OFFICE GREEN PREMIUM REVIEW

DNA, driver and outlook of labelled properties

IN A NUTSHELL

_ A broad academic literature can be found on green premiums across major office markets. Of the studies analysed, the median rental, price, and occupancy premiums amounts to 5%, 13% and 6% respectively.

_ Regulation, financial benefits and company brand impact are identified as key demand drivers for green choices. Construction costs are expected to remain below the green premium, supporting the case for the refurbishment of older stock into Next Generation Offices.

_ **Outlook:** We expect demand for sustainable properties to increase substantially, resulting in higher rent growth of green-labelled buildings. However, "Green premiums" are likely to erode as the new standards become more widespread, gradually turning into a "brown discount" for old stock.

Over the last decade, concerns about climate change and the global awareness of the need to decrease CO2 has led to increasing regulation efforts across global institutions and governments. Real estate plays a crucial role in the decarbonization process, being one of the largest energy-consuming sectors worldwide. Buildings are responsible for 40% of energy consumption and 36% of carbon emission in the EU, while roughly 75% of the EU's building stock is considered energy inefficient.[1] With cities and built environments accounting for approximately 75% of total energy use, a number set to continue to grow on the back of sustained urbanisation, the topic of sustainable buildings will become increasingly important.

Commitments to Net-Zero or even Net-Negative have led to a growing focus on ESG, supporting the rise of global rating systems such as BREEAM, LEED or DGNB in recent years. Green rating certifications and Energy Performance Certifications (EPCs) provide a good way to measure the performance of sustainable buildings compared to conventional stock. A large number of empirical studies have been published since 2010, with the clear majority showing positive relationships between certified buildings and related cash flows or market values. We anticipate the importance of sustainability as a driver of office values should only continue to increase.

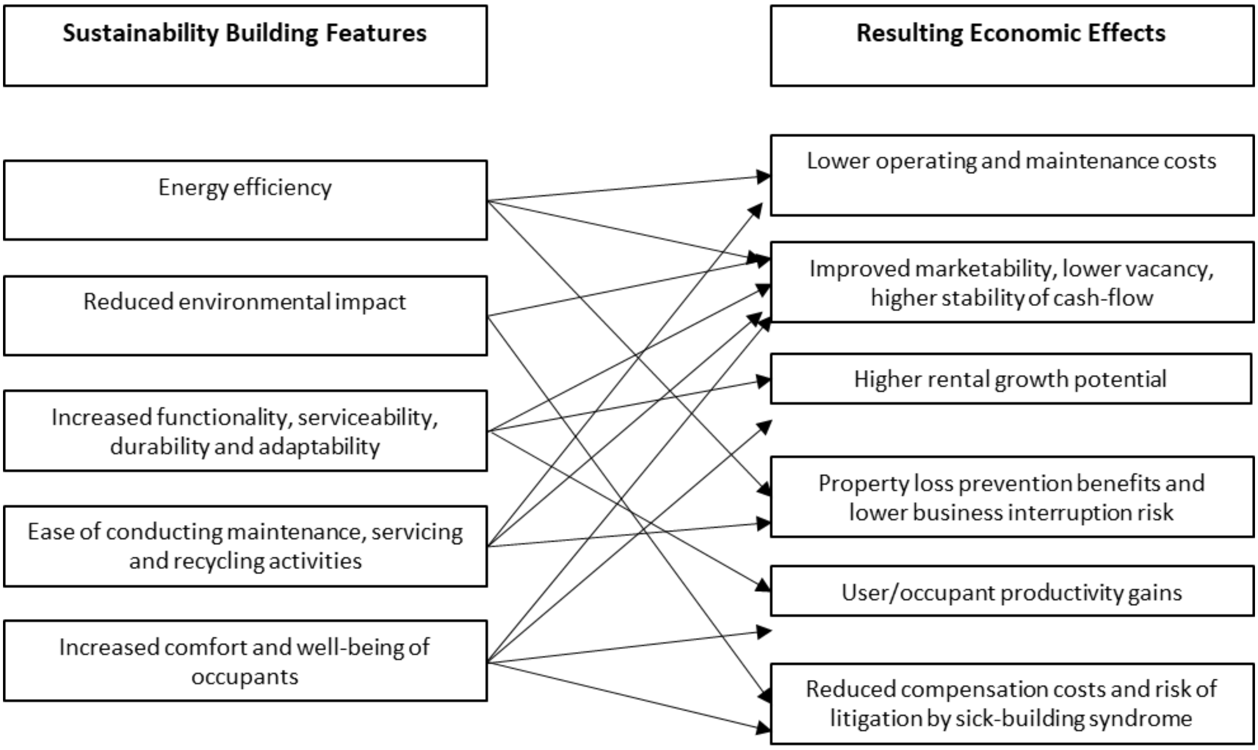
[1] European Commission (2020)

