

Building Back Better: Key Challenges In Reaching A Net Zero Built Environment

A white paper on how the urgency of reaching a net zero built environment is disrupting the real estate industry.

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“The real estate industry – a cornerstone of our society – must take responsibility to develop a net zero world. Building developers, investors and occupiers will have to find shared interest to align commercial and sustainable development objectives. By better understanding the key change barriers, industry stakeholders can work together to develop feasible transformation plans. KPMG and Planon are well positioned to guide them in this transformative journey.”

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Introduction

The transformative journey to a net zero future requires a monumental change. A journey that leaves no industry sector untouched. The real estate industry is one of those sectors that is set for profound change, with the built environment holding the potential to truly make a difference in the creation of a net zero future and the battle against climate change. By now, it is widely known that building construction and operations have a significant environmental impact, responsible for approximately 40% of the global greenhouse gas emissions. The role of real estate investors, developers and occupiers is therefore of paramount importance to accelerate the decarbonization of the built environment and reach its net zero commitments.

Business leaders and real estate managers have embraced ESG and net zero ambitions, and are gradually embarking on a sustainable transformation. However, changing the status quo is difficult and requires clear vision, strategy and a robust action and change plan. It also requires the identification of key risks and challenges to overcome. As such, KPMG and Planon have formed a strategic partnership to support organizations in the battle against climate change by leveraging their built environment. In a previous [blog](#), we discussed the key drivers behind the sustainable transformation of the real estate industry, touching on regulatory changes, the shift in occupier demand, greater environmental awareness, and higher ESG expectations from stakeholders and shareholders.

In this joint white paper, we discuss several key net zero challenges real estate developers, investors and occupiers must overcome, and aim to provide insight into the evolution businesses have to go through in order to reach their net zero objectives.

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The key takeaways of this white paper are:

- The built environment can function as a fantastic showcase for a net zero world, yet the net zero building and construction market is considered to be in a developing phase. The International Energy Agency has calculated that new high-performance construction is required to reach the 5 billion square meters of net zero real estate needed to support the 2030 sustainable development scenario.
- Various government bodies are developing regulations to accelerate the net zero building movement. Yet the legislative maze is a real challenge and likely to become more convoluted over time.
- In the transition to a net zero world, data is everything. There is a clear mismatch between poor carbon emission data reliability and the regulatory changes that will come into force.
- Real estate developers need radical transformation of their business and operating models, including lifecycle management. The development phase can account for a third of the carbon emissions during a 50-year building lifecycle.
- The current linear lifecycle management system – Cradle to Grave – should be replaced by new circular concepts such as the Circular Economy and Cradle to Cradle. These include new ways of designing buildings, with more eco-friendly materials, advanced technological manufacturing processes and sustainable and fossil-free operations.
- Net zero property development will result in higher construction costs, such as a predicted 8-17% incremental cost for net zero offices and a rise of 5.3% for residential properties. It is very likely that these costs will be offset against rent premiums, lower vacancy rates and lower lifecycle and operating costs.
- Real estate investors will be challenged with the re-allocation of their investment portfolios through buy, build, divest and retrofit strategies. They will be challenged with access to financing for retrofitting projects of non-sustainable assets given the growing attention given to sustainable financing.
- As ESG and net zero are becoming key corporate business strategy drivers, the strategic importance of real estate for occupiers is increasing. Operationalizing net zero pathways requires strong change leadership.

The built environment is the best showcase for a net zero world

Sustainability and the concept of sustainable development have been around for decades, defined in the well-known Brundtland report in the late 1980s. Since then, the real estate industry has witnessed a major shift in the application and awareness of sustainability, from a mere marketing gimmick, to energy performance building directives starting in the early 2000s, the rise of green building certificates, to today's carbon neutrality commitments.

As the world becomes more urbanized, and the global population continues to rise, building stock will further expand and global material use is expected to more than double by 2060. One third of this rise is attributed to materials used by the building and construction sector, according to the OECD (2019)¹.

Looking at [the KPMG NetZero Readiness Index \(NZRI\)](#)², it's clear that the green and net zero buildings construction market is considered to be in a developing phase. Although government regulations are pushing new construction to be smarter, greener and more efficient, there remains much work to be done. The International Energy Agency calculates that new high-performance construction will need to increase from around 275 million square meters to almost 5 billion square meters to support the 2030 Sustainable Development Scenario. The costs needed to meet this challenge mean outside investment will undoubtedly be required.

