

Future Proofing Offices:

Specifying HVAC systems to meet standards and certifications



A Mitsubishi Electric Guide

Future Proofing Offices:

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Offices - leading the way on sustainability

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The UK office sector has embraced the principles of carbon reduction and energy efficiency and in many respects this sector is taking a lead on sustainability in the built environment.

It's not only new-build offices that are targeting better energy and carbon performance. The office market is responding to several drivers that have seen owners of existing office buildings seek to improve their stock - to keep pace with higher standards.

One indication of these improvements is that, between 2012 and 2023 (the latest figures available), the office sector has seen median gas intensity (kWh/m²) reduced by 21%¹. During that same period, median electricity intensity (kWh/m²) also shrank by 35%.

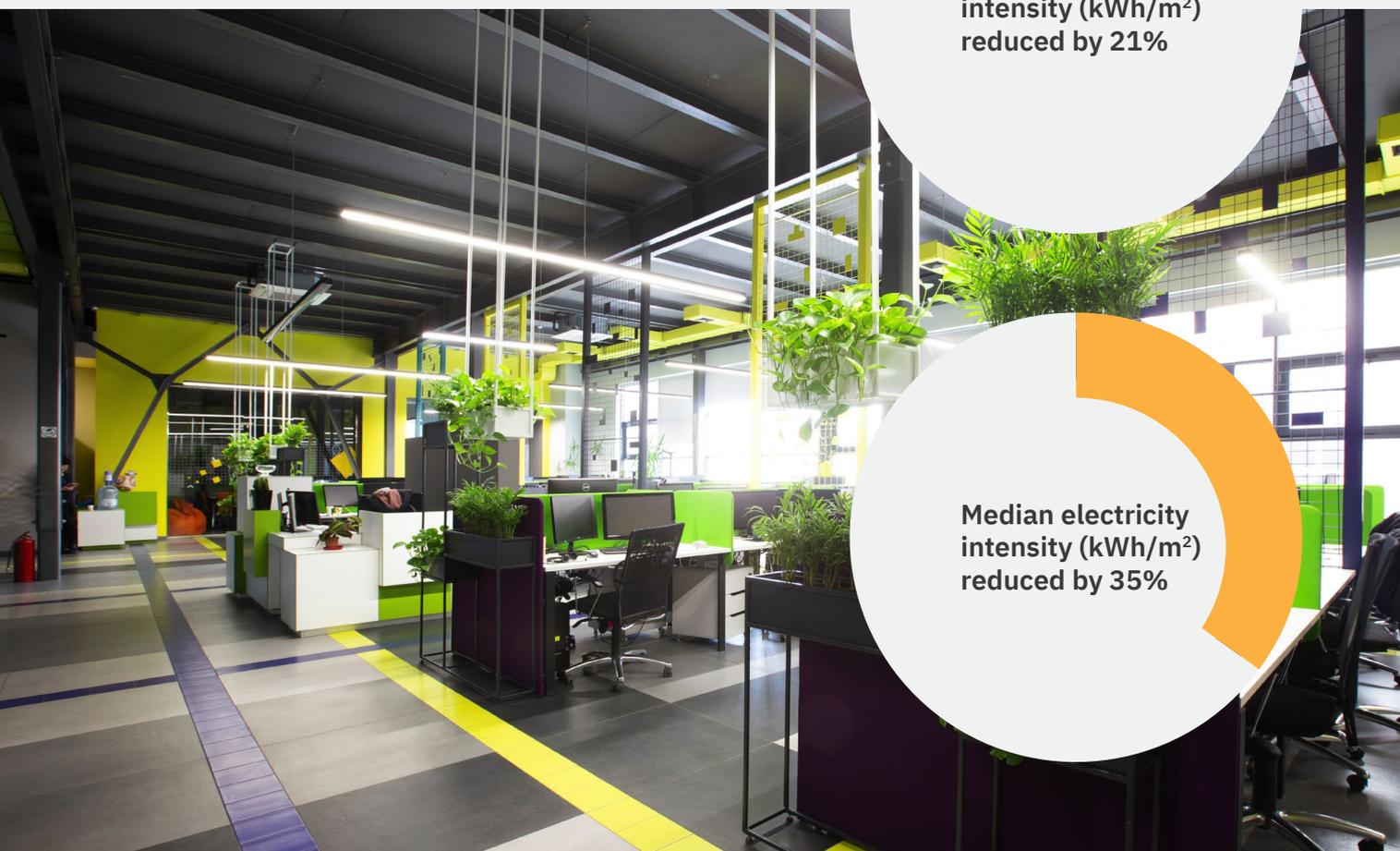
There are several factors in the office market that have contributed to these outcomes. Not least is the proposed change to Minimum Energy Efficiency Standards (MEES) for commercial buildings. Currently, office buildings must attain a minimum EPC rating of E before they can be sold or let. However, this minimum is set to change radically in the near future.



