credit information

Management

This category encourages the adoption of sustainable management practices in connection with design, construction, commissioning, handover and aftercare activities to ensure that robust sustainability objectives are set and followed through into the operation of the building.

Issues within this category focus on embedding sustainability actions through the key stages of design, procurement and initial occupation from the initial project brief stage to the appropriate provision of aftercare.

MAN 02 – Life Cycle Cost (LCC)

3 credits can be scored in the below assessment criteria:

1. Elemental life cycle cost (LCC)
2. **Component level LCC options appraisal**
3. Capital cost reporting

VRV IV / VRV 5 heat pumps:

+1 CREDIT

Our heat pumps minimise the life cycle costs of the building thanks to the long-lasting quality and upgradability.

Our local support teams (service, key accounts, consulting sales, ...) assist in project management by providing the necessary information on system costs, ROI, servicing, ...

MAN 04 – Commissioning and handover

4 credits can be scored in the below assessment criteria:

1. Commissioning, testing schedule and responsibilities
2. **Commissioning, design and preparation**
3. Testing and inspecting building fabric
4. **Handover**

VRV IV / VRV 5 heat pumps:

+2 CREDITS

We provide installation manuals and a schedule of commissioning for the HVAC-R work, including an overview for commissioning and recommissioning.

Our local service support teams can assist in advanced commissioning and hand-over and can provide an extensive set of documentation to make a user guide and training schedule for HVAC-R.

MAN 05 – Aftercare support

3 credits can be scored in the below assessment criteria:

1. **There is operational infrastructure and resources in place to provide aftercare support to the building occupiers**
2. **Handover seasonal commissioning activities will be completed over a minimum 12-month period**
3. Post-occupancy evaluation (POE)

VRV IV / VRV 5 heat pumps:

+2 CREDITS

Our local service infrastructure and resources provide oustanding aftercare support. Also the Daikin Cloud Service ensures a pro-active aftercare, by detecting potential issues before they occur.

Detailed credit information

Health & Wellbeing

This category encourages an increase in the comfort, health and safety of building occupants, visitors and others within the vicinity.

Issues within this category aim to enhance the quality of life in building by recognizing those that encourage a healthy and safe internal and external environment for occupants.

HEA02 – Indoor air quality

5 credits can be scored in the below assessment criteria:

1. **Indoor Air Quality (IAQ) plan**
2. **Ventilation**
3. Emissions from construction products
4. **Post construction indoor air quality measurement**
5. Adaptability – Potential for natural ventilation

VRV IV / VRV 5 heat pumps:

+3 CREDITS

Daikin VRV systems have no negative reaction on the VOC and formaldehyde emission on the building. Daikin ventilation units are fully integrateable in the heat pump solution.
The system is also part of the indoor air quality plan (description of the systems in the building + which influence they have on the indoor air quality).

Advantages of direct expansion

VRV systems

The use of refrigerant as heat transfer medium makes our VRV systems highly efficient and allows very precise zone and climate control with a fast response to changing temperatures.

HEA04 – Thermal comfort

3 credits can be scored in the below assessment criteria.

1. **Thermal modelling**
2. **Thermal modelling climate change environment / Post construction indoor air quality measurement**
3. **Thermal zoning and controls**

VRV IV / VRV 5 heat pumps:

+3 CREDITS

Our heat pumps provide an optimal indoor thermal comfort. Every indoor unit can be individually controlled and has a very fast response to changing temperature conditions, thanks to our direct expansion VRV technology with Variable Refrigerant Temperature.
This results in a positive Predicted Mean Vote (PMV) modeling and Predicted Percentage of Dissatisfied (PPD) measurement.

HEA05 – Acoustic performance

2 credits can be scored in the below assessment criteria:

1. **Sound insulation and indoor ambient noise level**
2. Room acoustics

VRV IV / VRV 5 heat pumps:

+1 CREDIT

Our heat pumps satisfy the low acoustic performance of indoor units offering wide range of indoor systems and solutions for acoustic attenuation.
The indoor acoustic values should always be checked with a suitably qualified acoustician (SQA).

Detailed credit information

Energy

This category encourages the specification of energy efficient building solutions, systems and equipment that support the sustainable use of energy in the building and sustainable management in the buidling's operation.

Issues in this section assess measures to improve the inherent energy efficiency of the building, encourage the reduce carbon emissions, and support efficient management throughout the operational phase of a building's life.

ENE01 – Reduction of energy use and carbon emissions

15 credits can be scored in the below assessment criteria:

1. **Calculate energy performance Ratio for New Construction (EPR NC) and compare with benchmarks**

VRV IV / VRV 5 heat pumps:
+1~15
CREDIT(S)

Daikin VRV heat pumps highly contribute to gain up to 15 credits in this category.