According to the World Green Building Council (WGBC)³, there are currently 500 net zero commercial buildings and 2,000 net zero homes around the globe. This accounts for less than 1% of global building stock and shows the immense net zero transformation challenge that is required through new development and retrofitting projects. The WGBC has launched a Net Zero campaign, calling upon real estate companies to tackle operational and embodied carbon emissions. The campaign is calling for all buildings to be net zero by 2050 and for all new buildings to be net zero in operation and reduce embodied carbon by 40% by 2030.



The number of net zero commercial and residential buildings accounts for less than 1% of the global building stock.

Regulations to 'construct' a net zero building movement

Various government bodies around the world have developed policies to accelerate net zero building movements, which in turn create safer, healthier and more climate-friendly communities. For example, the State of California passed legislation with which a net zero building code was created. This has mandated all new residential buildings in the state be net zero by 2020 and all new commercial buildings to be net zero by 2030⁴.

In Europe, the Corporate Sustainability Reporting Directive (CSRD)⁵ is set to replace the current Directive 2014/95/EU, also known as the Non-Financial Reporting Directive (NFRD), as of the fiscal year 2024. This will significantly extend mandatory reporting around policies, strategy and performance as they relate to environmental protection and other sustainability matters. At the same time, the CSRD is intertwined with the EU Taxonomy⁶, a new tool for investors that should improve capital flows to sustainable activities.

¹ OECD (2019): *Global Material Resources Outlook to 2060*

² KPMG Net Zero Readiness Index [<https://home.kpmg/xx/en/home/insights/2021/09/net-zero-readiness-index.html>]

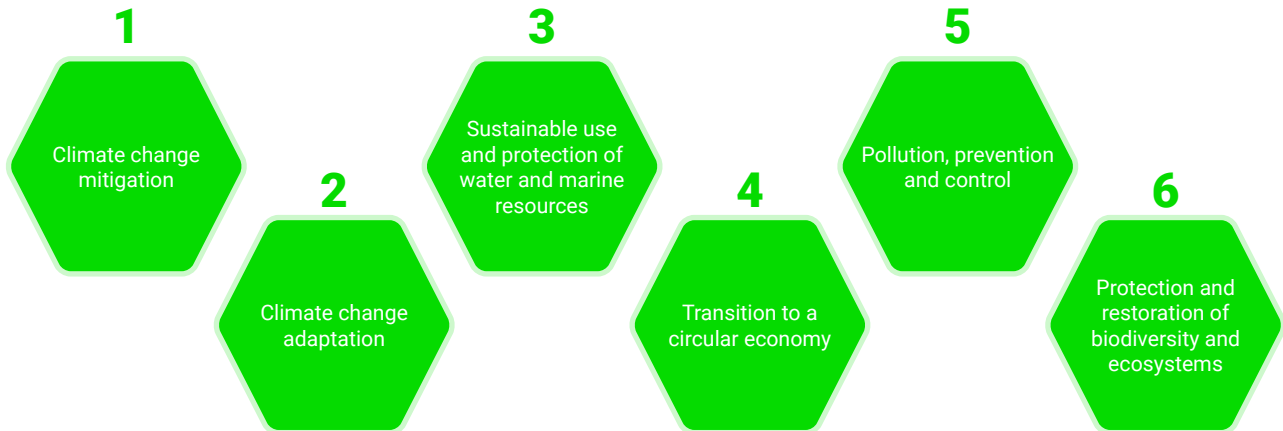
³ WGBC: *Every building on the planet must be 'net zero carbon' by 2050 to keep global warming below 2°C* [<https://www.worldgbc.org/news-media/every-building-planet-must-be-%E2%80%99net-zero-carbon%E2%80%99-2050-keep-global-warming-below-2%C2%B0c-new>]

⁴ Public Utilities Commission California: *Zero Net Energy* [<https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/zero-net-energy>]

⁵ European Parliament: *Legislative Train Schedule* [<https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-review-of-the-non-financial-reporting-directive>]

⁶ European Commission: *Eu Taxonomy: Commission present Complementary Climate Delegated Act to accelerate decarbonisation* [https://ec.europa.eu/commission/presscorner/detail/en/ip_22_711]

A perfect example of the changing regulatory environment is The EU Taxonomy – a classification system with the objective of creating a common understanding of what can be termed ‘sustainable activities’ in order to direct investment into activities with positive environmental impact. It is a key element in financing the European Green Deal (EU Green Deal), Europe’s growth strategy to improve the well-being and health of citizens across the bloc. The aim is to make Europe a climate-neutral continent by 2050 and protect, conserve and enhance the EU’s natural capital and biodiversity.



