



“SMARTER Finance for Families – Improving Citizens’ Health Comfort and Financial Well-being by Supporting Banks, Residential Investors and Solution Providers with Green Homes and Green Mortgage programs”



D4.07 Guidance Document to Increase Delivery of Environmentally Sustainable Residential Real Estate Project Portfolios Investable by Institutional Investors

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Table of Contents

1	<i>Introduction</i>	3
2	<i>Barriers</i>	6
3	<i>Solutions</i>	16
4	<i>Recommendations</i>	28
5	<i>Technical Annex</i>	33
6	<i>Supplemental Annex</i>	34
7	<i>Abbreviations</i>	35

1 Introduction

This study responds to the Grant Agreement: Annex 1 – Description of Action (Part A): p. 29. It is more specifically delivering on this task: Guidance document – using all WP 4 Tasks and Deliverables – to instruct Implementing Partners and Expertise Providers of the SMARTER Consortium how to best prepare their market to increase delivery of portfolios of sustainable residential real estate investable by conventional and climate-focused Institutional Investors^{1,2}.

"Climate-centric" investing is becoming increasingly mainstream as analysts and economists are increasingly acknowledging the current and future potential economic impact of climate change³. Institutional investors, banks, real estate developers, sustainability experts and policy makers are taking action to address climate change, which can lead to positive, mutually reinforcing environmental and economic outcomes. Furthermore, there will be significant competitive advantages for those who go beyond current and evolving policy as innovations in environmental sustainability that will directly translate into long-term economic benefits.

Institutional Investors pool funds and invest on behalf of clients or members (asset owners); notably pensions funds, insurance companies, endowments, commercial banks, hedge funds and mutual funds. These behemoths of the investment world move markets and generally invest by setting their asset allocations and selecting investment consultants to advise asset managers to manage their endowments through investment funds.

How institutions invest frequently varies based on obligations to beneficiaries and other stakeholders; different institutions will have different priorities such as capital preservation or hedging liabilities, which in turn impacts their risk appetite and investment style. For example, pension funds and insurance companies often engage in liability matching investment strategies due to the legal and contractual nature of the liabilities which they must pay out. Whereas a foundation's annual payout requirement or a hedge fund's absolute return mandate will allow them greater flexibility in strategy and security selection. Certain institutions, notably pension funds, are also subject to strict regulatory and internal restrictions on how they invest and the types of securities they may invest in.

The conception of institutional investors' fiduciary duty to their clients or members to act in their best interests has moved beyond simply maximizing risk adjusted returns, to include the incorporation of environmental, social and governance issues into their investment decisions and portfolio valuation. Investors are also increasingly subject to a (to date voluntary) measurement and reporting framework which takes climate risks, environmental impact and other non-financial factors into account. It is conceivable that these reporting requirements will be standardized and become mandatory in the near to medium-term; for example, the United Kingdom ('UK') has made for Task Force for Climate-Related Disclosures ('TCFD') reporting mandatory for financial institutions and large companies by 2025. This has provided impetus for many types of investors to start to systematically measure and report the environmental impact, emissions intensity and alignment with sustainable outcomes, such as those set out in the EU Taxonomy, of their portfolios. However, lack systematic and standardized data and measurements have held back these efforts.

Institutional investors allocate capital toward real estate for yield. Given that real estate is highly climate-sensitive asset class the degree of sustainability is increasingly important to institutional investors. Institutional investors have thus increasingly recognized the need to acknowledge climate risks. Institutional investors are seeking to mitigate such risks in their portfolios while gaining exposure to assets offering climate solutions and generally have a positive impact upon the world's most serious long-term threat. Alongside the inclination to increase returns, a consensus is emerging that positive environmental outcomes lead to positive economic outcomes^{4,5,6}. For example, the Net Zero Asset Owners Alliance, a group of 37 institutional investors representing US \$5.7 trillion have pledged to reach net-

¹ Related Reports and Analytics: Environmentally Sustainable Residential Real Estate: Sample Portfolio: Summary Report: D4.06 ([here](#))

² Related Reports and Analytics: Environmentally Sustainable Residential Real: Sample Portfolio: Data, Analytics, Graphics: D4.06 ([here](#))

³³ Oxford Economic. Nixon, James. (25 February 2020). Mitigation Pathways to Address Global Warming. Available [here](#).

⁴ CFA Institute. (2020). Future of Sustainability in Investment Management: From Ideas to Reality. Available [here](#).

⁵ Mercer. (2015). Investing in a Time of Climate Change. Available [here](#).

⁶ MSI ESG Research. (November 2012). Green Property Growth: Asia-Pacific and European REITs Setting the Trend. Available [here](#).

zero emissions by 2050 for their own operations as well as across their entire portfolios; as well as nearer term targets such as an emissions reduction of between 16 and 29% (in line with an Intergovernmental Panel on Climate Change 'IPCC' analysis) as early as 2025. This would require realignment and reallocation of their portfolios. As such, climate change considerations are increasingly driving mainstream investment decisions. Notwithstanding the pandemic, 2020 was a high growth year for sustainable finance generally, with 166 new fund offerings in Q3 2020 alone. Inflows to sustainable funds increased by 14% that quarter to €67.0bn. Notably, Sustainable funds have a variety of ambitions ranging from climate change-specific goals to broader environmental and sustainability aims⁷.

Traditionally, investors are primarily concerned with transition risk in the form of near-term policy actions and their impact on future cash flows and asset values. Chronic and episodic climate risks (transition and physical) to portfolio value will occur outside of the forecast period, far beyond business and credit cycle analysis. To manage climate risk more effectively investors should shift allocations in favour of more climate sensitive assets, including real estate, an asset class that is impacted by acute climate impacts, longer term chronic impacts as well as transition risk. On the positive side, real estate as an asset class and as a sector can realistically, practically and cost-effectively remain on a path toward net zero carbon emissions based on emergent and proven technology and practices in the construction, engineering and architecture arenas.

Institutions invest in real estate indirectly through public markets, or directly in either equity or debt through private markets. Traditionally real estate is an asset class held for income/yield and generally held over a longer holding period, especially when held directly. Institutional capital is key to large scale development of a green residential real estate sector, for new builds, green renovations and retrofits - a sector with huge growth potential as policy changes drive low carbon transition in the coming years.

Investors are not alone to act. Global policy makers are adopting transformative agendas to support common definitions of sustainable economic activities, progress towards a sustainable transition, mobilise capital towards sustainability, innovate sustainable financial instruments and increase sustainable projects. Central banks, supranational regulators, bank supervisors, and the global financial sector have recognized the nexus between environmental and systemic risk and joined forces to create a sustainable finance ecosystem that supports the transition towards a thriving and regenerative global economy^{8,9}.

While the growth in environmentally sustainable investing has grown across sectors, there is still room for growth in the sustainable residential real estate sector. The residential real estate sector is unique from other sectors where a large-scale shift to sustainability can be at the expense of the status quo. In the residential sector the increased supply of newly constructed real estate and increased supply of finance for renovation of existing residential real estate delivers environmental and economic objectives that are mutually inclusive and self-reinforcing¹⁰. Real estate developers can transform the buildings sector through delivering projects with a high standard of sustainable building design and construction. They should address areas such as building components and materials; building design, construction and operation; energy production, distribution and consumption; integrated urban systems and life cycle management; and strategies for each country and climate zone to be carbon-free by 2050. They should lower the energy demand in buildings in a cost-effective manner and reduce greenhouse gas emissions to a minimum level.

With the increased demand by institutional investors for sustainable residential real estate investment we address the supply of investable projects for institutional investors and the nexus between environmental performance standards, sustainable finance and the condition of the European housing stock¹¹. Through research of secondary sources, analysis, and a series of interviews with industry practitioners, spanning various sectors and sub-sectors in green real

⁷ Morningstar. (October 2020). Global Sustainable Fund Flows: Q3 2020 Review: ESG Fund Assets Reach €1.0tn, Boosted By Product Development. Available [here](#).

⁸ Carney, Mark. International Monetary Fund. (December 2019). Finance and Development, Vol. 56, No 4. The World Needs a New, Sustainable Financial System to Stop Runaway Climate Change. Available [here](#).

⁹ Carney, Mark. Bank of England. (17 April 2019). Open Letter on Climate-Related Financial Risks. Available [here](#).

¹⁰ S&P Global Ratings. (3 June 2019). ESG Report Card: Real Estate and Homebuilder/Developers. Available [here](#).

¹¹ MSI ESG Research. (November 2012). Green Property Growth: Asia-Pacific and European REITs Setting the Trend. Available [here](#).

estate finance and distributed across a broad geographical footprint across the European Region, this Guidance Document has been developed.

The document is structured in three simple chapters including:

- **Barriers:** a chapter identifying the barriers for mobilizing institutional investors toward European Sustainable Residential Real Estate. The chapter identifies three broad barriers and elaborates these seen from the point of view of different segments in the "market".
- **Solutions:** chapter that attempts to identify some of the solutions responding to the barriers, structured in the same manner as the barrier chapter.
- **Recommendations:** chapter that provides some final recommendations on how to mobilise institutional investors in green real estate. The guidance documents has an associated Technical Annex with additional context on the macroeconomic dynamics and residential real estate conditions along with a Supplemental Annex with substantially more detailed elaborations and examples.

2 Barriers

The barriers to increasing the supply of sustainable residential real estate projects investable by institutional investors are multi-faceted and can amongst others be categorised as 1) the limited supply of sustainable housing for potential investments, 2) consistency of environmental standards and environmental performance data and 3) sustainable real estate finance origination practices.

- 1) The barriers related to the **limited supply of sustainable housing** include features of the existing building stock and regional and national macroeconomic conditions. The building sector is the single largest energy consumer in the European Union ('EU') and 75% of the EU's buildings are energy inefficient^{12,13,14}. Furthermore most of the building stock needed is already built, and thus the projects to be supplied are more related to retrofits and renovation, while the new builds are fewer¹⁵. Also, these types of residential sustainability investments are individually relatively small in size and carry a longer-term return. Institutional investors are interested in scale, and it therefore requires a bundling or aggregation of homogenous residential mortgages into a pool or structured finance vehicle of sufficient deal size to be of interest to an institutional investor.
- 2) The barriers **related to consistency of environmental standards and performance data** are related to both the proliferation of standards and the lack of harmonisation of these, as well as the insufficiency of environmental performance data. Despite progress in green standard setting, there are still a range of different green standards in the building sector. The standards in some cases express a difference in focus/coverage e.g. what is measured, and in other cases a difference in ambition e.g. what is green (Technical and Supplemental Annexes). Standards may even compete on lowering of ambition, with the aim to mobilise green investments. This creates an uncertainty for the investor including the institutional investor, that results in a discouragement of their interest - at least until the context is more mature.
- 3) The barriers related to **sustainable real estate finance underwriting practices** are inhibiting the supply of investable projects for institutional investors. Banks are not fully integrating principles of sustainability into their underwriting practices for sustainable residential real estate. The full scope of environmental performance beyond energy efficiency is often overlooked. Considerations like embodied carbon, circular economy, ecosystem impact, biodiversity impact, marine resource impact as well as the connectivity of the site location and water efficiency of property can be overlooked during underwriting. These factors can significantly reduce a variety of risk types associated with real estate finance which translate into improved risk/return dynamics for the banks and translate into benefits for property owners.

We will in this chapter elaborate on these broad overall barriers from the point of view of different segments of the market. Thus, summarized below are the barriers to increasing the supply of projects investable by institutional investors broken down by stakeholder group across the sustainable residential real estate landscape, including Banks, Institutional Investors, Real Estate Developers, Sustainability Experts and Policy Makers.

BANKS

Lack of Sustainable Residential Real Finance Strategy

A low percentage of banks have a strategic, active and forward-looking approach to sustainable residential real estate¹⁶. Most of the sector is reactive or even passive towards sustainability without a strong regulatory framework

¹² European Commission. (17 February 2020). In Focus: Energy Efficiency in Buildings. Available [here](#).

¹³ EEFIG DEEP Platform: De-risking Energy Efficiency Platform. Available [here](#).

¹⁴ ZEBRA 2020 Data Tool. nZEB, Renovation, Energy Efficiency Trends and Building Codes. ([here](#))

¹⁵ TABULA Web Tool. National Residential Building Typologies. Available [here](#)

¹⁶ University of Cambridge: Cambridge Institute for Sustainable Leadership: Banking Environment Initiative: Banking Environment Initiative. (28 December 2020). Bank 2030: Accelerating the Transition to a Low Carbon Economy. Available [here](#).

and policy support mechanisms. The Bank of England ('BoE') Prudential Regulation Authority ('PRA') finds that climate risks are beyond the typical planning horizon of banks¹⁷. The PRA indicates that 90% of banks don't perceive climate risks to be unfolding or stringent climate policies implemented for the next several years. Banks are not adequately preparing for the growing demand for green investments. They aren't establishing processes to avoid misallocations of funds for non-resilient investments and aligning with future regulations¹⁸. Banks are likewise more client-led vs innovation led, and are as such forgoing opportunities to take initiatives to demonstrate the value of a sustainable mortgage over a conventional mortgage. Many banks see themselves as facilitators of the growth of a client's business rather than advisor on the direction of a client's business. The lack of an active strategy presents a barrier by limiting the amount of sustainable residential real estate projects which are financed and available for institutional investors.

