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01.



EXECUTIVE SUMMARY

THE FINANCIAL RISKS FROM CLIMATE CHANGE

Climate change carries financial risks that are increasingly recognized by major global organizations, such as the Financial Stability Board (FSB), the World Economic Forum (WEF) and the Organisation for Economic Co-operation and Development (OECD). Climate risks can be physical or transition related. While the first result from direct consequences of climate change, like the increased frequency and intensity of extreme weather events, droughts, or floods; the latter are connected to augmented regulations on climate, or to changing technological or reputational issues, that have an impact on companies, financial institutions, and the overall society. Both lead to serious changes in market dynamics that are likely to create new winners and losers in different economic sectors.



THE REAL ESTATE SECTOR AND CLIMATE CHANGE

The European Union (EU) and some of the most developed nations worldwide are setting ambitious carbon neutrality commitments for the next decades, pushing for improved climate policies, promising to put an end to “business as usual”. In the EU (with a similar pattern in other countries), the real estate sector is responsible for approximately 40% of the overall energy consumption and 36% of CO₂ emissions, which sets it as one of the main targets for these new policies and regulations.



TRANSITION RISKS WILL HIT, HARD AND SOON, THE REAL ESTATE INDUSTRY

It is paramount to understand certain initiatives, policies and regulations, deriving from the European Green Deal, the EU taxonomy for sustainable activities, or the Renewed EU Sustainable Finance Strategy, among others, that call for the urgency about the decarbonization of the sector. They encompass measures such as the higher renovation rates of the building stock, the need to create mitigation and adaptation actions to climate change, and the importance to perform environmentally sustainable real estate activities and investments. Moreover, key attributes like the inclusion of climate-related risks in financial ratios and reporting for real estate portfolios and the assessment of the adverse sustainability impacts of real estate assets are highlighted, with a focus on sustainable construction and renovation, and the usage of circular economy principles and processes.



01.

EXECUTIVE SUMMARY

THE FINANCIAL AND SOCIAL IMPACTS OF CLIMATE CHANGE FOR REAL ESTATE COMPANIES

Real estate companies carry specific climate physical risks, with potential negative financial impacts. Firstly, the sector is usually connected with longer investment cycles, which means that physical risks of climate change that are likely to arise in the medium and long run should start to be taken into consideration in the face value of today's investments. Secondly, they have a relative illiquidity due to the physical permanent location of the assets. As such, as extreme weather events increase in frequency and intensity, and as overall temperature increases, real estate investors will face higher asset impairments, operational costs, and, consecutively, increased insurance premiums and capital costs. This is especially true for buildings in coastal areas where 40% of the global population resides, with alarming sea level rise predictions related with climate change, affecting the lives of millions of people. Therefore, real estate companies should also consider key social impact drivers that play an important role in designing appropriate answers to climate change known consequences.



THE REAL ESTATE SECTOR RESPONSES TO FACE CLIMATE CHANGE CHALLENGES

A climate-change driven sustainability strategy and plan is essential for real estate companies to develop, incorporating financial climate risks in the investment analysis, following TCFD recommendations and applying climate risk modelling practices for a greater risk understanding and assessment. Furthermore, investing in buildings' energy efficiency, renewable energy sources, and circular and low-carbon technologies is the way to go, facing sustainability as a financial leverage positive aspect for access to capital, whose measures should be contained and described in the annual non-financial reports. A constant alignment and update according to international standards, best practices and regulations is key, to effectively face the challenges posed by climate change, towards promoting a more climate resilient real estate sector.



INTRODUCTION

02.

An overwhelming majority of climate scientists (97%) are certain that climate change is due to anthropogenic factors (activities originated by human intervention)¹ and that it will result in increasing adverse consequences for the natural world and the global economy. To confirm that, the latest Global Risks Report of 2021 of the World Economic Forum (WEF) has placed climate change at the top of the risks to be tackled². Phenomena such as the rise of global average temperature, natural disaster becoming more frequent or the disruption of ecosystems, together with the impact on human health brought by the pandemics, pose increasing risks for businesses. All of these have negative impacts in most sectors, but the real estate sector will be one of the most impacted according to another recent WEF study about the rising nature risks and their impact in the global economy³.

To understand financial risks resulting from climate change, the Task Force on Climate Change (TCFD) launched by the Financial Stability Board, released the *Recommendations of the Task Force on Climate-related Financial Disclosures* report, identifying the main risks, opportunities and financial impacts from climate change (see Figure 1). The report defines two types of risks:

1) Transition risks, related to the transition to a lower-carbon economy, motivated by changes in structural aspects such as new policies and laws, upcoming technologies, changing market dynamics or reputational effects;

2) Physical risks from climate change, that can be: acute, such as extreme weather events; or chronic, related to the long-term consequences of temperatures' increase, resulting in phenomena such as sea level rise, floods and biodiversity losses.

This TCFD report⁴, as well as the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), recognizes climate change as a source of financial risk, and that a set of measures must be taken to minimize such risks⁵.

