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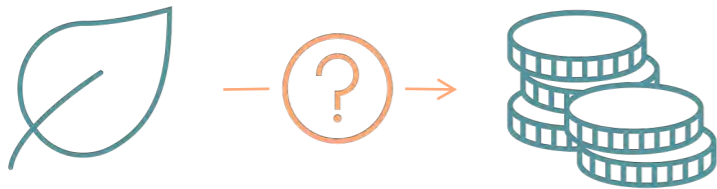
# What is the value of green?

Looking at the evidence linking  
sustainability and real estate  
outcomes

September 2023



# The value of green: Looking for 'hard' evidence



The transition to a lower-carbon built environment is reshaping the definition of quality real estate, creating various “transition risks”. We can point to numerous anecdotal examples of green building features driving higher rents and values, as well as better overall performance. However, **showing this rigorously and quantitatively is challenging.**

Various academics, real estate agencies and other researchers have attempted to rigorously and quantitatively identify sustainability-driven price, value and performance gaps between assets that possess and those that lack green features. They use a range of datasets that vary widely in terms of data quality, sector coverage and geographic purview. They have also enjoyed varying degrees of success in drawing clear, convincing findings from their analysis.

Our approach for this report is to examine the existing work on the topic and identify what we believe are the most helpful and relevant analyses. This sits alongside our monitoring of outcomes within our own portfolio, a few examples of which we highlight as case studies.

We find that while the range of estimates are wide, and depend on a variety of methodological considerations, the studies consistently find a **statistically significant** impact of asset sustainability features on metrics such as achieved rent, capital value, leasing success and overall performance. We recommend continuing to monitor the evolving evidence of these differentials, both in the broader literature and within portfolios. We also remind investors that the benefits of green investment—the focus of this report—must be considered alongside other variables that impact returns, such as cost of green features and the timing of implementing them.

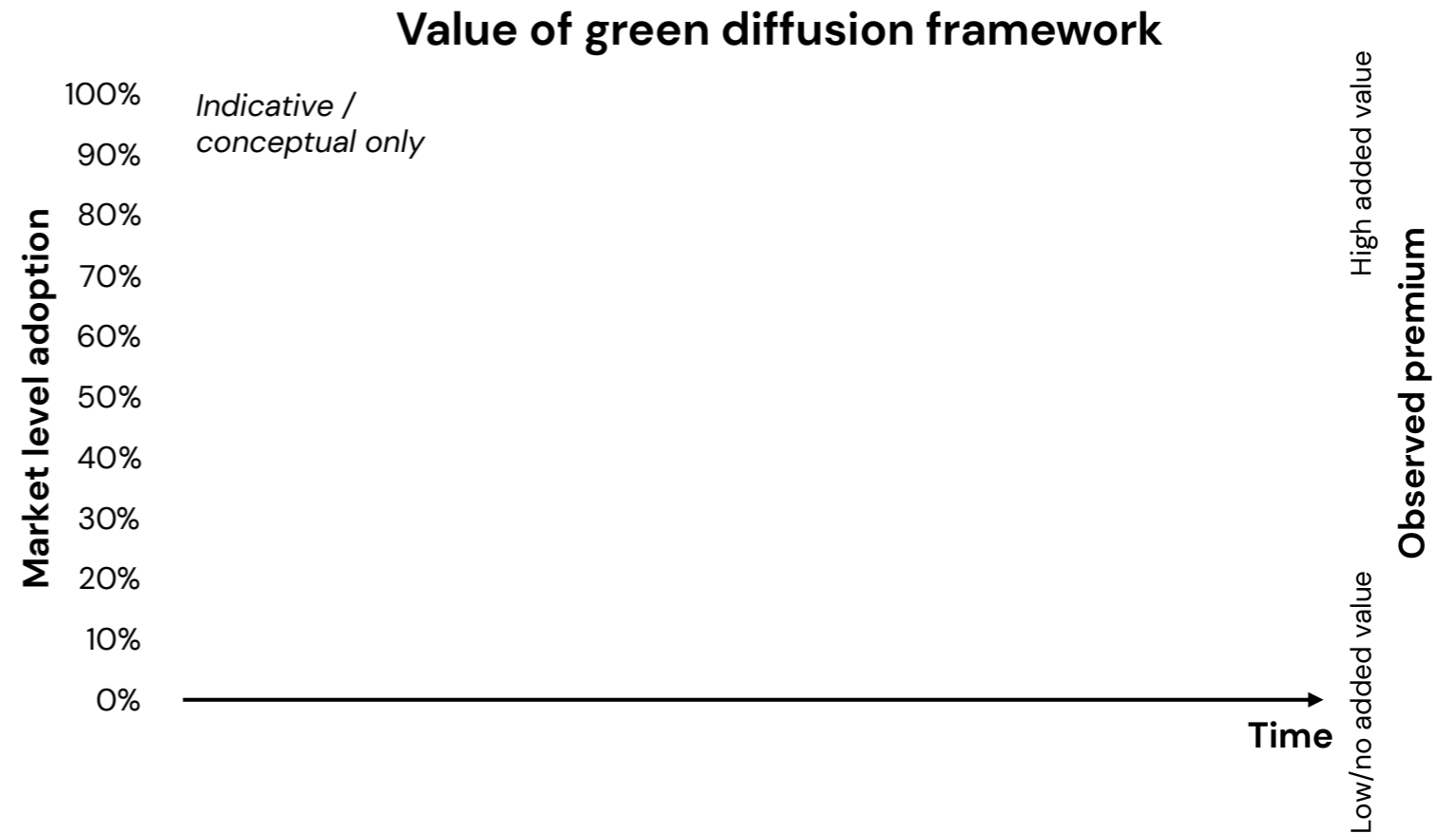
## **Green premium? Brown discount? We call it the value of green.**

Price, value and performance differentials between assets that possess and those that lack certain sustainable credentials are often called “green premia” or “brown discounts”. We have observed debates within the real estate industry as to which term is more applicable. In our view, the difference between the green premiums and brown discounts is a matter of perspective and can vary with time, as given green attributes transition from novel, to highly valued, to standard (see page 3). The fact that a gap exists between two assets is more relevant than whether the ‘premium’ or ‘discount’ label seems more applicable. As such, **we use the term value of green (“VoG”)** throughout this report and broadly within LaSalle.

