DAIKIN

BREEAM®

Green building solutions

Sustainable design
with Daikin HVAC-R systems

Today's challenges

From 2015 onwards the majority of new building projects in Europe are expected to be green.

93% percent of developers & Investors consider green certification important

(Source: DLP report 2014)

Property developers are setting high standards

› Aiming for a BREEAM Excellent or LEED Gold target is no longer rare
› The real challenge? Achieving these targets while staying within budget

HVAC-R systems play an important role

› Within the total green assessment & investment cost
› They require the alignment of many different parties

* BREEAM and LEED green building programmes are the two most important sustainable building certificates in Europe, covering more than 75% of the total sustainable-building certificate market.

Daikin: the best partner for your green project:

It is essential to choose an HVAC-R partner with the knowledge and portfolio to achieve your BREEAM or LEED objectives, and other green needs.

We have a team of BREEAM accredited professionals (APs) at your service!

› Over 20 APs across Europe
› Assisting you to achieve your BREEAM certificate

You get maximum support in scoring BREEAM credits & LEED points:

› Daikin Total HVAC-R Solutions
› High seasonal efficiency technologies
› Smart energy management with intelligent network
› Boost your end score with innovative products & technologies
› Assure your system runs in the most efficient way
› Top comfort all year round

Daikin BREEAM Accredited Professionals at your service!

We have over 20 BREEAM Accredited Professionals across Europe, helping you all the way – from design phase to commissioning – to achieve your BREEAM certificate. Their expertise goes beyond HVAC-R: they can help you on your entire project.

Even if a BREEAM certificate is not the target for your building, our APs are certified experts in selecting the most sustainable design to meet your needs.

To contact a Daikin BREEAM AP close to you, visit **www.daikineurope.com/minisite/sustainability/contactaps/index.jsp**







BREEAM®

Expertise






Maximise your BREEAM and LEED green building programme score with Daikin solutions

Daikin as your partner

- Daikin offers a total solution, bringing together expertise in green design and a wide range of sustainability focused products
- Simply working with our AP's will provide your project with BREEAM credits. Daikin's unique products have a big impact on energy efficiency, which in turn will score credits as well.

No energy waste

Many buildings today typically operate separate systems for heating, cooling, refrigeration, ventilation and hot water. As a result, a huge amount of energy is wasted.
A much more efficient alternative, Daikin offers a total solution managing up to 70% of a building's energy consumption, delivering maximum energy efficiency, minimum operating costs and reduced CO_2 emissions.

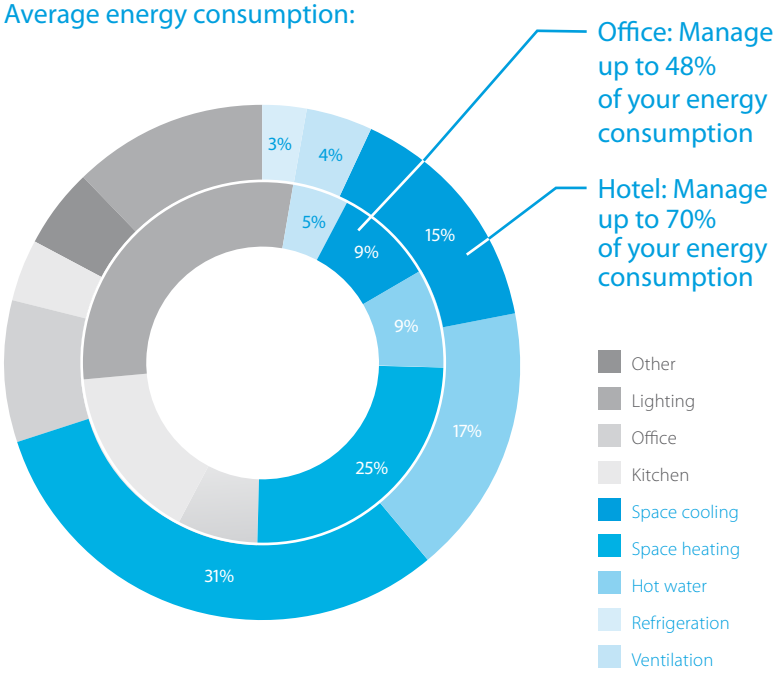
We make things easy to manage

The Daikin Total Solution provides a single point of contact for the design and maintenance of your system, making things easy for you.