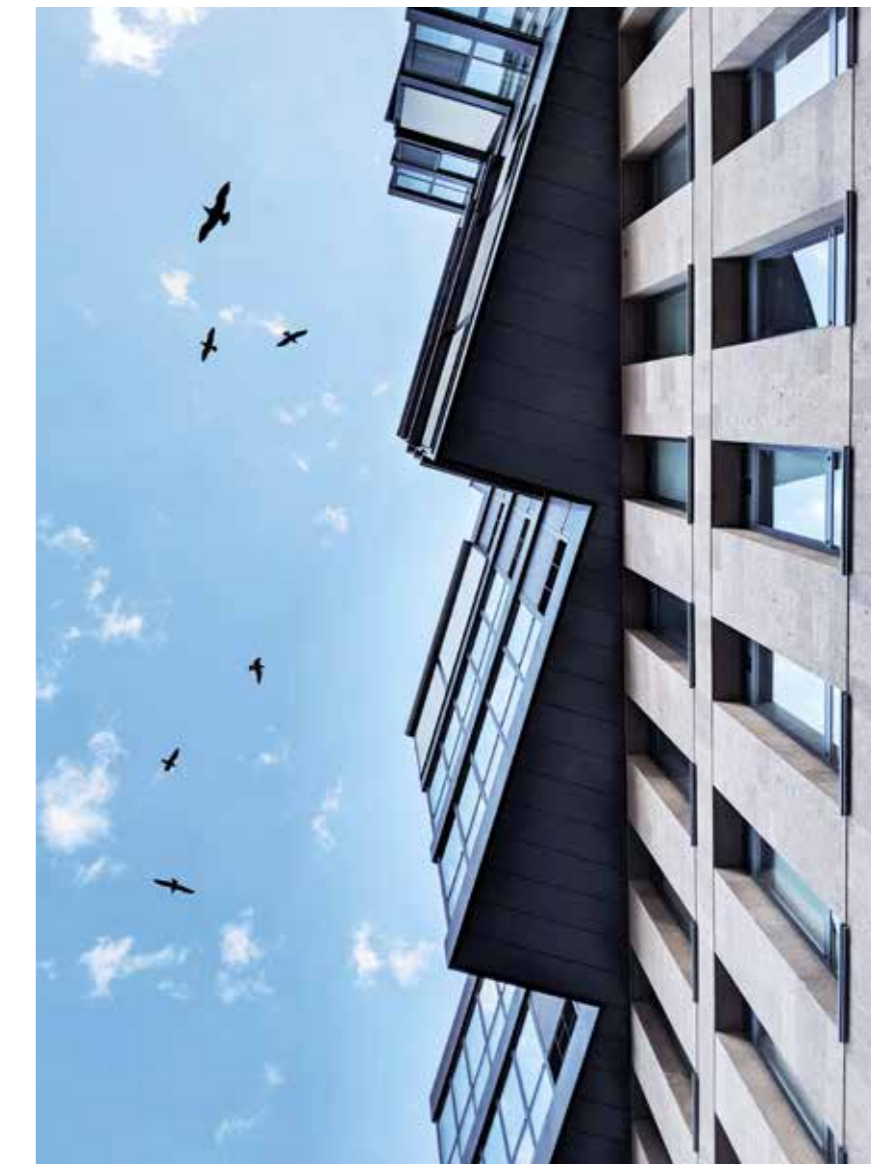
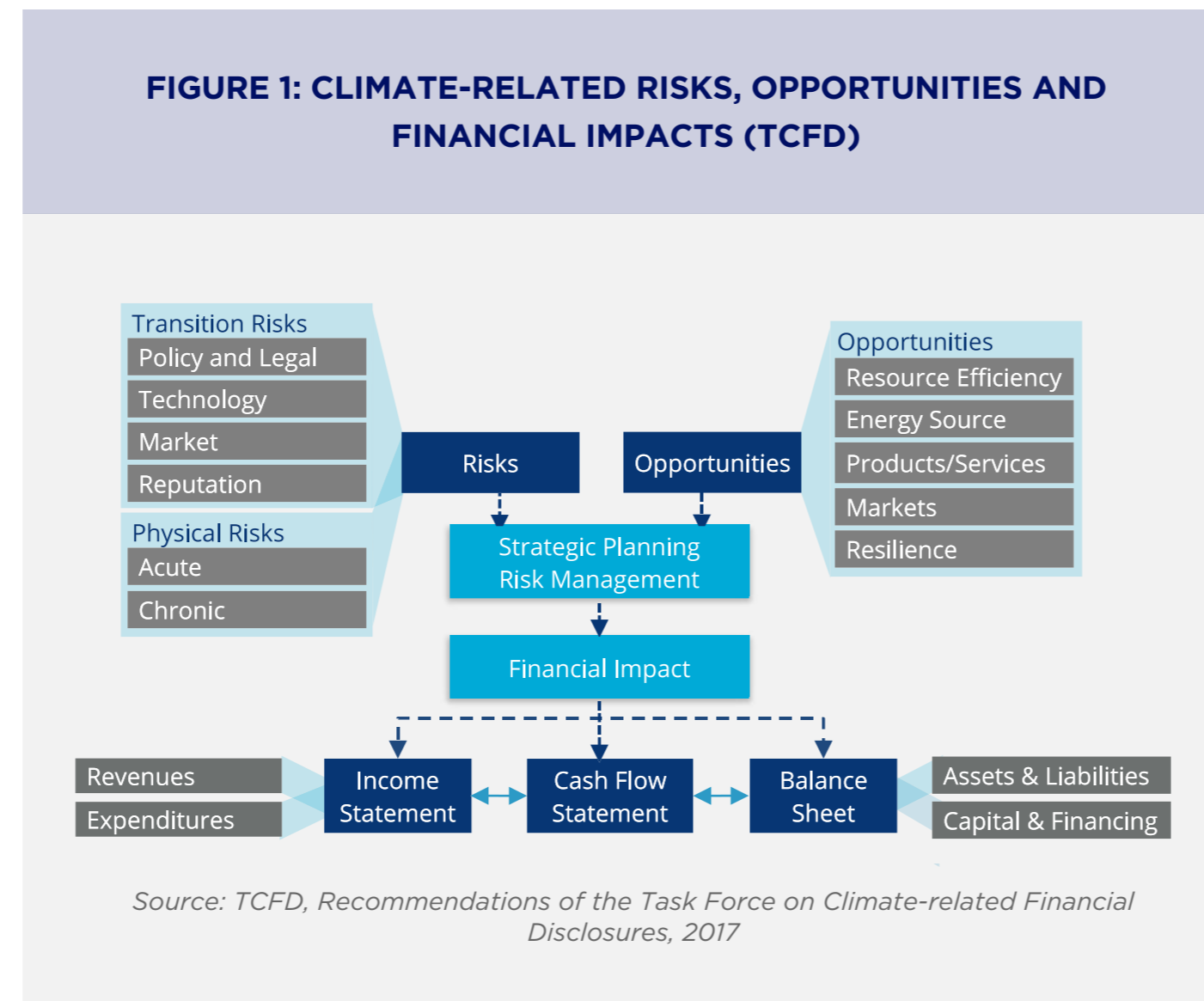
As of 2019, the size of the professionally managed global real estate investment market was worth USD\$9.6 trillion⁶. Real Estate is a significant asset class and long-life fixed assets should consider climate change-related vulnerabilities and exposure to both physical and transition risks⁷.

In the real estate sector, climate-related risks can impact the face and market value of the assets, and financial valuations should include the future impacts of climate change in those assets, as of today's prices. Giving a straightforward example, if a real estate asset is close to the sea, it has an increasing probability of being hit by waves, which may lead to the impossibility of obtaining insurance. Hence, this physical risk exposure will have an impact on the insurance of that particular asset.

Climate events can also have expensive maintenance and operational costs. In a worst-case scenario, a natural disaster could cause a complete property loss. That is why investors are demanding more environmental information before deciding which assets to buy or sell. Therefore, worldwide, there is an increasing number of investors looking for climate resilient companies.

From 2012 to 2018, total assets in sustainable investing have more than doubled, highlighting the strong growth in some of the global largest economies (e.g. Europe, USA, Japan, Canada, Australia and New Zealand)⁸. The expectation is that the market will grow 55% in 2021, according to Crédit Agricole CIB⁹. Real estate investments are a crucial part of the portfolios of many investment funds, whose managers should be able to understand the climate-related risks and reporting information that investors will demand for, implementing management systems that allow such information to be disclosed in an automatic and frequent way.

FIGURE 1: CLIMATE-RELATED RISKS, OPPORTUNITIES AND FINANCIAL IMPACTS (TCFD)



03.

3.1 THE CLIMATE PHYSICAL RISKS

The average world temperature has already gone up compared with the preindustrial baseline of 1720 to 1800, and will go up at least 1.5°C to 2°C by the end of this century¹⁰ (in the Mediterranean already went up by 1.4°C)¹¹. The rising frequency and intensity of storms, floods, fires, and strong winds is already having a financial impact. According to the European Commission, between 2000 and 2016, annual weather-related disasters worldwide rose by 46%. Between 2007 and 2016, economic losses from extreme weather worldwide rose by 86%, reaching a cost of €17 billion in 2016. The EU acknowledges climate change as a high priority, since close to 50% of the exposure of Euro area banks is directly or indirectly linked to risks stemming from climate change¹².

As hurricanes, wildfires and storms become more frequent, the real estate sector will suffer direct value impairments of assets, increased insurance costs and reduced insurance availability.

Globally, in 2017, insurers paid a record USD\$136 billion for damages caused by natural disasters¹³. Insurance companies have already stated that climate change may make buildings uninsurable. Global leading insurers signalled that, in a 3°C or 4°C scenario, some buildings in cities like New York and Mumbai will no longer be insurable⁷.

