Intelligent Investment

The Value of Green Building Features

REPORT — UK

CBRE RESEARCH
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Foreword

CBRE aims to be a market leader in understanding, pricing and reflecting the value of building environmental features.

Welcome to CBRE's new research report exploring the relationship between green building features and value.

The burgeoning 'green premium' literature aims to demonstrate that green features add financial value to buildings. There is a good case that they do – not least by protecting against the risk of future obsolescence.

But there is an urgent need to improve the quality of the evidence and underlying data. We also need to acknowledge that the issue is more complex and uncertain than we sometimes like to admit, posing valuation and decision-making challenges for our clients.

This report aims to move the debate forward and exemplify CBRE's active engagement in this important subject across our business.

We hope you find it stimulating. Get in touch with us to discuss how we can help you further with the challenges it outlines.

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Executive Summary

There is clear evidence of a green premium, in both attitudinal surveys and quantitative analysis.

But there are also issues with the evidence base, including significant gaps, methodological problems and a wide margin of error.

There is clear evidence of a 'green premium'

1. **A significant minority of large UK office occupiers say they will pay more for green features,** especially if there are direct benefits. A majority of large logistics occupiers say they will pay more. In the UK, premiums are now being observed by CBRE agents in prices paid
2. A survey of the international evidence implies an **average gross premium for green building certificates of 6–8% (rents) and 14–16% (capital values)**
3. After accounting for costs, **a net capital value premium of around 6% for green building certifications** is a reasonable global rule of thumb – but the margin of error is larger than this potential gain
4. **Measured premiums are likely to decline over time** as the supply of green building features increases. Indeed, continuous investment is necessary simply to avoid depreciation of existing value

But there are issues with the evidence base

1. **Evidence from the US and UK predominates.** In many European countries, and in some real estate sectors such as retail and logistics, the evidence base is much thinner; more data and research is needed
2. There is **very little literature on the premium associated with a 'net zero' building,** or the costs of achieving it.
3. The **evidence is very focused on the value of green building certifications,** and says much less about the value of high underlying environmental performance (such as actual energy consumption)
4. **Findings must be interpreted with caution.** Data is often out of date, evidence quality is variable, and the use of certificates as proxies for environmental performance can mislead. The heterogeneity of real estate also makes general conclusions difficult to apply to individual circumstances

Executive Summary

Thinking about discounts for the *absence* of a green building feature may be a helpful alternative.

Investment in green buildings may be defensive in nature, to avoid future discounts, rather than to achieve an uncertain premium.

Thinking about discounts as a driver

1. Thinking about discounts for the absence of a green building feature, rather than premiums for their presence, can be helpful. But **research-based quantification of discounts will be of limited use**

2. **Case-by-case modelling of discounts for the absence of green features may be better** at illustrating the costs of not taking action

3. There is evidence **that investors are implementing environmental improvements to their real estate defensively, to avoid discounts** and protect value, rather than aiming to achieve premiums through market-leading stock

01

Introduction

Introduction

In this report we explore the 'state of play' on the case for investment in green building features and the value this potentially creates.

About this report

Many firms using and owning real estate have targets to contribute to a wide range of environmental and social outcomes, especially tackling climate change.

However, good quality ethical real estate choices demand good data about costs and benefits. Without this data, there is a significant risk of making a bad investment unsupported by economic fundamentals and credible long-term demand.

In this report, we explore the 'state of play' on the investment case for leasing and owning green buildings – or more precisely – green building features, because there are many different and competing definitions of what a 'green building' is (see box, right).

We look at who's driving the demand for green building features, how much they might be willing to pay, and whether buildings without such features will start to experience falls in value.

We also reflect on whether price is in fact the main driver of action.

Structure of the report

The report is structured as follows:

- **Section 2** presents a conceptual framework for thinking about who drives green building value, and looks at the state of the evidence on the willingness of the occupier to pay for green features
- **Section 3** summarises the state of the literature on the premium for green building features
- **Section 4** considers whether discounts for the absence of green building features are a more prominent driver of action, and better at informing decisions, than searching for premiums
- **Section 5** offers some conclusions (which are summarised in the Executive Summary on page 4)
- **Section 6** offers a full bibliography of the studies we cite, links to other recent CBRE research, plus contact details for research authors and key CBRE advisory teams

What do we mean by 'green'?

As a shorthand we use the word 'green' in this report to mean anything which contributes to environmental sustainability, such as tackling climate change or adapting to its effects, improving biodiversity, or reducing water and waste usage.

A 'green building feature' is anything in a building that contributes specifically to these objectives.

We typically exclude contributions to social sustainability such as the health and wellbeing of building users, although the dominance of building certification schemes as the basis for research (see pages 17 and 23) means that these outcomes are sometimes included.

Indeed, certifications are so prevalent that 'green' can sometimes simply mean whatever bundle of features is included in the certification scheme. Or, in Europe, it can simply mean the building's Energy Performance Certificate rating.

02

Attitudes and ‘Willingness to Pay’

Attitudes and Willingness to Pay

The end customer is the main driver of demand for green building features.

Figure 1 conceptualises the drivers of demand for green building features.

Various stakeholders influence demand for such features, and this demand is transmitted from one party to another as shown here.

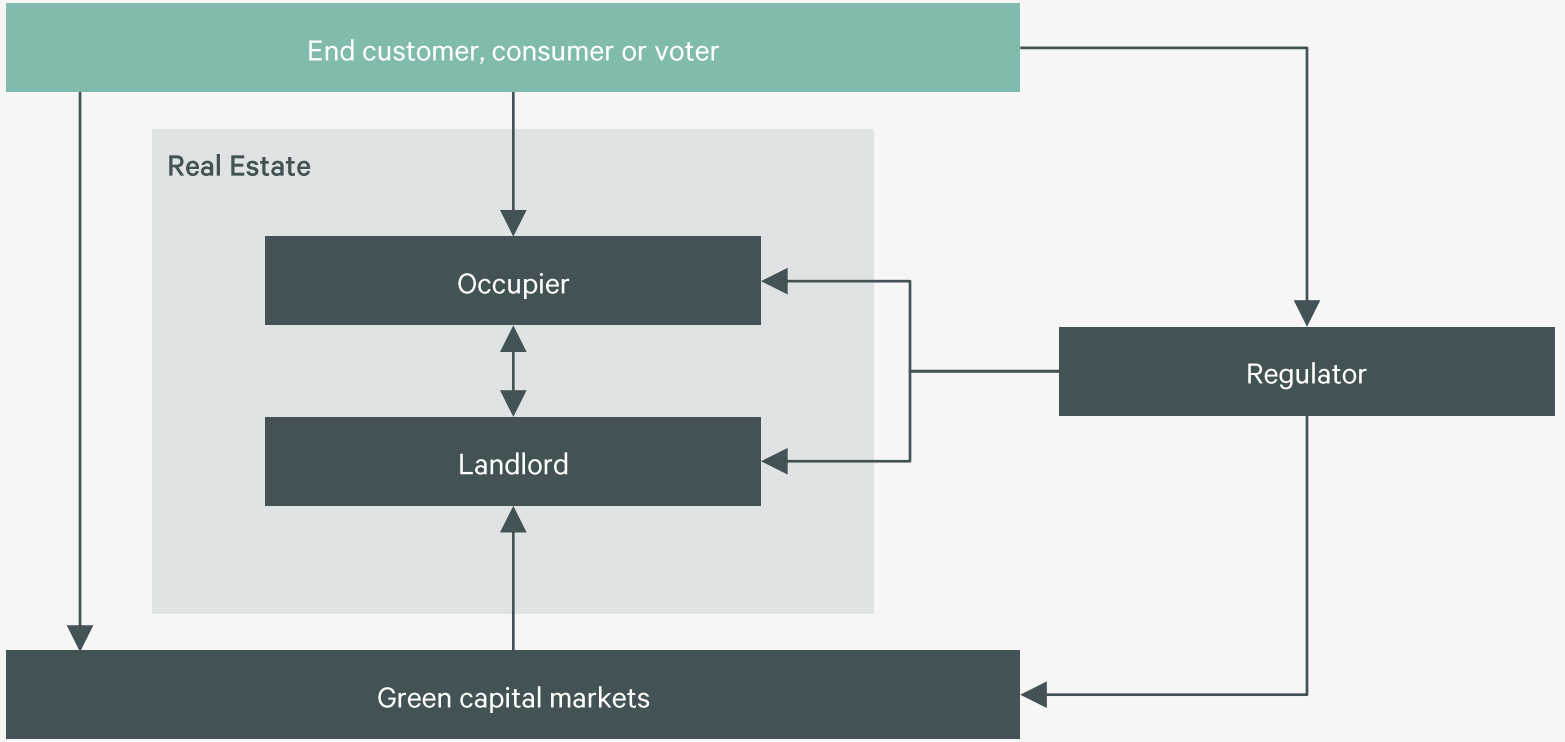
However, we suggest that the end consumer ultimately drives demand.

Consumers make ethical demands of the firms (occupiers) whose products and services they buy.

But they also express ethical choices in their savings and pensions choices, leading to pressure upon the capital markets, who in turn apply pressure through their investment choices and 'shareholder activism'.

Similarly, civil society brings pressure to bear upon regulators through political channels, leading to pressure upon the capital markets, landlords and occupiers to operate in environmentally responsible ways – and report on their activities.

Figure 1: Drivers of demand for green building features: Conceptual framework



Source: CBRE Research. Arrows indicate direction of demand.

Attitudes and Willingness to Pay

‘Green’ demands on real estate seem likely to grow, but they may not always be expressed in prices.

Rising living standards, and the consumer’s continually increasing awareness of environmental and social issues, suggest that pressures upon real estate decision makers to reflect ethical preferences will continue to grow – and become more complex.

As we show in this report, these pressures probably result in a modest uplift in financial value for real estate which reflects society’s preferences. Conversely, a failure to take action to respond to consumer, occupier and financier pressure could see the financial value of obsolete real estate fall.