Lack of Common Definition of Sustainable Residential Real Estate Finance

There is currently a wide variety of residential real estate finance programs intended to incentivize the development and ownership of sustainable real estate. The lack of a common standard has led to a proliferation of sustainable residential real estate finance product sets, including those under labels including Bioclimatic Mortgage, Biophilic Mortgage, Energy Efficient Mortgage, Eco-Efficient Mortgage, Green Mortgage, Healthy Mortgage, Passive Mortgage and Sustainable Mortgage. While a variety of options is a sign of healthy demand for mortgages, banks are over emphasizing the creation of a label to drive market share and not providing a degree of incentives which is commensurate with the environmental performance¹⁹.

Lack of Internal Labelling for Mortgage Origination and Bank Portfolios

Banks originating mortgages rely heavily on the construction year of a property as a proxy for the energy-efficiency label indicator which places limitations on the supply of green assets available for institutional investors. Furthermore, it may not consider an upgraded EPC from the renovation of properties.

Lack of Direct Sustainable Residential Real Estate Balance Sheet Exposure

Banks are not taking a high proportion of direct balance sheet exposure to green finance activities relative to the scope of market activity across the entire sector. The European Banking Authority (EBA) disclosed a Green Asset Ratio ('GAR') estimate of 7%-8% for the medium-to-large non-financial EU corporate exposures of a sample of 26 banks. These banks cover about half of the EU banking sector's assets²⁰.

Banks own green bond issuance represents around 20% of all green bond issuances worldwide, and about 35 out of 448 financial institutions in core and peripheral Europe are eligible to issue an EU Green Bond²¹ based on an analysis of published Green Bond Frameworks²². This demonstrates how direct lending remains less prevalent²³. As 80% of green finance activities in 2018 were bond structuring, with sustainability-linked loans and green loans emerging more recently, banks are forgoing a large portion of sustainable residential real estate finance market share. By 2019, banks issued their own green bonds in a volume of €120.1bn. These are largely for refinancing of existing projects with the proceeds used by further green lending activities of the bank. The issuance of these bonds was for large corporate and institutional clients while emergent sustainable real estate developers and sustainable real estate solution providers remain under-served²⁴.

Lack of Scale

¹⁷ Bank of England. Prudential Regulation Authority. (September 2018). Transition in Thinking: The Impact of Climate Change on the UK Banking Sector. Available [here](#).

¹⁸ Citi. (September 2020). Sustainable Tipping Points: The Net Zero Club - When Sustainability Meets Margins and Supply Chains. Available [here](#).

¹⁹ Fitch Ratings. (29 June 2020). Supply of Green Mortgages Still Low for RMBS, Covered Bonds. Available [here](#).

²⁰ European Banking Authority. (21 May 2021). Mapping Climate Risk: Main Findings From The EU-Wide Pilot Exercise. Available [here](#).

²¹ European Commission: EU Technical Expert Group on Sustainable Finance. (9 March 2020). Usability Guide for the EU Green Bond Standard. Available [here](#).

²² SMARTER Finance for Families. (22 April 2021). European Residential Real Estate Sector Analysis. Available upon request.

²³ Journal of Risk and Financial Management. (4 February 2020). Corporate Green Bond Issuances: An International Evidence. Available [here](#).

²⁴ University of Cambridge: Cambridge Institute for Sustainable Leadership: Banking Environment Initiative: Banking Environment Initiative. (28 December 2020). Bank 2030: Accelerating the Transition to a Low Carbon Economy. Available [here](#).

Lack of scale and ability to readily aggregate small and medium-sized sustainable residential new construction as well as renovation projects presents barriers to the supply of projects. While securitization sponsors and originators must disclose the environmental performance of the underlying mortgages to receive preferential capital treatment under the 'Simple, Transparent, and Standardised' (STS) regime, the STS regulation does not make sustainability a condition of STS qualification^{25,26,27}. This is presenting an obstacle to creating pools of sustainable residential mortgages while not offering financial institutions the same access to funding and liquidity benefits of the capital markets that originators of conventional residential mortgages benefit from.

Complexity of Green Bond Issuance and State of the Green Bond Market

As banks compete for transactions based on cost and speed, the complexity of green bonds can hinder execution. While issuance of green bonds is increasing, banks view them as less attractive to execute than conventional bonds and the administrative burden is seen as a constraint. According to a study by the University of Cambridge, "A green bond takes so much longer: you have to write the framework, get second party approval; you might have to do a roadshow. So a green bond could take three weeks, whilst a normal bond could take a few days. And you get the same commission. As a result, people on the markets side see it as a constraint²⁸." While there is current unmet and impending demand for sustainable real estate investment, the lack of consensus on the definition of green and lack of ability to aggregate common types of projects with a common and high standard of environmental ambition is inhibiting the supply of new deals to originate²⁹.

INSTITUTIONAL INVESTORS

Disparate Non-Standardised Green Performance of Funds and Green Washing

A variety of approaches and multitude of measures and metrics are currently used to measure and report the sustainability performance of investment funds. While each has its uses (e.g. carbon intensity, risk management, alignment with the Paris Agreement³⁰) the diversity inhibits comparison and not all measures are readily understandable by non-specialists. Current attempts to disclose the sustainability performance of funds are patchy, non-standardized and lack rigor - resulting in confusion and skepticism among beneficiaries. The multitudes of disclosures involve complex, costly and labor-intensive procedures for environmental impact reporting and external review. Greenwashing concerns relate to the reliability of environmental standards. When the institutional investor is facing a range of somewhat competing standards the interest is discouraged. The institutional investor will on the one hand fear greenwashing (with a potential negative reputational risk in the market), or an unfair level playing field if they opt for high standards that are more costly than necessary^{31,32}. Below is an overview of a range of standards applied and their coverage (Figure I).

²⁵ BIS. (11 December 2014). Criteria for Identifying Simple, Transparent and Comparable Securitizations. Available [here](#).

²⁶ Fitch Ratings. (3 December 2020) EU Green Securitisation Unlikely to See Beneficial Capital Regime Soon. Available [here](#).

²⁷ European Commission. (10 November 2020). Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) No 575/2013 as regards to Adjustments to the Securitisation Framework to Support the Economic Recovery in Response to the COVID-19 Pandemic. Available [here](#).

²⁸ University of Cambridge: Cambridge Institute for Sustainable Leadership: Banking Environment Initiative: Banking Environment Initiative. (28 December 2020). Bank 2030: Accelerating the Transition to a Low Carbon Economy. Available [here](#).

²⁹ Journal of Risk and Financial Management. (24 March 2020). What Future for the Green Bond Market? How Can Policymakers, Companies and Investors Unlock the Potential for the Green Bond Market? Available [here](#).

³⁰ United Nations. (2015). Paris Agreement. Available [here](#).

³¹ Wikipedia. (2021). Greenwashing. Available [here](#).

³² Responsible Investor. Scientific Beta. (12 May 2021). Everything You Need to Know About Portfolio Greenwashing. Available [here](#).

Figure I: Sustainable Residential Real Estate Certification Standards

Sustainable Residential Real Estate Certification Standards								
Climate Change Mitigation + Climate Change Adaptation + "DO NO SIGNIFICANT HARM" CRITERIA		SMARTER	BREEAM	LEED	EDGE	nZEB	EPC	LEVEL(s)
	Energy Efficiency Energy use + CO ₂ emissions	■	■	■	■	■	■	■
	Energy Savings	■	■	■	■	■	■	■
	Indoor Air Quality Ventilation, VoCs, Radon	■	■	■	□	■	■	■
	Water efficiency Water quality + testing	■	■	■	■	■	□	■
	Daylight Levels Health + Wellbeing	■	■	■	□	□	□	■
	Acoustic Comfort Wellbeing + Comfort	■	■	■	□	□	□	■
	Embodied Carbon	■	■	■	■	□	□	■
	Improving biodiversity	■	■	■	□	□	□	■
	Universal Design Lifetime Homes	■	■	□	□	□	□	■
	Connected Location Transport links, facilities, amenities	■	■	■	□	■	□	□
	Lifecycle analysis	■	■	■	□	□	□	■
	Circular Economy Design for reuse	■	■	■	□	□	□	■
	Nationally adapted Data fed back into national policy	■	□	□	□	■	■	■

DO NO SIGNIFICANT HARM CRITERIA + HEALTH

Climate change mitigation

Climate change adaptation

Sustainable + Protection Water + Marine resources

Transition to circular economy

Climate Pollution prevention + control

Protection + Restoration Biodiversity + ecosystems

Health & Wellbeing

■ **Fully considered**

■ **Partially considered**

□ **Not considered**

Investment Decision-Making Processes Not Adapted to Environmental Concepts

While institutional investors and analysts are more frequently incorporating environmental concepts into the investment process, they seldom adjust and inform their models based on environmental performance data and rarely change their investment-decision making process³³. This implies that institutional investors are in fact simply investing "on the side" in sustainable projects. Without the full scope of environmental concepts incorporated into models and investment criteria, the scope of options for potential investment is limited. Investment analysis is often backward looking and based on mean-variance analysis while climate risk analysis is forward looking by nature. This means the climate resiliency and reduced environmental risk of sustainable real estate projects can be overlooked by institutional investors. Institutional investors often take a top-down approach to investing while Environmental, Social and Governance ('ESG') investments involve a bottoms-up analysis. Allocations by the largest institutional investors are made based on top-down analysis and often overlook ESG analysis.

Performance Risk and the Risk-Benefit Perception

Performance risk is the risk that actual environmental performance will fall short of expected environmental performance. Performance risk in the context of sustainable real estate occurs when actual energy savings fall short of expected energy savings or when actual water efficiency falls short of expected water efficiency thus a performance gap. Investor concern over this uncertainty inhibits the flow of capital toward current and potential sustainable real estate projects. The value of current projects is adversely impacted while the prospect of future projects is curbed. Performance risk can create reputational and strategic risk if the shortfall in environmental performance means sustainability objectives won't be met. This inhibits future access to sustainable capital markets further inhibiting the supply of projects. On the other hand, there are multitudes of cash-flow positive, society benefitting sustainable real estate projects. However, there remains a lack of clear understanding around the economic benefits for banks and issuers. The benefits of sustainable residential real estate have been abstract until recently.

³³ CFA Institute. Principles for Responsible Investment. (2019). ESG Integration in Europe, The Middle East and Africa: Markets, Practices and Data. Available [here](#).

Stranded Assets

The risk of stranded assets is expansive and for institutional investors. Physical environmental risk factors as well as transitional risk related to evolving environmental policy can lead to a portfolio of residential real estate projects becoming obsolete, suffering from a loss in value or requiring capital intensive renovations. Summarized below are definitions of stranded assets from a range of significant international organizations³⁴ (Figure II).

Figure II: Stranded Assets Defined	
International Financial Reporting Standards	Stranded assets are assets that have become obsolete or non-performing, but must be recorded on the balance sheet as a loss of profit. ³⁵
Carbon Tracker Initiative	Result of changes in the market and regulatory environment associated with the transition to a low-carbon economy. ³⁶
Generation Foundation	An asset which loses economic value well ahead of its anticipated useful life, whether that is a result of changes in legislation, regulation, market forces, disruptive innovation, societal norms, or environmental shocks. ³⁷

The Carbon Risk Real Estate Monitor ('CRREM') project has developed national and segmental decarbonization pathways to identify and quantify environmental risks which indicates that many buildings could become "stranded assets" as early as 2024 due to cost burdens and pricing regime complexities of Carbon Dioxide ('CO₂') emissions³⁸. Building Minds cites an example of a property where the "climate change penalty" is approximately just under 2.9% of the market value of a property in Berlin, built in 1980 with a gross floor area of 2,000sqm³⁹. Based on the building's Paris-aligned CRREM 1.5°C decarbonisation pathway the net-present value of potential future carbon costs for this building until 2050 was estimated at €221 per ton of carbon emissions.

REAL ESTATE DEVELOPERS

Degree of Environmental Ambition

A focus on doing less harm rather than doing actual good has inhibited the pipeline of sustainable residential real estate projects. Many developers may not fully understand the difference between doing no harm and doing good. Alternatively, they may opt for the simpler and less expensive approach of doing no harm. Thus the pool of sustainable projects and investments for institutional investors is smaller.

Stranded Energy Efficiency

Energy efficiency can become stranded in a building when its benefits should be realized by the investor and property managers deploying the capital for the acquisition, development, construction, design and operation of the building as well as the tenants occupying the building⁴⁰. The energy efficiency benefits may be "harvested" by other stakeholders other than the real estate developer and its institutional investor.

Project Size

Project size can impact the cost of capital which inhibits access to capital for smaller projects. This creates barriers for small and medium size residential real estate projects and deep energy-efficiency retrofits of existing residential stock. Thus real estate developers focusing on smaller/medium sized projects may not have access to capital on the same terms as those focused on larger projects.

Housing Sustainability and Affordability

³⁴ Journal of Sustainable Finance and Investment. (11 December 2016). Stranded Assets and the Environment. Available [here](#).

³⁵ International Financial Reporting Standards. (April 2001). IAS 16: Property, Plant and Equipment. Available [here](#).

³⁶ Carbon Tracker Initiative. (23 August 2016). Carbon Tracker Initiative's Definition of Stranded Assets. Available [here](#).

³⁷ Generation Foundation. (30 October 2013). Stranded Carbon Assets: Why and How Carbon Risks Should be Incorporated in Investment Analysis. Available [here](#).