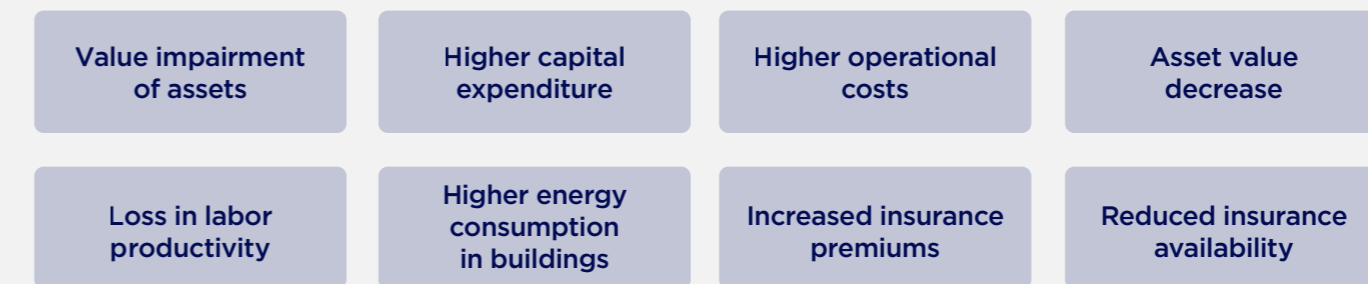
Moreover, gradual changes in climate will lead to increasing operating, maintenance and again, insurance costs, and may even mean adaptation measures such as elevating buildings in coastal areas, in order to deal with sea level rise. There is an increasing frequency of heavy rain and wind, long periods of draughts, higher temperatures and decreasing rainfall. The financial impacts of these are already being felt by the sector. Studies published by the Urban Land Institute in partnership with Heitman in 2017 and 2018, found that “homes exposed to flood risk or sea-level rise have sold for less than comparable properties or have seen values increase at a reduced rate in comparison to similar properties without flood risk”.¹⁴

Also, according to the Global Commission on Adaptation, this could force “hundreds of millions of people living in coastal areas to leave their homes, with total costs estimated at USD\$1 trillion each year by 2050”.⁷ This is particularly relevant, since that according to the United Nations, by 2007, it was estimated that “40% of the world population lived within 100 kilometres of a coast”¹⁵.

Other consequences include increasing energy demands for cooling and heating, and losses of labour productivity. The first will lead to boost energy efficiency solutions in buildings. The second is related to heatstress. Statistics also show a 1% to 5% decrease in construction labour productivity, depending on different geographical areas¹⁶.

Indirect risks also include the decrease in real estate asset values, generated by the possible GDP impacts of physical climate-related events, which may be felt directly or indirectly, through supply chain impacts. The real estate sector and companies must understand the risks of occurring such phenomena in specific areas and existing buildings, so that they can become more resilient to those impacts.

FIGURE 2: SUMMARY OF THE IMPACTS OF THE PHYSICAL RISKS OF CLIMATE CHANGE FOR THE REAL ESTATE SECTOR



3.2 THE CLIMATE TRANSITION RISKS

The climate transition risks potential impacts are increasing due to the growing pressure that governments and regulators are placing in financial institutions to increase transparency on their activities and respective clients' businesses, aiming at being resilient to face climate change-related financial impacts.

In 2015, the world has committed to reach carbon neutrality during the second half of this century with the signature of the Paris Agreement (PA), a United Nations initiative. Europe is committed to reach that goal in 2050¹⁷ and China in 2060¹⁸. Therefore, one of the major risks is coming from the regulators sphere in Europe, USA and other parts of the world, namely from China and India, which are developing public policies to lead their countries to carbon neutrality.

Real estate is responsible for “approximately 40% of the overall energy consumption and 36% of CO₂ emissions in the European Union”,¹⁹ making the sector one of the main targets for emissions' reduction. This poses serious climate change transition risks that must be anticipated by real estate developers. The focus of this section is to map the major climate transition risks, coming not only from policy and regulation, but also from technological, market and societal responses to climate change.

3.2.1 POLICY AND REGULATORY RISKS - WORLDWIDE

Towards achieving the carbon neutrality goal, the Paris Agreement signatory countries are creating policies and regulations that will increasingly benefit climate resilient businesses, meaning that the path towards decarbonization in the global economy is inevitable.

This is being acknowledged not only by governments, but also by international regulatory and supervisory agencies, such as the Financial Stability Board (FSB), as well as the Central Banks and Supervisors.

According to the Global Risks Report of 2021 by the World Economic Forum, COVID-19 has reinforced the need to build more resilient economies, businesses, and societies, aiming at responding more effectively to known global risks, such as health pandemics and climate change²⁰.



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Task Force on Climate-related Financial Disclosures (TCFD)

In 2015, the Financial Stability Board (FSB), upon the request done by the Ministers of Finance and the Central Bank Governors of the G20 countries, created the Task Force on Climate-related Financial Disclosures (TCFD) to make the assessment of climate-related risks and opportunities for companies and the global financial sector. Furthermore, and based on TCFD studies and recommendations, the United Nations Environment Programme Finance Initiative (UNEP FI) showed a strong concern about the real estate sector and its climate-related risks, having released, in 2019, the study "Changing Course: Real Estate - TCFD pilot project report and investor guide to scenario-based climate risk assessment in Real Estate Portfolios." This report states that: "With their relative illiquidity compared to many other asset types, and from their physical permanent locations and long investment cycles, it is essential that real estate owners and managers identify long-term climate change trends and take adequate risk mitigation measures to maintain and enhance value".

Central Banks and Supervisors Network for Greening the Financial System (NGFS)

Central Banks and Supervisors from around the world have joined forces to promote better climate-related risk management practices in the financial sector, mobilizing capital to the climate transition through NGFS.

3.2.2. POLICY AND REGULATORY RISKS - EUROPEAN UNION

Specifically, in relation to the European Union, the transition to a decarbonized economy, alongside with the digital transformation and the regional development and cohesion, were set as key priorities for the next decades. This awareness and ambition is reflected in the Pluriannual EU budget 2021 to 2027 and the COVID-19 recovery package Next Generation EU²⁰. The national plans for recovery and resilience should have "at least 37% of their total expenditure in supporting climate objectives" and all investments must respect the "do no significant harm" principle, meaning that all investments should be aligned with the EU taxonomy that defines what environmentally sustainable activities are.²¹

European Green Deal

The European Green Deal was launched in 2019 and is considered by the European Commission as the new growth strategy. It focuses on the strategic areas needed to achieve carbon neutrality by 2050, aiming at achieving economic growth decoupled from resource use.²²



EU taxonomy for sustainable activities

As the EU aspires to align the activities of all economic sectors with the European and global environmental agenda, the first necessary step to take was to create a common definition about what is a sustainable activity. Such definition includes environmental, social and governance issues (ESG), and the EU decided to start with the environmental aspects. Therefore, the existing EU taxonomy²³ aims at defining what environmentally sustainable activities are. According to it, an environmental activity has to:

1. Contribute substantially to one or more of the environmental objectives:

- Mitigation of climate change;
- Adaptation to climate change;
- Use and protection of water and marine resources;
- Transition to the circular economy, waste prevention and recycling;
- Pollution prevention and control;
- Sustainable healthy ecosystems protection.

2. Cannot cause significant damage to any of the environmental objectives defined above;

3. Must meet minimum social criteria (for example, OECD Guidelines on Multinational Enterprises and the UN Guiding Principles on Business and Human Rights);

4. Must comply with the taxonomy defined technical criteria.



03.

IMPACT ON REAL ESTATE SECTOR

So that renovation and/or construction, or the purchase of buildings, is considered environmentally sustainable, the sector must comply with the technical criteria that the EU taxonomy de fines. Such criteria imply several minimum requirements regarding energy consumption, water, waste, pollution and biodiversity protection.

Since banks and investment funds are now asked to disclose the percentage of the funds aligned with the EU taxonomy, they will be requesting a vast range of environmental information to real estate companies about the environmental performance of all buildings included in the portfolios or subject to be financed by the banks. Also, real estate companies must under stand these objectives, the minimum requirements to be considered environmentally friendly, and adjust their construction and management practices according to it.