But, even if real estate financial value does not increase by responding to societal pressures, this does not mean that such buildings deliver no additional value at all.

It may simply mean that the value cannot be expressed in financial terms (see box, right). Or it could mean that ample capital is available to invest in environmentally-friendly buildings whether those buildings deliver a superior return or not.

The price of everything and the value of nothing

Oscar Wilde famously warned against knowing ‘the price of everything and the value of nothing’.

While this research report aims to contribute to the debate surrounding the financial value of green building features, there is also a growing debate about whether value should always be measured in financial terms.

There has recently been an increase in interest in attempting to put a price on previously unpriced valued outcomes, including environmental protection.

However, Carney (2020) has argued that commodification of human values may in fact simply devalue them, “corroding the value of the activity being priced [so that] money crowds out civic norms.”

So, when considering motivations and rewards for investing in green building features, we should take account of the possibility that real estate decision makers might simply be advancing human values in a desire to ‘do the right thing’, rather than advancing financial value.

Attitudes and Willingness to Pay

Occupier attitude and agent surveys can help quantify the demand for green building features.

It is beyond CBRE's specialism as a real estate research house to investigate how consumers and voters choose to transact (or not) with brands and firms with environmental credentials.

However, we can look at whether occupiers say they will pay more for real estate which is consistent with those credentials. On the following pages we show that many occupiers do indeed say that.

We also show (at least in evidence from the UK) that CBRE agents are now seeing some evidence of 'green pricing', not only from occupiers but also in the capital markets.

This suggests that both occupiers and investors are seeking out green building features because of the demands placed on them by regulators, occupiers and end customers.

29%

of large UK businesses say they would pay higher rent for an office with reduced environmental impact, provided they see a benefit in reduced service charges or energy bills

62%

of European logistics occupiers say they would be willing to pay a rental premium for green building certification

40%

of relevant CBRE UK staff say they have been involved in real estate transactions where a better price has been achieved specifically because of a green building feature

Attitudes and Willingness to Pay

Demand is still patchy, but a significant minority of large occupiers say they will pay more for green features, especially if there are direct benefits.

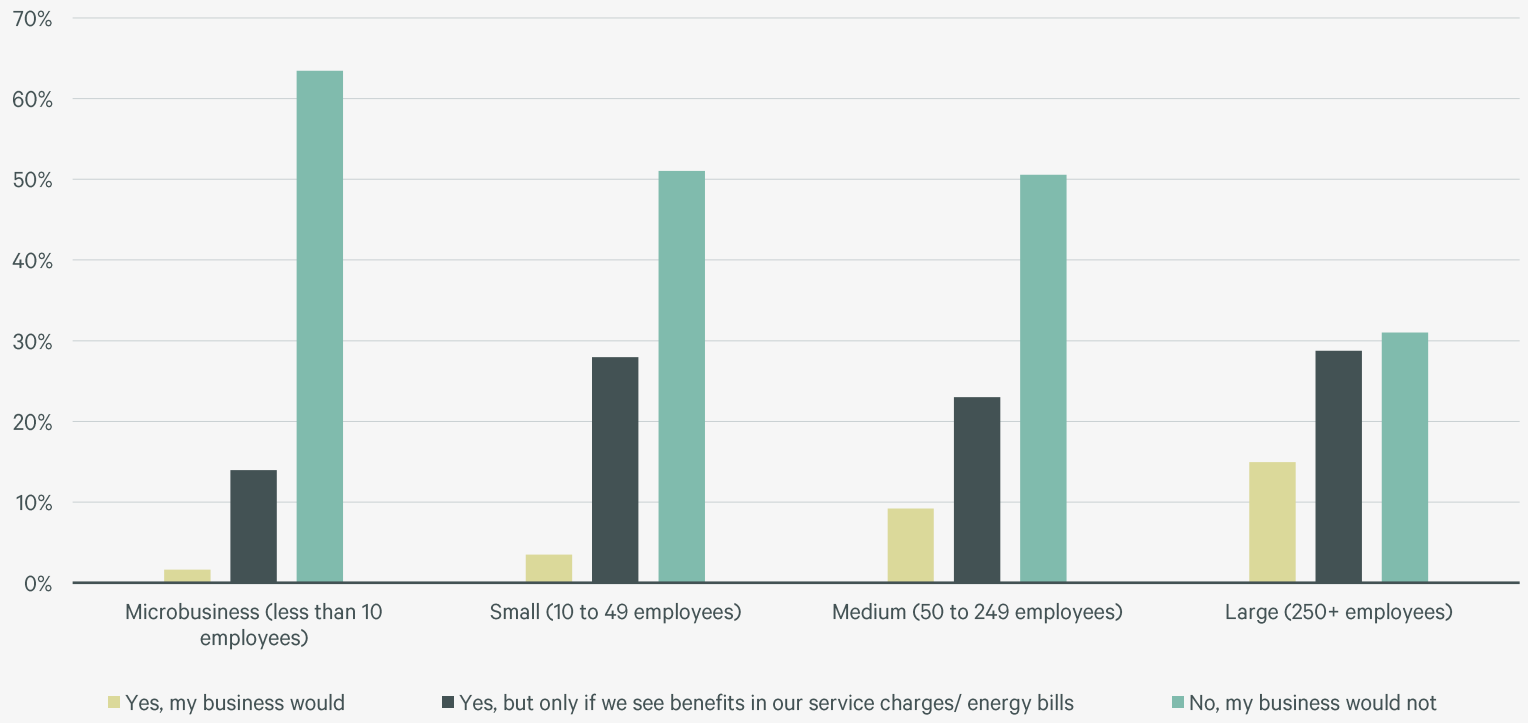
New UK data on office occupier willingness to pay for green building features shows that demand remains rather patchy.

Figure 2, for example, indicates that **UK office occupier firms are currently only weakly inclined to pay more.** Overall, 52% of those surveyed said they would not be willing to pay more for offices with lower environmental impact.

However, a significant minority (15%) of large firms were willing to pay a higher rent even if there is no direct benefit to them in reduced service charges or bills. This rises to 44% of large firms when including those who would pay a higher rent if they receive a direct benefit.

Smaller firms were also much more likely to say they would be willing to pay a higher rent if they could see a benefit in their service charges or energy bills. This may be relevant to landlords of shopping centres or multi-let industrial parks with higher proportions of smaller tenant firms.

Figure 2: Would your business pay a higher rent for office space to reduce the environmental impact of your office?



Source: Irwin Mitchell, 2022 (n=503, Base: senior UK decision makers who have a responsibility for office occupancy decisions, excludes Don't Know responses).

Attitudes and Willingness to Pay

A majority of logistics occupiers say they are willing to pay a small premium for new buildings with green certificates.

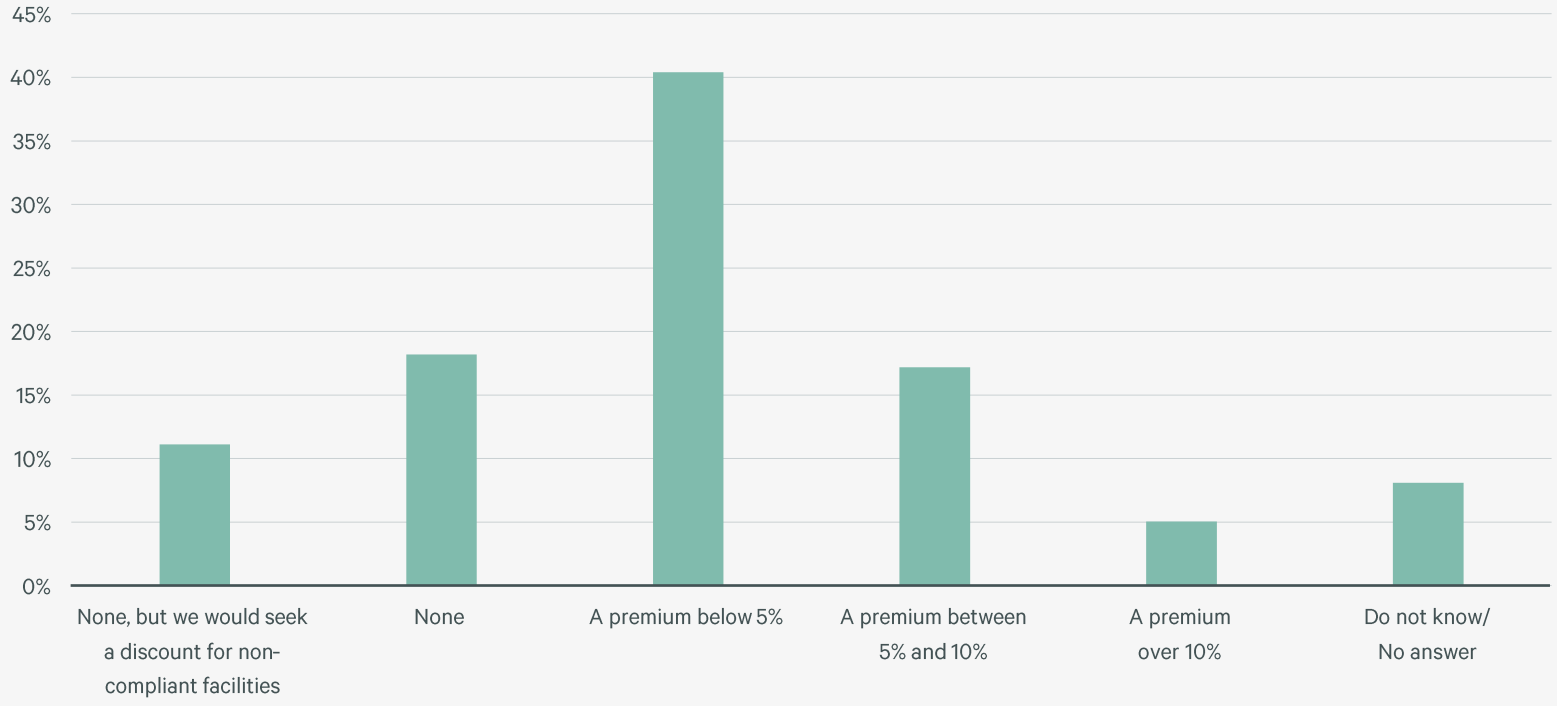
New CBRE survey evidence suggests that **there is a greater willingness to pay a small premium among European logistics firms** (see Figure 3) than among UK office occupiers (our sample size is too small to isolate the views of UK logistics occupiers alone).