Optimum comfort for guests and tenants

Our solution ensures the optimal balance of temperature, humidity and air freshness for a perfect comfort zone.

Average energy consumption:



Daikin have influence on many BREEAM categories:

MAN: Management	01 Sustainable procurement with our AP's	
	05 Life cycle cost and service planning with our selection software	
HEA: Health and Wellbeing	02 Indoor air quality thanks to our CO_2 sensors & high efficiency filters	
	03 Thermal comfort no more cold draft with Variable Refrigerant Temperature	
	05 Acoustic performance thanks to night quiet mode and low sound indoor units	
ENE: Energy	01 Energy efficiency thanks to heat recovery, inverter and Variable Refrigerant Temperature tecnology	See p8
	02 Energy monitoring with i-Net service	See p10
	04 Low and zero carbon technologies thanks to low carbon impact throughout the entire life cycle of our products	
	05 Energy efficient cold storage thanks to highly qualified Daikin installer network	
WAS: Waste	01 Construction waste management with our recycle programme	
POL: Pollution	01 Impact of refrigerants thanks to low refrigerant quantity in our system	
	02 Reducing nox emissions thanks to our automatic leak detection system	
	05 Noise attenuation with low sound outdoor units	

1. BREEAM category ENE: energy efficiency

Both BREEAM and LEED green building programmes put the strongest focus on energy efficiency. This is exactly why it's so important to choose Daikin.

Variable Refrigerant Temperature

Top seasonal efficiency

Customise your VRV for best seasonal efficiency & comfort

Thanks to its revolutionary Variable Refrigerant Temperature technology, VRV IV continuously adjusts the refrigerant temperature to the actual temperature and capacity needed, thus providing optimal seasonal efficiency at all times.

- **Seasonal efficiency increased by 28%**
- **The first weather compensating control on the market**
- **Customer comfort is assured with automatic adjustement of refrigerant temperature leading to higher outblow temperatures (avoiding cold draft)**

How does it work?

VRF standard

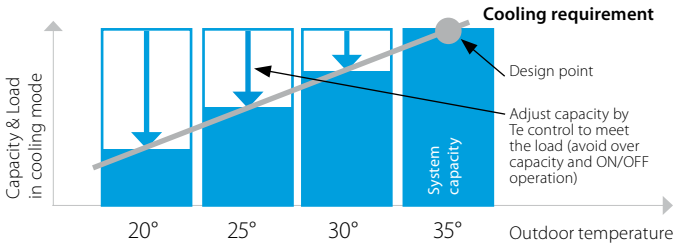
Capacity is controlled only with the variance of the inverter compressor

Daikin VRV IV

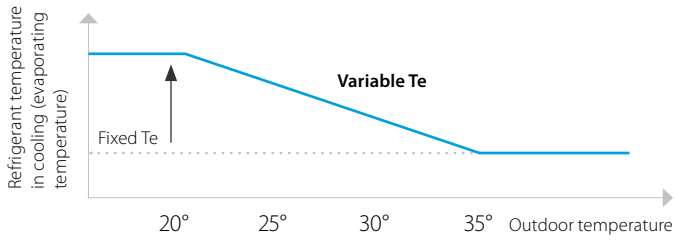
Variable Refrigerant Temperature control for energy saving in partial load condition.

The capacity is controlled by the inverter compressor AND variation of the evaporating (Te) and condensing (Tc) temperature of the refrigerant in order to achieve the highest seasonal efficiency.