³⁸ Carbon Risk Real Estate Monitor. (21 September 2020). CRREM Risk Assessment Reference Guide. User Manual for the CRREM Risk Assessment Tool. Available [here](#).

³⁹ Building Minds. (13 April 2021). CO₂ Emissions from the Building Sector: A Reckoning is (fast) Approaching. Available [here](#).

⁴⁰ Metered Energy Efficiency Transaction Structure. (May 2016). Pilot Interim Report. Available [here](#).

The state of the European residential housing sector in terms of affordability and sustainability can act as a barrier to a greater supply of affordable and environmentally performant residential real estate projects. Population growth pathways and urbanization dynamics are driving a need for additional housing⁴¹. Urbanization pressure across European cities which are economic growth centers increasingly attract more skilled workers. Already high house prices therefore continue to increase and increase faster than disposable income which creates an affordability issue and disequilibrium in supply and demand. Housing cost burden and quality of life conditions are becoming a concern. The productivity of construction is known area which is impeding the supply of environmentally performant and affordable homes. There’s a tradeoff between increased rents following renovations and the reduced energy bills which limits the amount of impact renovation measures have on the EU building stock.

SUSTAINABILITY EXPERTS

Information Asymmetry and Data Gaps

Information asymmetry and lack of data and common understanding on the linkage between environmental conditions, climate conditions, macroeconomic conditions, systemic financial conditions, microeconomic sector specific conditions and firm specific impacts influence the ability by sustainability experts to do their job well. EU Taxonomy Do No Significant Harm (‘DNSH’) data gaps were significantly higher than for climate change mitigation across of New Buildings, Building Renovations and Acquisition and Ownership. Availability and reliability of property-level data is seen as an absolute core factor by market participants, not only in terms of participants’ ability to provide evidence of eligibility but also in terms of resources and time needed to do so.

Lack of Standardization and Inconsistent Definitions

One of the factors limiting sustainable residential real estate investment has been a lack of standardization in defining, measuring and reporting environmental factors. Lack of clarity in sustainability definitions and a variety of standards, without consistency and with no harmonized approaches has limited the supply of projects. According to Jacob Michaelsen, Sustainable Finance Advisory, Nordea Investment Banks: “The ESG landscape is not just ‘the Wild West’, but ‘a jungle’ within the Wild West. Companies issuing stocks and bonds are asking for help. That includes figuring out how to live up to international reporting standards, such as those set by the TCFD. People on both sides of the table are almost equally confused.” In other words, investors are increasingly requiring uniform reporting and environmental impact is becoming an integral part of their real estate analysis frameworks, and this influences the work of the sustainability experts. Depicted below is a summary of several European and International Green Building Certification Standards⁴². While there are characteristics unique to certain residential property-types across different geographies and varying levels of urbanization and at different stages in the property lifecycle there needs to be alignment of standards in order to facilitate large-scale deployment of capital.

Figure III: Certification Standards

Title	Certifying Body	Description	Score	Design or Operational	International or national
BOMA 360	Building Owners and Managers Association (BOMA)	Buildings must follow industry best practices in 6 major areas of building operation	Certified	Operational	International
Building Research Establishment Environmental Assessment Method (BREEAM)	Building Research Establishment	Third-party certification of the sustainability performance of individual buildings, communities, and infrastructure projects	6 levels, Acceptable to Outstanding	Both	International

⁴¹ European Commission. European Construction Sector Observatory. (November 2019). Housing Affordability and Sustainability in the EU. Analytical Report. Available [here](#).

⁴² Urban Land Institute. (6 January 2021). Blueprint for Green Real Estate. Available [here](#).

DGNB	German Sustainable Building Council	Assesses three factors: life-cycle assessment, holistic approach, and building performance	Silver, Gold, and Platinum	Both	Germany/Europe
HQE	Cerway	Building-scale life-cycle analysis of the impacts of a project on health, personal comfort, and the indoor environment	0-4 Stars	Both	France/Europe
Leadership in Energy and Environmental Design (LEED)	U.S. Green Building Council	Rating system for all building types and building phases	4 levels, certified Platinum	Both	International
Living Building Challenge	International Living Future Institute	Holistic assessment against high-performance energy and ecological goals	Petal certifications	Both	International
Passive House	Passive House Institute	Building energy efficiency standard that lowers energy needed to heat or cool a space	Classic, Plus, Premium	Classic, Plus, Premium	International

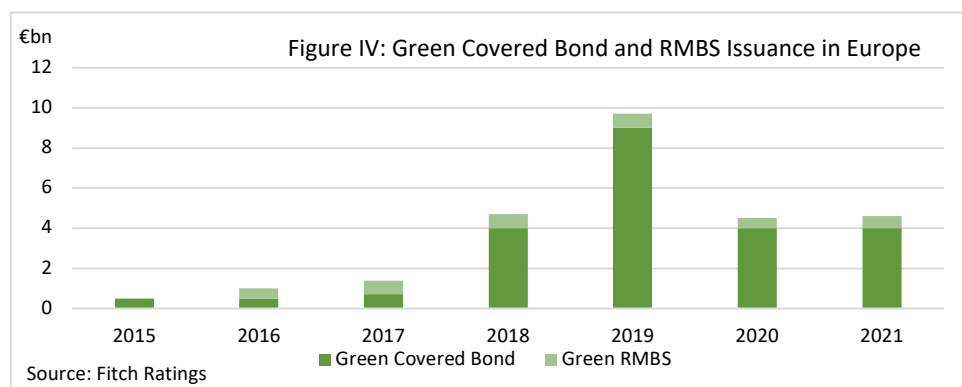
POLICY MAKERS

Long-Term Renovation Strategies Not Aligned With Energy Performance of Buildings Directive (‘EPBD’) Objectives

EU Member States’ long-term renovation strategies (‘LTRS’) are largely not compliant with the Energy Performance of Buildings Directive (‘EPBD’) objectives towards achieving a highly energy efficient and decarbonized building stock by 2050^{43,44}. Furthermore, LTRS are now misaligned with the EU’s strengthened 2030 Climate Target and 2050 Climate-Neutrality Objective. Half of the analysed strategies include an objective at or above 90% GHG emissions reduction, which is in line with the legal requirement of the EPBD Article 2a that requires Member States to set a long-term 2050 goal of reducing GHG emissions in the EU by 80-95% compared to 1990. However, none of the eight strategies targets 100% decarbonisation of the building stock. This implies that the policy makers have not yet fully embraced the greening of the real estate sector, and instead provided incoherent policy frameworks, which can act as a barrier for institutional investor engagement.

Growth in Eligible Assets for Sustainable Residential Mortgage-Backed Securities (‘RMBS’) and Covered Bonds is Low

The European Commission (‘EC’) has introduced a variety of investor and regulatory incentives to address the sustainability of the housing stock since 2020 but they have been insufficient to meaningfully increase the supply of sustainable mortgages to finance the acquisition, construction and/or renovation of properties serving as collateral for Sustainable RMBS and Covered Bonds⁴⁵ (Figure xx).

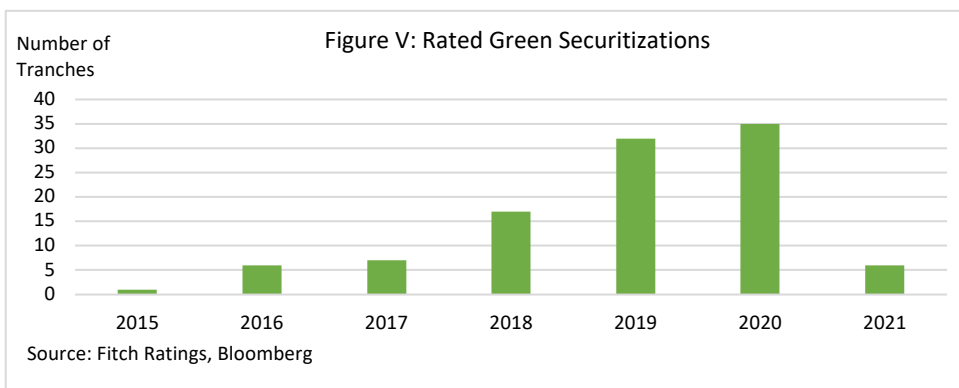


⁴³ Buildings Performance Institute Europe. (8 March 2021). The Road to Climate-Neutrality: Are National Long-Term Renovation Strategies Fit For 2050? Available [here](#).

⁴⁴ European Commission. DG Energy. (22 February 2021). Inception Impact Assessment: Revision of the Energy Performance of Buildings Directive. Available [here](#).

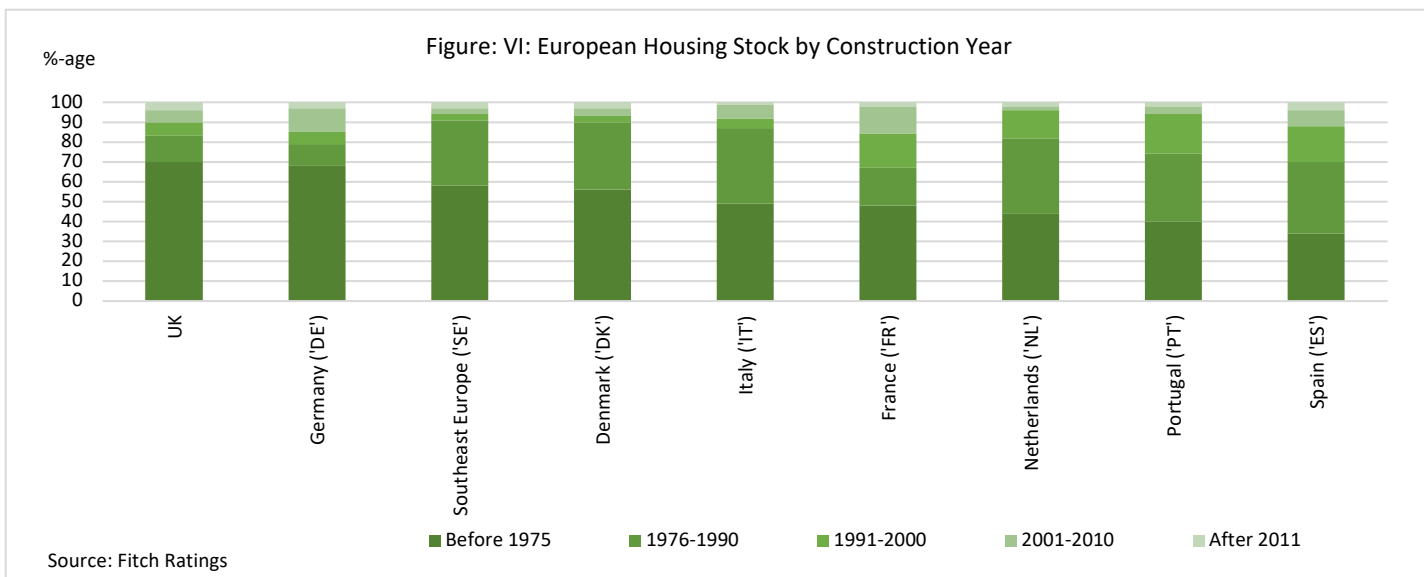
⁴⁵ Fitch Ratings. (15 April 2021). Green Securitization: Developments and Challenges. Available [here](#).

Potential issuers of Sustainable RMBS and Covered Bonds across the EU face a variety of challenges which limits the inventory of green assets (Figure xx). Policy makers should integration of environmental sustainability assessment of residential real estate deals and the credit rating process. That would be accomplished by bifurcating the environmental sustainability assessment and credit rating process so that it is performed by separate firms. Such firms must be registered with the EU Platform for Sustainable Finance. Sustainably-labelled Single-Family RMBS, Multi-Family CMBS, Covered, Pfandbrief and Single-Family RMBS backed Sukuks as well as Multi-Family CMBS Backed Sukuks would have to have both assessments performance before qualify for recognition as true securitisations as defined the by EU Securitisation Framework.



The residential housing stock in Europe is old and deep renovation is costly and government-sponsored incentives are limited which can present challenges (Figure xx)⁴⁶. For buy-to-let (BTL) markets, rental income may suffer from lack of such incentives available to the borrower for energy-efficiency renovations. The European Commission estimate that from 2012-2016 the average deep-renovation cost (at least 60% savings in energy consumption per year per square meter) across Denmark, France, Germany, Italy, the Netherlands, Portugal, Spain, Sweden and the UK was more than double the average cost of all energy-related renovations.

⁴⁶ Fitch Ratings. (29 June 2021). Energy Efficient Mortgages in Europe: RMBS and Covered Bonds Perspective. Available [here](#).



The European Securities and Markets Authority (‘ESMA’) reporting templates for RMBS deals includes voluntary energy-efficiency field (Energy Performance Certificate ‘EPC’ Value/EPC Provider)⁴⁷. The European Central Bank’s (‘ECB’) reporting templates included required fields for Sustainable RMBS but the EPC disclosure is voluntary. These energy efficiency fields should be compulsory to facilitate transaction comparability. The limited EPC comparability across countries is a key challenge to growth in eligible assets. For example, the UK is among the first countries to publicly implement EPC regulations and data requirements, distinguishing among A to G EPC classes based on numerical score ranging from 1-100. On the other hand, French, Italian and German EPC frameworks are based on actual consumption (Kilowatt Hours ‘kWh’, CO₂ emissions per square meter) (Supplemental Annex). In these countries where the EPC labels are based on kWh, the scales themselves differ. Other countries consider the property types. In France, when energy-consumption information is missing for properties built before 1948, the sale of such properties is still permitted with empty EPC fields until the end of 2024. Despite differences in definitions of labels, the proportion of properties with the highest EPC Classes (A, B) varies significantly by country, e.g. over 35% in the Netherlands and below 2% in Spain⁴⁸.