EU Taxonomy Environmental Objectives [https://eu-taxonomy.info]

The EU Green Deal focuses on three key principles, one of which is to improve the energy efficiency of our buildings, with two primary targets: reducing net greenhouse gas emissions by at least 55% by 2030 and reaching net zero carbon by 2050. The legislative maze, however, is a real challenge and likely to become more convoluted over time.

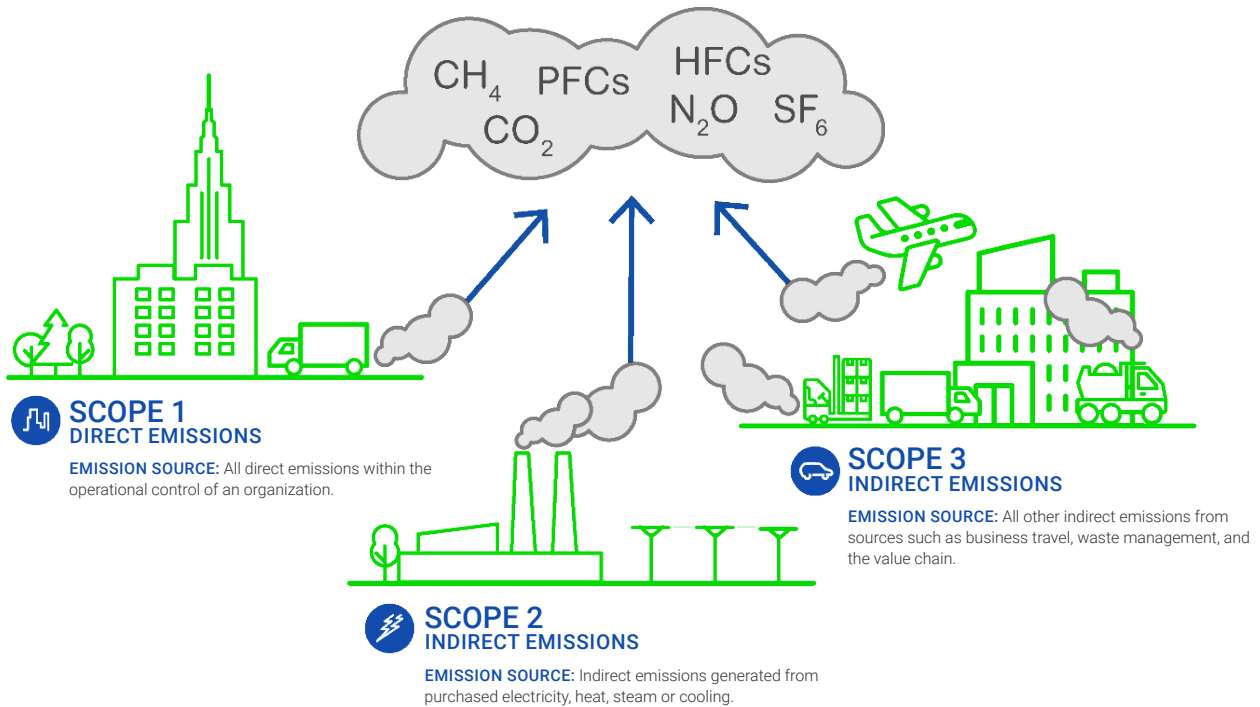
At present, the NFRD is applicable to approximately 11,600 large public interest entities with more than 500 employees in Europe. Under the CSRD this will increase to approximately 49,000 companies, both listed and large companies. Large companies are eligible if they fit two out of three criteria: More than 250 employees, \$40 million turnover, or \$20 million in total assets. To take timely action, it is recommended to [investigate](#) what the CSRD means for your organization.

Compared to the NFRD, the CSRD will possess more forward-looking information including sustainability targets and progress. It will also require companies to report how sustainability risks including climate change are affecting their business and the company’s impact on society and the environment. Through the CSRD, the European Commission is taking another step towards a sustainable economy as it requires companies to report in a more comparable, targeted, and reliable manner, as well as provide easily accessible information as the basis for sustainable decision-making. However, it also creates an added administrative workload, including the need for independent third-party assurance to validate the accuracy of sustainability data.