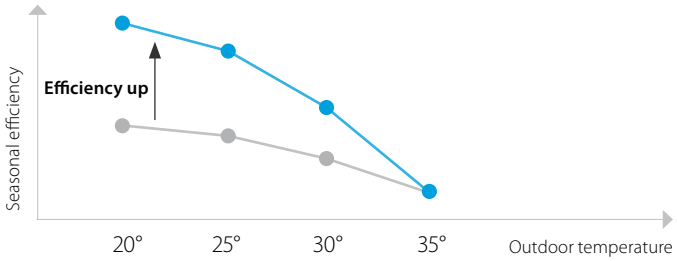
The colder it gets, the lower the load on the building and the lower the capacity need



The lower the capacity need the higher the refrigerant temperature can be



A higher refrigerant temperature results in a higher seasonal efficiency and higher comfort



Success story

Live test: up to 46% less energy consumed

A field trial was carried out at a fashion store chain in Germany and showed that the innovative Daikin VRV IV delivers dramatically better energy efficiency compared with previous models. The trial results showed that the new VRV IV system consumed up to 60% less energy than the VRV III system, particularly during cooling. Overall energy savings during heating averaged 20%.

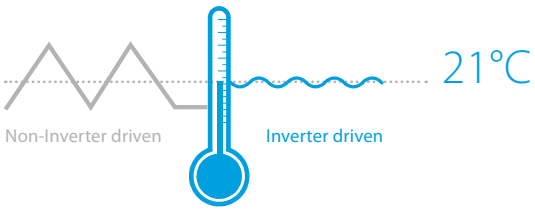
	VRV III 20HP (2 modules)	VRV IV 18HP (1 module)
Period	March 2012 - Febr 2013	March 2013 - Febr 2014
Avg (kWh/Month)	2.797	1.502
Total (KWh)	33.562	18.023
Total (€)	6.041	3.244
Yearly (operation cost/m² (€/m²)	9,9	5,3

46% savings = € 2.797

Inverter technology

Greater efficiency, comfort and reliability

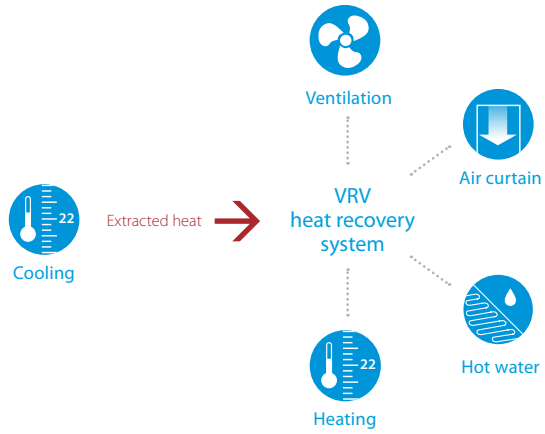
The inverter-driven units consume only the power necessary to match the load, resulting in reduced annual energy consumption and operation costs. Inverter technology delivers a quicker system response to changing load conditions, lower starting current requirements, fewer compressor start-ups for greater reliability and quieter operation at partial load. Daikin have the widest range of inverter-driven Chiller units on top of our fully inverter-driven VRV range.



No more heat waste with heat recovery

Daikin's VRV, Chiller and refrigeration heat-recovery units provide the highest BREEAM and LEED scores for energy efficiency calculations.

Heat recovery systems offer the highest efficiency by recovering heat from areas that require cooling to heat rooms and hot water virtually for free.



Measured data:
Fashion store Unterhaching (Germany)

- Floor space: 607m²
- Energy cost: 0,18 €/kWh
- System taken into account for consumption:
  - VRV IV heat pump with continuous heating
  - Round flow cassettes (without auto cleaning panel)
  - VAM for ventilation (2x VAM2000)
  - Biddle Air curtain