The EPC classification of properties is not taken into account by Automated Valuation Providers (‘AVM’) providers across Europe which means that many property valuations are not capturing the energy performance of properties. A constraint in determining the relationship between EPCs and property prices is the role played by the condition of the properties themselves or localized market dynamics. Size, location and supply and demand dynamics continue to be key drivers of property prices in current markets. AVM providers should incorporate energy-efficiency data into their processes to enhance the decision-making ability of institutional investors. Depicted below (Figure xx) is an example of the evolution of a European Sustainable Residential Real Estate Securitisation, in this case a securitization of Dutch mortgages^{49,50,51}.

Figure VII: Green Storm: Evolution of a Europe Sustainable Residential Real Estate Securitisation	
2016	A Definitive Energy Label of EPC A or a provisional label of A if constructed after 2001.
	An Energy Label of EPC or better if constructed after 2001
	A Final Energy Label or EPC C or better with an improvement of the energy label of at least two notches

⁴⁷ European Securities and Markets Authority. (30 June 2021). Securitization Regulation Overview. Annex II: Underlying Exposure: Residential Real Estate. Available [here](#).

⁴⁸ European Commission. (1 November 2019). Comprehensive Study of Building Energy Renovation Activities and the Uptake of Nearly Zero-Energy Buildings in the EU. Available [here](#).

⁴⁹ J.P. Morgan, Rabobank. (29 May 2018). Green Storm 2018 B.V.: Prospectus. Available [here](#).

⁵⁰ S&P RatingsDirect. (14 May 2018). Green STORM 2018 B.V.: Presale Report. Available [here](#).

⁵¹ Fitch Ratings. (15 April 2021). Green Securitization: Developments and Challenges. Available [here](#).

2017	No changes as compared to Green Storm 2016
2018	A Definitive Energy Label of EPC A
	A Final Energy Label of EPC C and EPC B with an improvement of the energy label of at least two notches
2019	No changes as compared to Green Storm 2018
2020	A Provisional or Definitive Energy Label of EPC A for properties constructed in 2020 or earlier, or
	A Definitive Energy Label of EPC C or B, with an improvement of the energy label of at least two notches

3 Solutions

The solutions to increasing the supply of sustainable residential real estate projects investable by institutional investors are multi-faceted and concern amongst others 1) establish a scalable pool sustainable housing e.g. through bundling or aggregation, 2) build upon the EU Taxonomy and establish a minimum of environmental standards, and a consistent environmental performance data system and 3) improve the sustainable real estate finance origination practices.

- 1) As the institutional investors require a **large pool and scale of EE residential projects**, the obvious solution is to aggregate or bundle smaller individual investments into a larger pool, potentially even a green bond. This will be far more accessible and attractive for the institutional investor.
- 2) The institutional investor concerns over inconsistency of **green standards** and the concerns over being associated with green washing can be overcome by the full implementation and follow up of the EU Taxonomy, as well as by setting a minimum environmental standard.
- 3) To improve underwriting practices the reduced risk of sustainable real estate should be integrated into the features of real estate finance products-sets. The reduced risk of **sustainable real estate mortgage finance** can be translated into benefits for property owner through mortgages with reduced interest rate, reduced mortgage insurance requirements, increased loan-to-value and increased debt-to-income eligibility. The full scope of environmental performance should be considered beyond energy efficiency and the impact of these environmental factors should be considered across the full scope of risk types.

BANKS

Banks to Transform Origination Strategy to Become Leaders in Sustainable Residential Real Estate

Banks should be front-line participants in translating bankable sustainable residential real estate projects and developer interest into capital markets products which are readily investable by institutional investors⁵². There is at once both a positive initiative among some banks, which are taking action to green the economy and a major market opportunity to address climate risk in the residential real estate sector of any bank^{53,54}. Banks could increase coverage of this sector and take leadership in directing resources, designing front-line banking products, launching landmark banking products in underserved markets and pioneering capital markets transactions that aggregate direct-exposure and transform it into sustainable real estate deal flow. This could encompass financial innovations in sustainable real estate acquisition, development, construction, renovation, refurbishment and retrofit finance along with mortgage finance product-sets with pre-determined sustainability performance targets.

Banks developing a Green Bond Framework encompassing sustainable real estate investments

Banks can engage in development of Green Bond Framework consistent with EU Green Bond Standard⁵⁵. For a bank to achieve scale and access capital markets, the ability to develop eligible portfolios under the Green Bond Standard is essential. As banks increase their appetite for sustainable projects they should align their strategy and risk governance frameworks to support further expansion into sustainable residential real estate^{56,57}.

Develop Low Carbon Sustainability-performance linked Loans

Deploy low carbon lending strategies focused on the acquisition, development and construction of sustainable residential real estate to be aggregated into sustainability-linked loans, ESG-linked loans or positive-incentive loans.

⁵² University of Cambridge: Cambridge Institute for Sustainable Leadership. (5 May 2021). The Essential Guide to Bank-Client Engagement. Available [here](#).

⁵³ Architecture 2030. (2020). New Buildings. Available [here](#)

⁵⁴ Architecture 2030. (2020). Global Initiatives. Zero Code. Available [here](#).

⁵⁵ European Commission: EU Technical Expert Group on Sustainable Finance. (9 March 2020). Usability Guide for the EU Green Bond Standard. Available [here](#).

⁵⁶ Morningstar DBRS. (16 June 2020). Banks Push for Sustainable Finance Continues Despite COVID19 Related Disruption. Available [here](#).

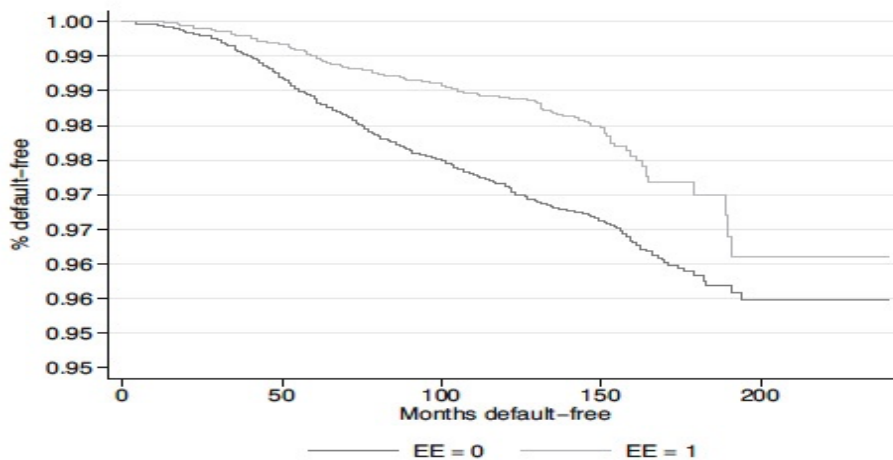
⁵⁷ S&P Global Ratings. (26 June 2018). What's Behind the Rise in Green Covered Bond Issuance. Available [here](#).

Loans of similar characteristics would be aggregated together in pools. Structural features such as the Loan-to-Value Ratio would be determined based on performance against a pre-determined KPI, or an external sustainability score at underwriting. The rate on such loans would adjust at pre-determined time intervals and pre-determined increments based on performance against the same set of pre-determined KPI and external sustainability scores at underwriting. The adjustment could impact the interest rate by 50-75 basis points (bps) and the adjustment is a self-financing through the reduction in risk.

Taking Advantage of the Green Finance Superiority Over "Normal" Finance

A highly collaborative and explorative approach is critical for real estate finance product innovation. Some private sector banks have demonstrated the effectiveness in working with a diverse group of stakeholders. As product innovation develops, demand and experience grow, standardization and securitization will follow along with an increased breadth, depth and volume of sustainable residential real estate projects. The figure below depicts the Kaplan-Meier time-to-default over a 20-year period for two mortgage groups: mortgages with energy efficient (EE = 1) and non-energy efficient (EE = 0) buildings. The Log-rank test for equality of survivor functions gives a p-value of 0.0001⁵⁸

Figure VIII: Mortgage Default Reduction and Residential Property Energy Efficiency



The figure below depicts the energy rating distribution of defaulted Dutch loans based on a study published in the Journal of Real Estate Finance & Economics on 11 May 2021.

Figure IX: Mortgage Default Reduction and EPC Rating

⁵⁸ Journal of Real Estate Finance and Economics. (11 May 2021). Buildings' Energy Efficiency and the Probability of Mortgage Default: The Dutch Case. Available [here](#).

Rating category	All	Defaulted
A	14.88	0.25
B	17.73	0.38
C	27.22	0.48
D	9.55	0.69
E	3.99	1.05
F	11.23	0.71
G	15.39	0.81
Total	100	0.55

Banks can also incorporate environmental performance into credit scoring models to reflect the reduced risk attributes of the borrowers. As homebuyers, mortgage originators, institutional investors, guarantors and counterparties consider energy ratings in property valuations, they should also be incorporated in banks' underwriting models.

Develop Increased Securitization Capacity

Banks should further develop securitization as a means to unlock small-scale sustainable real estate projects. Banks can overcome barriers for small and medium size residential real estate projects and deep energy-efficiency retrofits of existing residential stock in a number of ways. Aggregating comparable smaller ticket sustainable residential real estate projects together diversifies risk, attracts institutional investors and enables financing. The typical minimum institutional investment size for sustainable residential real estate is €85mn but can be as low as €15mn. The aggregation of projects should result in a deal size of €100mn or more to attract institutional investment. These could include green residential mortgages for single-family detached/semi-detached residences, apartments, condos and coops. Securitization could allow for the right structural design, deal mechanics and investment size for institutional investors thereby mobilizing finance that would not otherwise be available for certain borrower credit-tiers, property-types and real-estate sectors. Property-specific and loan-level performance data and related disclosures should feature environmental information on underlying assets⁵⁹. While the recently revised European Securitization Framework is still not widely appealing to issuers (including would be green mortgage issuers) and institutional investors, an overhaul could provide banks with capability to originate and securitize a broader range of sustainable loans and free capital for new sustainable projects and green mortgages^{60,61,62}. Synthetic securitizations are an appropriate tool for impact investments because it allows the banks to maintain relationships with clients while true sale securitization break the link between the lender and the borrower. Under a synthetic securitization framework, portfolios can be put together to meet investor requirements. The exposure can be as broad or specific as necessary. While sustainable real estate securitizations tend to be small deals, institutional investors typically don't have the opportunity to invest in them, synthetic securitizations represent an innovative way to provide access to such deals thereby increasing the supply of projects investable by institutional investors.

Develop Synthetic Risk Transfer Capabilities

Banks can increase lending capacity for sustainable residential real estate through synthetic risk transfer. The environmental risk which is not minimized through the development process can be transferred to third parties such as ESCOs. Performance risk is one area where a bank can transfer the uncertainty to third parties with specialized understanding and the wherewithal to manage such risk. The transfer of this risk will free up balance sheet capacity for sustainable residential real estate finance where the bank is able to focus it's expertise in managing traditional

⁵⁹ Principles for Responsible Investment. (5 May 2021). ESG Incorporation in Securitised Products: The Challenges Ahead. Available [here](#).

⁶⁰ European Banking Authority. (14 October 2014). Discussion Paper on Simple Standard and Transparent Securitization. Available [here](#).

⁶¹ European Banking Authority. (1 March 2021). Transparency and BCBS Pillar III. Available [here](#).

⁶² European Banking Authority. (1 March 2021). ESG Disclosure in the EU: Financial Institutions. Available [here](#).

financial risk types such as credit and market risks. This will in turn increase the supply of projects available for investment by institutional investors.

Develop Capital Relief Trade Capabilities

Capital Relief Trades ('CRTs') can play a more meaningful role in addressing environmental risk. Banks can use CRTs to free up balance sheet capacity to increase lending capacity for additional sustainable real estate projects⁶³. The capital relief trade market continues to grow in terms of application, originators and jurisdictions. CRTs can be harnessed for climate change transition, adaptation and mitigation by issuers and investors. CRTs will free capital to finance additional sustainable real estate projects for investment by institutional investors. Several examples of CRTs are outlined below.

- **Credit Agricole:** €2.14bn Premium Green 2017-2: references a portfolio of roughly 200 obligors distributed across a range of sectors, including real estate.
- **Société Generale:** €2.43bn Jupiter Transaction, October 2019: incorporated a capital allocation factor that incentivises additional positive impact finance lending.
- **Royal Bank of Scotland:** €1.2bn Project Grasshopper, January 2020: references UK Project Finance Loans, the approximately €90.6mn financial guarantee is the first risk transfer transaction to be backed entirely by green assets.

Allow Energy Savings to be Included as Income on Mortgage Applications

Encourage sustainable single-family and multi-family residential real estate as a means of strengthening the cash flow of households and firms and facilitating a sustainable economic recovery.