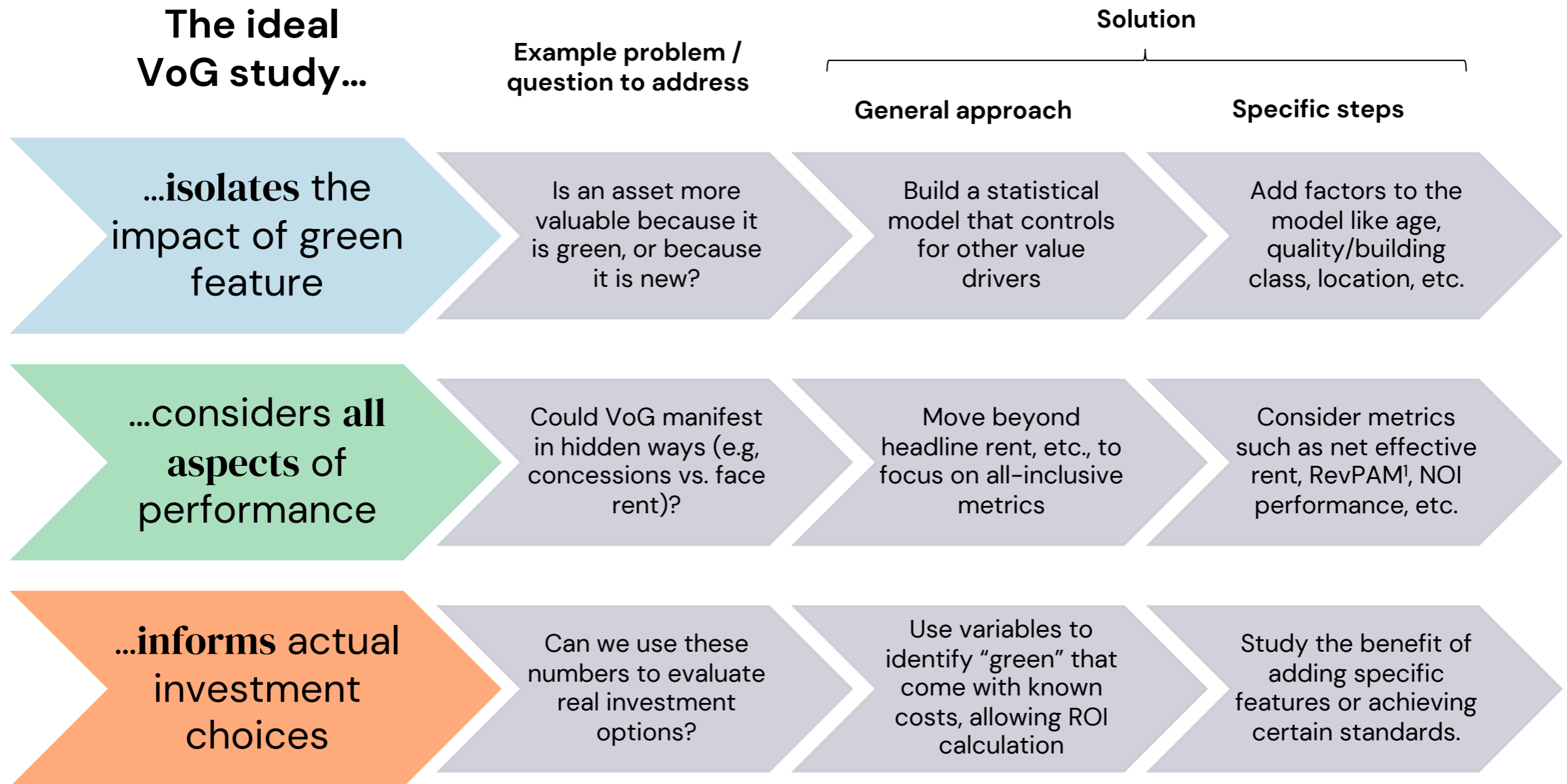
# “Green premium” versus “brown discount” is a matter of perspective and time

Studies on the value of green rely on well-defined attributes to accurately isolate its effects on rents and values. But the requirements and expectations around specific attributes evolve over time, driven by technological innovation, legislative compliance and occupier needs.

The chart gives a theoretical example of how we might expect the value of green to arise over time. The solid lines (left hand scale) indicate how widely adopted a certain feature is in a market; the dashed lines indicate an illustrative added value arising from adopting such an initiative (right hand scale).