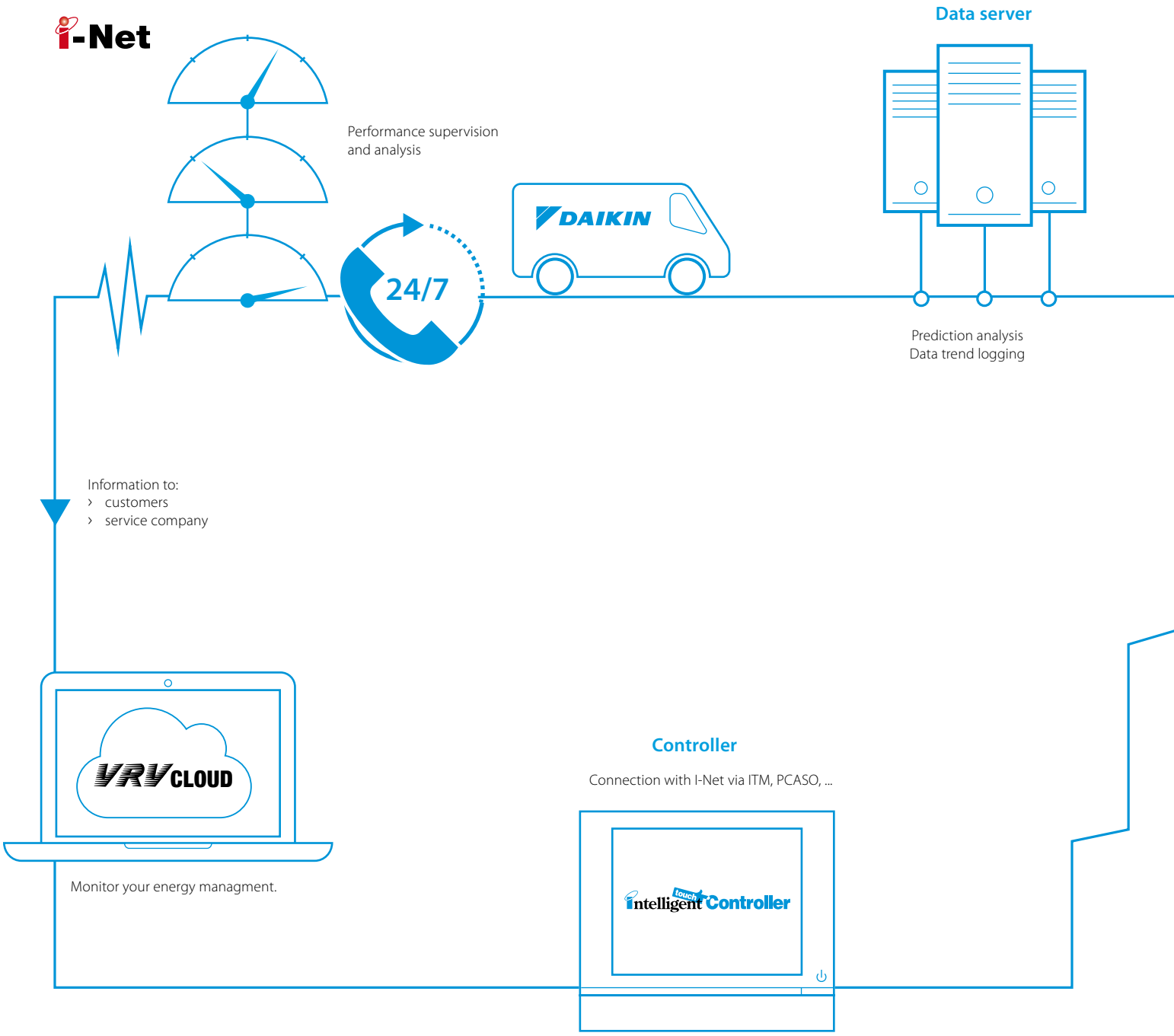
2. BREEAM category ENE: energy monitoring

To drastically reduce your energy consumption and CO_2 emissions it's not enough to simply make your equipment more efficient, also energy monitoring is important. BREEAM awards innovative products & technologies, such as VRV Cloud. This boosts your final points and BREEAM rating.

Intelligent network

To drastically reduce your buildings energy consumption the air conditioning operation needs to be managed and monitored 24/7.

Here, too, Daikin provides the solution: i-Net, a tool that gives you valuable knowledge to manage energy usage yourself or by Daikin professionals.