Median gas
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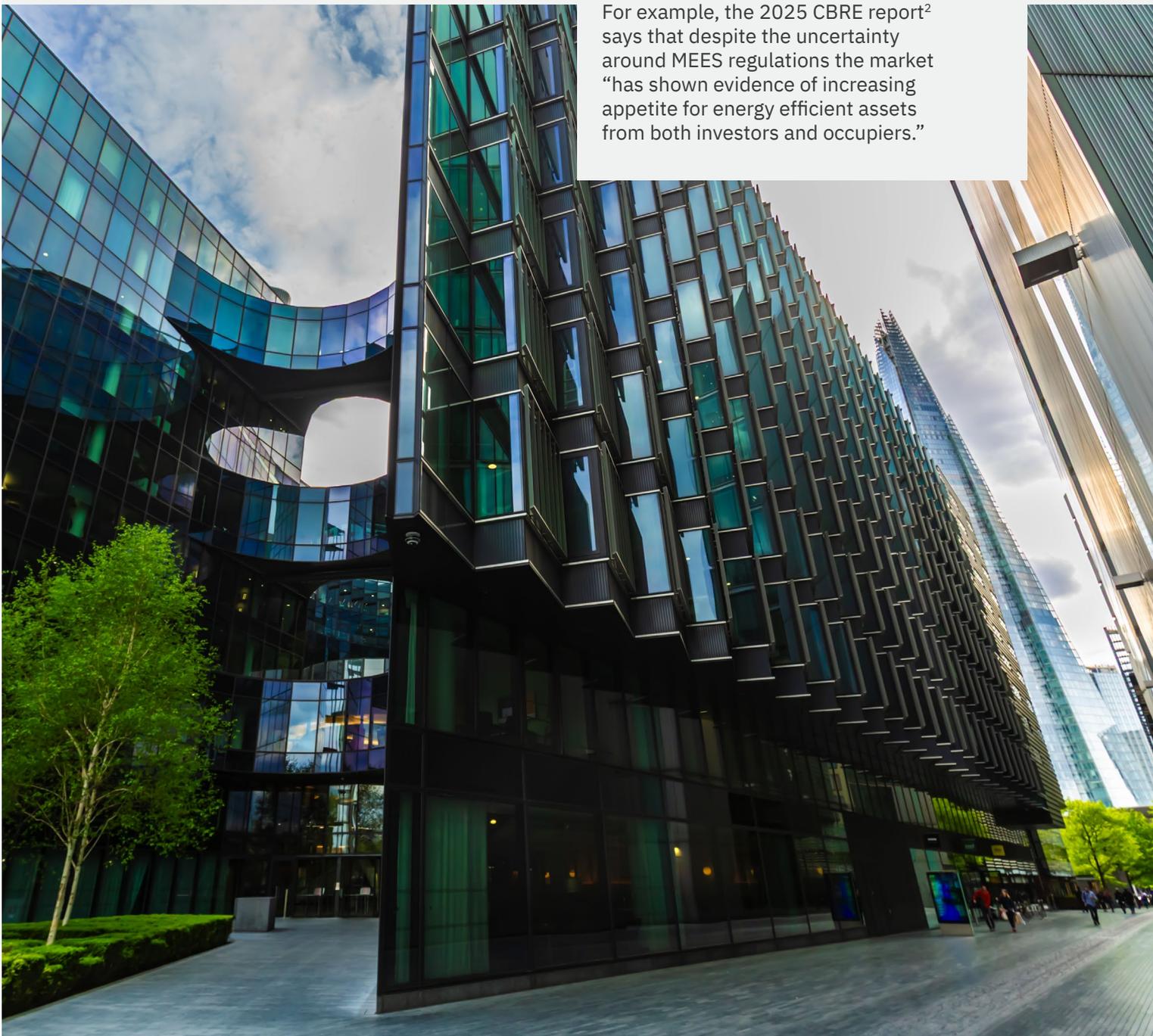
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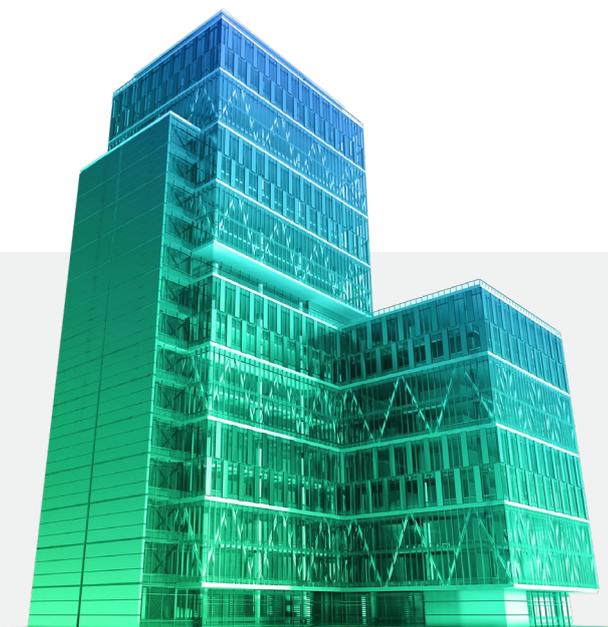
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Although the government has not confirmed its intentions, many building owners and managers are now working on the assumption that the minimum rating required for offices will rise to a minimum C rating and then B in the next five years - or less.

This has led to another incentive to improve office building energy performance. Several reports from the sector show that buildings with higher EPC ratings have enhanced commercial value, because they are ready for that regulatory change.

For example, the 2025 CBRE report² says that despite the uncertainty around MEES regulations the market “has shown evidence of increasing appetite for energy efficient assets from both investors and occupiers.”





In fact, there is not only a ‘green premium’ for efficient, sustainable office space, but also a ‘brown discount’ for buildings which do not meet modern standards. As CBRE notes: “Over H1 2025, the rental value discount for inefficient stock grew, indicating weaker demand for inefficient stock”.

This increasingly pronounced preference from tenants and investors for energy efficient offices highlights a growing risk in the office sector. If buildings cannot match these requirements, they are at risk of losing both rental and capital value. In the highly competitive office market demonstrable energy efficiency and sustainability features are not only a factor of financial value, but also of owner and tenant reputation.

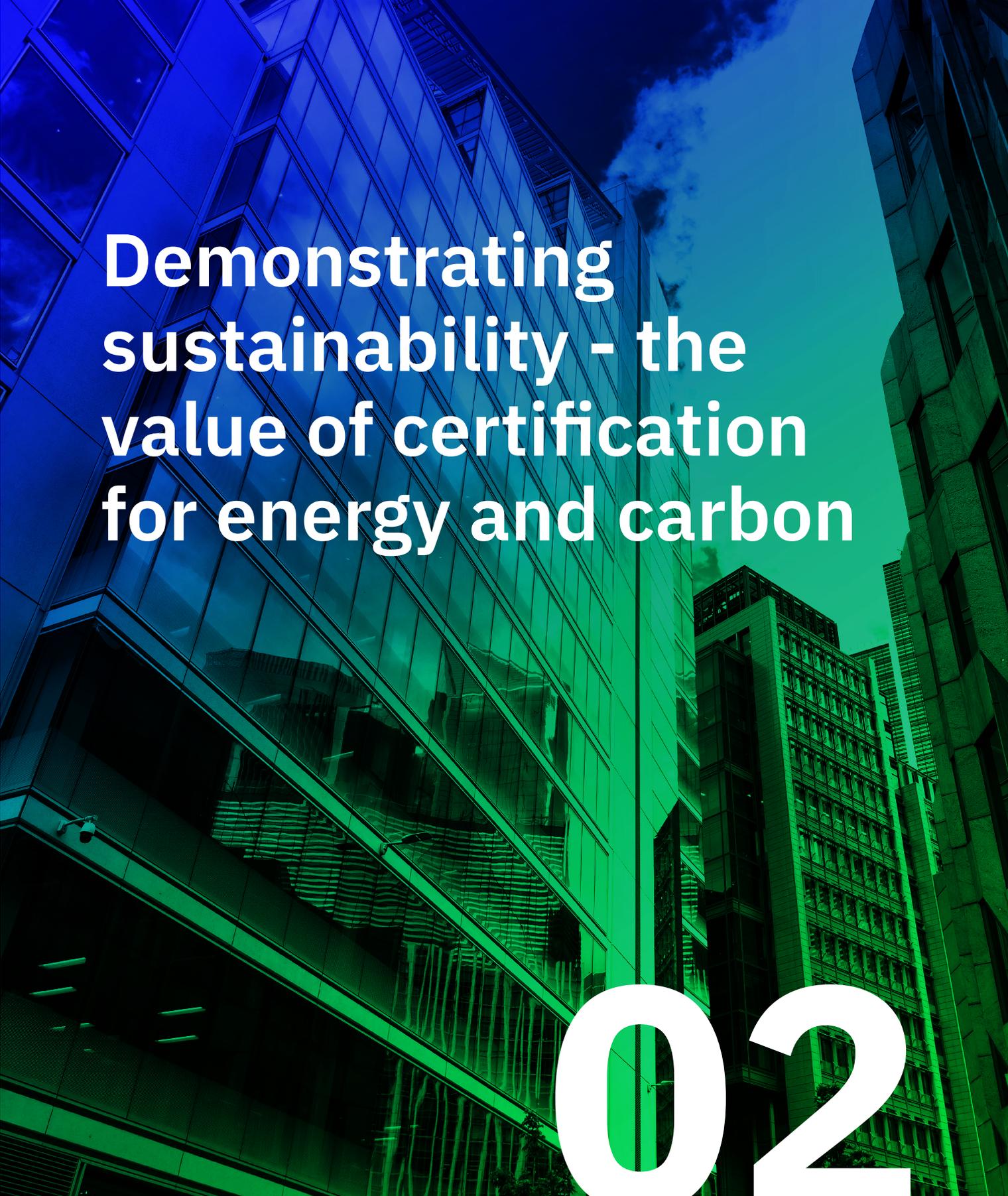
With these factors coming into play in the office market, early action on building refurbishment that enhances energy efficiency and carbon performance is vital to retain asset value. Many building owners have responded to this change and the UK has seen a wave of office refurbishments as a result.