Economic Benefits, Regulation & CSR as Key Driver and Value Creator

Financial benefits, increasing regulation and external pressure, alongside structural changes in Corporate Social Responsibility (CSR) in favour of a more sustainable company culture have been key demand drivers of sustainable buildings. Certified buildings can lead to many different economic, social, and environmental benefits from tenant well-being to improved resource consumption and increased marketability of the assets.[2]

This report will focus on the economic benefits of labelled properties, including higher occupancy rates, additional rental growth, lower interest loans and savings in operating expenses - of which **reduced energy costs account for around half of the total green premium**.[3]

FIG. 1: ECONOMIC BENEFITS OF SUSTAINABLE BUILDINGS



Source: Lorenz et al. (2007), Oyedokun (2017), DWS 2022

Demand for sustainable office stock is expected to continue to increase in the medium to long-term, both from an investment and occupier perspective. Key growth drivers can be summarised in three main pillars: external drivers such as regulatory pressure and client requirements. Property-level drivers and their associated financial benefits, and corporate-level drivers which describe the user-perspective of green buildings, including CSR, culture, and image/brand effects.

[2] Addae-Dapaah & Chieh (2011), Devine & Kok (2015), Eichholtz et al. (2013), Lützkendorf & Lorenz (2011), Reichardt et al. (2012)
[3] Darko et al. (2017), Falkenbach et al. (2010), Reichardt (2014)

TAB. 1: OVERVIEW OF KEY DEMAND DRIVER

	External Drivers	Property-level Drivers	Corporate-level Drivers
Key driver	**Regulation, standards and measures by governments and institutions**	**Financial Benefits**	**Reputation, image brand effects**
Examples	• Emission Trading system: carbon price expected to rise between US$100 and US$1,000/ton by 2050 • Minimum standards (EPC´s) • Sustainable construction metrics • Demand and pressure from clients	• Reduced resource consumption (energy, material, waste, water) • Lower risks (marketability, obsolescence) • Higher occupancy, rental & sales premium	• Climate change goals • CSR • Net-zero & net-negative strategies • Responsible Property Investment programme • Employee well-being
Outlook	Regulation is expected to tighten due to social and political pressure	Energy price inflation could increase tenants cost sensitivity	Corporates tend to become more innovative & sustainable (change of culture)

Source: Darko et al. (2017), Leskinen et al. (2020), DWS 2022

Energy Performance Certificates as New Standard Across Europe?

EU decarbonisation targets aim to reduce net greenhouse gas emissions by at least 55% by 2030 and achieve a decarbonised building stock by 2050. The frameworks in place to meet these targets include the 2018 EU Action Plan with the Sustainable Finance Disclosure Regulation (SFDR) alongside the 2019 EU Green Deal. ESG regulations affecting real estate investors are expected to tighten further while the Emission Trading System (ETS) should be expanded to real estate. Minimum standards of Energy Performance Certificates (EPCs) are likely to have a strong impact on the real estate market over the longer-term. The most stringent regulations are currently in place in the Netherlands and the United Kingdom.

_ Minimum Standards in the UK are expected to make buildings with an EPC of F and G unlettable from 2023 onwards. This should hold for all buildings with an EPC rating below C from 2030.
_ In the Netherlands, office buildings must have a minimum EPC rating of C by January 1, 2023, or they cannot longer be used, and all office buildings should achieve a rating of A by 2030.
_ In Spain, EPC's become mandatory on the 3rd of June 2022 in several segments including office spaces.
_ Other European countries are likely to introduce similar minimum standards, further increasing the divergent trend between high-quality and average office stock.
_ In Germany, all existing buildings should meet the standard "EG 70" as of January 1, 2024 and all newly installed heating system should be operated on at least 65% renewable energies according to the Buildings Energy Act (GEG).
_ France agreed to new regulations "RE 2020" regarding energy and consumption. New technical reports including carbon life cycle analysis apply for office buildings on or after July 1, 2022. The Tertiary Decree will apply to buildings with more than 1,000 sqm from September 2022 on and must declare energy use on an annual basis.