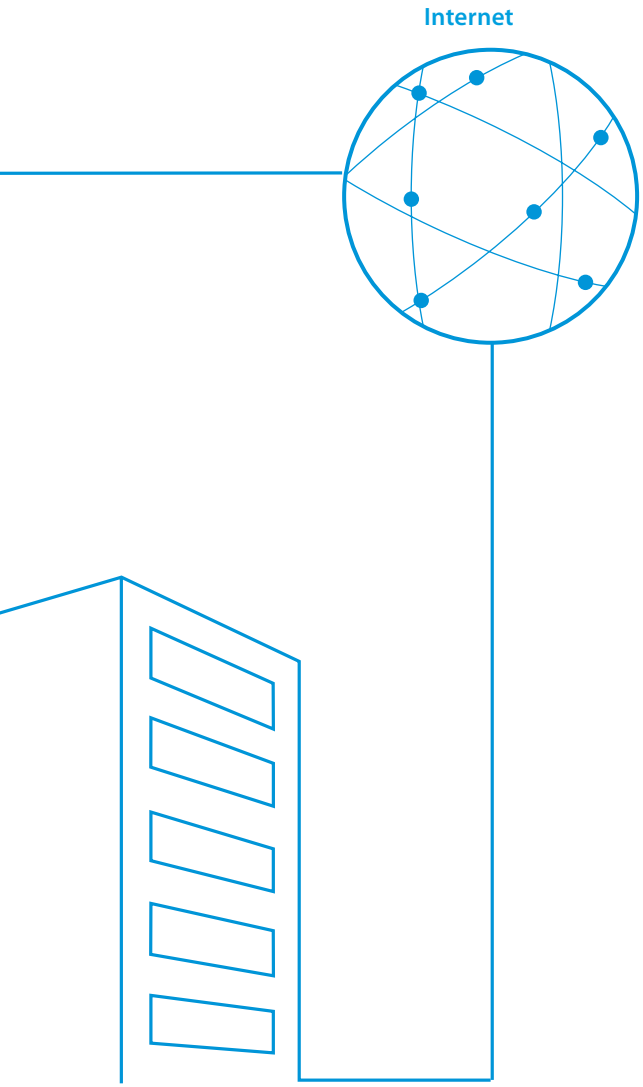


How does it work?

VRV Cloud

Get in the energy-management driver's seat with web-based energy data and analytics. Controlling your energy consumption results in energy savings up to 15%.

1. You plan your annual energy target assisted by Daikin
2. The cloud server monitors and checks the progress of your plan
3. The cloud server informs you if action is needed



Performance monitoring

Daikin's unique I-Net Service aims to prevent the equipment coming to an unexpected stop or needing emergency repair.

Analysis

Be connected with Daikin's experts, this gives you a clear overview of operability and use of the air conditioning system.