62% of logistics occupiers said they would be willing to pay a premium, although two thirds of those said they would only be willing to pay 0–5%. This range is similar to the actual premiums observed elsewhere in the academic literature (see page 17).

Similarly, HFW/Panattoni (2022) found that 95% of European third-party logistics firms, and 78% of manufacturers and retailers, would be willing to increase their costs to achieve environmental certifications for their supply chain operations and assets.

Levels of green building certification within European logistics real estate are typically extremely low. Over the last 5 years, CBRE data shows that only 6% of logistics investment transactions involved a BREEAM-certified building. The scarcity of certified logistics buildings may explain the higher willingness to pay for them.

Figure 3: Percentage of European logistics occupiers willing to pay additional rent over market average for a green certificate for a new building



Source: CBRE and Analytiqa European Logistics Occupier Survey (CBRE, 2022a) (n=100, sample includes UK respondents but a UK-only sample is too small to disaggregate)

Attitudes and Willingness to Pay

Occupiers seem most willing to pay for better waste handling, and reduced water and energy consumption.

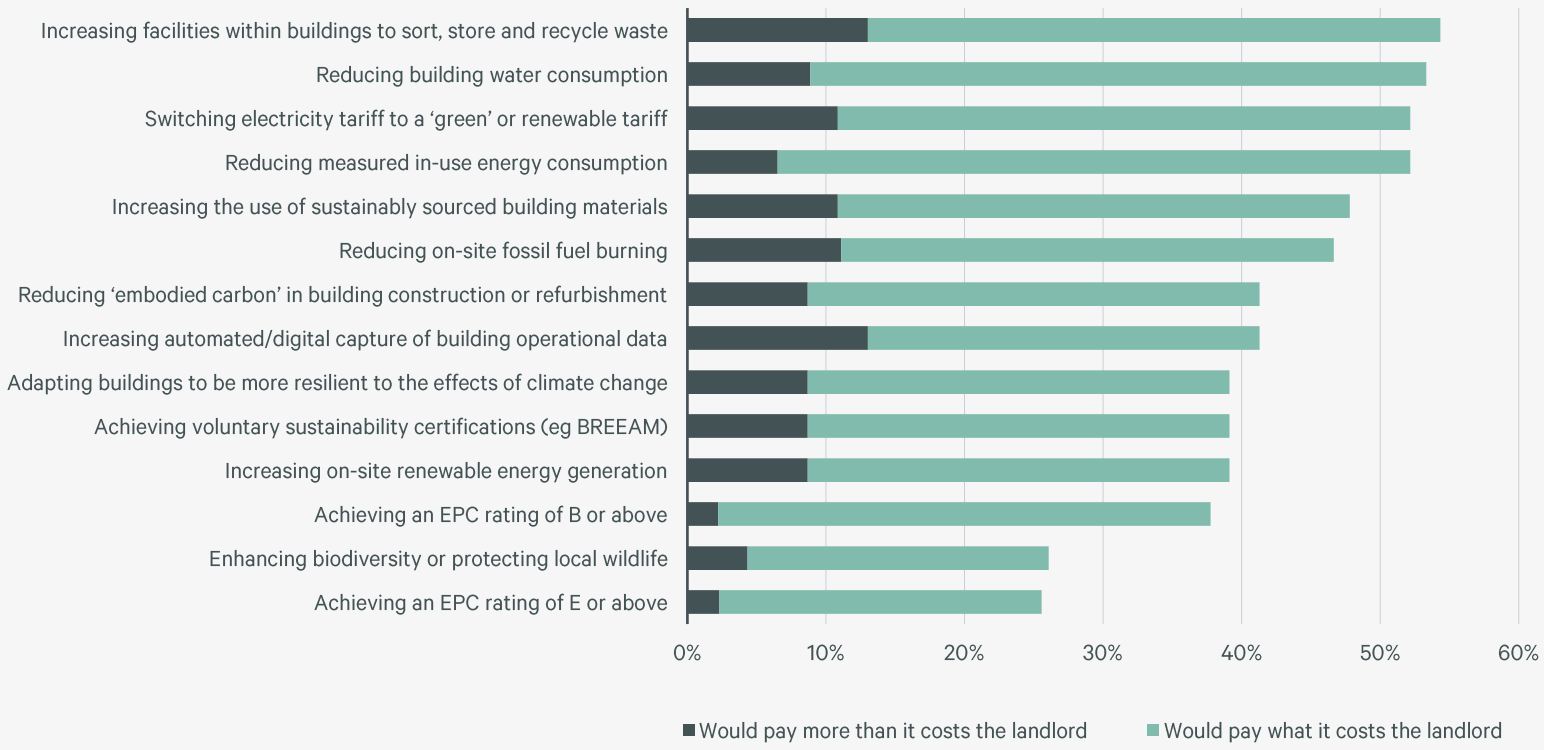
CBRE's 2021 survey of UK clients (covering all property types) provides clues about which green building features would be most popular with occupiers.

Figure 4 shows that our **occupier clients are most willing to pay for improvements which lead to better waste handling, and reduced water and energy consumption**. Again, this finding suggests that occupiers are most interested in features which reduce their own costs.

Typically, only around 2–13% of those we surveyed were prepared to pay more than it cost the landlord to create the feature concerned – in other words, to pay a genuine premium for the benefit (for example, reputational or brand benefit) of having that feature.

But substantially more, and sometimes the majority of occupiers, were prepared to pay at least as much as it cost the landlord.

Figure 4: Percentage of UK occupiers who would pay at least what it cost the landlord to provide selected green features



Source: CBRE Research, 2021a (n=46 CBRE UK occupier clients)

Attitudes and Willingness to Pay

A UK CBRE staff survey suggests there definitely are deals where green building features specifically prompt a higher price.

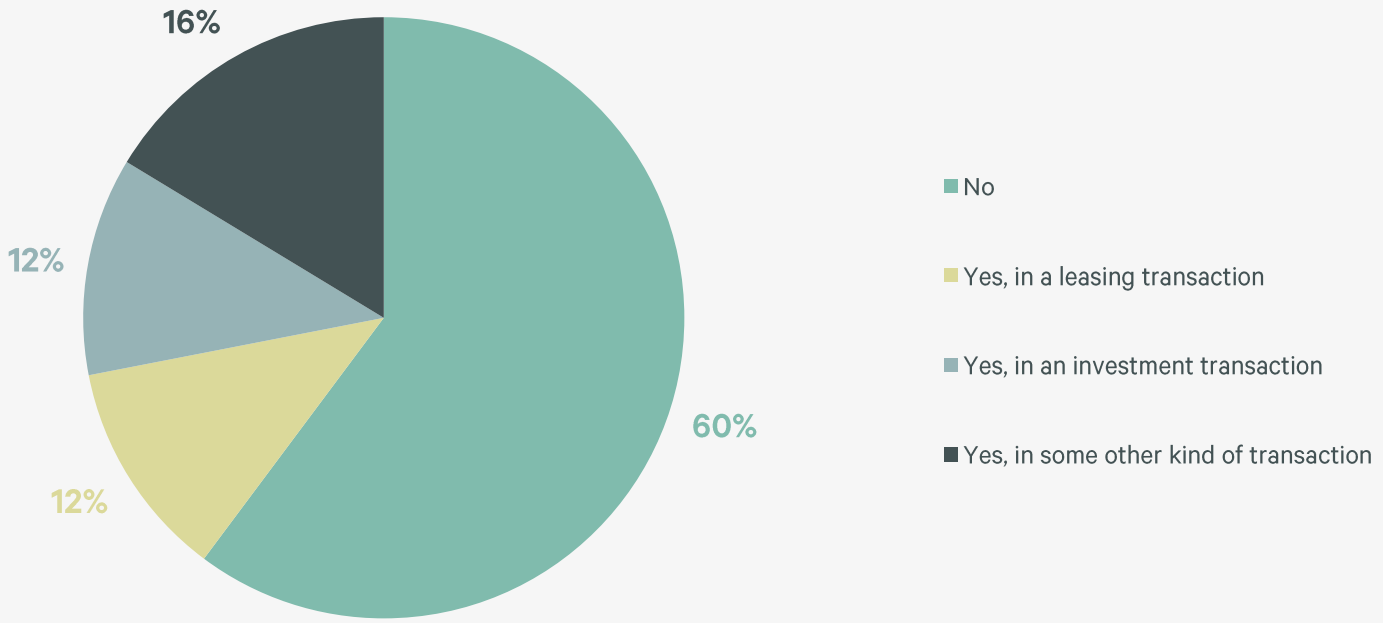
All of the foregoing results are, of course, subject to the risk of optimism bias among occupiers, who might claim in surveys that they would be willing to pay more when in fact they do not do so in practice.

However, a UK CBRE staff survey conducted as part of this research suggests **there definitely are deals where green features command a higher price**, as Figure 5 shows.

This survey of a random sample of around 200 CBRE UK fee-earning employees shows that 40% of relevant staff have experienced at least one transaction in the last 12 months where the specific presence of an above-average environmental standard in a building led to a better price.

The phenomenon appears to be evenly spread between capital markets (investment) deals, leasing deals, and other forms of deals (for example, loan arrangements).