Another important development has been the wider adoption of voluntary certifications for energy and carbon performance. Schemes such as BREEAM, NABERS and the new UK Net Zero Carbon Buildings Standard are increasingly important in the office sector, providing independent verification of building performance - and acting as marketing incentives for environmentally-focused tenants.



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Demonstrating sustainability - the value of certification for energy and carbon

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The importance of demonstrating sustainable credentials in the office market was highlighted by the UK Green Building Council³. The UKGBC saw a wider role for certification schemes, noting that as more buildings aim for these standards, the more sustainable the built environment can become.

But there are also financial benefits for building owners:

“Credibility and comparability around sustainable construction is enhanced by using established metrics and criteria, marketability for sustainable buildings increases and buildings have a better chance of being compliant with future, more stringent legislation.”

For example, BREEAM is one of the most established and well-known certifications in the UK. Launched in 1990, there are now thousands of BREEAM-certified properties around the world. It can be applied across almost any sector, in new-build or existing buildings and it has become a leading ‘green building’ certification for offices.

Independent BREEAM assessors examine a project across a range of nine categories including energy, materials and management and award credits for each.

BREEAM Ratings

BREEAM[®]

BREEAM Rating	Score %
Outstanding 	 ≥ 85%
Excellent 	 ≥ 70%
Very Good 	 ≥ 55%
Good 	 ≥ 45%
Pass 	 ≥ 30%
Unclassified 	 < 30%

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There is clear market evidence that BREEAM ratings directly impact the market value of office buildings. Research by Knight Frank⁴ shows that, in terms of sale value, a **Very Good or Excellent Rating can enhance value by 10%.**

And for rentals the premiums are:

3.7%

Very Good

4.7%

Excellent

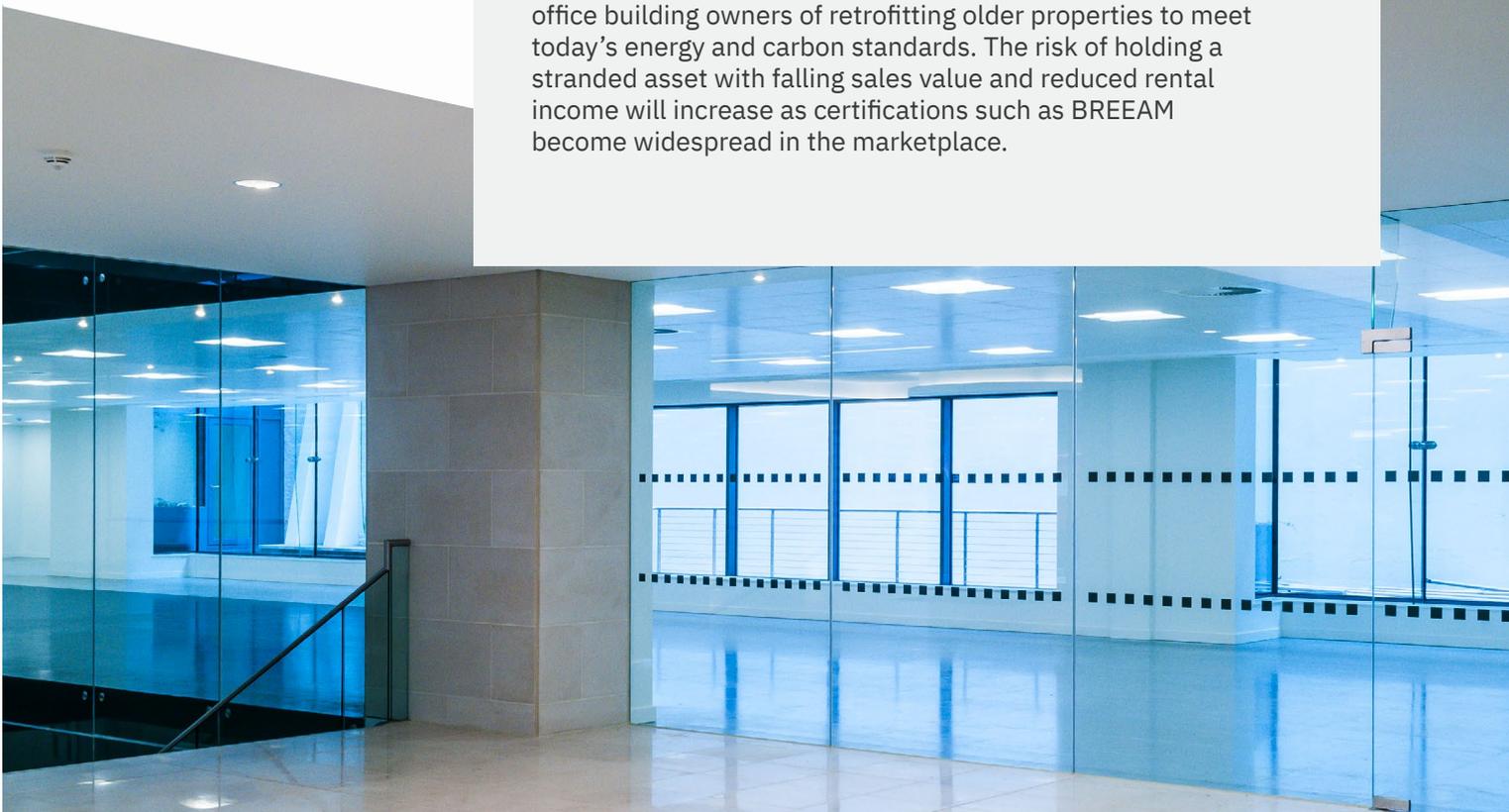
12.3%

Outstanding



One point to note, as Knight Frank highlights, is that quantifying the link between green buildings and rental or sale value is complex, since 'green-rated' buildings tend to be newer and of better quality construction than a typical 'brown' building.

However, this further illustrates the critical importance for office building owners of retrofitting older properties to meet today's energy and carbon standards. The risk of holding a stranded asset with falling sales value and reduced rental income will increase as certifications such as BREEAM become widespread in the marketplace.



The trend of certifications adding financial value can also be seen with the NABERS scheme. NABERS (the National Australian Built Environment Rating System) was launched in its home country in 1999 and introduced in the UK in 2020 (currently only for the office sector). It is administered in the UK by CIBSE.