# The ideal value of green study

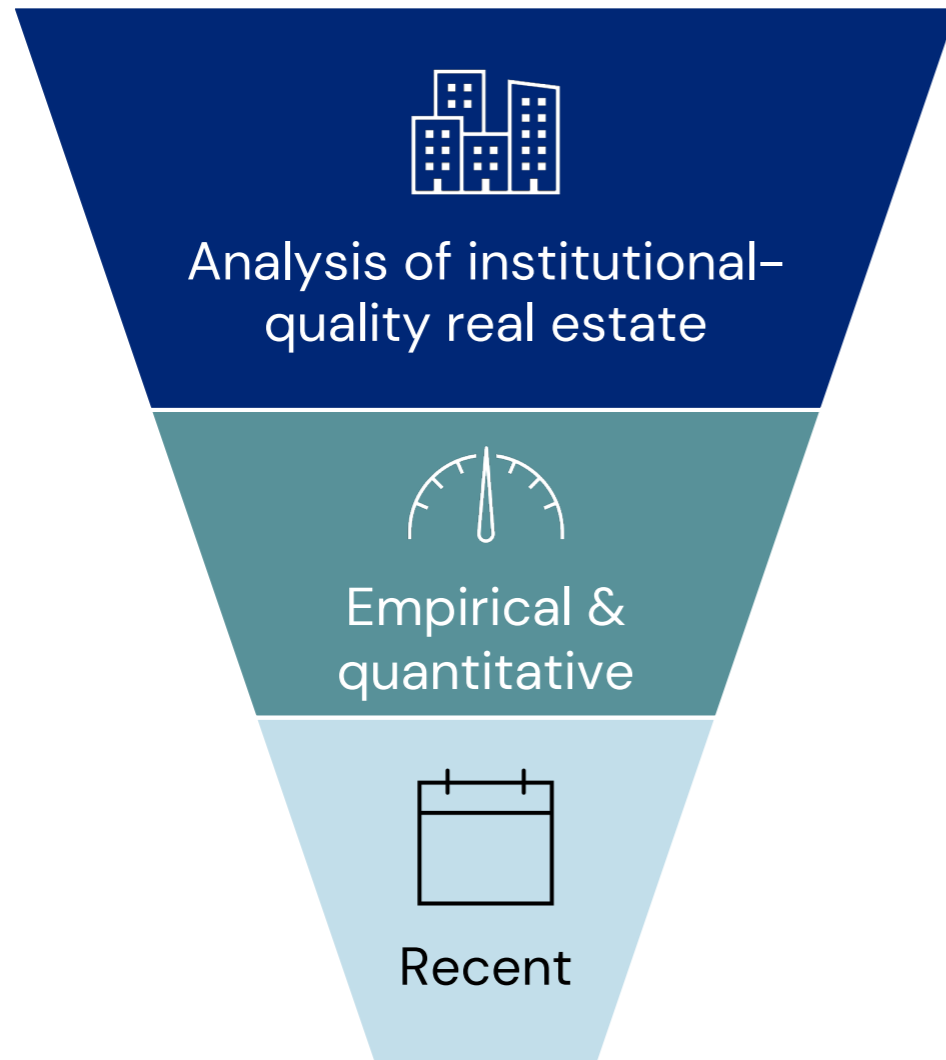


(1) RevPAM = Revenue per Available Meter (or foot). Combines the impact of varying rent with that of varying occupancy.

# Approach: Meta-analysis of VoG studies

Our meta-analysis of value of green analyses:  
The study selection “funnel”

All value of green studies → **100+**  
studies



We focused on analyses of income-producing real estate, including both commercial and rented residential. We excluded studies focusing on for-sale housing.

We only included studies that sought to quantitatively measure value differentials through prices—i.e., “revealed preference”. We excluded qualitative studies, including those based on surveys—i.e., stated intentions. Typically, the premium is measured through hedonic regression, appropriately ensuring building age, location and quality are appropriately factored out.

While publication dates vary, we focused on studies based on data from the past 10-15 years with a preference for more recent results, though made exceptions in cases where a study brought unique insight.

→ LaSalle value of green subject studies **41**  
studies\*

\*A full bibliography of studies is available in the appendix

# Introducing the LaSalle VoG Tracker

Example page from LaSalle VoG Tracker

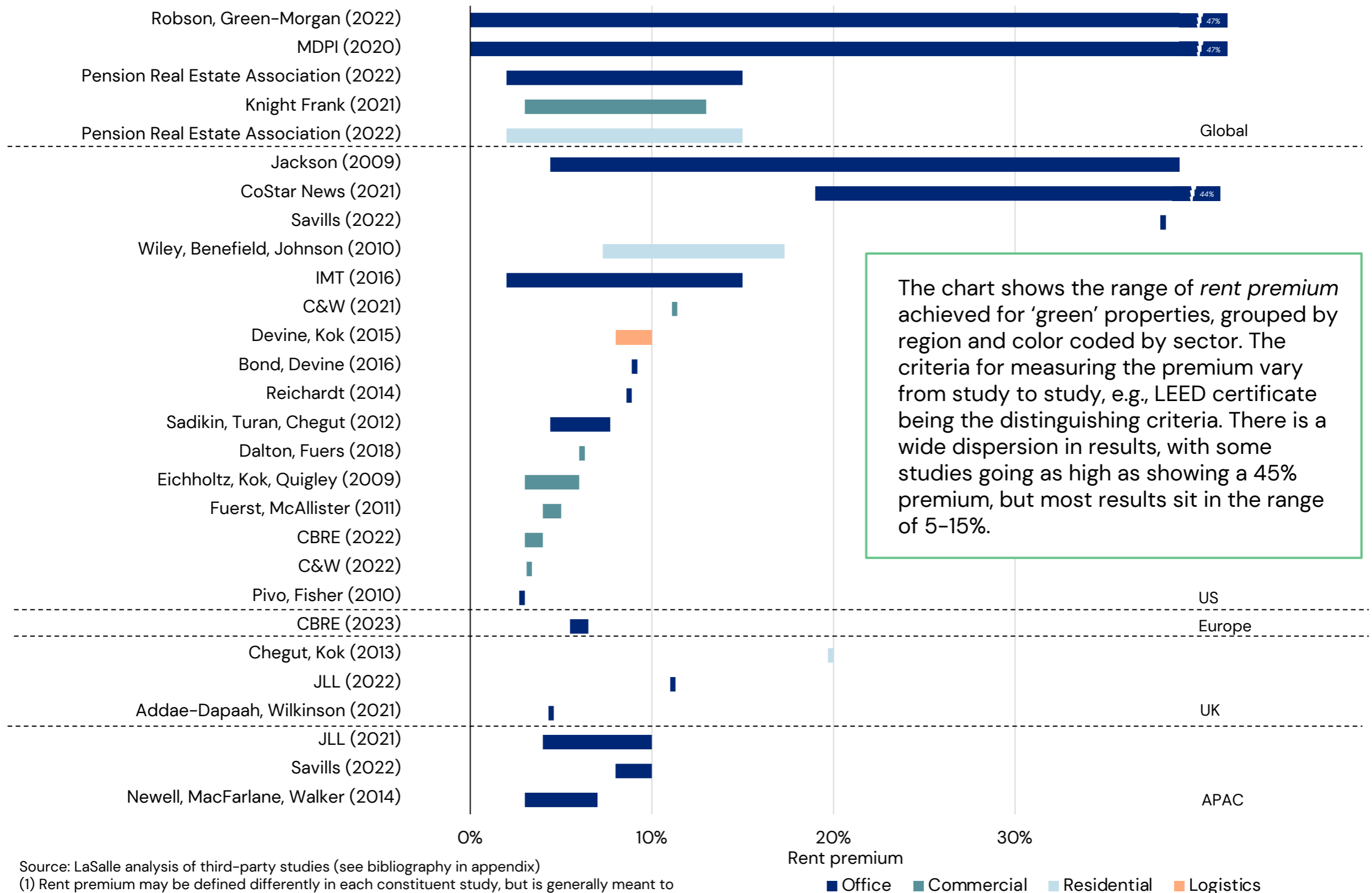
Title	Author	Organisation	Data Year	Publ. Year	Market	Sector	Data Source	Results
Green Office Buildings Report Even Bigger Rent, Sale Premiums During Energy Factors, Leasing Structure and the Market Price of Office Buildings in	Nancy Muscatello and Alexander Levy	CoStar News	2010 - Q1 2021	2021	IS (54 markets)	Office	3-5 star office properties in 54 markets in U.S. CoStar data -	Sales price per sf premium commanded by
ESG: The Impact of "E" in Commercial Real Estate	Dwight Jaffee, Richard Stanton, Nancy Wallace	UC Berkeley	2001-2010	2018	US	Office	Office buildings that were	Empirical results suggest that Energy Star labels
How Risk Area Sustainable Real Estate Projects? An Evaluation of LEED and Building Performance: Implications for Tangibles and Intangibles	Alaine Coffey and Daniel Ismail	Green Street University	2016-2019	2023	US	Office	Bloomberg, company filings and green	For every 5% increment in the total pcc of an
Sustainability and valueCapital Markets: Central London Offices	Jerry Jackson	al of Real Estate Lite	2008-2009	2009	US	Commercial	CoStar	Rent premium estimates from four recent
Green Premium: What is the Implied Prognosis for Sustainability?	Avis Devine, Nils Kok	iversity/Maastricht U	2004-2013	2015	US & Canada	Commercial	RE investment advisory	The study identifies a 8-10% rent premium
The 'Green Value' Proposition in Real Estate: A Meta-Analysis	John Neale	JLL	2017-2021	2022	Central London	Office	JLL	BREEAM rating can result in as much of a 20%
What Drives the Premium for Energy-Efficient Apartments - Green Awareness or	Kwame Addae-Dapaah & Jamie Wilkinson	l of sustainable real	2008-2018	2021	Greater London	Office	CoStar	The study finds a 4.3% premium to headline rent
The Economics of Green Building	Ben Dalton & Franz Fuers	iversity of Cambrid	2008-2016	2018	Mainly US			The results show a 6% premium in rents and a 7.6%
	Carolin Pommeranz & Bertram I. Steininger	yal Institute of Tech	2008-2019	2020	Germany	Residential	ImmobilienScout24	EPC rating has higher expected rents, locations
	Piet Eichholtz, Nils Kok, John M. Quigley		2007-2009	2010		Office	CoStar data - 20,801 rental	Ceteris paribus, the selling prices