Figure 5: Percentage of CBRE UK employees reporting recent transactions where a higher rent/ price was paid specifically due to above-average green features



Source: CBRE Research (n=196 randomly selected relevant CBRE UK employees reporting involvement in at least one real estate transaction in the last 12 months, where a higher rent or price was paid specifically because the building(s) concerned had above-average environmental features/credentials)

Attitudes and Willingness to Pay

Capital markets 'green premium' effects are also evident in UK investor attitudes.

We argue on page 8 that demand for green building features can also be asserted by and within the capital markets. And indeed we find that **36% real estate investors are willing to pay a slight premium for 'ESG friendly' assets** (see Figure 6).

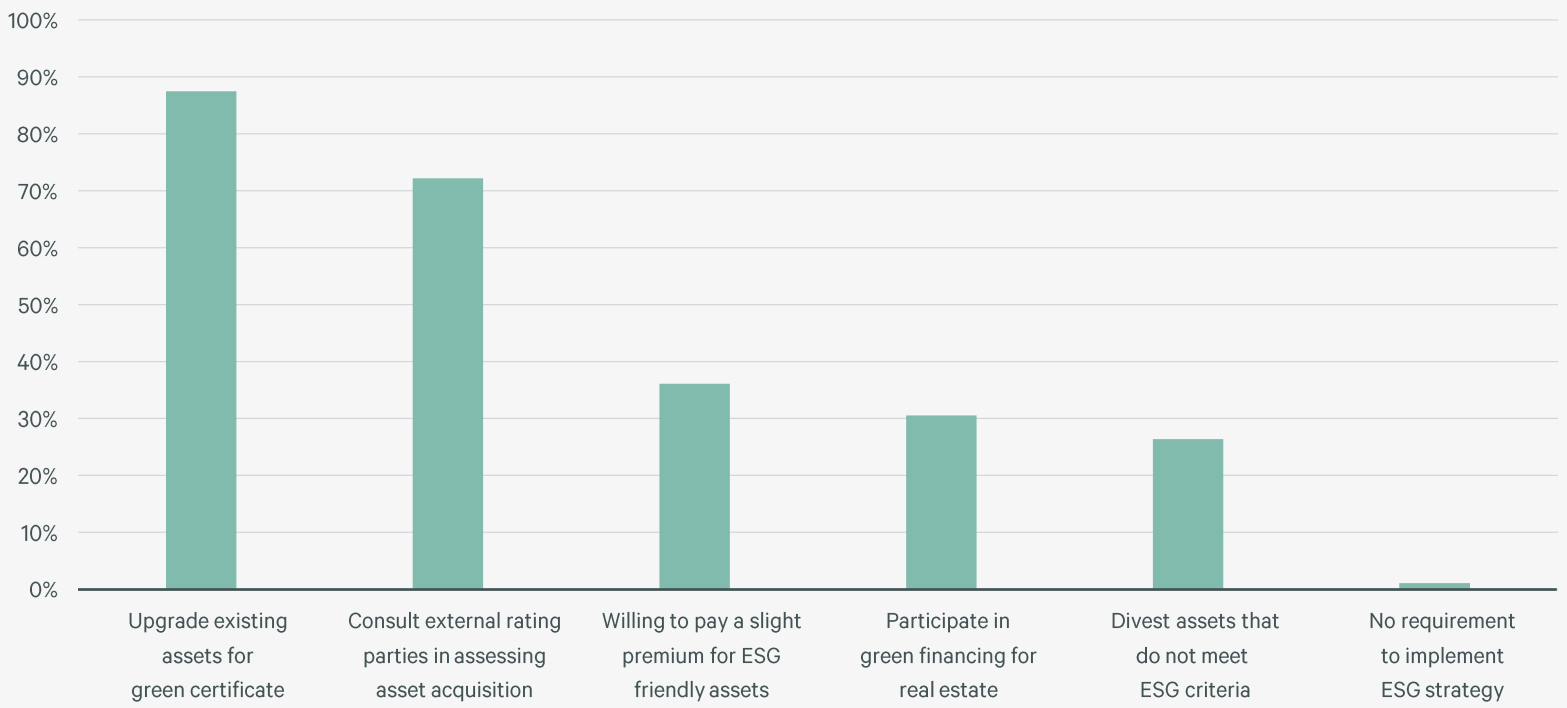
While this definition covers more than environmental features, it suggests there is a substantial body of investors experiencing demand for such features from their customers or regulators.

87% of UK investors are seeking green certification for their buildings, so the market for certification remains strong.

This matters because the demand for certification seems likely to drive prices up in the short term, and supply of certified buildings in the medium term. Furthermore, as Section 3 shows, the overwhelming majority of evidence of premiums for green building features is based on premiums paid for certified buildings.

However, this effect seems unlikely to last forever. CBRE has seen anecdotal evidence which suggests that in some occupier markets, just having a certificate may no longer not command a premium. It is increasingly necessary to have the most demanding version available.

Figure 6: Percentage of UK investors taking these actions to implement their ESG strategy



Source: EMEA Investor Intentions Survey, CBRE Research (CBRE, 2022b) (n=81 UK investors, 'Select all that apply')

03

The Quantified Evidence on Premiums and Costs

The Quantified Evidence on Premiums and Costs

Research typically looks at premiums for green certified buildings compared with the rest of the market. The typical rental premium is 6–8%, and the typical capital value premium is 8–16%.

CBRE has examined five recent major international literature reviews (see Figure 7). These 'meta studies' each aim to summarise the body of evidence on the value of green building features.

Typically these studies look at the difference in prices or rents between buildings in a market with an environmental certification (such as BREEAM or LEED) and those without, or the difference with the market average.

Some studies treat a building as 'green' if it has any such certification at all, irrespective of how demanding that certificate is. Others recognise that many certification schemes classify buildings on a performance scale, and seek to identify the additional premium associated with each point on the scale.

Most studies which these five authors reviewed control for the possibility that other factors than the certificate might be driving the value (see also page 23).

Studies of US and UK office markets dominate the sample, though much attention is also given to US and UK housing. The evidence base is much thinner on other property types and other countries.

Figure 7: Findings of five major 'green premium' literature reviews

Author	Number of findings included	Predominant markets studied (number)	Average gross rental premium (%)	Average gross capital value premium (%)
Dalton & Fuerst (2018)	66	US Commercial (28) UK Commercial (6)	6.0	7.6
Zhang et al (2017)	61	US Commercial (7) UK Commercial (3)	7.4	12.8
Mangialardo et al (2018)	36*	US Commercial (7) UK Commercial (3)	6.8	10.7
Leskinen et al (2020)	73	US Commercial (25) UK Commercial (4)	6.0	14.3
Monnier (2021)	26	US Commercial (17) UK Commercial (7)	8.0	15.6

Source: CBRE Research and literature reviews cited (see Bibliography). 'Findings' counts each individual finding cited within these literature reviews. Some studies may include more than one finding. Reviews may have identified the same findings, so their samples are not mutually exclusive. Where CBRE has calculated the average premium, the figures shown are arithmetic averages of all the findings in that literature review, without any weighting. Where findings are reported as a range, CBRE has used the midpoint of that range in its calculations. 'Gross' means before allowing for costs of creating the green building feature giving rise to the premium.

*Includes 3 perception-based findings.

The Quantified Evidence on Premiums and Costs

Premiums have typically declined over time as supply of certified stock increases.

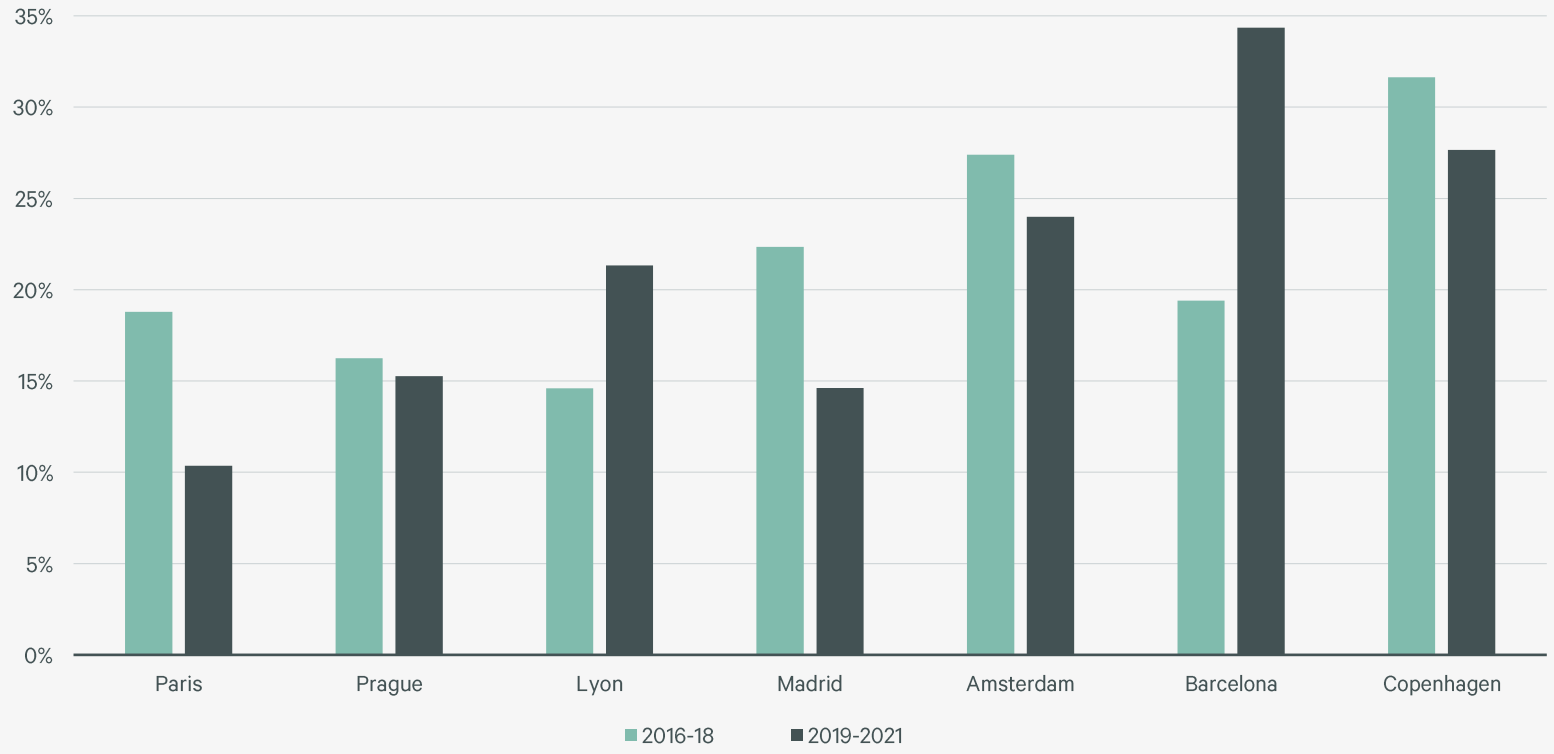
A recent CBRE study (2021a) looked for rental premiums for offices with sustainability certifications in selected EU city office markets. We find **an average 21% rental premium over the whole 6 year period studied.**

However, we also find that **premiums for office stock with a sustainability certification have typically declined over time**.