Here in the UK, NABERS has not been in use long enough to calculate its impact on building value. However, in Australia, where the scheme has operated for over twenty-five years, the sales price premium for a building with NABERS 5* and above is 18% higher than a non-rated building.

The NABERS scheme is quickly gaining traction in the UK office market.

There are currently three types of NABERS certification in the UK:

Target Rating, Design Review Target Rating and Certified Performance

Figures below are from CIBSE.



Rating type	What it measures	Number ratings (Q3 2025)
Target Rating 	A pledge by a developer / owner to achieve a specific NABERS rating for new-build or refurbishment. Provides a performance benchmark for the project.	74
Design Review Target Rating 	A target rating established during the design stage of the project, providing a performance goal based on design and simulation reports.	73
Certified Performance 	The final rating after at least 12 months of occupation, based on metered energy use.	13

NABERS provides star ratings from 1 Star to 6 Stars for building efficiency across four main categories: **energy** (actual metered use), **water, waste and indoor environment**. Office buildings can be rated in three ways:

Base building: covering central services such as heating, cooling lifts and lobby lighting

Tenancy: Rates energy used by the tenant usually for light and power but can also include specific requirements or local air conditioning.

Whole building: An assessment of energy used by the base building and tenants.

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Measurement of energy and carbon in BREEAM and NABERS

Building owners have several options when selecting a certification for their properties. As the UKGBC warns, it is important to choose the right one for each project. Many building owners elect to target both BREEAM and NABERS ratings (and others) to demonstrate a range of sustainable credentials. In the case of new projects, BREEAM accreditation may be required for new projects under local planning rules.

NABERS and BREEAM have distinct purposes. BREEAM covers a wider range of sustainability issues beyond carbon or energy, including areas such as transport, wellbeing and land use; NABERS is more focused on operational factors of energy use, water, waste and indoor environment.

One of the key differences between NABERS and BREEAM V7 (which has been in use since September 2025) is that BREEAM includes measures for embodied carbon. (Embodied carbon is not currently included in NABERS UK, however there is a NABERS Embodied Carbon rating scheme in Australia).

BREEAM's increased coverage of carbon emissions in V7 is one of its most notable updates from V6. BREEAM notes⁷:

“ The aim is to drive significant change and continued progress across all building types at every stage of the asset lifecycle.

This includes the explicit incorporation of mechanical, electrical and plumbing (MEP) systems into assessments which are critical yet often overlooked contributors to embodied carbon. ”



CAHV-Z450YA-HPB

Air to Water Heat Pump

Embodied Carbon Result with 'Mid-level TM65 Calculation' Method Total:

3,297 (kg CO₂e)

BREEAM 7 includes whole-life carbon assessments, which integrate elements of MEP such as ducts, pipes, cabling and other equipment into these calculations, **“leading to a more comprehensive understanding of an asset’s true carbon impact.”**

The update has also introduced some new minimum requirements. For example, to achieve an Outstanding rating:

The building must use no refrigerants or only refrigerants with a direct equivalent life cycle of <math><1000\text{ kgCO}_2\text{ per kW}</math>.

No fossil fuel combustion is allowed on site.

Building life cycle assessments are required at three projects stages - along with embodied carbon reporting.

Although there is diversity in the factors assessed by these certifications, there is an evolving convergence of approach to measuring and assessing the critical elements of energy and carbon.

This reflects a shared emphasis on lowering embodied and operational carbon emissions in the built environment and achieving greater energy efficiency. This is not only about individual building performance but also supporting decarbonisation of the electricity grid, which requires reduced national energy use to help achieve that goal.

BREEAM V7 for New Construction strives to achieve clarity on the predicted operational energy use and carbon emissions. For new buildings, BREEAM V7 relies on accurate modelling of energy use. As the Institution of Environmental Sciences⁹ notes: “Credits are also available for third-party verification of energy models. The scoring systems align with the methodology used in BREEAM In-Use and NABERS UK Guide to Design for Performance.”

BREEAM In-Use also includes energy efficiency assessments based on twelve months metered data - like the NABERS scheme.



UK Net Zero Carbon Buildings Standard

One of the most recent additions to the UK's sustainable building certification options is the UK Net Zero Carbon Buildings Standard (UK NZCBS). At its heart, this scheme aims to provide an agreed and transparent definition of a 'net zero building.'

To achieve alignment with the standard, a building must meet upfront embodied carbon limits and meet annual operational energy limits (measured as EUI). A 'net zero aligned' building must also be fossil fuel free, and there are annual space heating and cooling limits and limits on the GWP of refrigerants. Any refrigerant leaks must be reported and measured.

The UK NZCBS was introduced as a pilot scheme in the UK in 2025, so has some way to go before it is as widely adopted as BREEAM or NABERS. However, the fact that it encompasses both existing schemes demonstrates that achieving low-carbon and energy efficient buildings must examine every element of the building to reach ever-tightening targets.

It is clear that HVAC and MEP systems play a significant role in all three certifications and that the specification, design and operation of heating, cooling and hot water systems must be carefully considered for new-build and refurbishment schemes.



**UK Net Zero Carbon
Buildings Standard**

The background image shows a modern office space with several desks, computers, and indoor plants. The ceiling features recessed HVAC units. The entire image is overlaid with a blue-to-green gradient. The text is white and positioned in the upper left quadrant.

HVAC - delivering results in sustainable assessments

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With energy efficiency and reduced carbon emissions moving higher up the agenda in the office market, keeping pace with the requirements of regulation and voluntary standards is now a critical factor for success.

While new buildings can target high BREEAM, NABERS and EPC ratings from the design stage, existing offices must keep pace with their energy and carbon performance. That means retrofitting, with a focus on improving energy and carbon performance.

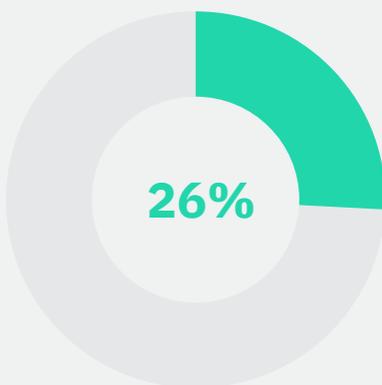
The UK Green Building Council's report on retrofitting office buildings⁹ makes the case that, in the office sector, simple 'optimisation' can cut energy use intensity by 26%, with 'light retrofit' plus 'optimisation' leading to 37% drop in EUI. A 'deep retrofit' and 'optimisation' can see reductions in EUI of up to 65%.



The table below shows how the UKGBC defines these levels:

Optimisation

Using building controls and operational controls in an iterative process that responds to occupier behaviour.

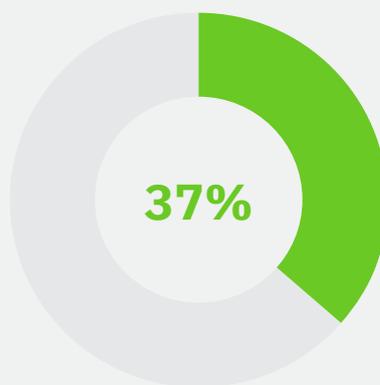


26% average reduction in EUI from baseline from Optimisation alone.