New evidence on the value of green continues to be identified on a regular basis. In order to track new evidence of VoG price and value impacts, **LaSalle has set up an internal value of green tracker**, collating reported findings from studies published by both academic sources and market participants to allow for an overview of reported findings. We expect that the value of green will see an increased focus in the coming years, as data related to green attributes becomes more widely available and reported.

We also anticipate that the studies will become more sophisticated and varied in terms of sector and market covering, providing further nuance to variable impacts across global real estate markets.

# Green features generate positive rent premium<sup>1</sup>

## Studies on “green” asset characteristics: Estimated impact on rents

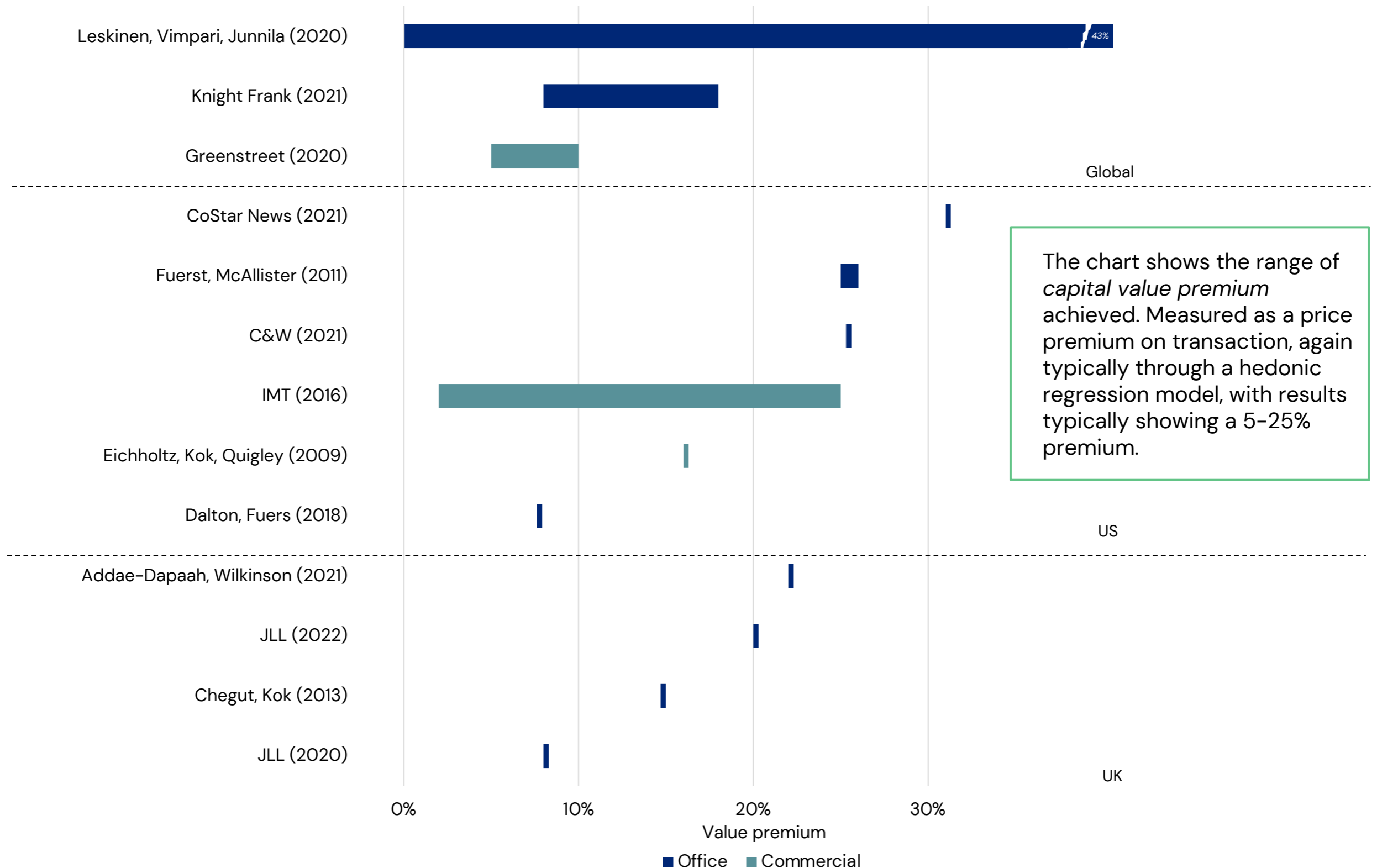


The chart shows the range of *rent premium* achieved for 'green' properties, grouped by region and color coded by sector. The criteria for measuring the premium vary from study to study, e.g. LEED certificate being the distinguishing criteria. There is a wide dispersion in results, with some studies going as high as showing a 45% premium, but most results sit in the range of 5-15%.