Figure 8 shows the observed rental premium in seven EU cities, comparing the average rental premium for certified stock between 2016 and 2018 with the average rental premium for certified stock between 2019 and 2021. In five of the seven cities studied, the premium declined.

This decline is likely to be due to an increase in the supply of certified stock in the cities concerned which was not offset by an increase in demand. **Taking all the cities in the study combined, the share of buildings with any environmental certification increased from 11% in 2016 to 20% in 2021.**

Figure 8: Rental premiums for certified office stock, selected EU markets (2016–18 compared with 2019–21)



Source: CBRE Research, 2021a. Average premium is the average of premiums over 5 years in each market (2016 to 2021). Certified includes LEED, BREEAM, WELL, DGNB and HQE. Study did not control for other influencing factors. UK data not available on a comparable basis.

The Quantified Evidence on Premiums and Costs

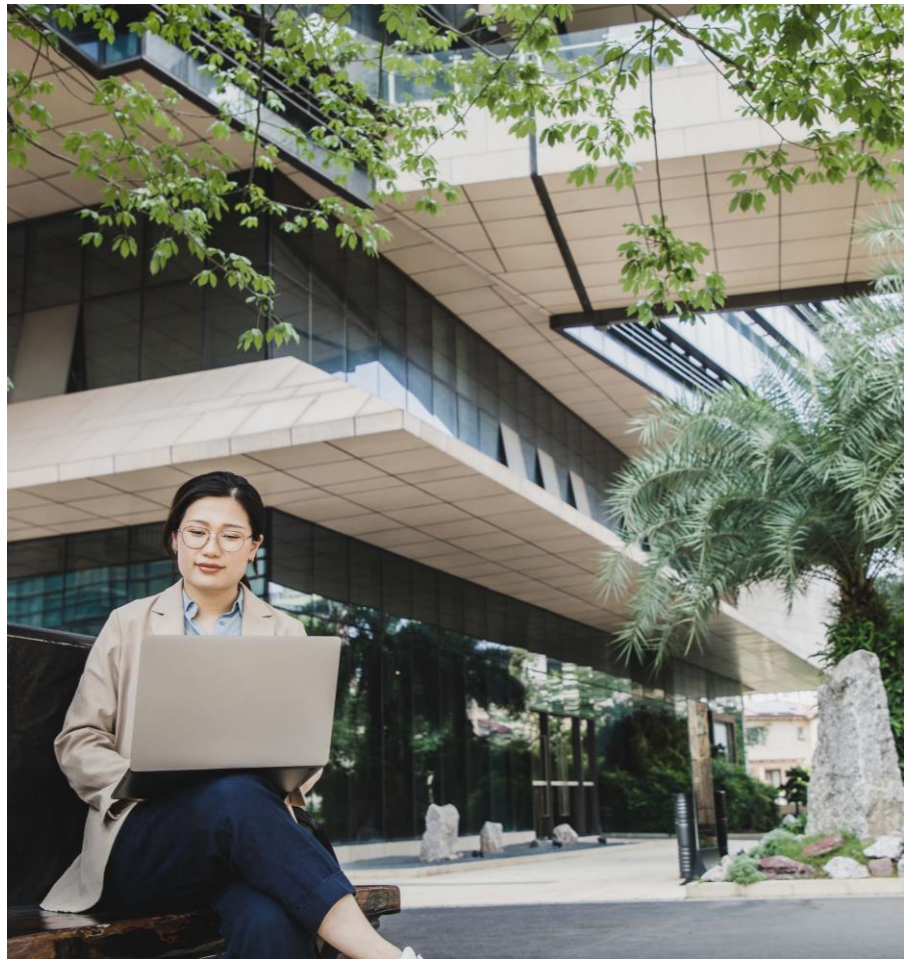
> As certification becomes an average characteristic, rents should also tend to the average.

However, in two of the cities studied (Lyon and Barcelona) we find an increasing premium over time.

This illustrates the importance of studying the demand side as well as the supply side. In Lyon, for example, very low vacancy rates coupled with increasing demand for green building features appears to have driven the premium up, even as the certified stock increased.

Even so, we hypothesise that in the long run, premiums will tend to fall. Almost by definition, premiums tend to be commanded by scarce assets. As certification becomes an average characteristic, rents should also tend to the average (see also the related discussion on page 26).

For example, Chegut et al (2014) found that each additional 'green' building decreased the premium in the markets they studied by 2% (for rents) and 5% (for prices).



The Quantified Evidence on Premiums and Costs

Value may also show up in faster leasing, or lower vacancy – not just in rents.

A number of studies also examine the potential for value to show up in metrics other than rent or capital value. Although the evidence from the UK is rather thin, international evidence suggests that **office buildings with green features lease faster than the rest of the market, and enjoy lower medium-term vacancy rates**. Figure 9 provides some sample findings.

Other value-related benefits anecdotally reported to CBRE researchers include:

- Lower **lending costs** for development or refurbishment of 'green' buildings
- Less need to offer **tenant incentives**
- Tenant agreement to **co-invest in green features** with landlord
- Lower **operating costs**

However these benefits should not simply be assumed. For example, Newsham (2009) found that around a third of LEED buildings used more energy than their conventional counterparts; while BSRIA (2012) found that only 44% of BREEAM clients felt BREEAM delivered operational cost savings.

Figure 9: Sample findings relating to non-rent 'green' value

Author	Market(s) studied	Non-rent factor studied	Finding
CBRE (2021a)	11 European city office markets	Vacancy rate	Vacancy rates in offices with sustainability certifications were universally lower than in non-certified buildings (as at H1 2021).
CBRE (2022c)	3 Australian city office markets	Vacancy rate	NABERS 5.5 and 6 Star offices have a 4% higher occupancy rate compared to NABERS 4.5 Star peers, and 11% compared to offices with 4 Star or lower ratings.
Mangialardo et al (2018)	Milan offices	Leasing velocity, vacancy rate	Green-certified buildings leased up four times as fast as the non-certified equivalents after 6 months, and had half the vacancy rate after 30 months.
Devine and Kok (2015)	Canada offices	Vacancy rate, likelihood of lease renewal	Offices with LEED certification had an 8.5% higher occupancy than comparable buildings. Offices with BOMA BEST certification were 3.4% more likely to experience lease renewal than a comparable uncertified building.
BSRIA (2012)	UK property with BREEAM certification	Leasing velocity, operating costs (energy)	44% of BREEAM clients felt BREEAM delivered operational cost savings; 28% felt it made properties easier to let (survey data).
Miller et al (2010)	US offices	Operating costs (energy)	Offices without Energy Star rating reported average combined electricity and gas costs per sqft 22% higher than buildings with Energy Star ratings.
Newsham et al (2009)	US commercial and institutional buildings	Operating costs (energy)	On average, LEED buildings used 18–39% less energy per floor area than their conventional counterparts. However, 28–35% of LEED buildings used more energy than their conventional counterparts.

Source: CBRE Research and studies cited (see Bibliography).

The Quantified Evidence on Premiums and Costs

Costs estimates also vary significantly, with a 'net zero' standard costing noticeably more.

Evidence on the cost of implementing green building features is surprisingly scarce. Arguably this reflects the fact that every building is different and costs to bring a building up to leading (or even average) environmental standards can vary significantly.

Figure 10 provides a range of costings studies published in the last decade. As with premiums, **cost figures vary substantially depending on the precise environmental standard being sought.**

Certification schemes which offer a scale of performance rankings not surprisingly tend to exhibit higher costs for the more demanding end of that scale.

However, it is often not clear whether the costing refers to new build or refurbishment costs. Furthermore, costings are variously expressed as a percentage of construction costs or capital value.

Two recent analyses of the theoretical cost of achieving 'net zero' unsurprisingly show a higher cost.