Using our heat pumps directly gains 1 credit, however in combination with other energy performant building materials they enable you to reach a BREEAM Excellent or Outstanding score.

Smart use reduces energy consumption

Continuous optimisation of system efficiency through our cloud solutions ensures our systems run at best efficiency.

Integration of presence sensors and window or key card contacts ensure the system only operates when needed, preventing energy waste while keeping maximum comfort.

ENE02 – Energy monitoring

2 credits can be scored in the below assessment criteria:

1. **Sub-metering of end-use categories**
2. **Sub-metering of high energy load and tenancy areas**

VRV IV / VRV 5 heat pumps:
+2 CREDITS

Through our optional intelligent Touch Manager or Daikin Cloud Service advanced energy metering is possible. This thanks to the permanent data collection and measurements of the energy usage of all energy consumers in the building. Additionally submetering is possible per floor through our PPD function.

ENE04 – Low carbon design

3 credits can be scored in the below assessment criteria:

1. **Passive design**
2. Free cooling
3. **Low and zero carbon (LZC) technologies**

VRV IV / VRV 5 heat pumps:
+2 CREDITS

Our heat pumps support the passive design strategy of the building and the reduction of CO_2 emission. Our products are also part of the low carbon feasibility study to select the most suitable solution for the building.

Detailed credit information

Materials

This category encourages steps taken to reduce the impact of construction materials through design, construction, maintenance and repair.

Issues in this section focus on the procurement of materials that are sourced in a responsible way and have a low embodied impact over their entire life, including extraction, processing and manufacture and recycling.

MAT03 – Responsible sourcing of construction products

4 credits can be scored in the below assessment criteria:

1. Sustainable Procurement Plan
2. **Using materials with responsible origin**

VRV IV / VRV 5 heat pumps:

+1 CREDIT

Daikin heat pumps carry the ISO14001 (waste reduction) and BES6001 (responsible sourcing) certificate and are mainly locally produced.

MAT06 – Material efficiency

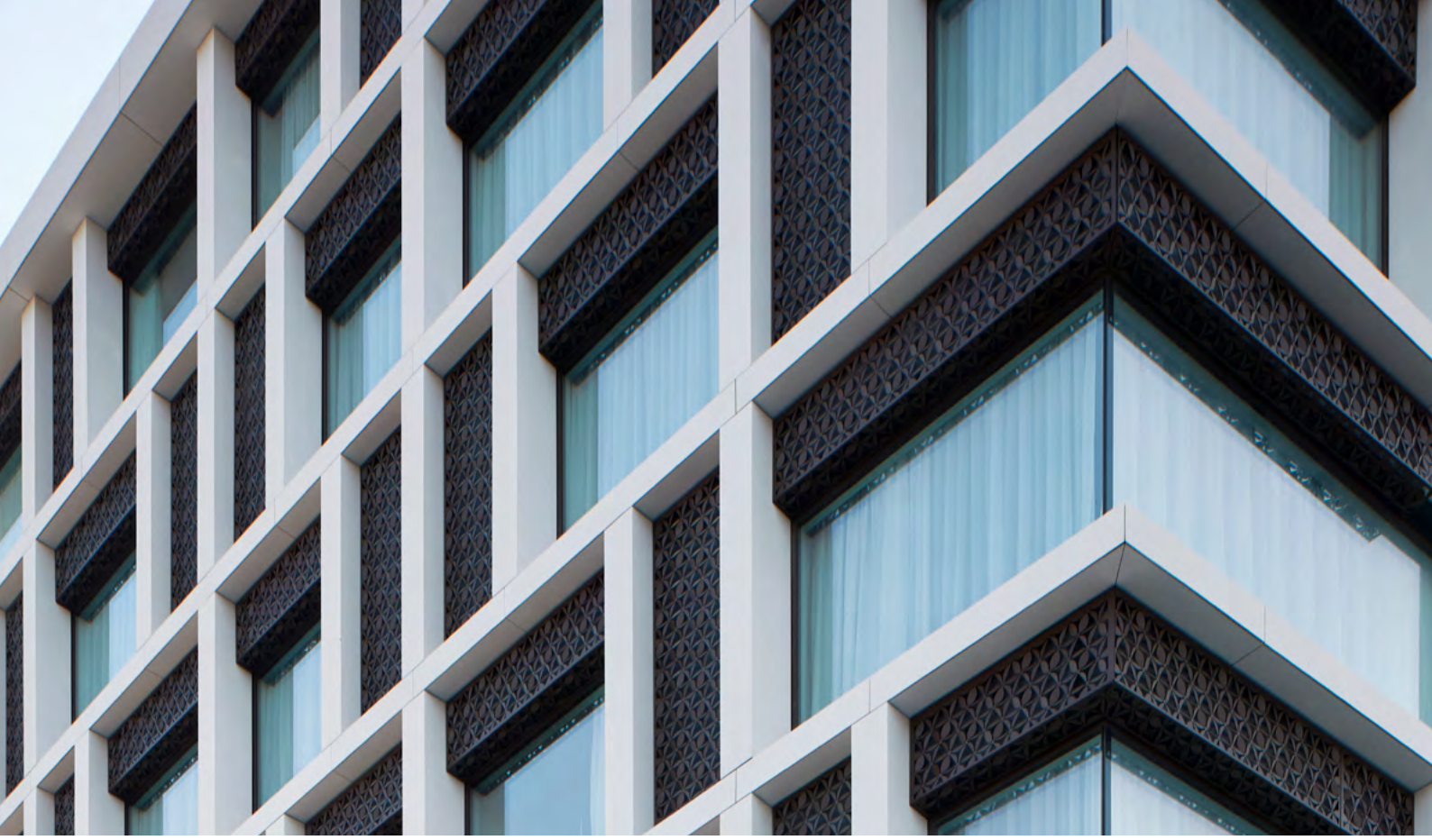
1 credits can be scored in the below assessment criteria:

1. **Efficient use of materials**

VRV IV / VRV 5 heat pumps:

+1 CREDIT

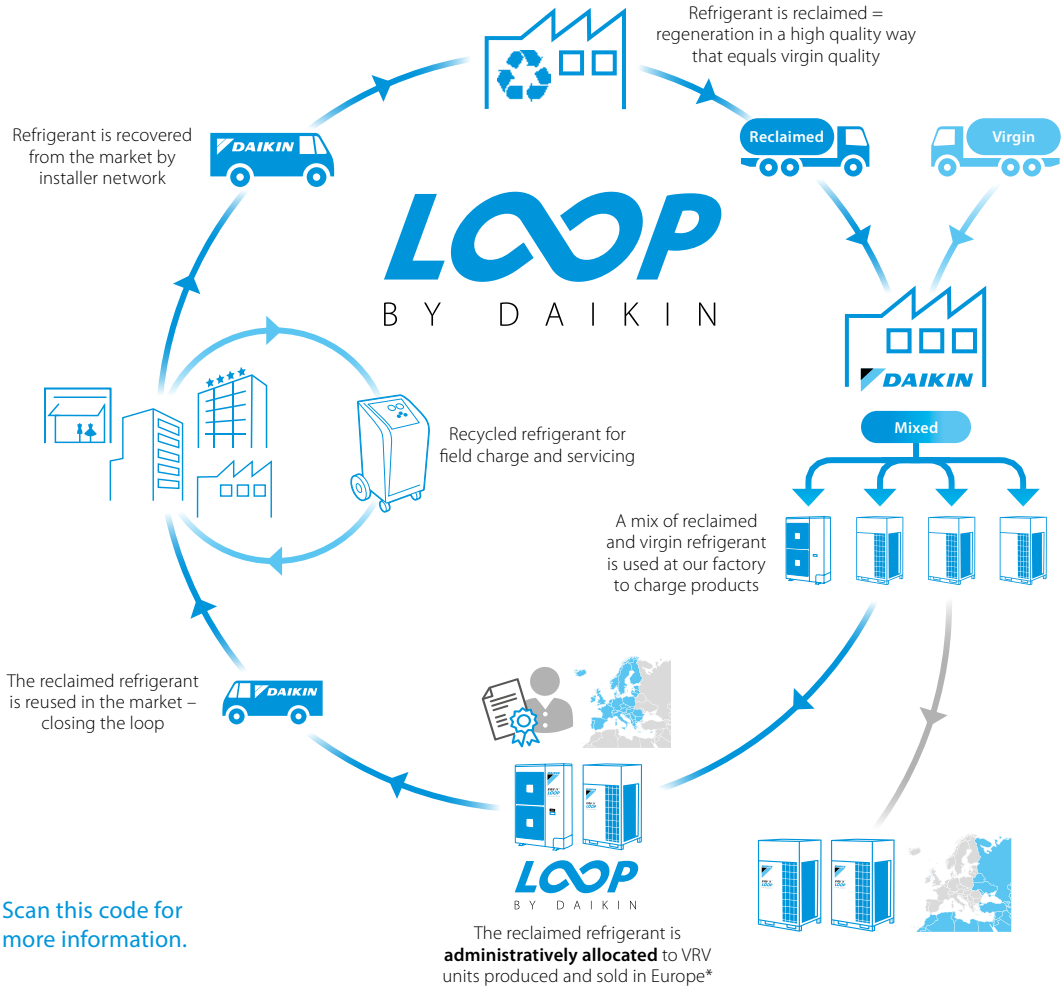
Our heat pumps are designed to be easily adapted when design changes happen throughout the lifetime of the building. Our products are also very durable and components can be easily upgraded, increasing the life time and optimizing material efficiency in the building.