Disclosure of non-financial information

The Directive 2014/95/EU, also called the non-financial reporting directive (NFRD)²⁴, identifies the rules on disclosure of non-financial and diversity information by large companies, being compulsory to report such information in annual reports from 2018 onwards. The new version of this Directive is expected to be released in the first semester of 2021 and will very likely include some of the TCFD recommendations. Therefore, one can expect that it will become obligatory for companies to disclose their CO₂ emissions under scope 1, 2 and 3 (different categories of emissions defined by the Greenhouse Gas Protocol)²⁵ and to disclose their scenario planning analysis for a 2°C average temperature increase.

IMPACT ON REAL ESTATE SECTOR

Since the NFRD aims at informing the investors about the environmental, social and governance (ESG) impacts, and good practices supported by a set of indicators, the real estate sector companies must be prepared to respond to the high level of information demand.

It is already known that companies will have to disclose their percentage of Turnover, Capex and Opex that is aligned with the EU taxonomy in 2022, in relation to 2021 data. The real estate sector is included in the taxonomy activities and therefore, in order to perform environmentally sustainable activities/investments, it has to comply with an extensive list of environmental issues. If a real estate property project is not labelled as environmentally sustainable by investment funds and banks, that might mean higher difficulties to access to capital.

The Renewed EU Sustainable Finance Strategy

The Renewed EU Sustainable Finance Strategy is expected to be fully launched still during the first semester of 2021, substituting the current Action Plan to finance sustainable growth. It will strengthen the ambition to align the entire financial system with the Paris Agreement goals and the United Nations Sustainable Development Goals (SDGs)²⁶ putting an additional pressure on the private sector to integrate environmental and social risks into the financial risk analysis.

Criticisms around poor risk management and short-term oriented practices of financial institutions is not new, pushing for the need for increased transparency and long-term focused measures.²⁷

More specifically, the current Action Plan to finance sustainable growth set the call for the:

- **Implementation of the EU taxonomy across all sectors;**
- **Creation of standards, labels and low carbon references;**
- **Inclusion of environmental risks in the banking and insurance prudential ratios;**
- **Further reinforcement of non-financial reporting obligations.**

IMPACT ON REAL ESTATE SECTOR

Raising capital will be linked with how aligned the assets are with the EU taxonomy. Most likely, companies will be having a taxonomy rating as they already have an “ESG” rating. If a building does not comply with the taxonomy requirements, a potential loan attribution for construction or renovation, might be considered as not aligned.

Therefore, it will be riskier for the bank to lend money which will increase the interest rate or, ultimately, lead to rejection of the loan. One possible way to respond to this challenge is to have all buildings with a LEED²⁸ and/or BREEAM²⁹ certification, validating the sustainability value of the real estate assets.

European Climate Law

Estimated to be launched soon, the European Climate Law will set the political commitment of achieving carbon neutrality until 2050 as a juridical obligation³⁰. This will bring predictability and certainty that the path to carbon neutrality is irreversible, being especially important to signal to businesses, investors and financial institutions that sustainable investments are the way to go.

IMPACT ON REAL ESTATE SECTOR

This can have a large positive impact, since real estate developers can be sure that the decarbonization ambition will not stop, and as such, investments in more efficient buildings aiming at being carbon neutral, circular on resources, and with improved waste and water management practices can be given a priority in the real estate developers’ perspective.



03.

Sustainability-related disclosures in the financial services sector (SFRD)

From March 2021 onwards, a set of financial players (such as investment funds, asset managers, venture capital, private equities, insurance and financial advisors) have the obligation to disclose how they include the ESG risks in their investment and remuneration policies. This is known as the regulation about the sustainability-related disclosures in the financial services sector (SFDR)³¹, and obliges financial players to publicly disclose how:

- **Sustainability is embedded in the financial institution's strategies, policies and procedures;**
- **Each financial product contributes (or not) to sustainability;**
- **The adverse sustainability impacts are taken into account in their financial products or in their investments (this one to be made compulsory from 30 December 2022 onwards).**

IMPACT ON REAL ESTATE SECTOR

The referred fund types will have to disclose about 32 obligatory indicators and 18 voluntary indicators respective to their assets, aiming at responding to the principal adverse sustainability impacts they might have. This means that real estate companies will have to be able to supply that information to investors so that they are able to disclose it accordingly.

Capital Requirements Regulation

Coming into force by June 2022, the Capital Requirements Regulation will require all large institutions with securities traded on a regulated market of any EU member state to disclose prudential information on ESG risks, including transition and physical risks.³²

IMPACT ON REAL ESTATE SECTOR

With the banks having to incorporate ESG factors in credit analysis, and with the pressure to state how aligned they are with the EU taxonomy, since capital requirements will be directly related to it, real estate developers and real estate companies will be asked to supply a set of information about the environmental impacts of the assets. The feasibility and interest rate of the loans will be also linked to such alignments.

3.2.3 MARKET AND REPUTATIONAL RISKS

These risks are related to factors that are derived from market changes and can have reputational hazards in the real estate companies, comprising items such as: changing customer behaviour; increased costs of raw materials; or an certainty in market signals, like abrupt and unexpected shifts in energy costs, or changes in energy revenue mix and sources.

In the real estate sector, these risks are directly connected to the increasing changes in consumer preference for buildings with better environmental performance. For instance, in the UK, some banks have developed green mortgages where consumers have a better interest rate if they purchase more sustainable flats/houses³³. This also induces and accelerates consumer behaviour changes towards a higher demand for greener buildings. From the corporate clients' perspective, there is a high pressure to track their carbon emissions and to have a carbon zero ambition. Therefore, corporates will also be looking for greener buildings.

Regarding market signals, there is a trend towards greener buildings and regulation is having a key role on this. From the financial players' side, it is becoming clear that insurance might not be available for buildings with high impact likelihood by physical risks, which also implies a change in the market, since insurance would not be available, and with that, the market value of the assets would decrease. In fact, investors are already³⁴.

- **Mapping physical risks for current portfolios and potential acquisitions;**

- **Incorporating physical adaptation and mitigation measures for assets at risk;**

- **Exploring a variety of strategies to mitigate risk, including portfolio diversification and investing directly in the mitigation measures for specific assets; and**

- **Engaging with policymakers on city-level resilience strategies, supporting the investment by cities in mitigating the risk of all assets under their jurisdiction.**

As expressed, both consumers and corporates are gradually becoming more interested in environmentally friendly buildings. Investors are also concerned with the physical impacts, paying close attention to the environmental practices that the real estate companies apply, being also an important reputational issue and ultimately, a key decision to invest or not.

IMPACT ON REAL ESTATE SECTOR

This means that real estate companies, developers and construction companies must consider all the items above, while deciding where to build and how to do it, since that will have an impact on the market value of the final real estate assets. If they do not incorporate these concerns, there is a high probability that the assets become less attractive for tenants and investors, and that can lead to a lower market liquidity.



CLIMATE CHANGE RISKS IMPACTING THE REAL ESTATE SECTOR

03.

3.2.4 TECHNOLOGY RISKS

Technology transition risks are related to the substitution of existing products and services with lower emission options, to the costs of transitioning to lower emission technologies, and to the negative consequences of not investing in novel and climate-friendly technologies. These risks can be high for the sector, since they imply additional investments on using new materials and technologies whose price can be high. Nevertheless, green technology is developing fast.

On one hand and providing an example, according to Bloomberg, “wind and solar are now cheapest across more than two-thirds of the world”³⁵, making them more cost-effective to use today. On the other hand, the calculation of the cost-benefit effect should also bear in mind the money that is saved during the usage of the buildings, since energy and water consumption will be much less when a building is developed with environmental concerns. Those savings should be included in the Profit and Loss accounts and should be explained to clients. It is also important to realize that the price of water consumption, waste disposal and even non-renewable energy consumption can increase in the near future, and this should also be considered.



As such, the industry is already taking a lead in addressing climate challenges, and the World Green Building Council has issued a Net Zero Carbon Buildings Commitment, advocating for all buildings to be net zero in operation by 2050³⁶.