INSTITUTIONAL INVESTORS

Consolidate Environmental Performance Measurement Frameworks

Consolidation would be beneficial in measurement frameworks and disclosure arrangements to enable performance comparability. Approaches used to quantify the environmental performance of a fund. This could be a 'Climate Stability' metric which is linked to UN Sustainable Development Goals would be helpful in streamlining analysis. It could also be other metrics and performance measures outlined below. The 'Climate Stability' metric indicates the impact of a €1mn investment expressed in tonnes of carbon dioxide equivalent (CO₂e).

Deploy a Twin-Bond Issuance Approach to Inform Markets About Advantages of Green Bonds

Several financial institutions are deploying a twin-bond issuance approach where they are issuing a conventional and a green bond simultaneously. This provides an opportunity for a like-for-like profile identical across all characteristics except for the difference in environmental performance, and demonstrates the green differential between sustainable and conventional residential real estate finance product sets to inform calibration of market risk models and pricing decisions⁶⁴. A comparison could resolve and reconcile some of the conflict and debate between issuers and investors in green bond markets over the risk premium on bonds and expected risk-return ratios⁶⁵. Such a comparison can guide pricing analysis in both primary markets and pricing assessment of sustainable residential real estate backed bonds in the secondary market⁶⁶. The role of policy measures to mobilize capital, increase transparency and reduce volatility for sustainable investment projects can also be evaluated⁶⁷. Issuers with high environmental standards will likewise benefit from favorable market pricings with a 'greenium' (green premium), delineating deep green projects and those which merely meet minimum standards. As has been demonstrated in the Sovereign, Supranational and Agency ('SSA') markets as well as the corporate bond, project finance and securitized product markets, the Twin-Bond Issuance Approach assists the market in rewarding a high degree of environmental

⁶³ Structured Credit Investor. (Spring 2020) CRT Research Report: Quarterly Analysis for the Risk Transfer Community. Available upon request.

⁶⁴ Erlandsson, Ulf G. (2020). Green Bond Risk Premiums A Twin-Bond ULFP Approach. Available upon [here](#).

⁶⁵ Federal Republic of Germany. (11 May 2021). The Bund's Green Twins: Green Federal Securities. Available [here](#).

⁶⁶ Federal Republic of Germany. (11 May 2021). The Bund's Green Twins: Green Federal Securities. Available [here](#).

⁶⁷ Federal Republic of Germany. (11 May 2021). Federal Republic of Germany: Green Bond - Press Release. Available [here](#).

performance and ambition while enabling the capital market to avoid transaction that are falsely labelled green thereby minimizing the exposure to stranded assets^{68, 69}.

Temperature Score

Institutional investors should develop a temperature score (°C) for investment funds as a means of reporting a comparable, readily understandable and outcome-based climate performance indicator⁷⁰. While there are a variety of measures for sustainability performance, a metric such as a temperature score is seen as a meaningful, outcome-based metric for reporting alignment with Paris Agreement ambitions. The temperature score could associate a sustainable residential real estate project, a portfolio of projects, structured finance transaction or an index referencing a portfolio of projects with a particular level of global warming, measured in degrees centigrade (°C). Such a score is readily understood by specialists and non-specialists alike.

Figure X: Temperature Score

Theme	Ideal Metric	Base Metric
Climate Stability	Alignment to future warming scenario based on consumption of global budget	Total Greenhouse Gas (GHG) Emissions (Scope 1 and 2)
	Unit: Degrees Celsius (°C)	Unit: tonnes (t) carbon dioxide equivalent (CO ₂ e)
Property-Level Sustainability	Total Certified Green-Square Footage	Total Certified Green-Square Footage (Unit-Level)

Scale Up Cross-Border Sustainable Residential Real Estate Portfolios

Develop a cross-border building portfolio sustainability performance measurement context for green investments which corresponds to the EU Taxonomy. Institutional investors with building portfolios should develop a standardised framework for defining and specifying financing eligibility and the entry points for so-called ‘green loans’. They should develop strong strategic plans for improving the sustainability-related performance and associated management of their building portfolios to align with the EU Green Deal, The Paris Agreement and the EU Taxonomy.

Deploy Exclusionary Strategies for Sustainable Residential Real Estate Portfolios

Develop exclusionary strategies to ensure that properties, projects and portfolios which deliver the highest degree of environmental performance sustainability outcomes are selected for investment⁷¹, and "brown" investments are ruled out.

Reduce Exposure to Stranded Assets

The residential real estate investment sector should increase the amount data available on the exposure of properties to evolving environmental conditions and policy initiatives⁷². The sector needs a single platform and Common Data Model to master the price regime complexity for CO₂ emissions in the sector. Such a sustainable management will reduce risks, mitigate emission levies/punitive penalties, and lead to asset optimization - also for institutional investors - that can increase the profitability of investments.

Widespread Adoption of Green Bond Indices

Institutional investors should gain exposure to sustainable residential real estate through European focused green bond indices to benefit from environmental outcomes as well as financial outperformance relative to conventional indices. European Green Bond Indices have been outperformed conventional European Bond Indices three of the last four years, by an average of 0.7% per year⁷³. A shrinking volatility differential means that replacing a portfolio of

⁶⁸ Federal Republic of Germany. (11 May 2021). Federal Republic of Germany: Green Bond – Transaction Review. Available [here](#).

⁶⁹ Responsible Investor. Scientific Beta. (12 May 2021). Everything You Need to Know About Portfolio Greenwashing. Available [here](#).

⁷⁰ University of Cambridge: Cambridge Institute for Sustainable Leadership. (14 April 2021). Understanding the Climate Performance of Investment Funds. Part I: The Case for Universal Disclosure of Paris Alignment. Available [here](#)

⁷¹ Deutsche Bank Research. (12 May 2021). What Are Exclusionary Trends in Sustainable Investing? Available [here](#).

⁷² GRESB. (23 January 2017). Addressing Stranded Asset Risk in Real Estate. Available [here](#).

⁷³ Amundi Asset Management. (31 January 2020). ESG Investing in Recent Years: New Insights From Old Challenges. Available [here](#).

conventional real estate-backed bonds with a portfolio of green real estate bonds brings improved returns and diminished risk⁷⁴.

Several examples of Green Bond Indices with significant European exposure include:

- **Bloomberg Morgan Stanley Capital International ‘MSCI’ Barclays Green Bond Index:** the index includes Pan-European green real estate projects. The use of proceeds must first fall within at least one of six MSCI defined eligible environmental categories which includes green buildings. Eligible green building activity includes construction, redevelopment, retrofitting and acquisition of ‘green’ certified properties. New construction properties must be within the top 15% of energy efficiency performance while renovation projects must achieve a minimum 30% improvement in energy compared to baseline performance prior to the renovation⁷⁵.
- **Bank of America Merrill Lynch ‘BAML’ Green Bond Index:** the index maintains an approximate 50% weighting towards European green finance. Qualifying bonds must have a clearly designated use of proceeds solely applied toward projects or activities that promote climate change mitigation or adaptation or other environmental sustainability purposes.
- **S&P Green Bond Index:** includes only those bonds whose proceeds are used to finance environmentally friendly projects. For a bond to be eligible, the issuer must clearly indicate the bond’s ‘green’ label, the rationale and intended use of proceeds. The green criteria must align with the Climate Bonds Initiative criteria.
- **Solactive Green Bond Index:** a rules-based, market value weighted index engineered to mirror the green bond market with exposure to European sustainable real estate finance. The index is calculated as a Total Return Index denominated in USD. For bonds to be eligible they must follow the Climate Bonds Initiative criteria.
- **Bloomberg:** provides curated portfolios to allow clients to select bonds with alignment to the ICMA Green Bond Principles. The portfolios are available for download on the Terminal and include and Labelled Asset or Mortgaged Backed Green Securities and Labelled Project Bonds.

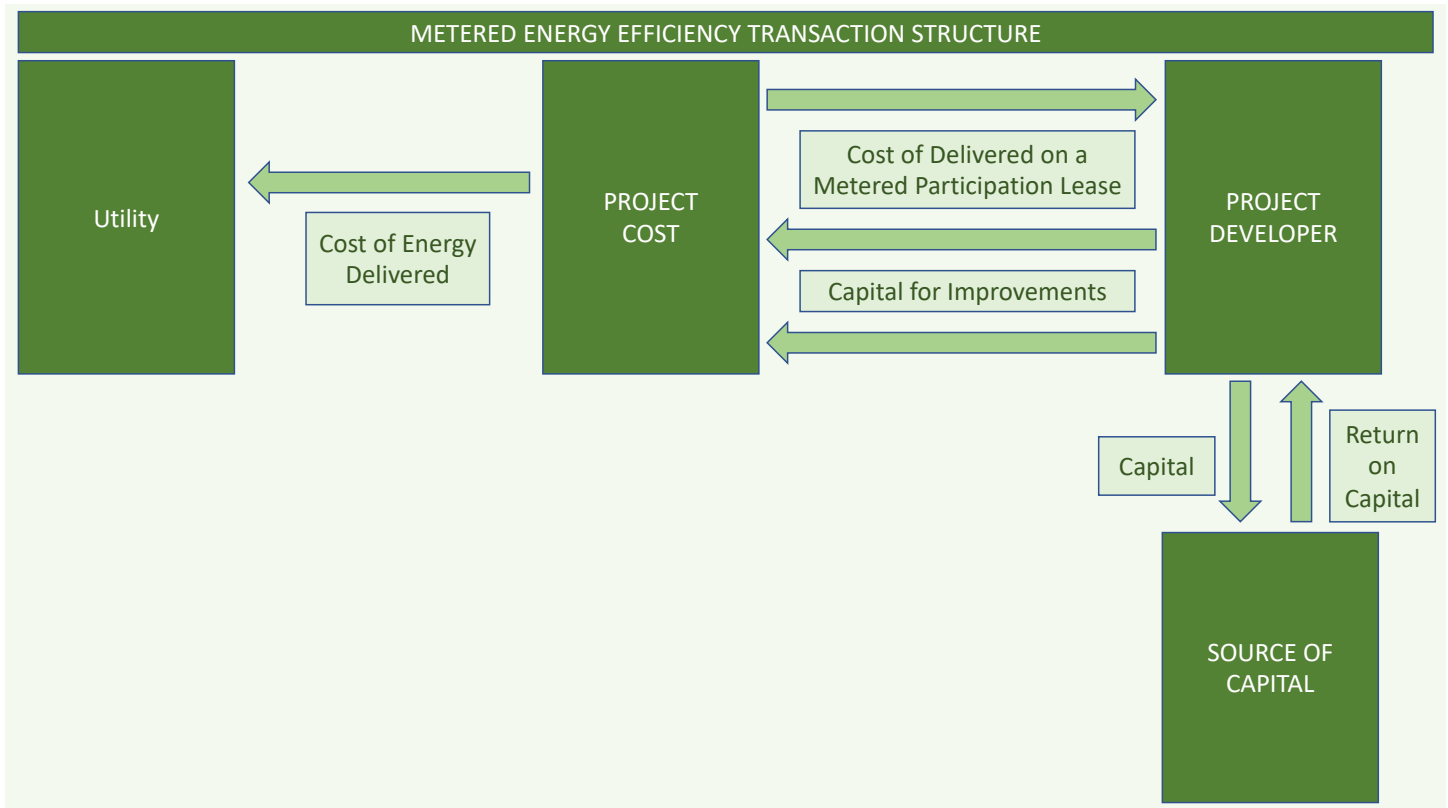
Deploy transaction structures which enables a capture of the energy efficiency benefit

Given that energy efficiency can now be measured and metered, the energy efficiency savings are therefore transactable, commercial grade and revenue grade. One structure that has been effective at delivering energy efficiency savings to landlords, tenants and eventually back to investors is the Metered Energy Efficiency Transaction Structure ‘MEETS’. The MEETS structure offers institutional investors the opportunity to invest in green real estate deal where the energy efficiency incentives are allocated towards the appropriate beneficiaries, i.e. investors investing in green real estate as well as landlords and tenants.

Figure XI: Metered Energy Efficiency Transaction Structure

⁷⁴ NN Investment Partners. (20 February 2020). Green Bond Bulletin: Performance Data Confirms Green Bonds Are Becoming Mainstream. Available [here](#).

⁷⁵ Bloomberg. (19 December 2019). Bloomberg Barclays MSCI Green Bonds Indices: Bringing Clarity to the Green Bond Market Through Benchmark Indices. Available [here](#).



REAL ESTATE DEVELOPERS

Integrate Health and Wellness into Sustainable Residential Real Estate Development

COVID-19 has elevated the importance of health and wellness into residential real estate development, acquisition and renovation decision-making. A paradigm shift within the sector is leading to a fresh evaluation of the role that the built environment plays in the safety, health and wellness of its occupants. 85% of global real estate investment managers and stakeholders representing an aggregate €4.9tn assets under management (AUM) and portfolio investments in real estate totaling approximately €.88tn expressed that current demand for healthy buildings is moderate or strong while 74% indicated that tracking data is a key priority for implementing healthy buildings into their ESG strategies⁷⁶. Integration of health and wellness into certification systems provides a clear pathway for the industry to more consistently accomplish this by establishing clear benchmarking and reporting standards. 61% indicate they already track health and wellness. When residential real estate buildings are healthy the homeowners inside are healthier which translates into greater desirability of the property. As citizens increasingly demand healthy building features, sustainability experts and real estate developers can meet this demand and add value through integrating such health and wellbeing characteristics into the design and construction of new projects and renovation of existing projects. Sustainability experts can pursue a healthy building certifications including WELL, Fitwell and RESET and by doing so increase the supply of sustainable residential real estate projects investable by institutional investors.