Beyond certification – the circular economy of refrigerants

Daikin goes beyond the current BREEAM assessement, offering all of it's VRV heat pumps produced and sold in Europe* with reclaimed refrigerant. This means that new VRV systems reuse refrigerant and avoid more than 250,000 kg of virgin gas being produced each year.

*EU member states, UK, Bosnia-Herzegovina, Serbia, Montenegro, Kosovo, Albania, North Macedonia, Iceland, Norway, Switzerland.



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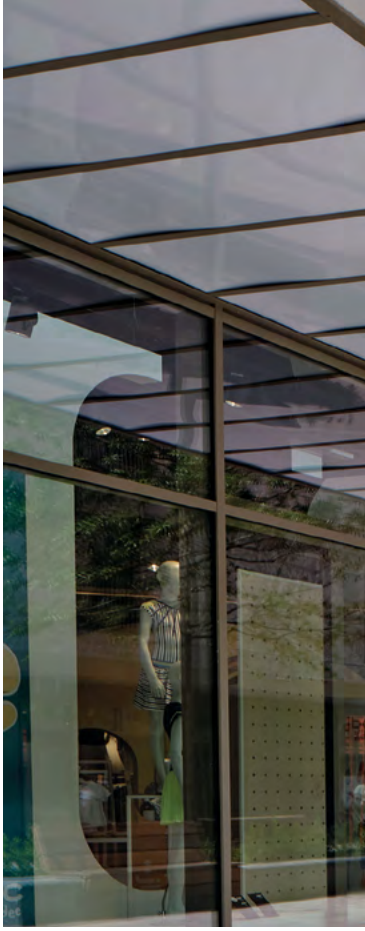


Detailed credit information

Waste

This category encourages the sustainable management (and reuse where feasible) of construction waste, operational waste and waste through future maintenance and repairs associated with the building structure.

By encouraging good design and construction practices, issues in this category aim to reduce the waste arising from the construction and operation of the building, encouraging its diversion from landfill.
It includes recognition of measures to reduce future waste as a result of the need to alter the building in the light of future changes to climate.

WST01 – Construction waste management

3 credits can be scored in the below assessment criteria:

1. **Reduction construction waste**
2. **Diversion of resources from landfill**

VRV IV / VRV 5 heat pumps:
+2 CREDITS

Our product packaging is easy to recycle and during projects we can optimize the waste streams on the construction site by following the waste reduction plan.

WST05 – Adaptation to climate change

1 credit can be scored in the below assessment criteria:

1. **Conduct a climate change adaptation strategy appraisal via risk assessment**

VRV IV / VRV 5 heat pumps:

+1 CREDIT

Our VRV heat pumps are designed to easily adapt to future climate changes. The operation range is very wide to cover potential temperature rise/decline. In addition, our Water Cooled systems are not subjected to outdoor condition changes, as they are installed indoors. Comfortable temperatures can be kept thanks to Variable Refrigerant Temperature control adjusting unit capacity to meet the demand at every point of the day.

WST06 – Design for disassembly and adaptability

2 credits can be scored in the below assessment criteria:

1. **Conduct a study to explore the ease of disassembly, the functional adaptation potential of different design scenarios and develop recommendations or solutions**
2. **The proposed recommendations or solutions are implemented**

VRV IV / VRV 5 heat pumps:

+2 CREDITS

Our VRV heat pumps are extremely flexible to easily adapt to interior or exterior changes. On top of that future expansion of capacity or upgrades to keep up with technological developments is easy as individual components can be replaced.

Detailed credit information

Pollution

This category addresses the prevention and control of pollution and surface water run-off associated with the building's location and use.

Issues in this category aim to reduce the building's impact on surrounding communities and environment arising from light-pollution, noise, flooding and emissions to air, land and water.

POL01 – Impact of refrigerants

4 credits can be scored in the below assessment criteria:

1. Refrigerants have a Global Warming Potential (GWP) ≤ 10 OR DELC CO_{2e} of ≤100 kg
2. **DELC CO_{2e} ≤1000 kg CO_{2e}/kW**
3. **ODP = 0**
4. **Leak detection**

VRV IV heat pumps: **+1 OR 2 CREDITS**

VRV 5 heat pumps: **+3 CREDITS**

All our heat pumps use refrigerants with an ODP of 0. Our VRV 5 heat pumps, with R-32 refrigerant, have a DELC CO_{2e} of ≤1000 kg CO_{2e}/kW and have a standard integrated leak detection system.