This commitment is also visible by the fact that 1323 companies are now taking action to achieve 652 targets under the Science Based Targets initiative³⁷, a partnership between CDP, the United Nations Global Compact, the World Resources Institute (WRI) and the World Wide Fund for Nature (WWF), gathering organizations that assume their commitment towards carbon neutrality, using science as the base for the definition of their targets.

IMPACT ON REAL ESTATE SECTOR

The business model of a real estate project must include the future operational savings coming from less energy and water consumption in the profit and loss calculations. Those should be done together with the CO₂ emissions that are avoided due to the use of more climate-friendly equipment and technologies. There will also occur an increasing need to use new techniques and renewable materials for construction.

In Europe, for example, the new buildings will need to be energy self-sufficient and ideally comprising sustainable supply chain networks. It is also important to understand the circular economy concept applied to buildings, developing methods that allow the materials used in a specific building to be used later in another one. This implies the need to have an inventory of the materials used in each building.

Buildings can be a biodiversity enhancer and help lowering temperatures of cities, with green roofs/walls, which also helps to balance the interior temperature of the buildings. On one hand, this might imply an increase in the investment. On the other hand, investors, banks and insurance companies are gradually becoming interested in investing or insuring buildings that are resilient to all of these risks.

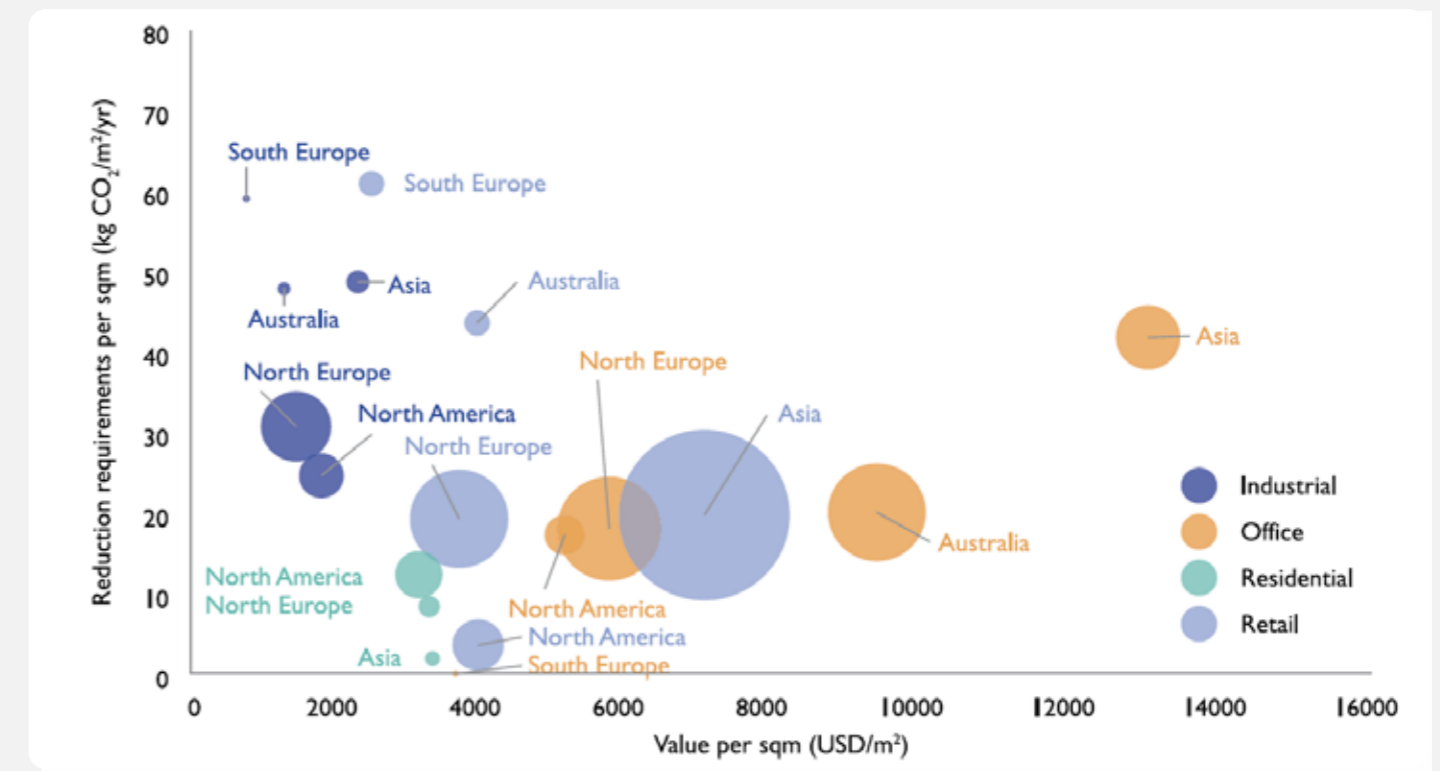
3.2.5 WARMING POTENTIAL

The Global Warming Potential was developed to allow comparisons between different global warming scenario impacts.

This allows real estate investors to understand the alignment of their portfolios to the global 2°C target. Currently, the global Business-as-Usual (BAU) is 3.8°C, meaning that all economic sectors and governments must work together to reach the collective goal towards climate change mitigation. According to the UNEP FI report previously mentioned⁷, the global average warming potential differs between asset types, as the average warming potential for residential buildings is 2.71°C, for retail is 3.12°C, for office buildings being 3.17°C, while for industrial buildings is 3.29°C.

Still, these numbers do not reflect the reality of specific regions. For example, real estate assets in the South of Europe have one of the highest warming potential levels in the world, meaning that countries in this region will probably be more pressured by governments, clients, and other stakeholders to mitigate buildings' carbon emissions, than in other regions. For a better overview of the emission reduction requirement per m² as a function of the average value property per geographic region and its building types, figure 4 is presented, where the size of the bubble represents the market size.

FIGURE 4: EMISSIONS' REDUCTION REQUIREMENT PER M² WORLDWIDE, BY TYPE OF BUILDING AND VALUE PER SQM (USD/M²)



Source: UNEP FI, Changing Course: Real Estate - TCFD pilot project report and investor guide to scenario-based climate risk assessment in Real Estate Portfolios, 2019

03.

3.3 IMPACT OF CLIMATE CHANGE ON LONG-LIFE FIXED ASSETS

As stated, the real estate sector is seriously impacted by climate change, both by transition and physical risks. This mainly happens because it is harder to respond to those risks when managing long-life fixed assets, such as buildings.