Design to Green Building Certification Standards

Certifications are becoming common in many global real estate markets, in large part due to local building code, regulations and broader policy initiatives along with homeowner and investor demand. Homeowners see value in sustainable properties, because they recognize the improved wellbeing, cost savings and potential for additional productivity. Seeing these benefits, homeowners are often willing to pay more for a green-certified home, making it a valuable investment for real estate developers, incl. institutional investors. Investors are also looking for ways to track a fund manager's commitment to sustainability, and the total green-certified square footage within a portfolio

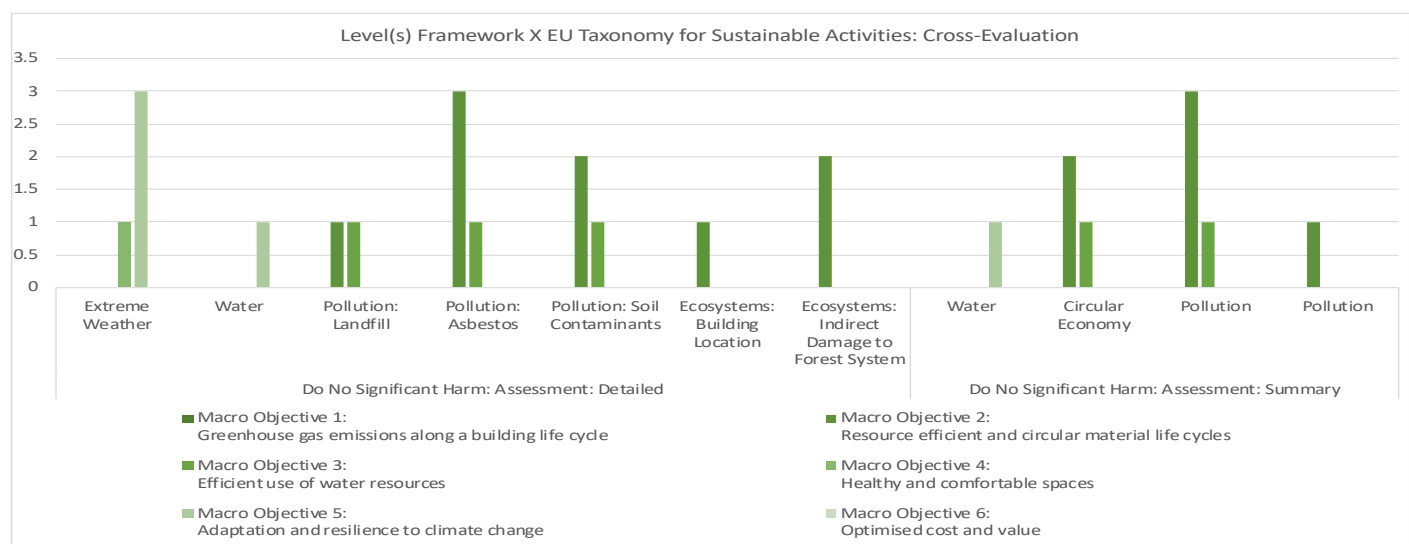
⁷⁶ United Nations Environment Programme Finance Initiative (UNEP FI). BentallGreenOak (BGO). (31 March 2021). A New Investor Consensus: The Rising Demand for Healthy Buildings. Available [here](#).

is a commonly requested metric. As was shown in an earlier figure, each green building standard has a different set of requirements to achieve certification, though all require the implementation of best practices in energy, water, waste, indoor air quality, homeowner comfort, material selection, or some combination thereof. In addition, certification can be specific to building type, building (or tenant space) design, or building operations. Certifications for design directly drive a project’s initial design and construction.

Utilize the Level(s) Framework to Address Embodied Carbon and the Circular Economy

Smart design strategies and low carbon material procurement (scope 1-3) should be addressed by real estate developers in collaboration with sustainability experts for holistic consideration of the environmental footprint from the manufacture, transportation and disposal of building materials. Level(s) is a common language for assessing and reporting the sustainability performance of buildings that can be useful for real estate developers in this regard. With a consistent measurement approach for individual buildings and portfolios of properties, Level(s) provides set of indicators designed to link a properties’ sustainability performance and environment impact directly with sustainability priorities at the European policy level⁷⁷. Depicted below is a high-level summary of Level(s) coverage of the EU Taxonomy Do No Significant Harm Assessment Criteria ‘DNSH’ which will make sustainable real estate projects more readily transactable by banks originating construction loans and mortgages and investable by institutional investors seeking to increase allocation to sustainable projects and align with top policy initiatives^{78,79,80,81}.

Figure XI: Level(s) Framework and EU Taxonomy for Sustainable Activities: Cross Evaluation



Collect Performance Data, Baseline and Benchmark

An accurate and comprehensive collection of energy, emissions, water and waste data for each project within a portfolio provides the basis for understanding and improving environmental performance. A portfolio of properties each financed with a sustainable mortgage and equipped with sub-metering technologies will help expand data coverage. The sustainable mortgage facilitates occupant engagement through reporting of environmental performance which is shared with financial institutions and sustainability experts. Large-scale data collection provides a sound basis for baselining performance and setting benchmarks against which performance of individual projects is assessed. Comparative analytics against other projects in the portfolio and external peer groups makes easier to

⁷⁷ European Commission. Level(s). (2021). The European Framework for Sustainable Buildings. Available [here](#).

⁷⁸ European Commission. (22 April 2021). EU Taxonomy. Delegated Act. Provisional Version. Available [here](#).

⁷⁹ European Commission. (22 April 2021). EU Taxonomy. Delegated Act. Annex I. Provisional Version. Available [here](#).

⁸⁰ European Commission. (22 April 2021). EU Taxonomy. Delegated Act. Annex II. Provisional Version. Available [here](#).

⁸¹ European Commission: EU Technical Expert Group on Sustainable Finance. (9 March 2020). Technical Report. Taxonomy: Final Report of the Technical Expert Group on Sustainable Finance. Available [here](#).

differentiate the supply of projects following ambitious environmental performance standards. Developers can use the resources below to collect performance data then baseline and benchmark projects when they are introduced to the market. This will facilitate improved understanding of project performance by institutional investors and enable greater market uptake.

Housing Affordability and Sustainability: Create 3D-Printed Communities

Innovations should be implemented by real estate developers to pioneer solutions to improve both the affordability and sustainability of new construction⁸². An example of this would be to create a 3D-printed [community](#) with a strategic plan to scale affordable housing. Collaborate with housing authorities and mayors, housing NGOs and sustainability experts for breakthroughs in affordable and sustainable home-building. The architecture, engineering and construction (‘AEC’) industry in collaboration with property technology companies can deliver environmentally and economically sustainable housing solutions. Innovations in construction materials can be used to address the environmental sustainability of the building stock through the delivery of sustainable homes in growing European cities as well as meeting affordable housing needs in developing markets.

Stay on Top of Trends

Developers can use the resources below to stay ahead of trends and learn from leading industry practice.

- BuildingRating, Institute for Market Transformation: [here](#)
- Decarbonizing the Built Environment: 10 Principles for Climate Mitigation Policies, Urban Land Institute: [here](#)
- Energy Performance Certificates in Europe: Assessing Their Status and Potential, Buildings Performance Institute Europe: [here](#)
- GlobalABC Roadmap for Buildings and Construction: 2020–2050, Global Alliance for Buildings and Construction: [here](#)
- Mandatory Building Performance Standards: A Key Policy for Achieving Climate Goals, American Council for an Energy-Efficient Economy: [here](#)
- MURE, ADEME, Agency for Ecological Transition: [here](#)

SUSTAINABILITY EXPERTS

Build the Financial Case for Sustainable Investment

Sustainability leads should partner across the real estate value chain on expensive and complex sustainability investments. They should partner with asset managers to assess the long-term ROI of these projects, as well as the other financial metrics the real estate firm uses in decision-making⁸³.

Stakeholder Engagement

Real estate developers and sustainability experts should engage with the other stakeholders in the real estate field, and preferably the ones convening on sustainability objectives. Experts can collaborate with industry peers, trade associations and municipalities in the development and implementation of new climate policies with interest for institutional investors. Some of these are depicted below.

Figure XII: Sustainable Real Estate Organizations

Organizations that Convene Industry Leaders to Discuss Best Practices in Sustainable Real Estate				
Property/facility managers	Standard Setters and Engineers	Building Owners and Managers Association (BOMA)	Green Building Experts	Owners and Investors

⁸² New Story Charity. (14 October 2020). Innovation Village. Available [here](#).

⁸³ Citi. (February 2021). Financing a Greener Planet: Catalyzing Private Capital for a Net Zero Emissions World. Available [here](#).

International Facility Management Association (IFMA)	Association of Chartered Certified Accountants (ACCA)	CoreNet	2030 Districts Network New Buildings Institute (NBI)	International Union of Property Owners
Institute of Real Estate Management (IREM)	International Code Council (ICC)	National Apartment Association (NAA)	U.K. Better Buildings Partnership (BBP)	European Property Federation
		National Multifamily Housing Council (NMHC)	Global Alliance for Buildings and Construction (GABC)	
		Urban Land Institute (ULI)		

Take Advantage of New Property Technologies

Sustainability experts should develop a process to identify, assess, and potentially pilot new technology as part of their sustainability strategy. Emerging technologies for real estate properties (commonly referred to as “proptech”) are helping buildings be smarter, more energy and cost-efficient, and more responsive to homeowner preferences. A sustainability expert can connect with innovative new technologies in multiple ways:

- **Proptech Incubator:** real estate or clean-tech incubators like Fifth Wall, VertueLab, and MetaProp provide capital to promising technology solutions and help them connect with the real estate sector. Many larger real estate firms either partner with these incubators to beta test technology or have developed their own internal incubators to assess and deploy new technology for their projects.
- **Utility and Government Partnerships:** to meet efficiency goals, utilities or government entities will occasionally offer real estate organizations the ability to pilot emerging technologies. As an unbiased third-party, the utility/government program vets the vendor, installs the technology at little or no cost to the company, and monitors outcomes.
- **Cross-disciplinary Membership Organizations:** membership organizations with a diverse group of members can be an excellent place to connect with and learn about potential technology and service providers. At ULI, Greenprint members engage with service providers and new technologies through the Innovation Partner program.
- **Existing Relationships:** most sustainability leads work with an array of technical experts, including sustainability consultants, architects, and mechanical, electrical, and plumbing engineers whom service providers approach regularly about new technologies. These experts can help vet the viability, ROI, and long-term maintenance implications of new solutions, as well as help sustainability leads find ideal pilot buildings within a portfolio.
- **Conference Trade Shows:** as sustainability experts attend conferences to network with peers and learn best practices to bring back to their own companies, the trade show floor of vendors and service providers offers an opportunity to learn about new PropTech innovations.

POLICY MAKERS

EPBD Revision to Ensure Europe Achieves 2030 Climate Targets and 2050 Climate-Neutrality

Member States should now be seeking to achieve 100% decarbonisation of their building stock and developing long-term renovation strategies to deliver the climate-neutrality objective. The European Commission (‘EC’) should assess all Member States’ Long-Term Renovation Strategies (‘LTRS’) in the context of the 2050 Climate-Neutrality Objective. The EC should adjust the ambition of the Renovation Wave strategy to 3% deep renovation rate by 2030. The EC should amend European Performance of Buildings Directive (‘EPBD’) Article 2a and consider full EPBD revision. To increase the number of environmentally sustainable properties which would collateralize Sustainable RMBS and Covered Bond deal, these initiatives would need the support of public and private funds.

Align Risk-Based Capital Prudential Frameworks with the Risk Profile of Sustainable Real Estate Mortgage Finance by Integrating Climate Scenario Analysis into Stress Testing Exercises at Financial Institutions.

Central banks, working under the auspices of policy makers should recommend a global risk-weight reduction regime for sustainable residential estate finance which is aligned with the EU Taxonomy and dynamically integrate Primary Energy Demand Reductions (kWh/m²/year)/(% of energy use reduced/avoided). Global and European policymakers should use the prudential framework to provide more favourable capital treatments for sustainable residential real estate finance. Top-down modeling exercises undertaken by central banks to assess the impact of climate risk on a wide-ranging set of economic and financial variables (e.g. GDP, inflation, employment, house prices, yield curve shifts, OAS spreads, bond prices, loan-level and pool-level valuations) can identify risks that arise from different physical and transition outcomes across a wide range of sectors and geographies⁸⁴. Central banks should report the results and the key assumptions underpinning them to address specific areas of risk and monitor key risk indicators. Bottom-up scenario analysis exercises undertaken by financial institutions can provide a basis for alignment of loan-level features with the risk profile of sustainable real estate mortgage finance product-sets, including calibration of mortgage insurance premiums, interest rate, LTV and debt-to-income at underwriting. The European Banking Authority ('EBA') in July 2020 told the European Commission that it would prefer to complete its review into incorporating Environmental, Social and Governance (ESG) factors into the bank prudential framework, which is only due by June 2025, before the Commission publishes specific legislative proposals on its Renewed Sustainable Finance Strategy. Overall, the EBA's desired sequencing suggests that a beneficial capital treatment regime for sustainable finance activities may not be a near-term prospect, yet environmental risk and climate scenario analysis capabilities make such risk-based capital adequacy supervision a practical solution for immediate application^{85,86,87,88}.