Light retrofit

Basic remodelling, replacement or adaptation of building elements - tends to focus on one feature e.g. lighting upgrades.

Can also include preparatory works for deep retrofits.



37% average reduction in EUI from baseline through Optimisation AND Light Retrofit.

Deep retrofit

Significant works or scale resulting in a fundamental change for the building.

This could be a series of 'light retrofits' but this depends on levels of disruption.

An opportunity to reconsider the building as a 'whole system'.



60% to 65% average reduction in EUI from baseline through Optimisation and Deep Retrofit.

EUI and operational carbon are not the only considerations for office retrofits. As noted, certifications such as BREEAM 7 and the UK NZCBS also put the spotlight on embodied carbon. If we consider HVAC within this context, it's clear that retrofitting HVAC systems can make significant contributions to building sustainability.

The figures below are taken from the UKGBC report and highlight the HVAC- related building updates that may be considered, along with their impact on EUI and embodied carbon.

The relative embodied carbon impact is denoted by a green, amber or red mark.



Retrofit type	Impact on EUI	Embodied carbon impact
Install mechanical ventilation with heat recovery	- 5.8%	GREEN
Install CO ₂ ventilation control	- 6.5%	GREEN
Install air source heat pump for domestic hot water	- 4.8%	AMBER
Decarbonisation of heat (e.g. through installation of air source heat pump)	- 17.6%	GREEN

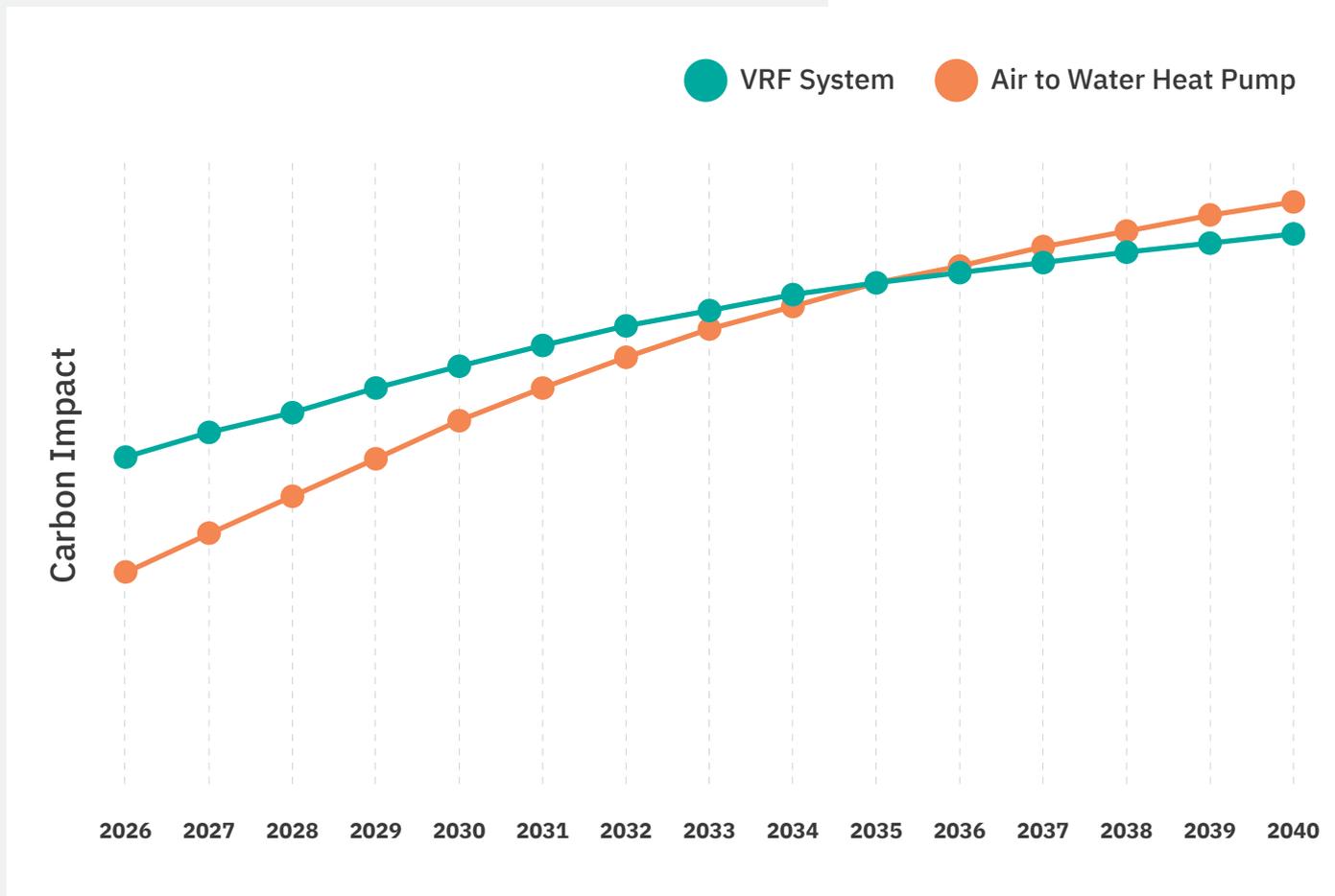




Whichever certifications a retrofit project is targeting, HVAC specification should be at the forefront of considerations. Modern HVAC systems can provide excellent solutions with increased energy efficiency and reduced embodied carbon impact.

One important point to note is that there is a balance between embodied carbon and energy use that must be weighed carefully during specification.

Whole Life Carbon Impact of Air to Water vs VRF



Both BREEAM 7 and UK NZCBS set limits on the GWP for refrigerants in HVAC systems, and this is an additional point for designers to bear in mind.

There are changes ahead in the refrigerant landscape, with updates to the F Gas regulations impacting the availability and price of higher-GWP refrigerants as they are phased out. If a HVAC system is a decade old, for example, these market changes may be an additional driver for retrofitting sooner rather than later.



Enhancing value through HVAC retrofit

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Retrofitting HVAC systems in office buildings has many benefits for owners and tenants. Modern, energy efficient and lower-carbon systems not only make sustainability certification achievable but also support better indoor environments and help to control operational costs.

The UK Green Building Council states¹⁰ that: **“HVAC systems are responsible for a significant proportion of the energy consumption in commercial buildings but often operate inefficiently and lack optimisation leading to unnecessary thermal and electrical energy consumption.”**

It’s important to note that many of the certification schemes for buildings involve continuous monitoring of factors such as energy use, so system efficiency is an ongoing issue that owners and operators must stay on top of.

While the UKGBC denotes HVAC upgrades as ‘deep retrofit,’ modern equipment in this field has often been designed to make retrofitting a more straightforward and less disruptive project. This means that it can be relatively simple to add value to an existing office building by achieving greater energy efficiency, reducing embodied and operational carbon - and even decarbonising by swapping fossil fuel heating systems for modern heat pumps.



Considerations and technologies for HVAC retrofitting

As with any building retrofit project, there are some considerations to bear in mind for HVAC refurbishment and these will influence the selection and design of new systems.

Plant space:

Finding the space for replacement plant can be more challenging in existing buildings as it cannot be designed in from the start.