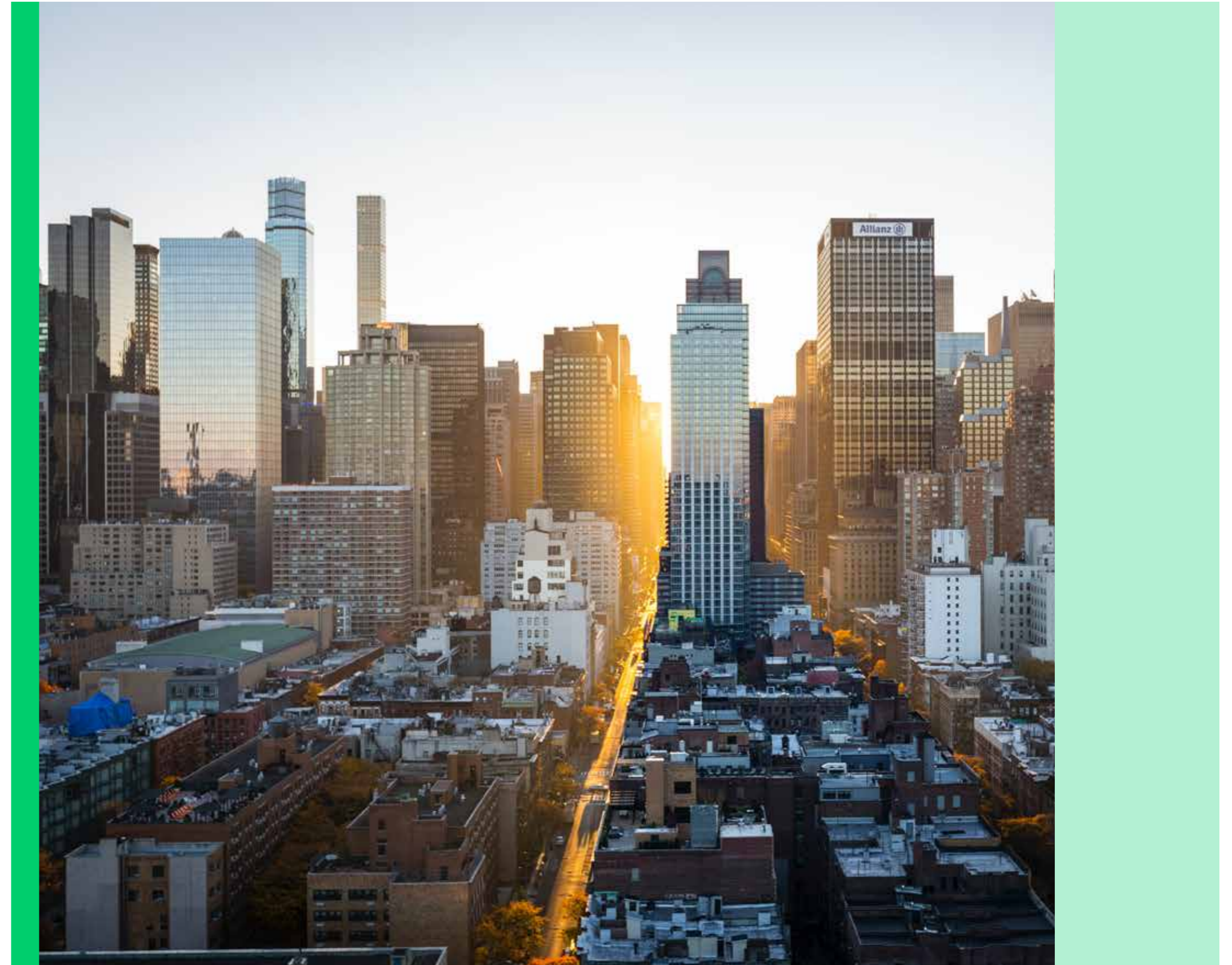
Physical Risks

The UNEP FI report mentioned earlier concluded that “it is expected that physical risks and accompanying damage will become more significant towards the middle of the century as temperatures rise and while most present assets are still expected to be in service”. Therefore, climate risk modelling might be a challenging issue. Real estate companies and investors will have to choose what time-variable to use and how they want to consider it in the different climate change scenarios identified by the United Nations Intergovernmental Panel on Climate Change (UNIPCC). For example, the UNIPCC business-as-usual scenario, assumes that if emissions keep rising at current levels, that will result into an estimated increase of 4°C in the global average temperature by the end of the century, considering significant climate-financial risks and impacts.

Moreover, this scenario analysis will also have to consider geographical variables, since different regions will experience distinct increases in temperature, chronic and acute risks. Although it may seem that taking an approach of a time horizon that goes until the end of the century seems unnecessary, looking at physical and transition risks consistently is crucial, to understand the combined effect of the aggregated risks in different scenarios.

Transition Risks

Responding to decarbonization, regulations will be challenging as it is expected that, by 2050, a vast majority of the current building stock in the EU will still exist and that a big chunk of it will still be energy inefficient. This means that deep and, potentially, costly retrofits will have to be done by real estate companies. Also, the real estate sector should take into consideration, not only the current demands of public and market regulations, but also to anticipate future demands. This is a strong argument for the investment in R&D and for the implementation of new technologies in the sector.



TRANSITION TO A CLIMATE RESILIENT REAL ESTATE SECTOR

04.

4.1 MAPPING FINANCIAL RISKS

The overall consensus is that climate risk is not yet priced into asset valuations, and this applies across sectors, including bonds, equities and real estate. Nevertheless, due to the advancement on regulations and increasing investors' concerns, one can expect that to take place in a near future. In the meantime, the sector should be prepared to face a set of important challenges^{38 39}.

- **Insurance premiums:** The consequences of climate change are already making an impact in the insurance coverage for assets in vulnerable markets, through higher deductibles, reduced coverage, and increased premiums. Insurance can only protect assets from physical risks, and not from transition risks. For example, a higher risk of hurricanes and other environmental extreme weather events in a region, may result in a decrease in buyers and tenants, which constitute risks of illiquidity and value reduction of the assets.

- **New accounting methods:**

The real estate companies should include climate risks in their valuation formulas, namely in what concerns operational and capital costs, rental growth or degrowth, potential of insurability, real estate taxes and terminal values.

- **Operational costs:**

Increased costs for cooling and heating are expected, as global temperature increases, which will result into higher tenants and private owner's household bills. Moreover, extreme weather events such as storms and floods increase rates of property damage, leading to additional operational expenses for repairs.

- **Capital expenditures:**

Preventative measures to climate change should be considered in renovations and new building developments. These may come in the form of flood barriers or storm drainage systems, which will protect assets from damage incurred during extreme climate events.

- **Real estate property taxes:**

Governments, especially the ones placed in more vulnerable regions, may increase property taxes in order to protect infrastructures, limit physical risks and improve climate resilience.

- **Debt availability:**

Banks will differentiate loan pricing instruments or require higher equity portions based on where the asset is located. Hence, climate-related risks need to be embedded in the real estate development projects business plans and financial forecasts.

- **Investor's appetite:**

Investors will be looking for assets with low climate-related risks and with low environmental impacts.

- **Terminal value:**

The value of a real estate project beyond the forecasted period when future cash flows can be estimated, may decline, if located in a high-risk area.

4.2 SOCIAL IMPACT CONSIDERATIONS

If housing has always played a key role in people's quality of life, the COVID-19 pandemic has reinforced that importance, as people have been obliged to stay home and to do remote work during most of 2020 and 2021.