Source: LaSalle analysis of third-party studies (see bibliography in appendix)  
 (1) Rent premium may be defined differently in each constituent study, but is generally meant to describe rent differentials between assets that possess and those that lack certain green features.

# Green features drive higher asset values<sup>1</sup>

## Studies on “green” asset characteristics: Estimated impact on capital values



Source: LaSalle analysis of third-party studies (see bibliography in appendix)

(1) Capital value premium may be defined differently in each constituent study, but is generally meant to describe capital value differentials between assets that possess and those that lack certain green features.



# Value of green is complex and multi-faceted

While most studies focus on the benefits of green buildings in terms of headline rents and capital values or yields, there are **additional benefits** that have been found in various studies and reports. For example:



**Higher occupancy, driving a higher NOI.**  
For example, a 2.3% occupancy premium for green logistics properties (Savills 2022), and an 8% higher occupancy for LEED labelled offices (Frank Fuerst, Patrick McAllister 2009)



**Lower cost of financing** is reported for environmentally certified buildings, which command a lower spread for corporate debt as compared to conventional but otherwise comparable buildings. The difference in spread is as high as 36 bps. (Eichholtz, Holtermans, Kok, Yönder 2015)

To consider the full range of potential ways the value of green is manifest, LaSalle has developed its AVD/DVP framework, as detailed to the right.

## LaSalle's AVD/DVP framework

Green investments can add value via **Accretive Value Drivers (AVD)** and **Defensive Value Protectors (DVP)**. Evaluated through this lens, making the business case for green investments can be multi-dimensional and complex, but more significant than a simple rent premium.

### Accretive value drivers (AVD)

- More desirable spaces
- Rent premiums
- Increased occupancy
- Increased tenant retention
- Faster lease-up
- Lower operating expenses
- Higher net operating incomes
- Greater investor appeal
- Lower cap rates

Decreased...

- Carbon pricing risk
- Climate impact risk
- Resilience risk
- Regulatory disclosure risk
- Insurance premium risk
- Valuation risk
- Functional obsolescence risk
- Reputational risk

### Defensive value protectors (DVP)

# Key findings: Value of green meta-analysis



## Value of green is uncertain, but clearly non-zero

The ranges of estimates for the value of green are wide, but are almost universally positive. Barring possible bias in that studies with ambiguous or negative results may not get published, the data supports a conclusion with high conviction that green characteristics are accretive to rents and values, although the magnitudes of these differentials are uncertain.



## Uneven, but widespread evidence by sector and geography

Value of green is not confined to specific sectors or regions, but widespread. That said, there is a clear tilt in the volume of studies toward the office sector, and to North America.



## Approach matters in identifying “greenness”

Isolating relationships and causation (“identification”) in statistics is difficult. Value of green studies must focus on a specific variable that is meant to capture “greenness”—e.g., green certification or some physical feature like LED lighting. But each of these attributes are subject to complexities such as the adoption curve of a certification paradigm or technology



## Holistic approach to value of green needed

While many studies focus on rent and value variables, there are other drivers of performance that may be shaped by green features, such as vacancy rates, lease up periods, etc. These must all be considered in evaluating the value of green.



## Fundamentally, unavoidably backward-looking

All of these analyses require historical data, and time to analyse those data, which means that results reflect the past. This suggests that forward-looking, nimble investors must identify signs of increased pricing of green factors in markets other than academic, empirical studies.

# Conclusions and implications

A preponderance of both anecdotal and more rigorous empirical evidence points to a relationship between greener property characteristics and higher rents, greater values and better performance by other measures—in other words, **the value of green is almost certainly not zero**. That said, the magnitude of the differentials is uncertain, and measuring them precisely is confounded by data availability and challenges in statistically isolating various effects, especially over time.

## LOOKING AHEAD

- Fundamentally, investors need to calculate a return on investment from incremental “greening” of their assets—i.e., **compare the value of green versus the Cost of Green**, utilizing decision-making tools such as IRR, NPV, payback periods, etc.
- In such an exercise, investors should **take care to properly align assumptions of incremental cost with incremental benefits**. The cost of green capex that should be included should only be that above and beyond the baseline of realistic required capex, which is often underestimated in sectors such as conventional office.
- Transition risk operates over multiple timescales, especially the medium- and long-term. Ideally, investors should build models covering sufficiently long periods of time to account for factors beyond the near term. The costs of not taking action, such as the potential for asset stranding, should be considered in the “do nothing” case.
- As always, forward-looking modeling requires making educated assumptions around the timing of market adoption of green features and the resulting impact on tenant and capital market demand. **It may be advantageous to stay one step ahead of the market, but investing too far ahead of the market is also a risk.**
- How should investors act in light of the wide range in estimates of the current value of green, and an uncertain path in how it will evolve? Considering such investment through lenses other than conventional ROI metrics, such as risk management and option value, can be helpful.