POL02 – Local air quality

2 credits can be scored in the below assessment criteria:

1. **Heating and hot water is supplied by non-combustion systems (electricity)**
2. **Emissions from combustion systems do not exceed levels set**

VRV IV / VRV5 heat pumps:

+2 CREDITS

Our heat pumps have a low indirect NOx emission, meeting the BREEAM standard.

POL05 – Reduction of noise pollution

1 credit can be scored in the below assessment criteria:

1. **Noise impact assessment compliant with the national standards**

VRV IV / VRV5 heat pumps:

+1 CREDIT

Our VRV Heat Pump sound emmissions are well within the BREEAM criteria on noise impact. Our water-cooled units are installed indoors and so no special measures or calculations are needed to comply.

In very sound sensitive environments the sound can easily be further reduced by activating the low noise operation (LNOP) on our units.

VRV total solution at a glance

Typically, many buildings today rely on several separate systems for heating, cooling, air curtain heating and hot water. As a result energy is wasted. To provide a much more efficient alternative, VRV technology has been developed into ...

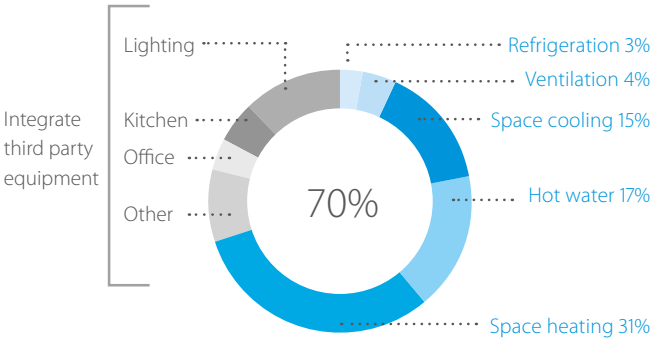
a total solution managing up to

70%

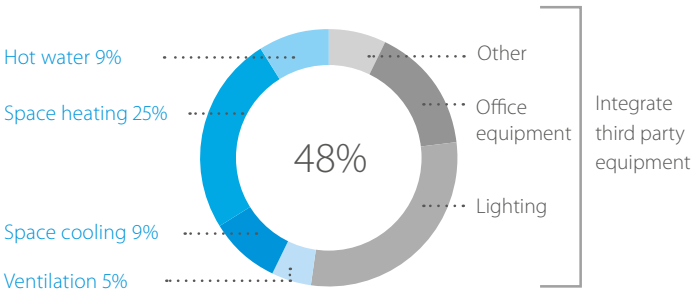
of a buildings energy consumption giving large potential to cost saving

- **Heating and cooling** for year round comfort
- **Hot water** for efficient production of hot water
- **Underfloor heating /cooling** for efficient space heating/cooling
- **Fresh air ventilation** for high quality environments
- **Air curtains** for optimum air separation
- **Controls** for maximum operating efficiency

Average hotel energy consumption



Average office energy consumption



Office total solution application

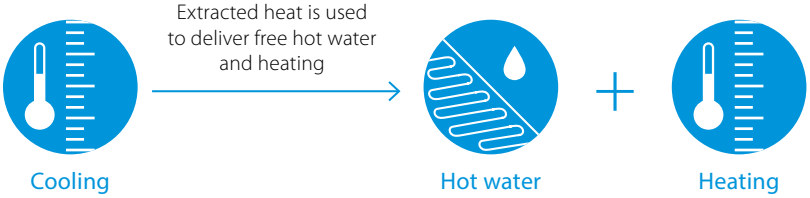
HEATING AND COOLING
› Wide range of indoor units models to suit the application
› With optional presence sensors
› Individually controlled per zone

FRESH AIR VENTILATION
› Minimising energy waste by recovering exhaust heat
› Centralised control with the cooling & heating system
› A range of air filtration filters ensures supply of clear air

CENTRALISED CONTROL
› Complete Daikin Building Management System
› Plug & play connectable
› Smart energy management
› Predictive maintenance

HOT WATER
› Cutting the cost of hot water by use of heat pump technology
› 'Free' hot water production by transferring heat from areas requiring cooling
› Possibility to connect solar panels