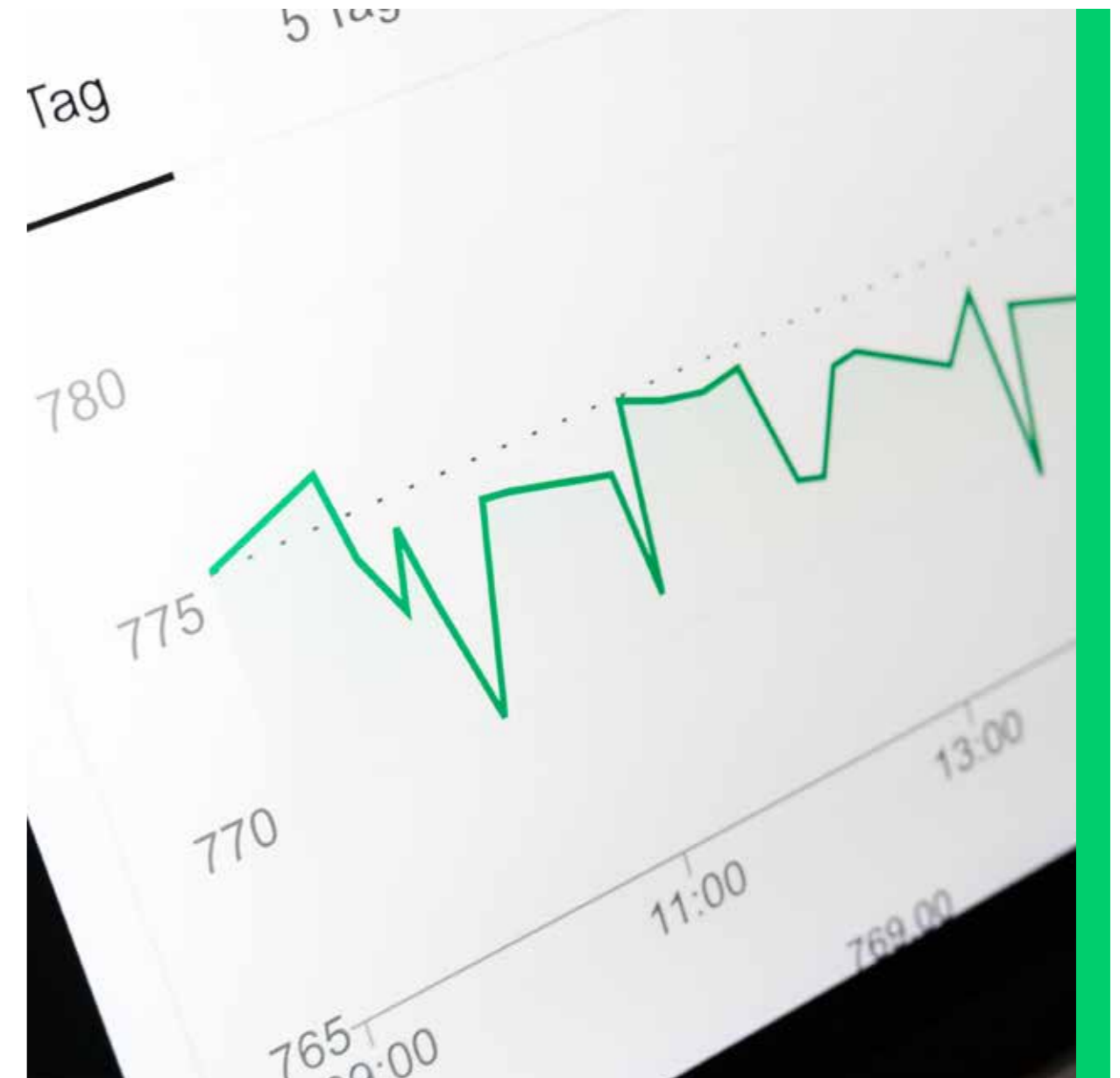
Buildings' isolation is an increasingly important factor, as extreme weather events become more frequent.

Better isolation, together with other energy efficient factors and the change to renewable power sources, should stabilize or decrease the cooling and heating expenses of families, something particularly important for low-income families.

Moreover, the real estate sector has the responsibility to respond to climate change known consequences (e.g. sea level rise), addressing complex issues such as the hundreds of millions of people that have to leave their homes due to these kinds of events.

The transition to a low carbon and climate-resilient sector can also have a positive social impact by creating jobs. In fact, as suggested by the European Federation of Building and Woodworkers, towards zero-emission efficient and resilient buildings, "the construction sector is the leading industrial employer in Europe, representing 7.5% of total European employment and 28.1% of industrial employment in the EU", and with a "very powerful multiplying effect as one job in construction generates two new jobs in the overall economy", while playing a critical social role for the integration of migrants in to many European host countries.⁴⁰

The EU Renovation Wave Strategy, published as part of the COVID-19 European recovery package, aims at overcoming the present barriers of energy and resource-efficiency of existing buildings, stating the benefits of a sustainable approach as "buildings can be made healthier, greener, interconnected within a neighbourhood district, more accessible, resilient to extreme natural events, and equipped with recharging points for e-mobility and bike parking. Smart buildings can provide essential privacy-compliant data for city planning and services".



KEY RECOMMENDATIONS AND FORESIGHT

05.

5.1 DEVELOPING A SUSTAINABILITY STRATEGY

DEFINE A REAL ESTATE SUSTAINABILITY STRATEGY

Real estate companies should understand the market and regulatory challenges, faced as a consequence of the physical and transition risks they are subject to. As such, they should develop a sustainability strategy with a 2030 and 2050 vision, identifying a set of concrete actions, allowing to respond to the several issues raised in this document.

Since buildings are expected to reduce drastically their carbon emission, the strategy should consider the usage of more efficient processes, switching to renewable energy sources and implementing sustainable purchasing policies. In relation to the emissions that need to be compensated, the real estate companies should identify projects that allow them to purchase carbon credits or to sequester carbon.

Real estate companies must also include the creation of a non-financial reporting system to respond to a set of indicators requested by investors and banks. Some can be about energy efficiency levels, the use of renewable energy sources, the water management systems' practices, or related to the type of certifications the buildings have. Putting this strategy in place will mean for the real estate companies to do a set of investments to wards building renewable-energy infrastructures and retrofitted buildings.⁴² A good platform and tool to help in this process is the Greenhouse Gas Protocol.⁴³

5.2 INCORPORATING CLIMATE FINANCIAL RISKS AND FOLLOWING TCFD RECOMMENDATIONS

DEVELOP A CLIMATE RISKMODELLING APPROACH TO ASSESS CLIMATE-RELATED RISKS

Real estate companies should include a climate-related scenario analysis in their decision-making process, so that the assets built or bought can have lower climate risks. As such, they should develop a methodology to create a scenario analysis framework, covering the:

1. Identification and assessment of appropriate climate-related scenarios;
2. Development of reporting formats towards disclosing the results of the scenario analysis;
3. Apply a continuous monitorization and enhancement of the disclosure methodology.

To help, companies can use the climate change data analytics tool produced by Carbon Delta referred in the UNEP FI report⁷, which can be especially useful for:

- **Understanding the Warming Potential issue** which in turn will provide major insights on how the assets and portfolios are benchmarked against global targets;
- **Comprehending underlining transition risk values**, which will help identifying the regions with highest climate transition risks. Investors may want to start decarbonizing their portfolio in areas with greater transition risks, since those will have a larger impact in the short term. These can be inferred from studying the areas where the defined reduction commitments are greater, and where the portfolio's highest value assets (or group of assets) are located;
- **Understanding how to spot and assess the outlier assets with particularly higher climate risks**, undertaking different responses such as: ensuring that buildings' design is fit-for-purpose; transferring the risks through insurance; or, at the extreme, of flooding the risk by selling the assets.

INCORPORATE CLIMATE RISKS FOLLOWING TCFD RECOMMENDATIONS

The real estate companies should follow the TCFD. "Recommendations of the Task Force on Climate-related Financial Disclosures", namely the disclosure of the following critical aspects:

- **"Governance"**: The real estate organizational governance practices around climate-related risks and opportunities;
- **"Strategy"**: The actual and potential impacts of climate-related risks and opportunities on the organization's business, strategy and financial planning;
- **"Risk Management"**: The identification, assessment and management of climate-related risks;
- **"Metrics and Targets"**: The risks definition, metrics and targets used for their management.



KEY RECOMMENDATIONS AND FORESIGHT

05.

5.3 DEVELOPING SUSTAINABLE PROPERTIES AND APPLYING CIRCULAR TECHNOLOGIES

DEVELOP PROPERTIES WITH GREEN LABELS

Companies should consider greening their buildings, by developing their construction and renovation plans in a way that allow them to obtain international building labels like BREAM or LEED. Real estate companies should also be aware that changes will be made to the EU Renewable Energy, the Energy Efficiency Directives and the EU Emissions Trading System (ETS), which will include eco-design and labelling measures.

USE EFFICIENT TECHNOLOGIES THAT ALSO ACCOUNT FOR MATERIAL REUTILIZATION

Identify low carbon and circular economy technologies, taking into account the new EU Renovation Wave Strategy, and the European Green Deal, focusing on energy production, raw material re-usage and biodiversity enablement. Other key actions include the digitalization of assets to measure and assess sustainability, such as digital services to monitor consumption - and thus CO₂ emission levels' - helping to identify new risks, opportunities and sustainable solutions.