Appendix 1

JLL on the  
value of  
green



# JLL on the value of green

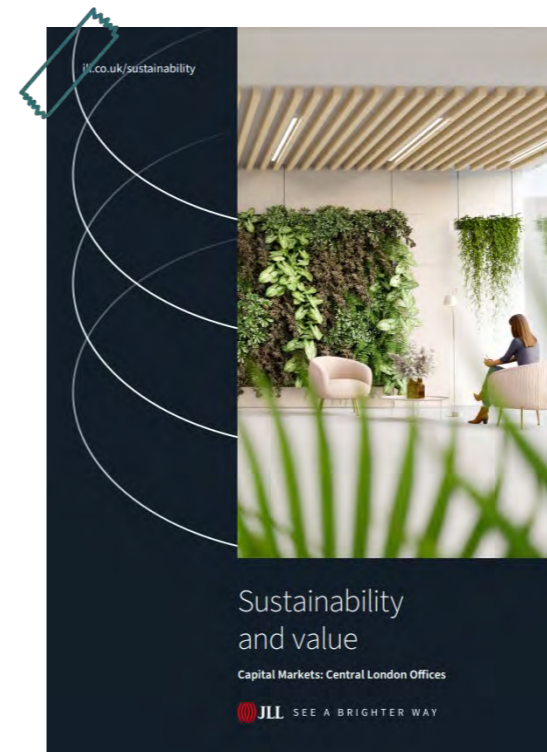


Our colleagues at JLL have leveraged the company's considerable proprietary data on individual investment and leasing transactions to provide evidence of the value of green across the globe. LaSalle continues to work with JLL to identify new and emerging evidence of rent, value and other divides between assets based on sustainability considerations. A summary of recent JLL reports on the topic are on the next two pages.



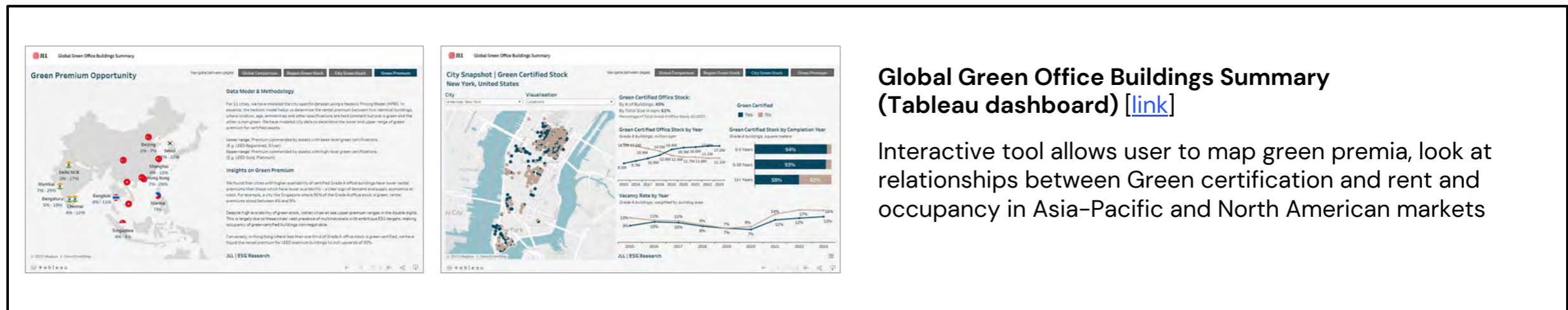
## The value of sustainability: Evidence for a green premium in Asia [\[link\]](#) November 2022

- Hedonic analysis of 3,000+ Grade A office buildings in 14 Asia-Pacific cities
- Consistent with LaSalle's value of green diffusion framework, larger premia were observed for cities with a lower share of certified stock
- Singapore (90% of stock certified), shows premium of 4-9%; Seoul's (37% certified) premium is 7-22%



## Sustainability and value: Central London Offices [\[link\]](#) January 2023

- Hedonic analysis of almost 600 Central London investment transactions over a five-year period
- Capital values were on average 20.6% higher as a result of BREEAM certification
- Average increase in rents associated with BREEAM certificates and a step improvement in EPC were 11.6% and 4.2%



## Global Green Office Buildings Summary (Tableau dashboard) [\[link\]](#)

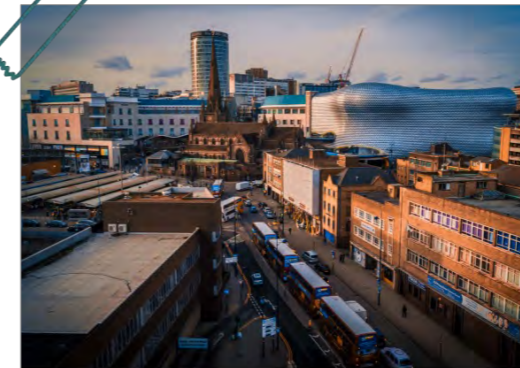
Interactive tool allows user to map green premia, look at relationships between Green certification and rent and occupancy in Asia-Pacific and North American markets

# JLL on the value of green (continued)



## Return on Sustainability: How the 'value of green' conversation is growing up [\[link\]](#) January 2022

- Tracks shift in the "green premium" debate to one about value preservation and risk mitigation
- Addresses evolution of green certification schemes to more closely relate to carbon performance
- Argues that a wait for perfect data proving value of green would be too long



## Sustainability and value in the [UK] regions [\[link\]](#) December 2021

- Similar to May 2020 report, but for 8 regional UK cities
- Finds BREEAM Outstanding buildings typically achieve rents on par with prime, Excellent 5% below prime, Very Good 10% below
- Outstanding or Excellent buildings have average void rate of 9% 24 months post-completion, compared to 16% for Very Good



## The impact of sustainability on value: Central London [\[link\]](#) May 2020

- Looks at impact of BREEAM and EPC ratings on rental values and leasing velocity for Central London office buildings
- Finds rental premium for green certification of 6-11%
- Vacancy lower in green certified buildings both 12 and 24 months following completion

## Reports on incorporating sustainability in valuation

Series of reports argue that valuers need to consider the accretive impact of green investments and the stranding risks associated with not making them:



## Valuing Net Zero & ESG for Offices: Global Market Trends and Valuation Methodology [\[link\]](#) April 2021

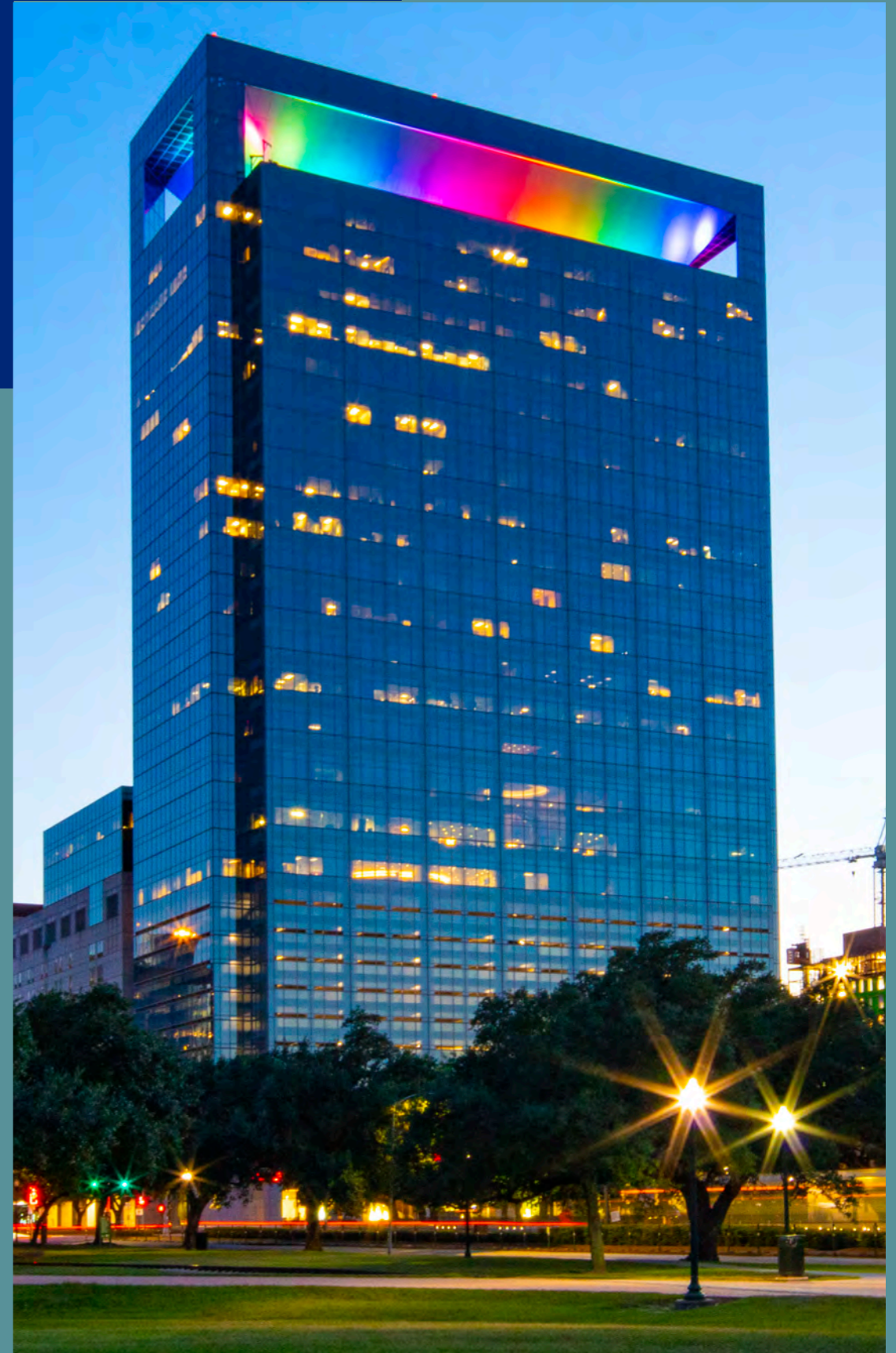


## Valuing Net Zero & ESG for Industrial & Logistics: Global Market Trends and Valuation Methodology [\[link\]](#) May 2022



Appendix 2

# LaSalle case studies



# Maison Manuvie

NZC-aligned office building in Montreal, Canada

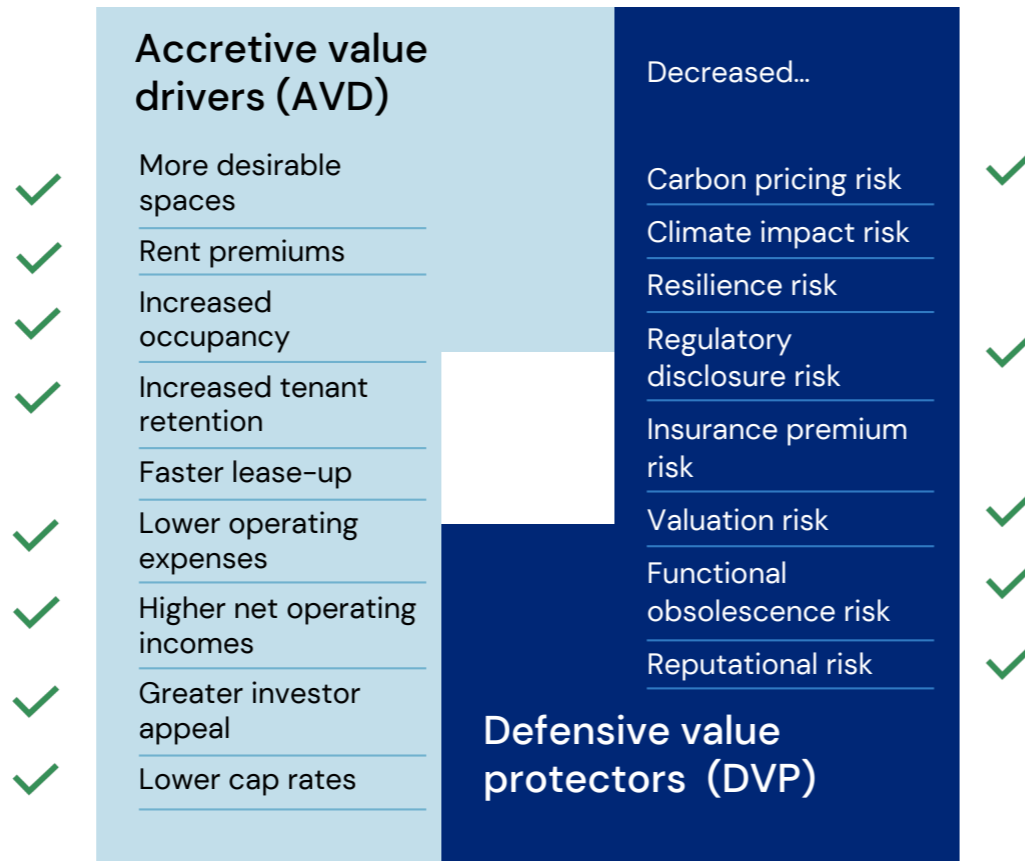
## Tenant engagement and alignment toward net zero

LaSalle and Manulife Investment Management formed a partnership in 2021 to make Maison Manuvie a certified Zero Carbon Building. We worked closely with the building's anchor tenant to meet a greenhouse gas reduction target of 80% by 2050.