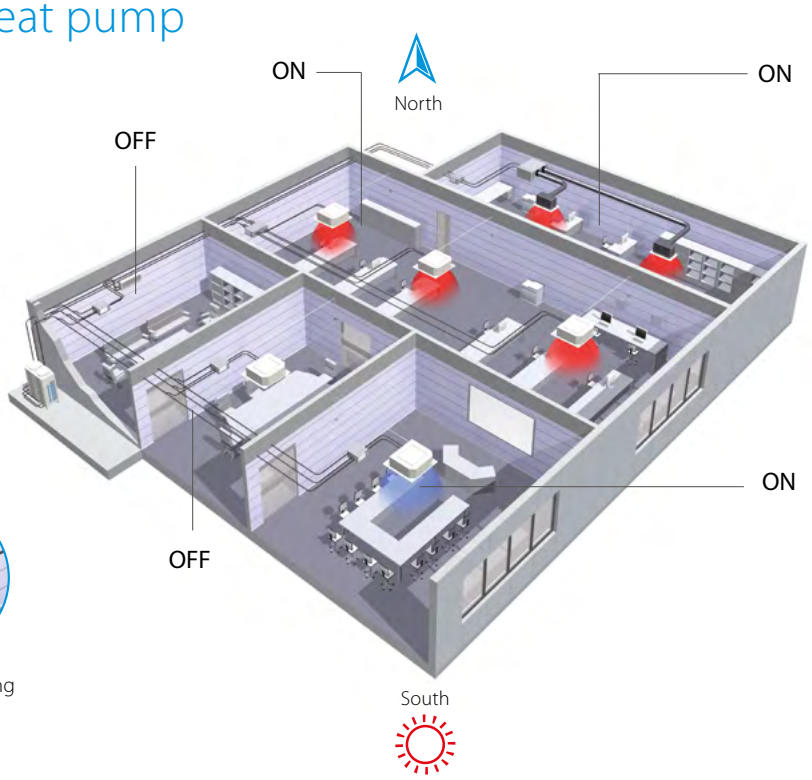
"Free" heat and hot water production
A VRV total solution heat recovery system reuses heat, from for example offices and server rooms, to warm other areas or produce hot water.



VRV system advantages

Air cooled (heat recovery) heat pump

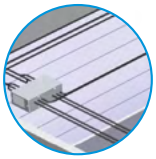
- Fast and easy to install: no need for additional components
- Simultaneous heating AND cooling with individual temperature control*
- "Free" heating and hot water production by transferring heat from areas requiring cooling*
- In rooms where there is no occupation the system can be switched off
- Running costs can be 30 to 40% lower when compared to water fan coil systems
- Operation range from - 25°C ~ 52°C



Components:

Outdoor unit

Indoor unit

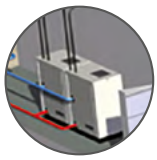


Refrigerant piping (and BS box*)

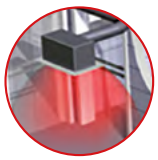
Water cooled (heat recovery) heat pump

- Suitable for high rise and large buildings because of the nearly unlimited possibilities of water piping
- Not affected by outdoor temperature/climate conditions
- Reduce CO_2 emmisions thanks to the use of geothermal energy as a renewable energy source
- Allows heat recovery in the entire building thanks to the storage of energy in the water circuit
- Lower refrigerant levels thanks to the limited distance between outdoor and indoor units
- Very compact & stackable units reduce plant room space

Components:

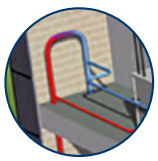


Outdoor unit

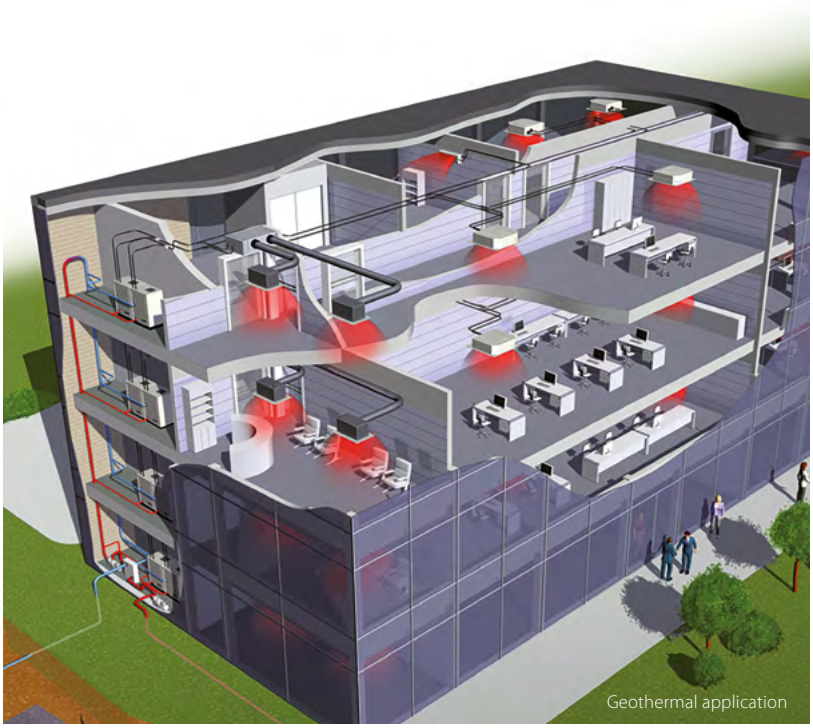


Indoor unit

Refrigerant piping (and BS box*)



(Geothermal) water loop



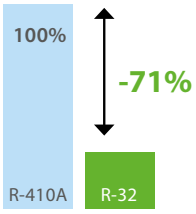
* VRV heat recovery only

Designed for the future

Definitely the best air cooled heat pump we ever made!

VRV 5 S-series

R-32 BLUEVOLUTION



Lower CO_2 equivalents thanks to R-32 refrigerant

› R-32 Global Warming Potential (GWP) is 68% lower than R-410A
› 15% less refrigerant charge
› Leading to a **GWP reduction of 71%** on system level!

-71%
potential global warming impact

ErP 2021 COMPLIANT

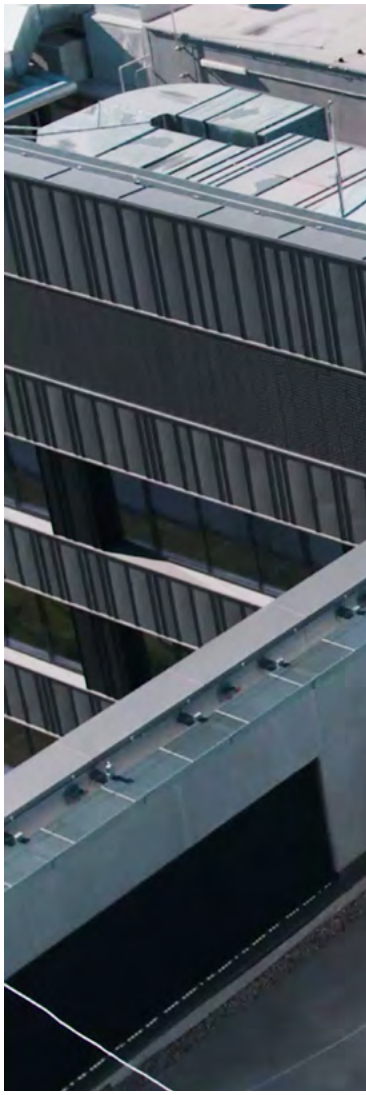
Industry-leading real life efficiencies

› Exceeding the ErP 2021 ecodesign legislation
› Tested with our most sold indoor units

Unique Variable Refrigerant Temperature

Variable Refrigerant Temperature

› The biggest leap in efficiency since the inverter compressor
› Continuous adjustment of both the inverter compressor speed and the refrigerant temperature, ensuring the necessary capacity to meet the building load with the highest efficiency at all times!



Case studies

Daikin has successfully participated in many green and sustainable projects. Helping builders achieve BREEAM Excellent, LEED Gold, WELL and similar certificates has become one of our specialities – and our case studies prove it!

DOT complex

BREEAM Excellent

The DOT complex consists out of 7 class A buildings with a leasable area of more than 63,000 m^2. Daikin provided a single point of contact for HVAC, by offering the heating, cooling, ventilation and controls.

Comfort cooling and heating

VRV IV heat recovery units were used for comfort cooling & heating. The system offers simultaneous operation in cooling and heating. This allows flexible zoning and better energy management as heat can be recovered. The indoor concealed ceiling units used are only 245 mm high, while delivering 150 Pa of static pressure, making them the slimmest yet most powerful on the market.

Ventilation

3 R-32 chillers provide the capacity for the Air Handling Units. The AHU's provided have air flow rates up to 36,000 m^3/h and are equipped with CO_2 sensors.

Control

The entire solution, including the Sky Air serverroom cooling, is centrally controlled our intelligent Touch Manager mini BMS. Thanks to the PPD function the total power consumption can easily be divided over the different tenants.