The Simple, Transparent and Standardized ('STS') Regime to Include Sustainability as a Condition for Qualification

To facilitate financing of sustainable assets and their subsequent securitization, review and improvement of the EU Securitization Framework should be a priority for EU Legislators. Market-driven structures can support the rollout of the European Commission's Green Supporting Factor. The European Banking Authority should propose a specific framework for preferential risk-based capital treatment of sustainable residential estate securitisations and financial instruments as part of the 'Simple, Transparent, and Standardised' regime. While sponsors and originators must disclose the environmental performance of the underlying assets to receive preferential capital treatment under the 'Simple, Transparent, and Standardised' (STS) regime, the STS regulation does not make sustainability a condition of STS qualification^{89,90,91}. Article 501c of the EU Capital Requirements Regulation mandates the European Banking Authority ('EBA') to assess prudential treatment for assets associated substantially with environmental and/or social objectives. Amendments to the EU Securitisation Regulation proposed in the European Parliament on 10 November 2020 call for the EBA to report on the development of a specific framework for sustainable securitisation by 1 November 2021[3]. This report would consider whether preferential capital treatment could be justified for green securitisations through introduction of sustainability factors. The EBA and the European Parliament should consider the 15 types of risk reduced by sustainability, including: Climate Risk, Transition Risk, Physical Risk, Credit Risk: Probability of Default, Credit Risk: Loss Given Default, Credit Risk: Correlation: 1st Order: Borrower Specific, Credit Risk: Correlation: 1st Order: Property Specific, Credit Risk: Correlation: 2nd Order: Securitized Product, Market Risk: Climate VaR, Market Risk: Stressed VaR, Option-Adjusted Spread, Prepayment Risk, Interest Rate Risk, Underwriting Risk, Liquidity Risk and Operational Risk.

Improve Quality of Energy Performance Certificates

Sustainable Architecture and Construction Management Companies Housing Companies, Real Estate Operators, Real Estate and Mortgage Banks, Project Developers, Investment and/or Asset Management, Pension Funds have indicated the reliability of EPCs as low, and called for next generation-EPCs to be established with improved compliance,

⁸⁴ Oxford Economics. Nixon, James. (6 July 2020). Research Briefing: Modelling the Economic Cost of Global Warming. Available [here](#).

⁸⁵ Network for Greening the Financial System (May 2020). Integrating Climate-Related and Environmental Risks into Prudential Supervision. Available [here](#).

⁸⁶ Network for Greening the Financial System (June 2020). Guide to Climate Scenario Analysis for Central Banks and Supervisors. Available [here](#).

⁸⁷ Network for Greening the Financial System (10 September 2020). Occasional Paper. Case Studies of Environmental Risk Analysis Methodologies. Available [here](#).

⁸⁸ European Commission. (12 November 2019). Keynote Speech of Vice-President Valdis Dombrovskis on Challenges and Impacts of Implementing Basel III. Available [here](#).

⁸⁹ BIS. (11 December 2014). Criteria for Identifying Simple, Transparent and Comparable Securitizations. Available [here](#).

⁹⁰ Fitch Ratings. (3 December 2020) EU Green Securitisation Unlikely to See Beneficial Capital Regime Soon. Available [here](#).

⁹¹ European Commission. (10 November 2020). Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) No 575/2013 as regards to Adjustments to the Securitisation Framework to Support the Economic Recovery in Response to the COVID-19 Pandemic. Available [here](#).

usability and reliability. To fully realise their potential, EPCs, mandated by the policy makers, should incorporate new indicators, such as, smart readiness, real energy consumption data and interaction with district energy systems. After the reliability of EPC data improves, the EPC can then be used innovatively as a more dynamic tool for databases, building passports or logbooks, tailored recommendations (building renovation passports or deep renovation roadmaps) and as a source of information for financing options and as a tool to support the long-term decarbonisation of the European building stock. They can as such increase the confidence of institutional investors.

Contribute to a Centralized Register of Sustainable Real Estate Projects

Life cycle assessment databases should be developed globally in a consistent and centralized approach with efforts supported by governments and the industry. As the UNEP-led Global Alliance for Buildings and Construction (GlobalABC) indicates the most challenging aspect of adopting a more consistent approach to building data and information management is not a lack of data but rather the lack of a central data and information storage option. Life cycle assessment data and information repositories need to be stepped up and supported by policy-makers. Disclosure obligations introduced by the new Sustainable Finance Disclosure Regulation (SFDR) requires financial market participants to have access to comparable, robust and reliable ESG data^{92,93}. The EU Taxonomy for Sustainable Activities requires that companies disclose how and to what extent their activities qualify as environmentally sustainable as defined in the regulation. A centralized register for sustainable real estate projects will help developers log their projects into a unified system and will help banks and investors assess and identify risks in lending activities.

Furthermore, there should be a linkage between common taxonomies across geographical regions, industries and environmental standards. A database can contribute to establishing such a linkage between common national, supranational and global taxonomies. Moreover, a linkage to the environmental standards in jurisdictions outside the scope of major taxonomies is important. The varied landscape of certifications related to financial instruments, projects, properties or companies, are however all of them expressing a form of environmental or climate related performance. If these certifications are related in nature, the logic step is to create a linkage among them to the selected taxonomy or taxonomies.

Capture Sustainability Impact of Sustainable Residential Real Estate in Economic Policy

Leverage macro-econometric models based on non-equilibrium economic theory and adopt a more empirical approach to treatment of sustainable residential real estate and the financial system that is more consistent with observed relationships and conditions⁹⁴. Sustainable residential real estate investment provides economic stimulus which complements, compounds and amplifies existing investment while obsolete forms of residential real estate investment crowds out investment which is critical to recovery and sustainable environmental and economic outcomes. Consider the reduced household operational costs and the influence on consumption patterns throughout the economy. Capture the sustainability impact of sustainable residential real estate in household Income in macroeconomic models used to guide policy decisions to such that Household Income = Wages – Taxes + Benefits + Other Income. Whereas Other Income includes Residential Operational Cost Savings Attributable to Sustainability Measures + Monthly Mortgage Savings Attributable to Sustainability Measures (or Monthly Rent Savings Attributable to Sustainability Measures). Leverage econometric techniques with strong empirical grounding to refine the functional form and specifications of the equation where short-term dynamic (or transition) outcomes move towards a long-term trends. Capture changes in the long-run price elasticity of demand for energy based on changes in the sustainability profile of the housing stock and consumer energy demand patterns. Quantify the range of economic impacts, CO₂ emission reductions of contribution to climate mitigation targets resulting from increased supply of sustainable residential real estate through new construction activity as well as renovations, refurbishments and retrofits.

⁹² European Commission. (27 November 2019). Sustainability Related Disclosures in the Financial Services Sector. Available [here](#).

⁹³ S&P Global Market Intelligence. (1 April 2021). What Is the Impact of the EU Sustainable Finance Disclosure Regulation? Available [here](#).

⁹⁴ Pollitt, Hector., Mercure, Jean-Francois. (15 February 2017). The Role of Money and the Financial Sector in Energy-Economy Models Used for Assessing Climate and Energy Policy. Available [here](#).

4 Recommendations

In this chapter we are summarizing some of the main recommendations to the mobilization of institutional investors in green residential investments. The recommendations range from major new initiatives and approaches to more simple steps to move in the right direction. Many of the recommendations requires multi stakeholder engagement and consultation and cooperation between policy makers, real estate finance practitioners, developers, sustainable building experts etc. For instance, influencing shifts in market demand requires credible environmental performance data along with verification and certification. The latent demand by institutional investors can be stimulated through robust environmental performance data and deal-level mechanisms which protect against greenwashing along with performance risk and transition risk.

Policy makers must decide if they want the scope of regulatory incentives to be front loaded over the next several years and potentially sunseting or if they have confidence that the private sector can continue on a trajectory towards net zero by 2050. Strategic level decisions such as these should be based purely on environmental interests as the private sector already demonstrated the ability to adapt to a net zero economy. The private sector must now demonstrate the willingness to recalibrate towards net zero by showing policy makers, the financial sector, the real estate sector and society as a whole that they can remain on a net zero path with minimal regulatory incentives and maximum collaboration with the public sector so there is a consistent private and public sector transition towards a circular economy.

1) Align Regional, National and Local Regulations with the EU Taxonomy for Sustainable Activities

Description of the recommendation:

Unify, clarify and simplify metrics, thresholds, reporting requirements and disclosures used for sustainable residential real estate finance through consistent disclosure regimes aligned with the EU Taxonomy. Two examples are provided below.

- **Sustainability-Related Disclosures in the Financial Services Sector ('SDR')**: consistent sustainable residential real estate disclosure against the Taxonomy should form part of a broader sustainability-related disclosure regime in conjunction with the SDR, including pre-contractual, website and periodic reporting obligations. The SDR requires investment managers to disclose whether their funds/products promote environmental or social characteristics. This is expected to lead to increasing demand for assets meeting the new sustainable criteria from asset and pension fund managers.
- **Non-Financial Reporting Directive ('NFRD')**: companies disclosing against the Taxonomy are also required to comply with the NFRD and should be required to report at the same level of detail and consistent units of measure for sustainable residential real estate disclosures level of detail and consistent units of measure for sustainable residential real estate disclosures⁹⁵.

How will it assist in mobilizing institutional investors in green residential investments:

Consistent metrics will allow institutional investors to fully participate in existing and emerging sustainable economic activities in the residential real estate sector across differing geographies. Institutional investors will have greater ability to increase allocations toward European sustainable real estate and build portfolios of sustainable residential real estate projects.

⁹⁵ Fitch Ratings. (13 May 2021). Corporate Sustainability Reporting Changes: Good for EU Banks But Not Before 2024. Available [here](#).

2) Allowing Energy Savings as Alternate Income on Mortgage

Description of the recommendation:

Allow Energy Savings as Alternate Income on Mortgage Applications. Regional and national regulator should allow the inclusion of energy savings from the purchases of a sustainable home at the highest standard of environmental performance (Figure xx) as certified by leading certification systems on mortgage applications as ‘Alternative Income from Sustainable Residential Real Estate Energy Savings’. Regional and national regulators should first formally recognize energy savings from the purchase of a sustainable home as ‘Alternative Income from Sustainable Residential Real Estate Energy Savings’. National and regional regulators should then provide incentives to financial institutions who specifically acknowledge and document this ‘Alternative Income from Sustainable Residential Real Estate Energy Savings’ on mortgage applications and those financial institutions who integrate such income into the underwriting process and make underwriting decisions that concern the Mortgage Insurance Premium, Mortgage Rate, Loan-to-Value and Debt-to-Income levels. National and regional regulators should provide regulatory risk-based capital relief which is directly attributable to the incremental ‘Alternative Income from Sustainable Residential Real Estate Energy Savings’ derived from the purchase of sustainable residential real estate. A like-for-like comparison should be made between properties that are similar in all respects except for environmental performance. The quantifiable differential in environmental performance and energy will be translated into risk-based capital adequacy relief.

Figure XIII: Proposed Property-Level Environmental Performance Requirements for Energy Savings to be Included ‘Alternative Income from Sustainable Residential Real Estate Energy Savings’		
Certification System	Rating	Rating Type
LEED	Platinum: (80+ Points)	Points
BREEAM	Outstanding: (≥85)	% Score
SMARTER	Superior: (130-160 Points)	Points
DGNB	Platinum: (≥80%)	Total Performance Index
HQE	Excellent (9-11 Stars)	Stars Obtained

How will it assist in mobilizing institutional investors in green residential investments:

Recognition that projects with credibly modeled or demonstrated energy savings (or revenue generated from green energy production) affords the homebuyer a higher income and greater purchasing power adds value to the property and lowers the risk of the portfolio for institutional investors. The added importance of accurately measuring energy savings will improve the credibility of EPCs and ensure that financial information collected is improved over time thereby protecting institutional investors from greenwashing. The collateralization of energy savings by the bank can unlock capital to fund additional projects and further increase the supply of green real estate projects and real estate backed deals available to institutional investors.

3) Create a Platform to Scale Small Ticket Sustainable Residential Real Estate Projects Allowing Developers to Raise Additional Forms of Debt

Description of the recommendation:

Design financial instruments to aggregate sustainable real estate projects. The financial products can span asset classes including equity, debt, securitized products and derivatives. While instruments in each asset class will be appealing to different categories of investors including private equity, fixed income and multi-strategy investors a high degree of environmental ambition across the underlying real estate projects will be essential to deliver positive environmental outcomes to both the climate-centric impact investor as well as the main stream institutional investor.

How will it assist in mobilizing institutional investors in green residential investments:

Banks should structure instruments to aggregate smaller scale projects whereby a high volume of small-scale projects can be brought into both the climate-centric, ESG-focused, energy efficient residential real estate credit investment sectors as well as mainstream real estate and fixed income capital markets. While loan-level real estate finance product sets have been developed many of them have a singular focus on energy efficiency. This should be expanded to capture the full scope of environmental performance. While many structured finance products, derivatives and swaps have been designed to address the environmental sustainability of the European Building Stock there is divergence in the reporting of environmental performance data-sets which complicates comparability. While policy measures are evolving to address convergence of standards, financial institutions should implement common yet ambitious reporting frameworks.