By offering a highly sustainable workplace, the building has maintained nearly 100% occupancy on a long-term basis, and surveys show that tenants value and are satisfied with the building's sustainability initiatives. Two major tenants (75% of floor area) have sustainability goals.



✓ We believe these AVDs and DVPs can have a positive impact on overall investment performance on this asset.



### GREEN FEATURES:

- LEED certification was issued in March 2022.
- Net Zero Carbon Building certification was issued in July 2022.



# 222 Exhibition St.

Office refurbishment in Melbourne, Australia

## Reducing energy demand, optimizing building systems

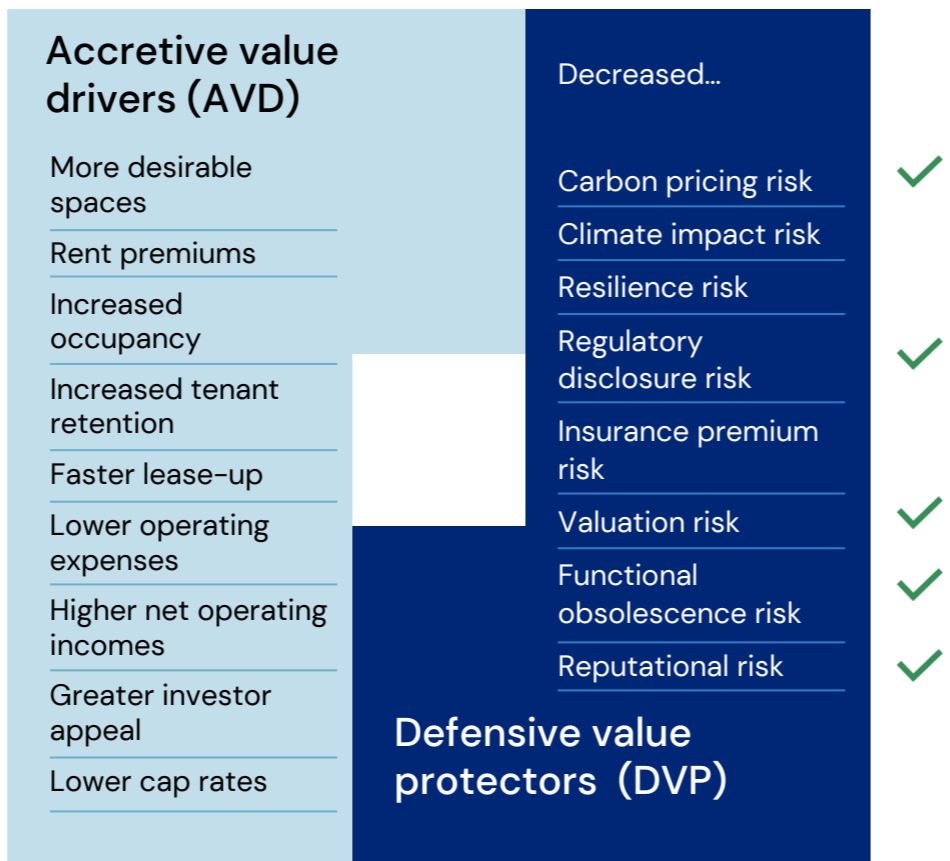
LaSalle successfully turned an outdated 1980s commercial building into a sustainable success story, while minimizing costs and maximizing efficiency. Unique amongst Australian commercial buildings, the BUENO predictive maintenance system detects and identifies issues before occupants can detect any reduced level of service and before it escalates into something more costly.

LaSalle was awarded the Collaborative Partnerships Award by the Facilities Management Association (FMA) of Australia in 2017.

Four AVDs and five DVPs immediately identified, however over time we expect some of the other benefits to appear as well, such as tenant retention, faster lease-up, etc.

✓ We believe these can have a positive impact on overall investment performance on this asset.

- ✓
- ✓
- ✓
- ✓



### GREEN FEATURES:

- Optimizing mechanical systems controls and cooling towers
- Improving air-conditioning and ventilation strategies
- Implementing a predictive maintenance program
- Utilizing BUENO Analytics Platform
- Implementing upgrades for premium aesthetics, improved wellness outcome
- Creating easy ways to reduce, reuse and recycle onsite

# Tri, Munich, Germany

Hybrid timber office redevelopment

## A holistic approach to redevelopment

Else is an office property in Munich’s Westend submarket, close to the CBD comprising a front (Else 31 / Tri) and rear (Else 33) buildings of initially 9,513 sqm and 14,850 sqm.

Tri is the name of the Else 31 redevelopment project. The former office building will be redeveloped to create a 16,000 sqm office using hybrid timber construction with the highest ESG standards, the first of its kind in Munich.

The property is located in a dynamic market driven by its location adjacent to the CBD, low vacancy, and excellent links to local and regional public transportation and highways.

Six AVDs and seven DVPs immediately identified.

Over time expecting to increase market appeal and retain asset value over the long-term.

✓ We believe these can have a positive impact on overall investment performance on this asset.

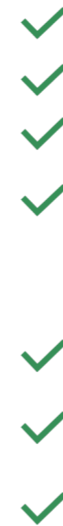


### Accretive value drivers (AVD)

- More desirable spaces
- Rent premiums
- Increased occupancy
- Increased tenant retention
- Faster lease-up
- Lower operating expenses
- Higher net operating incomes
- Greater investor appeal
- Lower cap rates

Decreased...

- Carbon pricing risk
- Climate impact risk
- Resilience risk
- Regulatory disclosure risk
- Insurance premium risk
- Valuation risk
- Functional obsolescence risk
- Reputational risk



### Defensive value protectors (DVP)

## GREEN FEATURES:

- Targeting 100% decarbonized energy consumption: Groundwater Heating and Cooling & Photovoltaic panels (400 sqm)
- Targeting 100% of concrete from the former building to be recycled; 35% of the concrete components in the new building will be from a recycled source
- Increase offsite factory-controlled pre-fabrication, increasing construction quality

Operational CO2e	60% reduction*
Embodied CO2e	22% reduction*
Energy Saving	70% reduction*



\*compared to typical development, based on design calculations and industry benchmarks (JLL, DGNB)

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