Location

L1 building, DOT complex, Krakow

Building details

Total usable area: 64.000 m^2
Total capacity: 8.000 kW
L1 building area: 13.450 m^2
L1 building capacity: 1.300 kW
Construction year L1: 2019
No of floors L1 building: 6 + basement

Daikin systems installed L1 building

- 33 VRV IV heat recovery outdoor units
- 51 branch selector boxes
- 325 FXSQ medium static pressure concealed ceiling units
- Sky Air Alpha-series for duty-rotation server room cooling
- 3 multiple-scroll chillers connected to AHU
- 3 Daikin Air Handling Units
- Local wired controllers + 2 iTM mini BMS

Crystal Tower

BREEAM Design Phase: Excellent rating

A great and well-known example of a Daikin Total Solution leading to high energy-efficient HVAC consumption

› A combination of VRV, Sky Air and Applied systems ensuring all offices and common areas are fully air conditioned.

› Water-cooled VRV as the main contributor to total HVAC energy efficiency due to its two-stage heat recovery system.

› Flexibility: individual thermal control and comfort with VRV on each floor and space.

› Problem-free connection between Daikin units and the LonWorks BMS system ensures the building's total energy consumption is properly monitored and controlled.

Location

48 Lancu de Hunedoara Boulevard
Bucharest Romania

Building details

Built-up area: 24,728 m^2
Total usable area: 20,020 m^2
Floors: 4 basements, 15 floors, technical floor
Building height: 72 m
Office space per level: approx. 1,000 m^2

Daikin systems installed

› 67 x VRV water-cooled units
› 2 x VRV outdoor heat pump units
› 289 VRV indoor units (265 ducts, 24 x cassettes)
› 5 x Sky Air with Roundflow Cassettes
› 4 x air-cooled water chillers
› 11 x DMS504B51 (LonWorks gateway)

Awards

› Green Building of the Year 2012 (ROGBC)
› Environmental Social & Sustainability award (ESSA)

Velocity

BREEAM Excellent

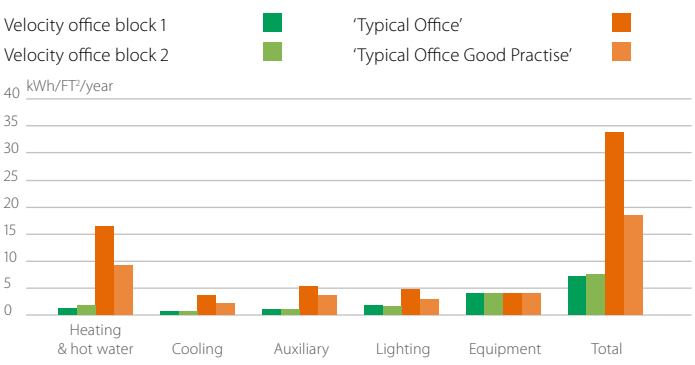
Daikin VRV Heat Recovery system as a big contributor to high Energy Performance of a stylish headquarter office

Cost effective occupation

Velocity, with its strong eco-credentials can demonstrate significant occupation cost savings when compared to a more typical office building in the UK.
The graph below demonstrates the difference in annual energy consumption, per unit floor area, for both Velocity office blocks when compared to the CIBSE* 'Typical Office' benchmark and 'Typical Office'. Good Practise' benchmark built to the Building regulations at the time. A CIBSE 'Typical Office Good Practise' is equivalent to those built between 2006 and 2010.

*Chartered Institute for Building Services Engineers

Energy use (per FT² per year



Location

Velocity Brooklands, Weybridge, KT13 0SL, United Kingdom

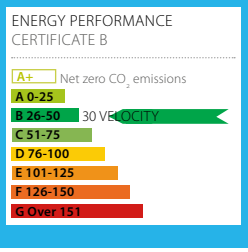
Building details

Total usable area: 9885 m²
Floors: ground floor + 4 floors
Building Height: 19,25 m (3,850 m floor to floor)
Construction year: 2012

Daikin systems installed

› 25 x VRV III Heat Recovery units
› 2 x VRV heat pump outdoor units
› 265 VRV indoor units (Ducted fan coil unit)
› 10 x DCS601C51 (Intelligent controller)

Energy Performance Certificate: B



Perial Asset Management

BREEAM In-Use: Good

- Built in the 1990's, this 4,200 m² office building was refurbished in 2020
- Thermal coatings were installed on the glazing of the south-facing façade, lowering interior temperatures in summer with 2°C.
- The new VRV system was measured to be up to 28% more efficient then the old system
- Thanks to the use of reclaimed refrigerant 156 kg of virigin refrigerant production could be saved

For more in-depth information you can download our assessment sheet, created by our team of experts, to help you increase your building's rating.

You also save time using this sheet as base of evidence towards assessors when applying for BREEAM credits.

Scan this code to download the sheet.

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