Figure 10: Costs of achieving green certifications or targets

Author	Basis of cost	Cost as % of capital value
Chegut et al (2019)	BREEAM Very Good	4.9%
Mangialardo et al (2018)	LEED Gold	5%
	LEED Platinum	7%
Abdul & Quartermaine (2014)	BREEAM	2%*
WGBC (2013)	BREEAM, LEED, Energy Star, etc	0–12.5%**
BRE (2016, citing Target Zero 2012)	BREEAM Very Good/Excellent (office)	0.2–0.8%
	BREEAM Outstanding (office)	9.8%
BSRIA (2012)	BREEAM Very Good	1-4%***
	BREEAM Excellent/Outstanding	5%***
AEW (2021)	Net zero: retrofit cost estimate to avoid stranding to 2030	0.25–0.65% per year to 2030
UKGBC (2020)	Net zero: by 2030	8–17%

Source: CBRE Research and studies cited (see Bibliography). See Zhang et al (2017) for a list of earlier costing studies published prior to 2012. *Based on 3 case study buildings. **Costs stated as % of construction costs rather than capital value. ***Modal response from a survey of 17 clients using BREEAM

The Quantified Evidence on Premiums and Costs

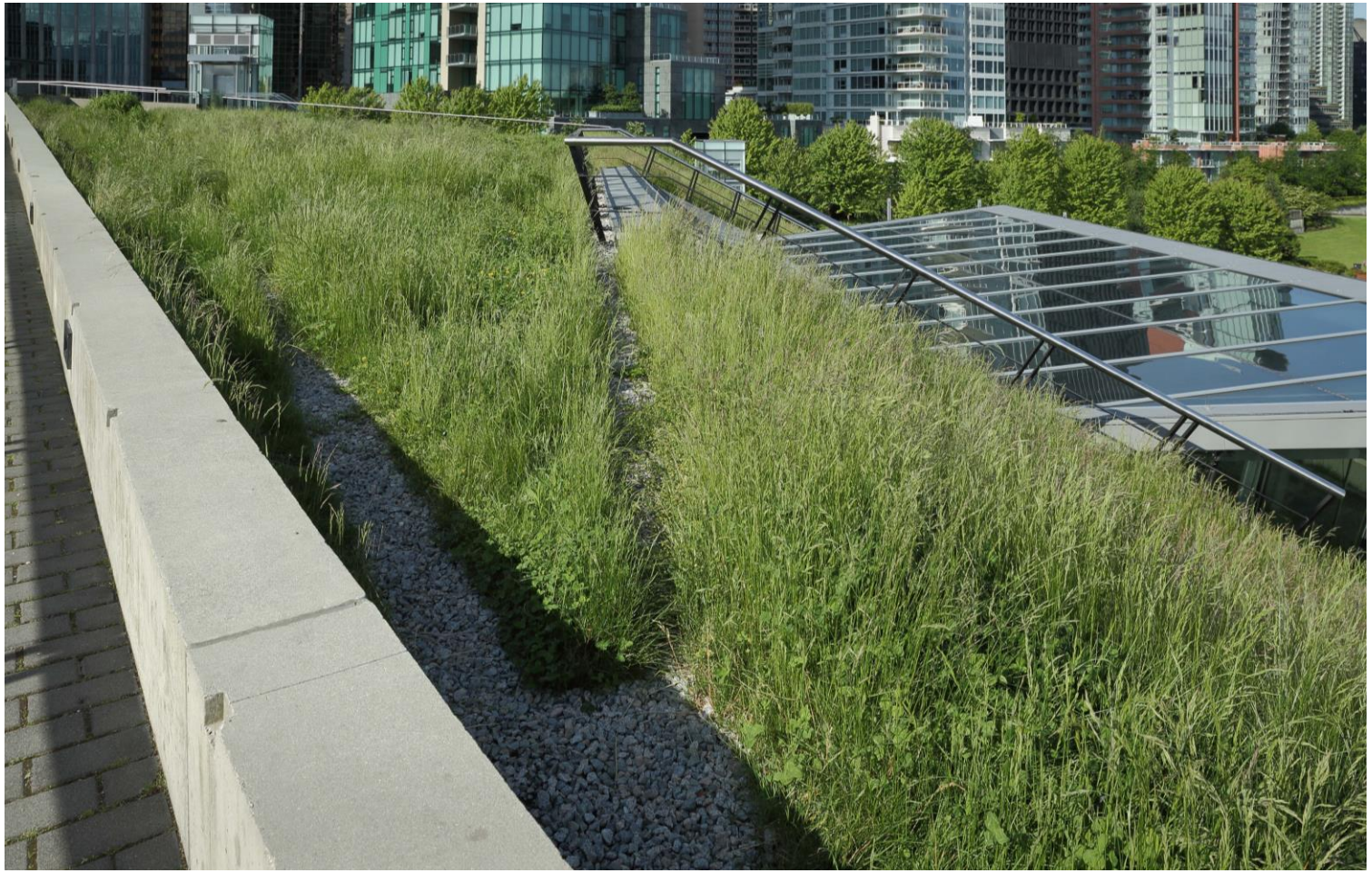
Deducting costs from observed gross premiums suggests a ‘rule of thumb’ net premium of around 6% of capital value – but with a large margin of error.

Deducting a 2–10% range of costs from the 8–16% gross premium suggests an **illustrative ‘rule of thumb’ net green premium of around 6% of capital values globally,** taking the full range of cost and premium estimates into account.

However, this calculation assumes that the lower bound of cost estimates should be deducted from the lower bound of gross premium estimates. In fact, in the worst case, a building might experience the higher bound of costs but the lower bound of gross premiums. If it did, the net premium would be -2%, with costs exceeding benefits.

And in the best case, where costs are minimised and the gross premium is maximised, the top of the range of average outcomes would be +14%.

This wide (but typically positive) range shows that **while a green premium is typically likely to exist, its precise value could vary wildly, and it may not exist at all in certain circumstances.** Attention therefore needs to be paid to the best available local evidence.



Four Important Caveats to the 'Green Premium' Literature

Specifically identifying the value of green building features is difficult. So findings in this field should be interpreted with some caution. Four main caveats to the 'green premium' literature need to be considered.

1. Timing

Most studies are snapshots of the market under study at a point in time. However, as we show above (see pages 18-19), premiums are likely to erode over time as green features become more common.

So research showing a particular value for a green building feature risks going out of date relatively quickly. Some of the findings identified by the meta-studies cited on page 17 are now more than a decade old.

Research may also not identify the supply of a given green building feature at the time the study was conducted, making it difficult to establish how 'mature' the market was for that green feature.

2. Evidence quality

Many studies recognise that green building features may be present alongside other non-environmental features which also add value to a building, and that it is difficult to attribute value specifically to the environmental features. Statistical techniques are available to remove the influence of these other factors, but not all studies use them. This may be as a result of a lack of appropriate data.

The evidence is also extremely thin on sectors other than offices and residential, and in some markets there is not an adequate body of research to draw meaningful conclusions.

3. Certification as a proxy

The widespread availability of green building certification schemes in some markets, and the lack of any other comparable data, explains why certifications are heavily used as an indicator of a green building.

However, there are risks with this approach. Certifications are typically weighted scores combining a wide range of environmental performance metrics covering (for example) energy, water and waste. But it is possible that customers want to pay a premium for only a subset of these features.

Conversely, separate CBRE research (2021b) offers some evidence that UK buyers may only be interested in the certificate as a 'badge' with which to evidence their environmental credentials, without actually looking at whether the building delivers superior environmental performance in practice.

Furthermore, the certifications that form the basis for most studies relate to the building 'as built' rather than 'in use'.

Studies looking at specific metrics such as actual energy consumption seem increasingly likely to be needed.

4. Every building is different

The heterogeneous nature of property, especially commercial property, means that the outcomes for individual buildings could vary wildly from researched averages.

04

Discounts Instead of Premiums

Discounts Instead of Premiums

Is it easier to identify the discount for the absence of a green feature than it is to identify the premium for its presence?

The difficulties described above in establishing the value of a net green premium have in recent years led some commentators to prefer instead the related concept of the 'brown discount'.

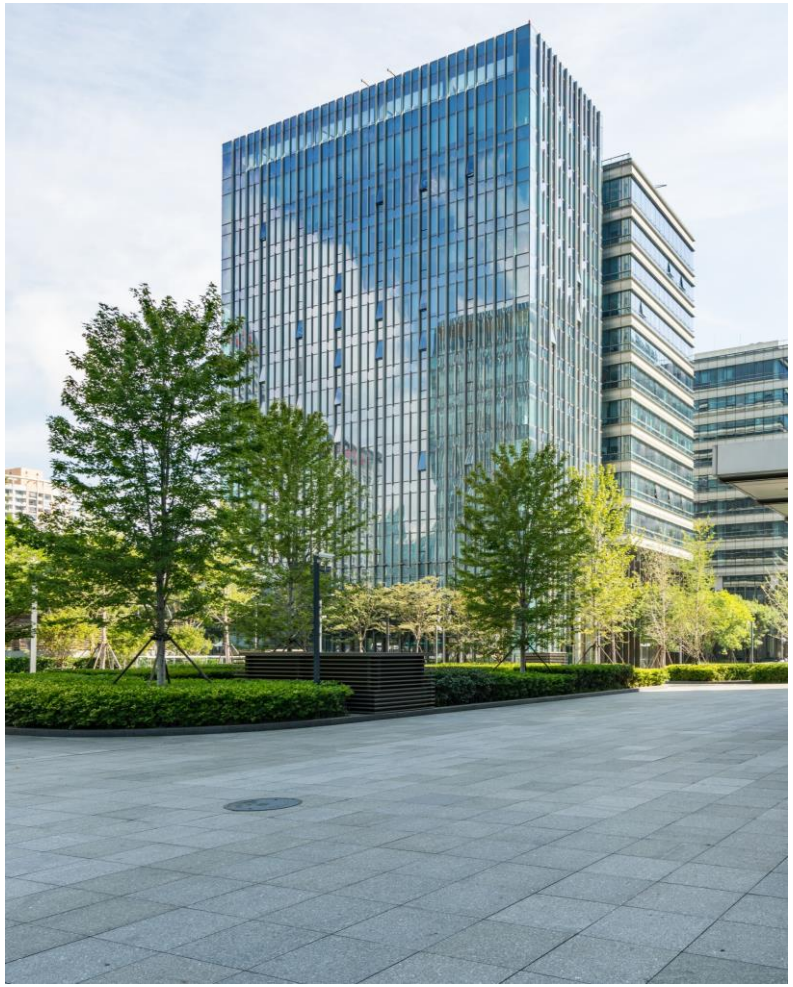
This concept may be defined as **the discount in price sought when a building lacks green features which have come to be expected in the market.**

The discount will reflect the risks which arise from the absence of those building features. That might simply be the risk of low demand. But it could also include:

- **physical risks of climate change** such as wildfires, flooding or water scarcity
- **transition risks of climate change** such as inefficient building design leading to unmanageable energy costs
- **legal risk** of failure to comply with existing or forthcoming regulations
- **other environmental or social risks** such as poor support for biodiversity, or the presence of controversial tenants

In this section of the report, we present a framework to help clients reflect on whether thinking about discounts for the absence of green building features is more helpful than thinking in terms of premiums for the presence of those same features.