EPC regulation should drive demand towards high-quality properties as minimum standard makes substandard stock redundant, therefore supporting the divergent trend in the office markets. This is the case for the UK, where over 70% of city take-up in 2021 took place in properties with a BREEAM certification.[4] The risk of assets being stranded as new regulation is introduced is likely to increase and as such a structural shift in the quality composition of office space is expected. Existing poor-quality, unsustainable office stock will likely see more conversions.

[4] PMA (2021)

Confirmed Outperformance of Green Buildings in Various Areas

The studies reviewed in this report show a median rental and price premium of approx. 5% and 13% respectively over the long-term, varying according to model specifications, market, dataset, and time of observation. These findings are in line with other meta-studies, showing an average rent premium ranging between 4% and 8% and a sales premium ranging between 8 % and 22 %.[5] Generally, a higher level of certification generates a higher premium, but the relation is not linear, and premiums are not homogenous across markets. In addition, green premiums are minimised by the number of additional variables analysed, especially by control variables for super trophy assets like size, number of floors and landmark buildings.[6]

FIG. 1 RENTAL PREMIUM IN %

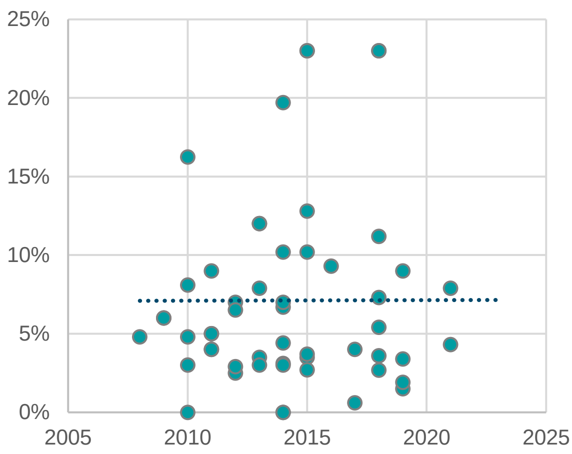
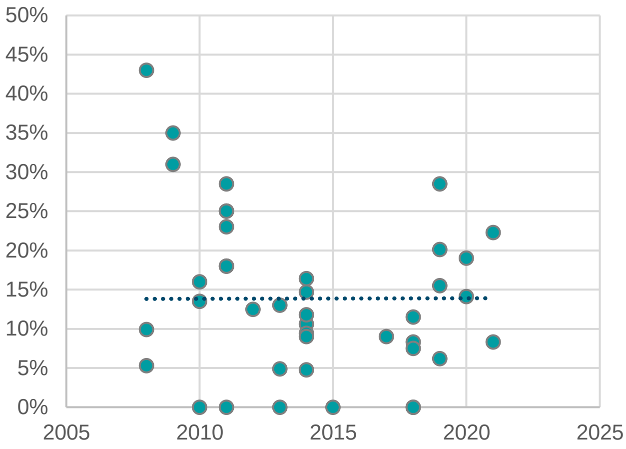


FIG. 2 SALES PREMIUM IN %



Source: DWS 2022

TAB.1 KEY LITERATURE FINDINGS

	Minimum	Maximum	Average	Median
Rental premium	0%	23%	7.1%	5.0%
Sales premium	0%	43%	13.9%	12.8%
Occupancy premium	2%	17%	7.0%	6,2%
Financial premium (yield discount)	0.36%	0.55%	0.46%	0.46%
Construction premium	-0.4%	21%	6.5%	

Findings in this report are based on 56 empirical data points, with **rental premiums** estimated at 5% on median and 7.1% on average. BREEAM certificated building show a higher premium on average of 13.4%, compared to LEED (6.3%) and Energy Star (3.8%). That rental premiums change over time is shown on increased premiums from Energy Star properties between 2006 and 2008, followed by a decline in 2008 due to the general economic downturn.[7]