Equity:

And area where financial institutions can have an impact on the aggregation of projects in the early stages is on the equity side, including:

- **Crowdfunding:** financial institutions can develop crowdfunding platforms to source the equity base for the capital structure of small ticket items which will then allow them to raise debt:
- **Sustainable Real Estate Exchange Traded Fund ('ETF'):** Sustainable real estate ETFs can increase global momentum toward sustainability and elevate the role of green buildings toward climate change mitigation⁹⁶. The flexibility of the ETF instrument can enable investment banks and institutional investors to structure deals with coverage that spans the entire green building ecosystem including sustainable real estate projects and companies involved in every stage of construction, redevelopment, and retrofitting green-certified properties.
- **Sustainable Real Estate Investment Trust (REIT):** 78 of the top 100 REITs own green certified buildings in their portfolios consisting over 2100 properties and 627mn square feet^{97,98,99}. The expanded inclusion of highly environmentally performant properties and projects into this construct will deliver positive environmental outcomes to a broad venue of mainstream, Pan-European and Internationally-active institutional investors.

Debt:

A high degree of environmental performance at the property and project level will translate into short-term debt (letters of credit, credit facilities, medium term notes) and long-term debt (loans, vanilla bonds, convertible bonds, hybrid bonds) aligned with regional, national, supranational standards for financial institutions issuing debt. High environmental standards across a broad scope of environmental categories will deliver positive environmental outcomes to mainstream institutional investors that climate-centric investors

Securitized Products:

Property and project level environmental performance meeting or surpassing regional, national and supranational regulation will be the foundation for environmentally performant securitized product deals included Sustainable RMBS, Multi-Family CMBS, Covered Bonds, Sukuks and Pfandbriefs,

⁹⁶ Invesco. (22 April 2021). Invesco Expands Thematic Environmental Suite by Launching Invesco MSCI Green Building ETF. Available [here](#).

⁹⁷ NAREIT. (1 February 2021). NAREIT Guide to ESG Reporting Frameworks. Available [here](#).

⁹⁸ NAREIT. (1 June 2021). 2021 REIT Industry ESG Report: Exemplifying Leadership Through ESG. Available [here](#).

⁹⁹ NAREIT. (1 June 2021). REITs in Europe. Available [here](#).

- Sustainable Real Estate Mortgage Investment Conduit ('REMIC')**: a REMIC is a Special-Purpose Vehicle ('SPV') which aggregates pools of similar mortgages together and issues Mortgage-Backed Securities ('MBS'). Individual mortgages are pooled together based on loan-level characteristics which include borrower credit tier, residential property sector (detached single-family, semi-detached single-family, multi-family residential), geographical distribution, loan-to-value ratio and loan-type (fixed-rate, floating-rate). Mortgage originators should fully capture the entire scope environmental performance in their underwriting and require that properties with a high degree of environmental performance have an environmental performance certification. MBS issuers should require certification at the highest level of environmental performance for inclusion into an MBS deal that's labelled green, environmentally performant or otherwise environmentally sustainable.

Derivatives:

Residential real estate backed derivatives such Stranded Asset Total Return Swaps may no longer be necessary for new originations and recent vintages if steps are taken at a loan-level to implement high environmental performance standards. These steps must be implemented at a portfolio level and governed by firm-wide policy, standards and protocols. The integration of environmental performance factors into the loan-level underwriting process should be overseen at a functional level, externally reviewed and overseen by the Board of Directors.

Derivative instruments like a Stranded Asset Total Return should only be used for seasoned portfolio after a financial institution has put into practice principles for environmentally sustainable residential real estate portfolios.

A financial institution who has put into place high standards of environmental performance will benefit from cross risk type risk reduction which expand their access to derivative financial products to hedge financial risks like credit, market and currency risk with swaps, futures and forwards.

4) Innovate Sustainable Residential Real Estate Mortgage Finance Product-Sets

Description of the recommendation: Bank should develop a suite of sustainable residential real estate finance product-sets to facilitate the acquisition and ownership of sustainable residential real estate. The table below can be used as a practical guide for financial institutions on how to convert an existing suite of conventional residential real estate finance product-sets into sustainable financial products. There are 15 discrete types of risks reduced or eliminated through environmental sustainability, and each of these translates into an adjustment factor known as an Environmental Performance Coefficient ('EP Coefficient') which is then applied to the specific features of the mortgage, including the Mortgage Insurance Premium, Mortgage Rate, Loan-to-Value Ratio and Debt-to-Income Ratio. The EP Coefficient is then applied to each feature based on the ex-post reduction in each discrete risk-type demonstrated by a sustainable mortgage. The EP Coefficient translates the reduced risk of sustainable real estate mortgage finance into benefits for homeowners through mortgages with reduced interest rate, reduced mortgage insurance requirements, increased loan-to-value and increased debt-to-income eligibility. The coefficient encourages capital allocation to the most ambitious sustainable residential real estate projects which has a direct and immediate impact on the supply of projects investable by institutional investors as it protects cash-flows and prevents greenwashing. The cost of capital will likely become lower for banks demonstrating robust sets of environmental performance data that demonstrates risk reduction across each of these 15 types and provides investors with protection from greenwashing¹⁰⁰. This will translate to a lower cost of funding for construction, acquisition, development and renovation finance as well as lower cost of funding for mortgage finance and refinance opportunities¹⁰¹.

Figure XVI: Mortgage Conversion: Conventional to Sustainable	Mortgage Insurance Premium	Mortgage Rate	Loan-to-Value Ratio	Debt-to-Income Ratio
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¹⁰⁰ Fitch Ratings. (30 November 2020). Data and Disclosure are Key for Green Mortgage Analysis. Available [here](#).

¹⁰¹ University of Cambridge: Cambridge Institute for Sustainable Leadership. (January 2019). In Search of Impact: Measuring the Full Value of Capital: Update. Available [here](#).

Climate Risk ¹⁰²	x0.9	x0.95	+1.10 up to 100%	+2pps
Transition Risk ^{103,104,105}	x0.9	x0.95	+1.10 up to 100%	+2pps
Physical Risk ¹⁰⁶	x0.9	x0.95	+1.10 up to 100%	+2pps
Credit Risk: Probability of Default ^{107,108}	x0.9	x0.85	+1.10 up to 100%	+150bps
Credit Risk: Loss Given Default ^{109,110,111}	x0.9	x0.85	+1.10 up to 100%	+2pps
Credit Risk: Correlation: 1st Order: Borrower Specific	x0.9	x0.85	+1.10 up to 100%	+150bps
Credit Risk: Correlation: 1st Order: Property Specific	x0.9	x0.85	+1.10 up to 100%	+150bps
Credit Risk: Correlation: 2nd Order: Securitized Product		x0.85		
Market Risk: Climate VaR ¹¹²		x0.98	x0.95	
Market Risk: Stressed VaR ¹¹³		x0.98	x0.95	
Option-Adjusted Spread ¹¹⁴		x0.85		
Prepayment Risk ¹¹⁵		x0.8		
Interest Rate Risk		x0.8		
Underwriting Risk	x0.9	x0.9		
Liquidity Risk		x0.98		

How will it assist in mobilizing institutional investor in green residential investments:

For mortgage originators, MBS issuers, guarantors and credit enhancement providers to capture the full benefit of environmental performance and the tangible and intangible benefits associated with a high degree of environmental ambition, the highest degree of environmental performance must be applied at the most granular property and project level. Once these measures have been taken only then they can then be translated into loan-level features that deliver the benefits directly to homeowners and create competitive advantages for institutions.

¹⁰² European Central Bank. European Systemic Risk Board. (1 June 2020). Positively Green Measuring Climate Change Risks to Financial Stability. Available [here](#).

¹⁰³ United Nations Environment Programme Finance Initiative. Oliver Wyman. Decarbonisation and Disruption: Understanding the Financial Risks of a Disorderly Transition Using Climate Scenarios. Available [here](#).

¹⁰⁴ United Nations Environment Programme Finance Initiative: CICERO. Pathways to Paris: A Practical Guide to Climate Transition Scenarios for Financial Professionals. Available [here](#).

¹⁰⁵ University of Cambridge: Cambridge Institute for Sustainable Leadership. ClimateWise. (February 2019). Transition Risk Framework: Managing the Impacts of the Low Carbon Transition on Infrastructure Investments. Public Report. Available [here](#).

¹⁰⁶ University of Cambridge: Cambridge Institute for Sustainable Leadership. ClimateWise. (February 2019). Physical Risk Framework: Understanding the Impacts of Climate Change on Real Estate Lending and Investment Portfolios. Full Report. Available [here](#).

¹⁰⁷ Bank of England. (January 2020). Staff Working Paper No. 852. Does Energy Efficiency Predict Mortgage Performance? Available [here](#).

¹⁰⁸ Journal of Real Estate Finance and Economics. (11 May 2021). Buildings' Energy Efficiency and the Probability of Mortgage Default: The Dutch Case. Available [here](#).

¹⁰⁹ Appraisal Practices Board. (2 June 2015). APB Valuation Advisory 6: Valuation of Green and High Performance Property: Background and Core Competency. Available [here](#).

¹¹⁰ Appraisal Practices Board. (3 May 2016). APB Valuation Advisory 7: Valuation of Green and High Performance Property: One-to-Four Unit Residential. Available [here](#).

¹¹¹ Appraisal Practices Board. (3 May 2016). APB Valuation Advisory 7: Valuation of Green and High Performance Property: One-to-Four Unit Residential. Available [here](#).

¹¹² Climate VaR aims to assess the potential financial sensitivity to climate risks and opportunities, i.e. what would be the potential financial impact of different climate scenarios (1.5°, 2°, 3° of warming)

¹¹³ Covered Bond, Residential Mortgage-Backed Security ("RMBS"), RMBS Backed Sukuk and Pfandbrief related VaR

¹¹⁴ Convexity: For an MBS, the word "Option" in Option-adjusted spread relates primarily to the right of property owners, whose mortgages back the security, to prepay the mortgage amount. Since mortgage borrowers will tend to exercise this right when it is favourable for them and unfavourable for the bond-holder, buying an MBS implicitly involves selling an option. (The presence of interest-rate caps can create further optionality.) The embedded "option cost" can be quantified by subtracting the OAS from the Z-spread (which ignores optionality and volatility). Since prepayments typically rise as interest rates fall and vice versa, the basic (pass-through) MBS typically has negative bond convexity (second derivative of price over yield), meaning that the price has more downside than upside as interest rates vary. The MBS-holder's exposure to borrower prepayment has several names: call risk; extension risk; prepayment risk and reinvestment risk. This difference in convexity can also be used to explain the price differential from an MBS to a Treasury bond. However, the OAS figure is usually preferred. The discussion of the "negative convexity" and "option cost" of a bond is essentially a discussion of a single MBS feature (rate-dependent cash flows) measured in different ways.

¹¹⁵ Call Risk, Extension Risk, Reinvestment Risk

5 Technical Annex

A Technical Annex is available to provide context, subject-matter depth and additional quantitative and macroeconomic dimension to the European Sustainable Residential Real Estate landscape.

6 Supplemental Annex

A Supplemental Annex is available which provides some detailed examples of Barriers and Solutions to the supply of sustainable residential real estate projects readily investable by institutional investors.

7 Abbreviations

Abbreviations	
European Union	EU
Southeast Europe	SE
Denmark	DK
France	FR
Germany	DE
Italy	IT
Netherlands	NL
Portugal	PT
Spain	ES
United Kingdom	UK
Automated Valuation Providers	AVM
Bank of England	BOE
Basis Points	bps
Building Owners and Management Association	BOMA
Carbon Dioxide	CO ₂
Carbon Dioxide Equivalent	CO ₂ e
Carbon Risk Real Estate Monitor	CRREM
Deutsche Gesellschaft für Nachhaltiges Bauen eV (German Sustainable Building Council)	DGNB
Do No Significant Harm	DNSH
Energy Efficient	EE
Energy Performance Certificate	EPC
Energy Performance of Buildings Directive	EPBD
Environmental, Social and Governance	ESG
EU Taxonomy	EU Taxonomy for Sustainable Economic Activities
European Banking Authority	EBA
European Central Bank	ECB

European Commission	EC
European Securities Market Authority	ESMA
Green Asset Ratio	GAR
High-Quality Environmental Standards	HQE
Intergovernmental Panel on Climate Change	IPCC
Key Performance Indicator	KPI
Kilowatt Hours	kWh
Leadership in Energy and Environmental Design	LEED
Long-Term Renovation Strategy	LTRS
Prudential Regulatory Authority	PRA
Residential Mortgage-Backed Security	RMBS
Simple, Transparent and Standardized	STS
Task Force on Climate-Related Disclosures	TCFD
Million	mn
Billion	bn
Trillion	tn
Capital Relief Trades	CRTs
Sovereign, Supranational and Agency	SSA
Bank of America Merrill Lynch	BAML
Morgan Stanley Capital International	MSCI
Standard and Poor's	S&P
Metered Energy Efficiency Transaction Structures	MEETs
Assets Under Management	AUM
Association of Chartered Certified Accountants	ACCA

Global Alliance for Buildings and Construction	GABC
Institute of Real Estate Management	IREM
International Code Council	ICC
International Facility Management Association	IFMA
National Apartment Association	NAA
National Multifamily Housing Council	NMHC
New Buildings Institute	NBI
UK Better Buildings Partnership	BBP
Urban Land Institute	ULI
European Securities and Markets Authority	ESMA