5.4 FACING SUSTAINABILITY AS A FINANCIAL LEVERAGE ASPECT

ENFORCE SUSTAINABILITY AND CLIMATE-RELATED PRECAUTIONS AS POSITIVE FOR ACCESS TO CAPITAL

EU Public Grants: For European companies, the EU Renovation Wave strategy, released as one of the responses for COVID-19 economy crisis, is expected to provide public grants to ensure higher rates of green renovated buildings.

Investment Funds and Banks: Investment funds and banks will start asking for a set of indicators that need to be supplied by real estate companies. They should understand which indicators are expected to be reported and prepare the systems in place to supply with such data, at least, annually.

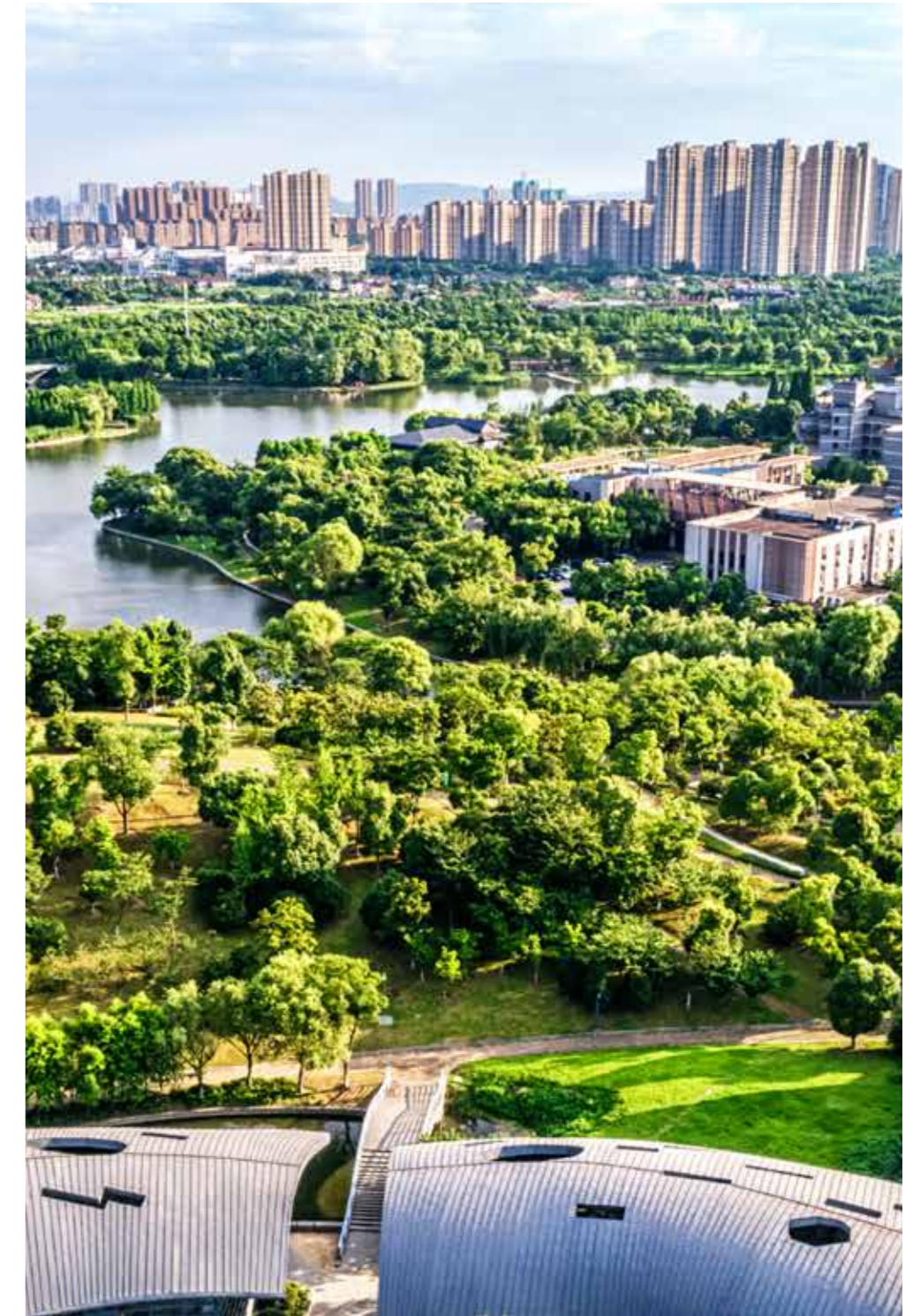
5.5 REPORTING ON SUSTAINABILITY PRACTICES

PROVIDE ANNUAL NON-FINANCIAL REPORTS ON SUSTAINABILITY MEASURES

Many large companies are already requested to annually report their non-financial information. The second version of the EU Directive (NFRD) comprised in this document is about to be published, and more items are expected to become obligatory for companies to report, namely the percentages of Turnover, Capex and Opex that are aligned with the EU taxonomy.

Real estate companies should have an annual report on non-financial information, including reporting that follows the TCFD recommendations and explaining how they are aligned with the EU taxonomy.

They should also start to report the Principal Adverse Impacts (PIA) indicators as described in the "Final Report on Regulatory Technical Standards" published in February 2021 by the European Securities and Markets Authority (ESMA), the European Banking Authority (EBA) and the European Insurance and Occupational Pensions Authority (EIOPA).⁴⁴



06.

On the one hand, transition climate financial risks (regulation, technology, market and reputation) are and will be strongly felt in the short run. Buildings that are more energy efficient and made from low-carbon materials will constitute an increasing push from governments, clients, and investors. This can become an opportunity for the real estate sector to renovate and innovate in its portfolio of assets, since green subsidies and other sustainable finance incentives should decrease the cost of investments.

On the other hand, it is likely that physical risks will be an increasingly stronger factor for value impairments in real estate assets. Extreme weather events will cause damages that increase maintenance costs and, in worst case scenarios, may cause total assets impairment. These will create higher insurance premiums and capital costs, especially as governments, regulators and supervisors augment their pressure to include climate-related risks in the financial risk analysis of banks and other financial institutions (through the TCFD, the EU taxonomy or the SFRD to provide some examples).

For this reason, real estate investors are also demanding for more environmental-related information before deciding which assets to buy or sell, because climate resilient real estate companies are increasingly perceived as organizations with better risk management practices, and thus, as investments with a greater potential to generate higher returns.

Integrating sustainability in a holistic perspective in the core strategy of real estate businesses is key to mitigate these risks. This paper presents essential recommendations for real estate companies, allowing for the identification of new markets, technological and financing opportunities that shall lead to business prosperity in a sustainable-minded real estate sector.



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ABOUT



We are a global integrated real estate player that unites organizations and people around good solid real estate projects and investments.

We commit to generate sustainable value and deliver a better life for people and communities by selecting, creating and managing space.

From economic to social progress, we are firmly aware of our impact and committed to being a positive force in business and on the planet. That's what we have been doing for over 30 years.

Sustainability is the cornerstone of our approach, and we actively work with clients to develop sustainable and socially responsible projects that have a positive impact on society and the environment.

We leverage decades of our own experience to offer holistic sustainability services that meet our clients' needs. These range from assessing and mitigating risks, to designing and implementing stand-out strategies for success. Our experts actively identify new trends, emerging challenges and technical innovations, to ensure our clients have the best solutions delivered on time, within budget and correctly aligned with their ESG agenda.

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FINANCIAL RISKS FROM CLIMATE CHANGE FOR REAL ESTATE COMPANIES