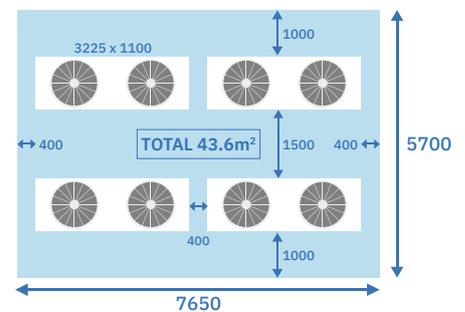
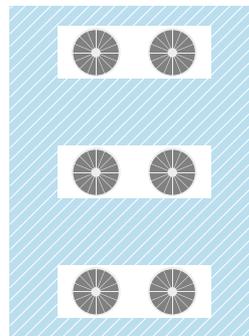
Where space is at a premium, there are solutions such as modular chillers which offer more flexibility in physical positioning than a single, large chiller. They can also be useful for phased updates, with further modules added over time to allow for office building retrofitting over time.

Modular systems are also easier to install as they are lighter and the Mitsubishi Electric pre-packed modular chiller range is supplied pre-piped and pre-wired for quick installation.

Example of 300kW modular ASHP footprint

The typical footprint of modular ASHP falls between approx. 9-24m² per 100kW of heating capacity with the median being around 16m².

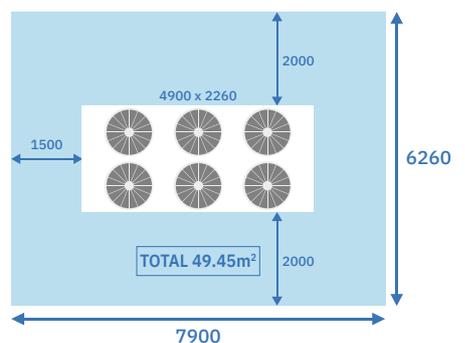
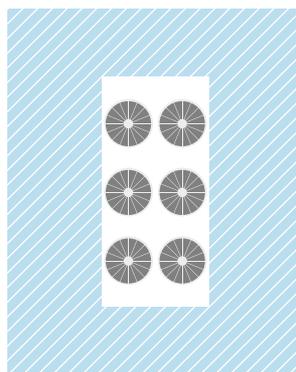
Note - modular systems often have better overall kW/m² ratios compared to single large capacity units due to smaller service space requirements.



Example of 300kW single ASHP footprint

The typical footprint of a single large capacity ASHP falls between 12-42m² per 100kW of heating capacity with the median being around 25m².

Note - larger capacity single units (>200kW) often have better kW/m² ratios than smaller units due to similar service space requirements of smaller capacity units.



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Disruption to operations:

It's important to plan retrofit to minimise tenant disruption. It may be possible to undertake updates on the whole building if it is unoccupied at the end of a lease, for example. However, where tenants are in place, then it may be useful to consider a phased approach to HVAC retrofitting. Again, modular equipment is a good option.

Mitsubishi Electric has also developed a **Hybrid VRF system** which has all the benefits of VRF in a format that is applicable to retrofit projects. The system is unique in that refrigerant is removed from the occupied space with heating and cooling delivered to the indoor units via water pipework.

Like traditional VRF, it can supply heating and cooling simultaneously around the building, which is a good solution for offices where heat loads and cooling requirements may differ widely, depending on equipment in use, occupation levels and building orientation.

Because the indoor units are served by water, rather than refrigerant, the system is easier to expand on a floor-by-floor basis, allowing for phased updating with less disruption across a whole building.

An additional benefit of this approach is that if, in the changing refrigerant landscape, there is a shift away from R32 in future, the HVRF system is more adaptable.

The only change with this system could be the outdoor unit and piping to the HBC box - indoor units can remain unchanged irrespective of the refrigerant being used.



Power supply:

While decarbonisation of heating and hot water systems are encouraged or even required by sustainable certifications, it is vital to assess electrical power supply to the building when thinking about electrification of heating and hot water.

Switching to heat pumps, for example, will increase the building load. One option is a **bivalent solution**, where gas boilers and electric heat pumps operate in tandem, with gas phased out over time as electrical supply can be added or building heating load can be reduced (such as through improvements to the building fabric etc.).

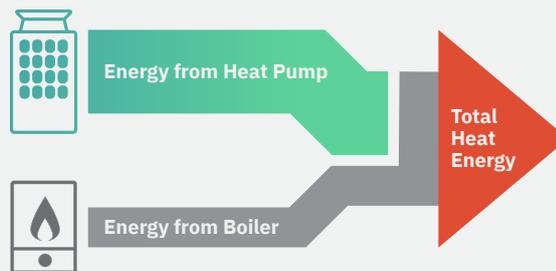
Using a boiler to top up peak space heating requirements in a heat pump system, can also save CO₂ emissions and costs¹¹. When correctly designed, bivalent gas boiler / heat pump systems make the most of the price gap between gas and electricity, while lowering the building's carbon footprint.

Bivalent Options:

1. Bivalent Changeover

Heat pump working in isolation to the boiler.

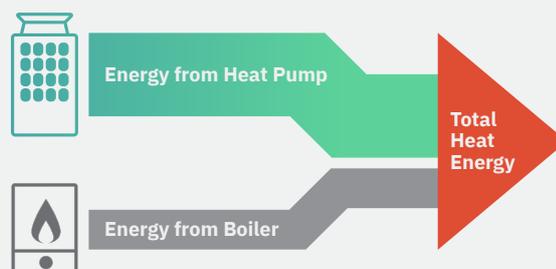
The heat pump operates as the lead heat source until it can no longer meet requirements whereby it stops operating and switches over to the boiler.



2. Bivalent in Parallel

Heat pump working simultaneously or in parallel with a boiler.

The heat pump operates as lead heat source with the boiler topping up capacity or flow temperature when required.



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System optimisation:

As noted by UKGBC, using modern control technology to optimise HVAC performance provides significant energy savings over the long-term. This reduces energy costs and operational carbon emissions, while also extending the lifetime of equipment by ensuring it only operates when required. Better controls can be as simple as ensuring that heating and cooling are 'Off' in unoccupied spaces

However, with more advanced control technology it is possible to gather data from HVAC systems over the long term - spotting changes in system performance to highlight potential problems before they become breakdowns. Remote monitoring by FM teams across large estates also allows for better system - and building - performance.

In addition, many of the certification schemes including BREEAM, NABERS and UK NZCBS require data collection which not only serves to achieve their requirements but also helps to inform their view of what 'good' building performance should look like.



Regulatory requirements:

While voluntary certifications are shifting the office market to greater consideration of energy use and carbon, there are also specific regulations to bear in mind when retrofitting HVAC systems. The F Gas Regulations were developed by the European Union to phase down the use of fluorinated (F) gases within its member countries. F gases are powerful greenhouse gases, which trap heat in the earth’s atmosphere, contributing to global warming and climate change. The aims of the Regulations are to cut the use of F gases and to reduce their release into the atmosphere.