CHRYSTAL TOWER (BUCHAREST)
BREEAM Excellent design phase p.14

Case studies

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

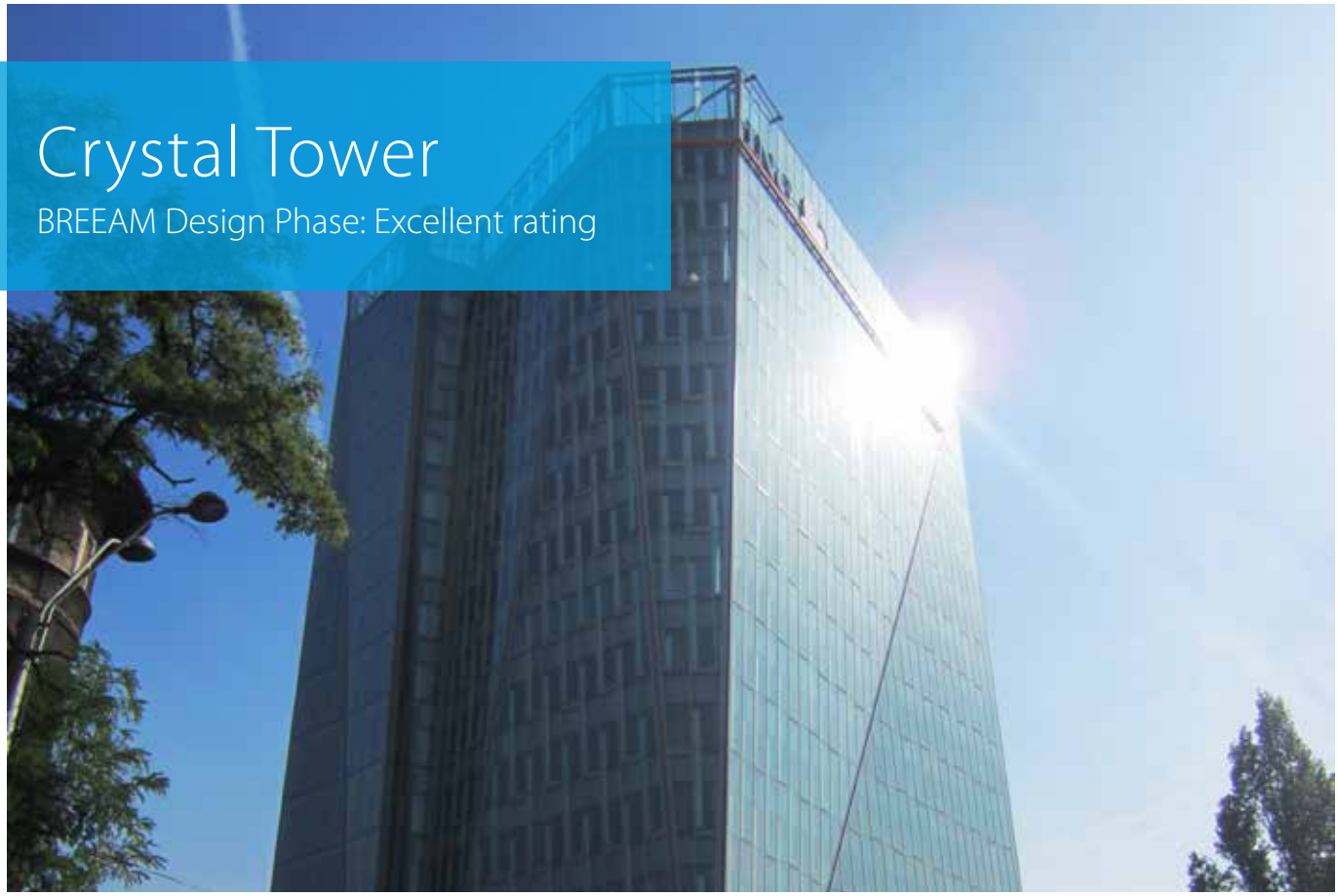
Other green references

PARK PHI (ENSCHEDE NL)
BREEAM Excellent

QUATTRO PARK C (KRAKOW, PL)
BREEAM Very Good

JAPAN HOUSE (MOSCOW, RU)
BREEAM Good

Find out more on www.daikineurope.com/references



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

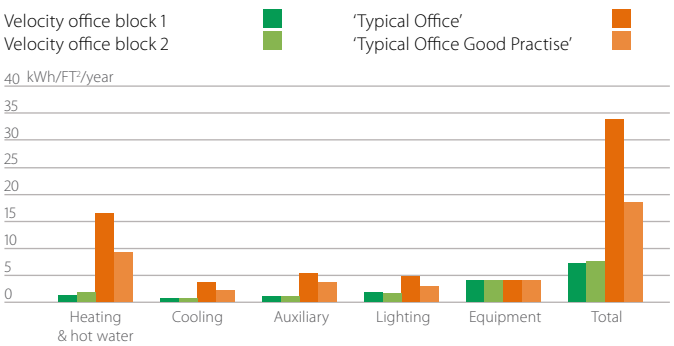
Daikin VRV Heat Recovery system as a big contributor to high Energy Performance of a stylish headquarter office

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

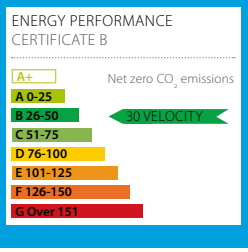
Building details

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



Daikin

Global leader in HVAC

For more information on Daikin please visit **www.daikineurope.com/greenbuildings**

To find a Daikin BREEAM Accredited Professional
please visit **www.daikineurope.com/minisite/sustainability/contactaps/index.jsp**

Founded in Japan in 1924, Daikin is the global and European N°1 HVAC provider. Present throughout Europe with a dedicated sales team and highly trained technicians, we deliver solutions for residential, commercial and industrial applications.

Our common goal?

Selecting the best sustainable HVAC system for your project, looking beyond the initial investment, while staying within your budget.

We have trained experts to advise you and give you the best solution according to your specific needs.

As a global company with local service, Daikin is the best HVAC partner to obtain your BREEAM & LEED green building programme certificate.

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