We also argue that investors seem to be more preoccupied with the potential loss of value arising from failure to invest in green features, than they are the potential to benefit from premiums.



Discounts Instead of Premiums

Discounting for poor environmental performance is just another sort of depreciation.

Real estate decision makers are familiar with the concept of 'prime' pricing for high quality real estate. But they are also familiar with pricing for poor quality or obsolete real estate which suffers from low demand and lacks the features that the market expects.

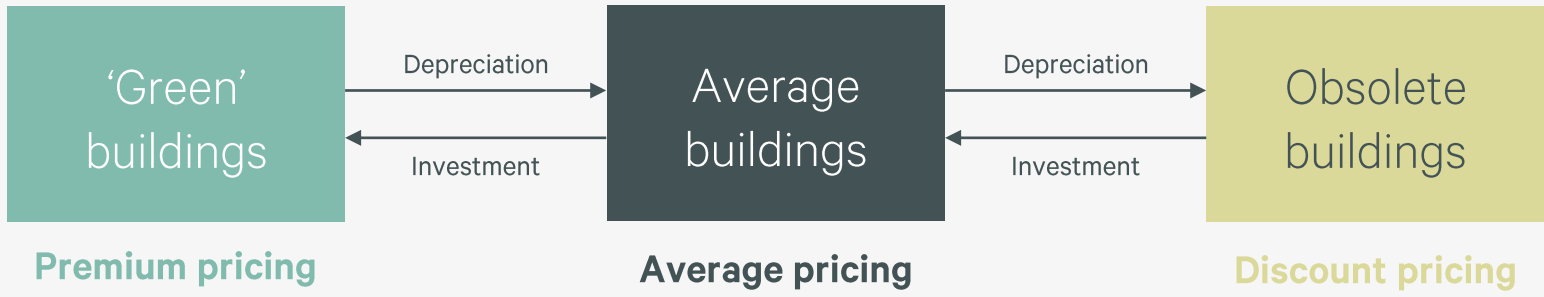
These familiar concepts can be applied to the value of green building features. As illustrated in Figure 11, properties with desirable but scarce green features can expect to command a premium in the market, compared to average buildings lacking those features.

But the demand for green building features is likely to increase their supply, making them commonplace or average over time, and expected 'as standard' within the market.

But average buildings experience average pricing, eroding the premium previously enjoyed (see also pages 18-19).

Demand falls further for buildings which fail to meet even average standards, rendering them obsolete and suffering from discounted pricing.

Figure 11: How real estate moves from green to obsolete (and back)



Source: CBRE Research

This market progression, with constantly rising expectations and pricing following suit, also gives rise to depreciation. Investment is required to stave off depreciation and stay in the mainstream of the market.

Green building features are not immune from this phenomenon, especially if regulation requires those features.

This means, for example, that there may come a point when purely having a green building certification is not enough – it will be necessary for buildings to advance up the rankings of such certification schemes in order to continue to attract a premium.

CBRE has seen some anecdotal evidence that this effect is already occurring, with some markets now regarding 'entry level' certification as commonplace and no longer attracting any premium or special occupier interest. By contrast, rarer and more demanding levels of certification should, in theory, continue to attract a premium.

Discounts Instead of Premiums

Research on discounts is rare because it must wait for green building features to become common – and by then it's too late to be useful.

Discounts for the absence of a green feature ought, in due course, to be observable in the market through research.

However, there are in practice very few studies which attempt discount-based analysis.

Even attempting to quantify general real estate depreciation has proved difficult, with widely varying estimates (see for example Crosby & Devaney 2011).

We suggest that there are two main reasons why this might be the case – and why it may not matter.

1. The feature is not yet common enough

A green building feature needs to be relatively common before a discount for its absence is meaningful. The discount that research would be looking for is the discount relative to the market average.

However, the penetration of green building certifications in many markets is still very low. For example, CBRE's (2021b) study of selected European markets found that only 20% of buildings held a relevant certification.

If 80% of buildings do not have certifications, it would not be meaningful to attempt to identify the discount from the market average which those buildings experience – because the market average building is one without a certification.

We think there is likely to be a discount for the lack of that feature only when a minority of buildings in a market lack it.

Almost no environmental feature of interest is yet sufficiently common that it meets this test.

However, European EPC ratings are a useful exception. There are studies identifying a discount for a poor (F or G) EPC rating (see next page). In our view, such studies are valid because the number of buildings with poor EPC ratings is small, they do not represent the market average, and they do not typically meet market expectations.

2. Research would be too late to be useful

However, by the time a green building feature is commonplace in the market, research identifying any discount for buildings which don't have it is arguably not of much value.

The market will have moved on by that point, and specific pricing and valuation evidence is likely to be abundant in a way that it is not for emerging, higher standards.

A 'green premium' evidence base therefore seems much more necessary to support decision making than a 'brown discount' evidence base.

Even so, research can point to the cost or risk of failing to adequately invest in environmental outcomes. But such research will necessarily focus on theoretical loss of future value rather than evidence that it has already happened. Examples include AEW (2021) and Monnier (2021).

Discounts Instead of Premiums

Regulation in the UK and the Netherlands has led to observed discounts for lower EPC ratings.

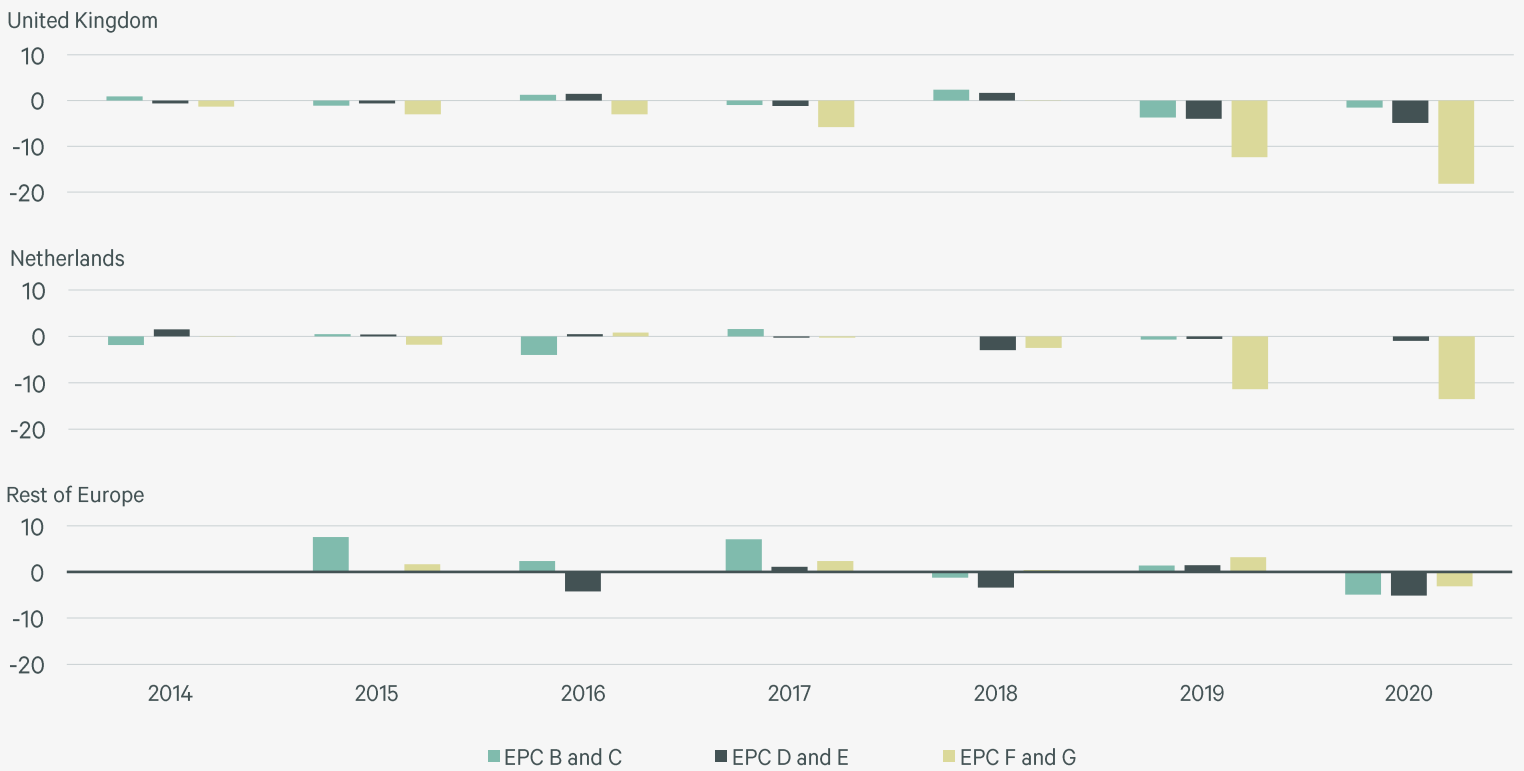
An example of research on discounts for 'obsolete' property is CBRE IM's (2022) work on Energy Performance Certificate (EPC) ratings. Legislation imposing minimum energy performance ratings based on EPCs was implemented in the UK in 2015 and the Netherlands in 2016.

CBRE IM find **discounted investment returns for assets with lower EPC ratings.** This effect was most notable for F/G rated UK buildings from 2019, when it had become illegal to re-let such buildings.