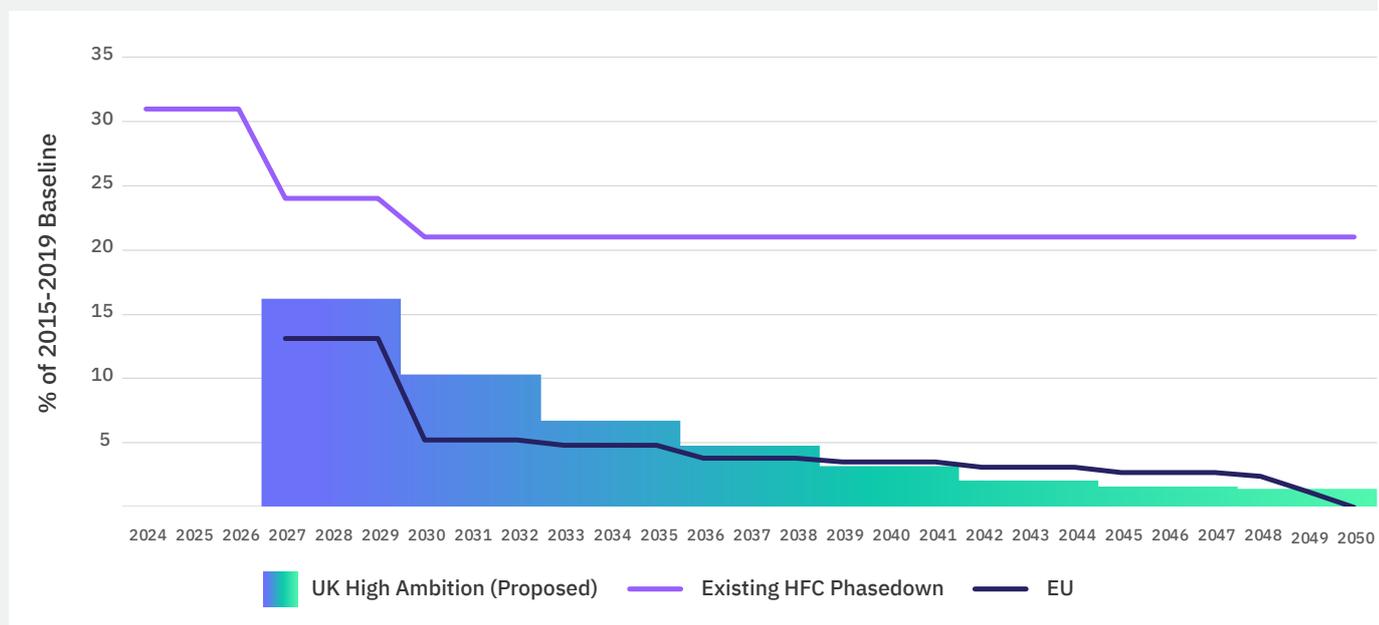
The Regulations particularly focus on the most common type of F gas, HFCs (hydrofluorocarbons). Under the Regulations, each HFC is allocated a global warming potential (GWP) number to reflect its impact on the environment. GWP indicates how much heat is trapped by a mass of the HFC compared to a similar amount of carbon dioxide. The higher the GWP, the greater its potentially damaging impact on the environment.

The F Gas Regulations also introduced other requirements for equipment containing HFCs. This includes regular leak checks, training and certification of individuals handling HFC-using products.

When the UK left the EU in 2000, the phasedown regulations continued in parallel between the UK and the EU. However, in 2024, the EU increased its phasedown schedule from 2027 onwards and now DEFRA which administers the scheme in Great Britain, has announced its own plans for updating the UK phasedown programme.

The table below shows the proposed phase down which was published as part of the new industry consultation. The percentages shown represent the proportion of HFCs allowed onto the market against the ‘reference average’ (calculated as the average volume placed onto the market between 2015-2019).

F-Gas Phasedown Current vs Proposed vs EU



DEFRA notes that the proposals mean adjusting existing figures to include further phase-down steps than are currently include between 2030 and 2050. This means revising the target end date of the phase down, replacing the 79% reduction by 2030 target with a 98.6% reduction by 2048. Retrofitting older HVAC systems can help to ensure an office building is ahead of these requirements. Lower GWP refrigerants include R32 which is now widely available across the Mitsubishi Electric range of solutions. And Mitsubishi Electric’s hybrid VRF not only uses lower-GWP R32 but also contains less volume of refrigerant, making it easier to achieve the BREEAM and UK NZCBS targets on refrigerant usage in buildings.

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Lessons from the office market

05

The UK office market is evolving to meet new sustainability standards. While this has been partly driven by regulations, the sector has also been quick to see the financial value in certifications such as BREEAM and NABERS.

Other commercial property sectors could look to offices and see their future. The drive for sustainable office space comes from corporate clients who are looking to achieve their own carbon emission reduction goals. The properties they occupy are included in those calculations, so they look for office partners who can help them achieve corporate objectives.

We are already seeing other property sectors such as warehousing and logistics head in this direction. New-build warehouses or logistics hubs are more often than not targeting BREEAM as well as EPC A ratings. Transportation and storage are critical parts of the supply chain for many large businesses - reducing the footprint of these parts of the business, even when operated by third parties, is critical for hitting carbon reduction targets.

Value protection is the common denominator here. Buildings which do not meet the requirements of a market hungry for sustainable options will soon be left behind - stranded financially and losing rental value in a competitive market.

Even if we leave aside the more sophisticated voluntary certification schemes and focus on EPCs, the level of risk is there to see.

While EPCs do not measure actual energy consumption, only theoretical, modelled energy use, they are required by law for commercial properties.



A

B

C

D

E

F

G



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The table below shows EPC ratings for non-domestic buildings in England and Wales¹³. The figures illustrate the shift in ratings between 2014 and ten years later in 2024.

Year	2014	Percentage of total lodgements 2014	2024	Percentage of total lodgements 2024
Number of lodgements in the year	69,732		102,873	
A+	127	0.18%	570	0.5%
A	1,205	1.73%	7,413	7.21%
B	5,874	8.42%	33,420	32.49%
C	18,293	26.23%	35,510	34.52%
D	21,556	30.91%	17,117	16.64%
E	11,224	16.10%	7,568	7.36%
F	5,242	7.52%	619	0.60%
G	6,201	8.89%	656	0.64%

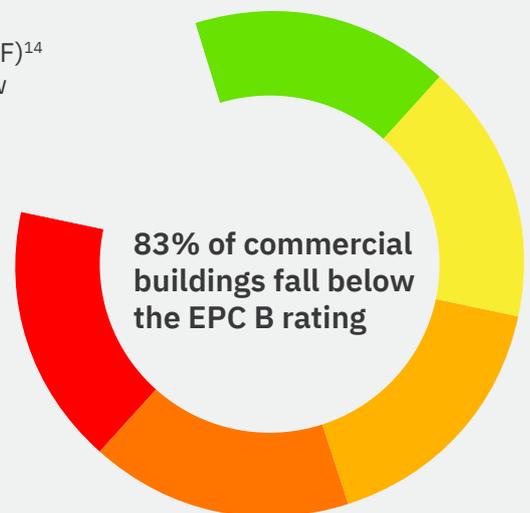
There are some points to note about EPC data. First, these figures relate to all non-domestic buildings, not just offices. Second, over the decade shown, some buildings may have updated EPCs, others may represent new buildings, so there is likely to be some overlap.