Data: The new oil in a net zero world

Validating the accuracy of sustainability data is especially challenging for the measurement of greenhouse gas (GHG) emissions from real estate assets. The most significant regulatory challenge, however, is known as the ‘Scope 3 challenge’. While Scope 1 and 2 greenhouse gas emissions refer to those that occur directly and indirectly due to a company’s energy use respectively, upstream and downstream emissions are known as Scope 3. These emissions are difficult to control, have no direct ownership, and yet can amount to 80-90% of a company’s carbon footprint.

You can probably imagine the impact of Scope 3 for the sector and for real estate developers in particular. Not only will real estate developers have to create piles of paperwork with proof of their sustainable operations including their value chain partners, they will also need to register all their materials during construction. Data companies are playing into this challenge by offering automatically generated, secure, web-based material passports for registered buildings and construction objects. Clearly, without data governance and process automation, the manual process of obtaining emissions and energy consumption data from multiple sites and across operations can be a time-consuming process and increases the margin for data flaws. It is easy to envision what impact data challenges have on the development of a strategic real estate decarbonization roadmap and the required organizational change to bring it to fruition.



Atmospheric Greenhouse Gases [<https://perspectives.se.com/>]

Why re-engineering lifecycle management is the key for real estate developers

In order to meet the EU Green Deal commitments, real estate developers are challenged to rethink collaboration across the entire value chain, radically transforming business and operating models, and their lifecycle management. While a lot of emphasis is placed on operational carbon emissions, real estate developers are mainly challenged with the reduction of embodied carbon emissions during the production, manufacturing, and transport of building materials and components, as well as the carbon dioxide that is emitted during the construction and assembly of the building or during a retrofitting building project.

Reducing upstream and downstream emissions – the Scope 3 challenge – is difficult to control, yet takes up 80-90% of a company's carbon footprint.

In academic research from Kumanayake et al (2018)⁷, a life cycle carbon emission assessment was conducted on a university building with an assumed lifespan of 50 years. They discovered that the development phase accounted for 33% of the total emissions, while the operation and maintenance phase accounted for 66% and the demolition phase for only 1%. Think about the impact of the development phase when a third of the total building life cycle emissions are emitted in year zero. As a result, Circular Economy and Cradle to Cradle concepts have received increased interest from the industry and will replace the current linear 'Cradle to Grave' building life cycle system. Real estate developers will have to contemplate new ways of designing buildings with more eco-friendly materials, new advanced technological manufacturing processes and sustainable and fossil-free operations. A question remains, however, as to how feasible it is to achieve this at the scale required to achieve the first EU Green Deal milestone in 2030.

The UK Green Building Council (UKGBC) conducted a study⁸ into the feasibility of net zero carbon buildings, illustrating how new buildings can be designed to reach net zero performance targets (in terms of both embodied carbon and operational energy) and the effect this has on cost, thereby comparing climate goal scenarios with a 2020 baseline. One of the key findings is that the replacement of steel and concrete structures with a fully timber structure, along with the removal of a concrete basement, helped reduce total upfront carbon by 39%. However, a compromise in terms of the number of floors was needed which would ultimately impact the building's value. One real-life net zero office development is located in the Netherlands: office building Well House, one of the tallest wooden office buildings in the world, set to be constructed later in 2022.

According to the UKGBC, there is a cost impact to net zero development. To reach the EU Green Deal 2030 scenario, the incremental cost for net zero offices is between 8-17% and 5.3% for residential buildings. It is very likely that these costs will be offset by property value benefits through rent premiums, lower vacancy rates and lower lifecycle and operating costs. However, transparency and market data are limited, hence the underwriting of net zero business cases remains challenging. It is also a signal that the sector and marketplace are not yet ready to deliver net zero properties at scale. And although we are seeing ESG purpose-driven developers being the initiators of construction projects, the profitability of a project remains key, driven by the total construction cost and construction period. From their academic research, Chegut et al. (2019)⁹ found that green building developments require a duration that is 11% longer compared to conventional buildings. A longer construction period increases the burden of construction loans and can reduce the return on the developer's equity investment, which is another challenge that real estate developers have to take into consideration.



The incremental cost for net zero residential and commercial real estate developments are expected to be offset by property value premiums. But limited transparency and market data are making investment underwriting a challenging task.

⁷ Kumanayake R. & Luo H. (2018), *Life cycle carbon emission assessment of a multi-purpose university building: A case study of Sri Lanka*, *Frontiers of Engineering Management*.