Figure 12 shows that the discount on total return for assets with an EPC of F/G was -18% (UK) and -14% (Netherlands) compared to A/A+ rated assets in 2020. The lower total return for poorly performing assets was driven primarily by capital growth, not by income return.

The discount was not observed elsewhere in Europe, where legal minimum EPC requirements have not yet been introduced. This suggests that it is the presence of regulation, rather than customer demand (or other recent Europe-wide influences, such as the COVID-19 pandemic) that has created the discount.

Figure 12: Difference in total return of EPC B/C and EPC D/E compared to EPC A/A+ rated properties (percentage points)



Source: CBRE Investment Management, 2022. To ease comparisons, findings shown here are simple averages; however, they are 'highly similar' to regression analyses undertaken by the same authors, which controlled for location and construction date. Covers industrial, office, retail and residential assets.

Discounts Instead of Premiums

Rather than seeking a premium, modelling when and how to avoid a future discount might provide the best assistance to decision-making.

In the absence of timely research about the scale of discounts, investment choices can be assisted by constructing and comparing scenarios in which a green building feature is present, or not.

Figure 13 illustrates the factors which a typical cash flow analysis could consider. This approach does require the analyst to make a range of assumptions, but those assumptions are at least transparent and informed by research.

Such analysis might include estimates of the additional rental premium that occupiers might pay for green building features.

But it does not have to do so: instead, modelling can make a judgment about whether demand for the green feature will be so sustained that not having that feature is likely to be discounted in future.

If it will, then preserving value and preventing depreciation through defensive investment becomes essential.

Figure 13: Reflecting green feature choices in cashflow analysis

Cashflow item	Do nothing: Do not implement green building feature	Take action: Implement green feature
Capital expenditure	Costs of managing risks arising from absence of the feature (e.g. flood defences)	Construction costs needed to create the feature
Operating expenditure	Higher running costs (e.g. gas prices, carbon pricing or offsetting) Higher lending costs	Lower running costs Lower borrowing costs
Revenue	Rental depreciation or actual rental discount due to loss of tenant demand because the feature is not present (severe loss if demand is regulated away)	Protection of existing rental stream; potential for premium for scarce best-in-class features
Discount rate	Higher rate reflecting risks remaining	Lower rate reflecting risks now managed

Discounts Instead of Premiums

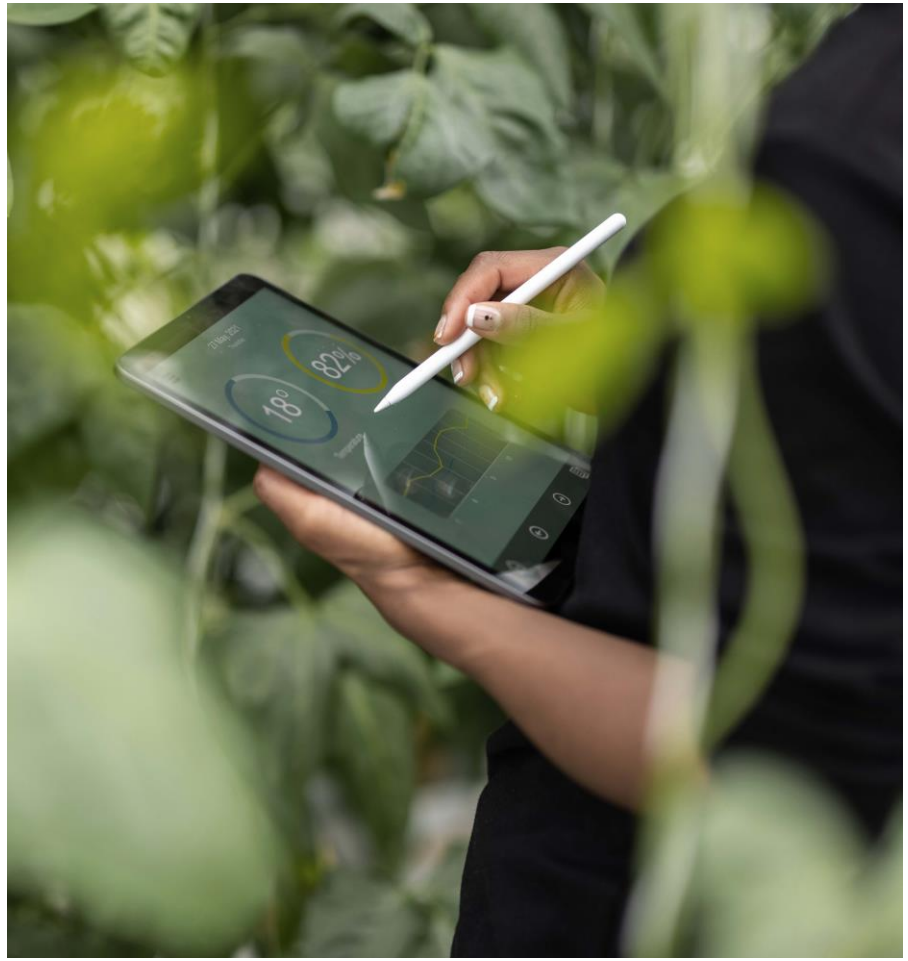
> ‘First mover’ investment in green features may be worthwhile… Investing early comes with costs, but is more likely to deliver a premium.

Such analysis also shows that ‘first mover’ investment in green features may be worthwhile:

- **Investing early** comes with costs, but is more likely to deliver a premium
- **Investing late** purely to avoid a discount involves the same costs (technological advancement and economies of scale notwithstanding) – but no premium

However, it is nevertheless possible that avoiding a future discount could be the main reason why we see investment in green features, rather than because of an uncertain or modest green premium. In other words, the investment has a defensive character aimed at protecting future value.

This is especially true when the discount appears to be driven by firm regulatory requirements (see example on page 28) rather than uncertain or weak occupier demand.



Discounts Instead of Premiums

UK real estate investors are indeed most driven by protecting value in their sustainability strategies.

This defensive approach to protecting the value of real estate does indeed seem to be a significant driver of decision-making among UK real estate investors. Figure 14 suggests that **protecting value is investors' biggest single sustainability priority**.

Enhancing brand image and adhering to relevant regulations were significantly less important as drivers of strategy.

Ultimately, therefore, the understanding that obsolete real estate suffers a value discount may be a bigger driver of action than the potential for modest value premiums.

This doesn't mean that protecting value is the only aim. For example, some real estate capital is being actively allocated purely to environmentally-friendly assets, whether there is a higher return from those assets or not.

Figure 14: Main sustainability priorities among UK real estate investors

Source: EMEA Investor Intentions Survey, CBRE Research, 2022b (n=81) ('Select top three priorities' question)

05

Conclusions

Conclusions

There is clear evidence of a premium for green building features. Green building features add value, but potentially only for a minority of occupiers.

However, there are issues with the evidence base.

In any case, premiums may not be the main reason landlords decide to invest in green features. It may instead be helpful to think of avoiding a discount, and protecting existing value, as the key driver.

1

There is clear evidence of a 'green premium'

Overall, we conclude that there is reasonably clear evidence that a premium will be paid for green building features.

Attitude surveys suggest **that a significant minority of large UK office occupiers say they will pay more for green features**, especially if there are direct benefits. A majority of logistics operators say they would may more for green-certified stock.

While such surveys arguably suffer from optimism bias, better prices for green buildings are now sometimes being directly observed by CBRE's UK agents.

The best available international evidence suggests that **there is likely to be a gross green premium of around 6–8% of rents and around 14–16% of capital values**.

After accounting for costs, **a net capital value premium of around 6% for green certifications** is a reasonable global rule of thumb. However, the margin of error is larger than this potential gain, suggesting that case-by-case analysis is needed.

In any case, **measured premiums are likely to decline over time** as the supply of green features increases. Indeed, continuous investment is necessary simply to avoid depreciation.

2

However, there are issues with the evidence base

Even if it is a reasonable assumption that green building features will add financial value, care should be taken not to overinterpret this finding. A range of caveats should be borne in mind.

Evidence from the US and UK predominates. In many European countries, and in some real estate sectors such as retail and logistics, the evidence base is much thinner; more data and research is needed.

The **evidence is very focused on the value of green building certifications**, and says much less about the value of high underlying environmental performance (such as actual energy consumption).

There is also, to date, **very little literature on the premium associated with a 'net zero' building**, or the costs of achieving it.

We also find that **data is often out of date, and evidence quality is variable. The use of certificates as proxies for environmental performance can mislead.** But there are few practical alternatives until data availability improves.

The **heterogeneity of real estate** also makes general conclusions difficult to apply to individual circumstances.

Conclusions

3

It may be helpful to view ‘avoiding a discount’ as a stronger driver

It can be difficult in practice to establish the value uplift for green building features. So, thinking about discounts for the absence of a green building feature, rather than premiums for their presence, may be a helpful alternative.

Research-based quantification of discounts will be of limited use to decision makers because it will lag the market. However, such research may help indicate which of the drivers we discuss on page 8 is actually bringing the discount into being.

Case-by-case modelling of discounts for the absence of green features may be better at illustrating the costs of not taking action, for example using cashflow analysis of alternative scenarios. When doing such modelling, care needs to be taken to make realistic assumptions about timing and the likely magnitude of the premium (or discount) likely to be experienced for the presence or absence of green features.

There is evidence that **investors are implementing environmental improvements to their real estate defensively, to avoid discounts** and protect value, rather than aiming to achieve premiums through market-leading stock.

06

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Further Reading: Explore CBRE's Recent Research on Sustainability Issues

View our sustainability research at cbre.co.uk/esg

A Practical Guide to UK Biodiversity Net Gain Costs

CBRE European Sustainability Legislation Mapping Tool

CBRE UK & Ireland ESG Report 2021

ESG and Real Estate: The Top 10 Things Investors Need to Know

Real Estate's Role in the Environmental, Social and Governance (ESG) Agenda

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