However, the trends are very clear: there are hardly any F or G rated buildings (since these were regulated out in 2018 with only certain exemptions allowing F & G rated buildings to remain) and there is a surge in B ratings.

What’s more, the figures for 2024 show that if the Government raises the minimum required EPC rating to C, many commercial properties would currently be at severe risk of becoming stranded assets, unable to be leased or sold.

In February 2025, research from the British Property Federation (BPF)¹⁴ across UK cities showed that 83% of commercial buildings fall below the EPC B rating, highlighting the major risk across all sectors.

With the same patterns reflected across all EPC ratings, it makes sense for other sectors to consider retrofitting for energy efficiency as soon as possible.



HVAC is a universal opportunity. Offices that invest in new equipment, with modern controls and system integration can achieve significant gains in energy efficiency and reduced carbon emissions.

This applies across other sectors from retail and warehousing to data centres and restaurants.

As the UK's carbon reduction targets tighten on our progress to Net Zero 2050, the built environment will have to respond to survive. Selecting the right HVAC system now will pay dividends not only in better performance, but also in the long-term value of the whole building.

The 'green premium' and 'brown discounts' in today's office sector illustrate the financial implications of sustainability. Other asset classes will face the same pressures - and can avoid accelerated depreciation by acting early.

NET ZERO
2050



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Case Study 1

York House retrofit shows how to decarbonise heating

When leading UK property developer, British Land wanted to decarbonise its flagship London headquarters, the company took the opportunity to showcase how low carbon heating could be achieved, without needing gas as backup.

York House is a multi-tenanted office space with a 24-hour cooling demand. The project to remove the carbon-intensive heating involved installing two air source heat pumps and a water-to-water heat pump to replace four gas boilers.

The result is a 5-storey office building where gas has been completely removed to deliver more than 400,000-kilowatt hour reduction year on year in energy - all achieved in a central London retrofit project.

The system was designed to utilise a 95% peak load to minimise equipment size and optimise project costs. The offices were previously heated by four gas boilers equating to over a megawatt of heating capacity.

The new equipment is two Climaveneta i-FX-Q-GO5 air source heat pump chillers with a combined heating capacity of 1,113 kilowatts and a combined cooling capacity of 1,250 kilowatts.

Working with the heat pump chillers is an EW-HT/0612 water to water heat pump which raises the flow temperature from 50°C to 65°C this means that the existing heat emitters could be left in place and utilised, saving both time and costs.



Based on the success of what has been achieved at York House, it now serves as the benchmark for future projects so, where British Land is looking to retrofit existing assets, they are looking to fully remove gas, so York House has become the model to follow.

Download the full case study



Case Study 2

Refurbishing to EPC A is easier with an empty building

When the owners of Manchester's Exchange Quay wanted to refurbish the vacant Building Seven, they knew it needed to be ready for future legislation affecting energy use and carbon emissions.

The 5-storey 25,000 square feet office was empty, so it was easier to plan a comprehensive refurbishment to look at every aspect of energy performance. It was completely stripped out to ensure the finished refurbishment met the requirements of a modern office block.

The upgrade saw the removal of an old 4-pipe fan coil chiller system and its replacement with City Multi VRF air conditioning, which can be installed module by module to match the requirements of the refurbishment.

City Multi can deliver simultaneous heating and cooling, so that energy use can be more balanced across a building, with waste heat from areas that need cooling reused in other areas that need heating. The system offers complete flexibility in design, installation and operation with the ability to connect up to 50 indoor units with one outdoor condenser.

Five City Multi PURY-EP models were installed in the roof space. These are connected to a mixture of ceiling cassette, wall-mounted and ducted indoor units to deliver heating and cooling around the building. The result is that the overall building achieves an EPC rating of 'A' with the VRF system delivering exactly what tenants expect.



For the landlord, the refurbishment of Building Seven has shown how straightforward it can be to upgrade and improve the energy efficiency of your premises, especially when the building is empty.

Download the full case study



Future Proofing Offices:

Specifying HVAC systems to meet standards and certifications

Case Study 3

The comfort of a future-proof working environment

4 Angel Square is a 200,000 sq ft net zero contemporary office located in the heart of Manchester's thriving NOMA business district, which is leading the way in creating sustainable, healthy workplaces for the city and for the future.

This means that the building services within the office building must match its sustainability and energy efficiency requirements, so the building owners opted for an EW-HT water-to-water heat pump and two i-FX-Q2-G05 chillers.

These low noise; high performance INTEGRA chillers are 4-pipe air cooled systems which utilise VSD screw compressors and EC fans. They are designed to produce chilled and hot water simultaneously and use lower-GWP R513A refrigerant.

This means they are not only the perfect match between energy efficiency and high performance, but they also comply with F Gas Regulations making them a future-proofed option for both new construction and retrofit projects.

4 Angel Square not only delivers on sustainability, but it also aims to provide a healthy workspace with wellbeing at its heart. To ensure comfort is maintained the installation will be serviced and maintained with a 7-year MELServe Planned Preventative Maintenance (PPM) contract.

4 Angel Square is accredited with Net Zero Carbon in operation, 5-star NABERS rating at design and BREEAM outstanding design; and is on track to receive both in operation, achieving an EPC rating of A.



It also highlights the use of energy efficiency air source heat pumps as one of its key features, emphasising how sustainable and renewable heating and cooling systems are an essential part of our decarbonised future.

Download the full case study



Case Study 4

Heating upgrade helps office retrofit achieve EPC B

Originally developed in the 1980's, Exchange Quay has long been a busy hub of commerce in Manchester. The campus is spread across ten buildings and sits in a prime location with excellent transport links to the rest of the city and surrounding area.

One of the most important things for its tenants now is their credentials in terms of carbon emissions, energy and social governance, so, the challenge for the landlord is how to upgrade buildings to reduce their energy use and carbon footprint, without disturbing or decanting existing tenants.

For the 10-storey Building Eight, which is one of the largest on the campus, the landlord wanted to achieve an EPC of B by replacing the 600-kilowatt gas fired boilers, with heat pumps.

The system designers looked at localised weather data over the past decade and designed the system specifically for this building, specifically within this area. This meant that they were able to specify fewer heat pumps, achieving an EPC of 'B'.

The installation of 12 CAHV air source heat pumps provides water flow temperatures of 25°C up to 70°C without boost heaters. Multiple units can also be cascaded together to achieve up to 688kW, making the CAHV suitable for a wide range of applications.

The heat pumps provide space heating on all ten floors of Building Eight at Exchange Quay through four-pipe fan coils which were retained from the existing installation, minimising any disruption.



The lessons from Building Eight demonstrate how commercial landlords can retrofit to improve heating systems without having to disturb existing tenants.

Download the full case study



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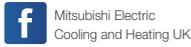
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Note: The fuse rating is for guidance only and please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R515B (GWP:292), R454C (GWP:148), R1234ze (GWP:7) or R1234yf (GWP:4). *These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a hydrocarbon, R290 (GWP:0.02). *These GWP values are based on IPCC 6th edition.

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