Sales premiums are based on 41 data points, results largely varying between 0% and 43% with median and average sales premiums at 12.8% and 13.9%. Green buildings command an average **yield discount** of 0.46%, ranging between 0.33 and

[5] Dalton & Fuerst (2018), Addae-Dapaah & Wilkinson (2021), Zehner (2021), Leskinen et al. (2020)
[6] Ott & Hahn (2018), Zehner (2021)
[7] Onishi et al. (2021), Addae-Dapaah & Wilkinson (2020), Reichardt et al. (2012)

0.55 basis points.[8] A DCF valuation model suggests, that a green certificate increases the property value by an average of 9.0%.[9] Improved yield and net rental income were the main reasons for the higher property value. Research suggests that REITs with a higher share of sustainable properties achieve a higher net operating income, carry less systematic risk, and show a lower turnover ratio, while achieving higher risk-adjusted returns.[10] Several studies indicate significantly higher occupancy rates compared to non-sustainable buildings with **occupancy premium** ranging between 2% and 17% standing at 6.2% on average.[11]

The question around operational savings and rental / price outperformance of green buildings compared to **construction costs** remains difficult and heavily dependent on individual assets. This is even more the case in the current inflationary environment. However, a meta-analysis of 17 reviewed studies found that over 90% of cost premium results fell in the range of −0.4% to 21%.[12] A large dataset with over 2,000 observations in the UK showed a 6.5% construction cost premium on average from BREEAM-certified buildings compared to conventional, non-certified buildings,[13] while a study by the World Green Building Council (WGBC) from 2013, showed additional costs in the range of 0% to 12.5%.

These studies are in line with industry assumptions. Through our analysis we have found many developers see construction costs being in the range of 5% to 10% higher for sustainable buildings compared to conventional buildings. In the long-term, however, green buildings do seem to pay off financially, even if this is not empirically proven in terms of construction costs.

Confirmed Outperformance of Green Buildings in Various Areas

There is empirical evidence that increasing supply (clustering) of green buildings decrease rental and sale premiums.[14] Findings suggest that the marginal premium increases by 10.5% per 1 km distance from the city center over the 2010-2015 period in Finland, France and Germany.[15] This has also been evident in London over the period of 2000-2009, where each additional certificated building decreased the marginal effect of certification in the rental and transaction markets by 2% and 5% respectively.[16]

A “novelty vintage premium” could explain the clustering effect, shown in markets where eco-labelled buildings are new, resulting in higher rental and sales price premiums.[17] There are small or no rental premiums in (certified) high value buildings, whereas low and middle value buildings seems to have much higher premiums which could be explained by the lower number of certificates in these segments.[18] A possible reason is that as certificates become the norm in high-value buildings, it is no longer considered a differentiating factor in these buildings.

The clustering effect in combination with stronger regulation (EPC/CO2 tax) and corporate-level drivers should result in a “new normal” of certificated buildings, as more and more buildings will need to compete on energy efficiency and sustainability with the effect that “brown discounts” rather than green premiums may become a more important consideration over the coming 10 years.

The higher construction volume is in a certain market, the greater the expected share of certified buildings, raising the risk of obsolesces in these cities. Theory suggests that the highest rental premium should be achievable in markets with low share of certified buildings and with regulation becoming tighter. However, this is only one factor. Investor focus should not just be about achieving a green premium, but also avoiding stranded assets, carbon transition risks and protecting the future value of assets.

[8] Miller et al. (2008), McGrath (2013)
[9] Vimpari & Junnila (2014)
[10] Devine & Yönder (2017), Fuerst (2015)
[11] Wiley et al. (2010), Devine & Kok (2015)
[12] Dwaikat & Ali (2016)
[13] Chegut et al. (2019)
[14] Chegut et al. (2011), Clark (2013), Fuerst & Van de Wetering (2015), Addae-Dapaah & Wilkinson (2020)
[15] Porumb et al. (2020)
[16] Chegut et al. (2013)
[17] Fuerst & Van de Wetering (2015)
[18] Robinson & McAllister (2015)

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