⁸ UK GBC (2020), *Building the Case for Net Zero: A feasibility study into the design, delivery and cost of new net zero carbon buildings* [https://www.ukgbc.org/wp-content/uploads/2020/09/Building-the-Case-for-Net-Zero_UKGBC.pdf]

⁹ Chegut et al. (2019), *The price of innovation: An analysis of the marginal cost of green buildings*, *Journal of Environmental Economics and Management*.

No green deal means no deal

In reference to the research from Kumanayake et al (2018), investors have a significant operational carbon footprint due to the operational phase of standing assets under management. In order to comply with EU Green Deal commitments, real estate investors will be challenged to implement sustainability and net zero principles across their real estate investment portfolio. Retrofitting strategic standing assets through green and smart technology to reach net zero will be vital, thereby minimizing the embodied carbon emissions. They will also contemplate the divestment of non-strategic standing assets that no longer fit their investment profile and will acquire assets that include higher levels of sustainability and smart infrastructure.

The challenge with investment allocation of net zero assets, through new acquisitions and retrofitting standing assets, is access to financing. This especially applies to retrofitting projects of non-sustainable buildings. Historically, debt financing was based on underlying financial asset performance, asset class and even business relationships. Now with the increased attention being paid to sustainable financing, these metrics no longer hold by default. They will have to be married with ESG fundamentals in order to acquire debt financing. Real estate investors will likely have to reach out to the equity market to finance retrofitting projects or find opportunities via green bond structures. These green bonds are designated to encourage sustainability investments, as well as others aimed at energy efficiency and cultivating environmentally friendly technologies and the general mitigation of climate change.

With the allocation of net zero and smart buildings, also comes the challenge of product scarcity. There is tremendous competition among investors for green and smart buildings. This can lead to heavy price competition with reduced investment yields and lower returns. With a rising appetite for sustainable buildings, the lack of a unified green certification system means that it remains difficult to measure and compare the monetary value of sustainable structures and policies. More importantly, sustainable certification programs primarily measure a building's 'greenness' at the time of its design and construction. They pay less attention to the ongoing operations of a building to see how it is performing once it is occupied. Changes can occur to the building during occupation, hence the challenge for investors and property managers is to better understand building performance relative to carbon emissions during the use-phase and continually validate green certification and net zero principles.

Operationalizing net zero pathways requires strong leadership

With ESG and net zero evolving into corporate strategy drivers, the strategic importance of (corporate) real estate is elevating. When it comes to occupiers, corporate real estate managers are challenged to go 'beyond green certificates' and develop robust ESG and net zero real estate strategies - strategies that are aligned to the corporate ESG strategy and support their business on a net zero path. Real estate occupiers should recognize the significant difference between baselining carbon emissions, developing net zero scenarios and operationalizing net zero pathways. A theoretical exercise in carbon baselining and net zero pathway modeling is one thing, but the actual implementation of net zero plans demands significant organizational change and key stakeholder buy-in.

Corporate real estate managers require an in-depth understanding of their company's sustainable transformation and the ability to translate that to their built environment. Which real estate assets fit the net zero profile? Where do we require investments in owned properties that require sustainability upgrades? There are various sustainability initiatives undertaken by real estate occupiers to drive sustainable transformation of their corporate real estate portfolio and real estate & facility operations as part of their journey to net zero. These include the divestment of non-core unsustainable real estate, consolidation of business units in fewer sites, purchasing of green energy and the reduction of energy consumption, as well as investment in solar panels, wind turbines or forestland either as carbon off-set or to produce alternative energy. Developing a net zero (corporate) real estate portfolio and operations requires a new approach to existing ways of working, processes, collaboration with outsourcing vendors, and even a cultural change, especially given that real estate is not a core business function for occupiers.

A significant challenge for corporate real estate managers is underwriting building investments and justifying net zero business cases. The return on capital employed and/or payback terms are not always in line with company guidelines, which are based on traditional methodologies. This demands the promotion of the net zero business case - particularly how it can deliver shareholder value. Justifying net zero investments requires a different business case approach to the norm. They do not always deliver the standard financial ROI that companies are used to and, therefore, require a balanced approach between corporate and societal value creation.



Modelling net zero pathways is one thing, but the actual implementation requires significant organizational change.

Insuring against climate damage and value depreciation is not the solution to the problem

Despite the sustainable transition of the real estate industry, we have to realize that climate change is no longer just a threat to future generations - it is happening today. Catastrophic events such as wildfires, flooding caused by heavy rainfall, cyclones and extreme temperatures with long periods of drought occur with alarming frequency. That is why the IPCC¹⁰ is raising significant awareness among authorities, businesses and wider society to depict the climate impact scenarios that are expected to emerge if we do not act today, including what is likely to happen if we reach global temperature increases of 2.2 degrees and 5.4 degrees Fahrenheit compared with pre-industrial levels.

It goes without saying that climate change events have already affected the built environment, even if they haven't always received a great deal of attention. In fact, climate events exposing real estate assets are not new. However, with growing research into climate change also comes growing attention to collateral damage to the built environment and the subsequent financial consequences affecting insurers, real estate investors, and occupiers as well as governments.

¹⁰ Intergovernmental Panel on Climate Change, Fact Sheet Europe: Climate Change Impacts and Risks [https://www.ipcc.ch/report/ar6/wg2/downloads/outreach/IPCC_AR6_WGII_FactSheet_Europe.pdf]

In its insurance report (2021)¹¹, Swiss RE forecasts that global property insurance premiums will rise by 22% by 2040 as weather-related catastrophes become both more intense and frequent. Regulators and market actors are signaling the need for forward-looking climate risk analysis and assessment of the real estate asset risk impacts. Climate risks stemming from more intense and frequent weather events will negatively affect cash flow, capitalization rates and even financing conditions. For example, cash flow will be affected due to reduced rent from demand decline. Capitalization rates may fall due to reduced asset liquidity and, finally, financing conditions could be affected because of a reduced willingness to lend against higher interest rates and even fewer potential equity partners. It is clear that insuring against climate risks to recover property damage and value depreciation is a necessity but not the solution to the problem. We need to face the challenge collectively and work together to mitigate climate change events.

Meeting the challenge together

The built environment plays a huge role in global sustainability. This white paper highlights the challenges that exist for real estate investors, developers and occupiers looking to create a more sustainable industry. But these challenges are not insurmountable. Net zero can be achieved, but only by working shoulder to shoulder across the value chain, alongside robust data, a solid digital strategy, and a commitment to change management.

Support in proving your progress

The partnership between Planon and KPMG is engineered to make the built environment more sustainable. The companies' integrated solution consists of KPMG's real estate and sustainability strategy capabilities, climate data and technology solution, business implementation and automated data governance and reporting. This is coupled with powerful real estate and facility management sustainability software and smart building technology from the Planon group, including technical engineering on the ground.

The accurate recording of environmental data is vital to reducing the carbon footprint of buildings - for investors, developers and occupiers alike. Both KPMG and Planon can support owners of existing buildings, as well as real estate firms looking to launch new construction projects, through research, smart technologies and advanced analytics. Collectively this is supported by organizational change management to ensure organizational readiness for the gradual transition to the new net zero reality.

Want to know more?

For more information on sustainability in the real estate industry, read [this KPMG study](#) about the CSRD-readiness of Dutch companies or [this recent KPMG EU taxonomy publication](#): 'Setting the Baseline towards Transparency'. If you're interested in knowing more about how Planon software supports real estate and facility managers in reaching sustainability objectives, please [read the brochure 'Planon's Energy & Sustainability Management solution'](#).

¹¹ Swiss Re Institute, *More risk: the changing nature of P&C insurance opportunities to 2040* [<https://www.swissre.com/dam/jcr:19f316fe-0381-42a9-8cfd-9794f746e421/swiss-re-institute-sigma-4-2021-en.pdf>]

About Planon

Planon is the leading global provider of Smart Sustainable Building Management software that connects buildings, people and processes. By eliminating data silos and aligning solutions into one shared information platform, Planon provides all building stakeholders with actionable and meaningful insights. Independent market research and consulting firms have consistently rated Planon as a global leader in the market. Planon has implemented its comprehensive solutions for more than 2,500 clients, supported by offices and partners around the world.

For more information please visit us at planonsoftware.com



About KPMG The Netherlands

Since 1917, KPMG has been offering high-quality services in the field of accountancy and business strategic advice. We support organizations in the world of today and tomorrow. KPMG does this based on the idea that progress only really pays off if it is good for people and society. "People-driven progress" is our view of progress and the way we add value for customers through our services. At KPMG in the Netherlands, 3600 professionals work in 12 offices. Our head office is located in Amstelveen. KPMG The Netherlands is part of an international network of independent KPMG offices that is managed from Canada.

For more information please visit us at home.kpmg



Do you have any questions about the content of this white paper?

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