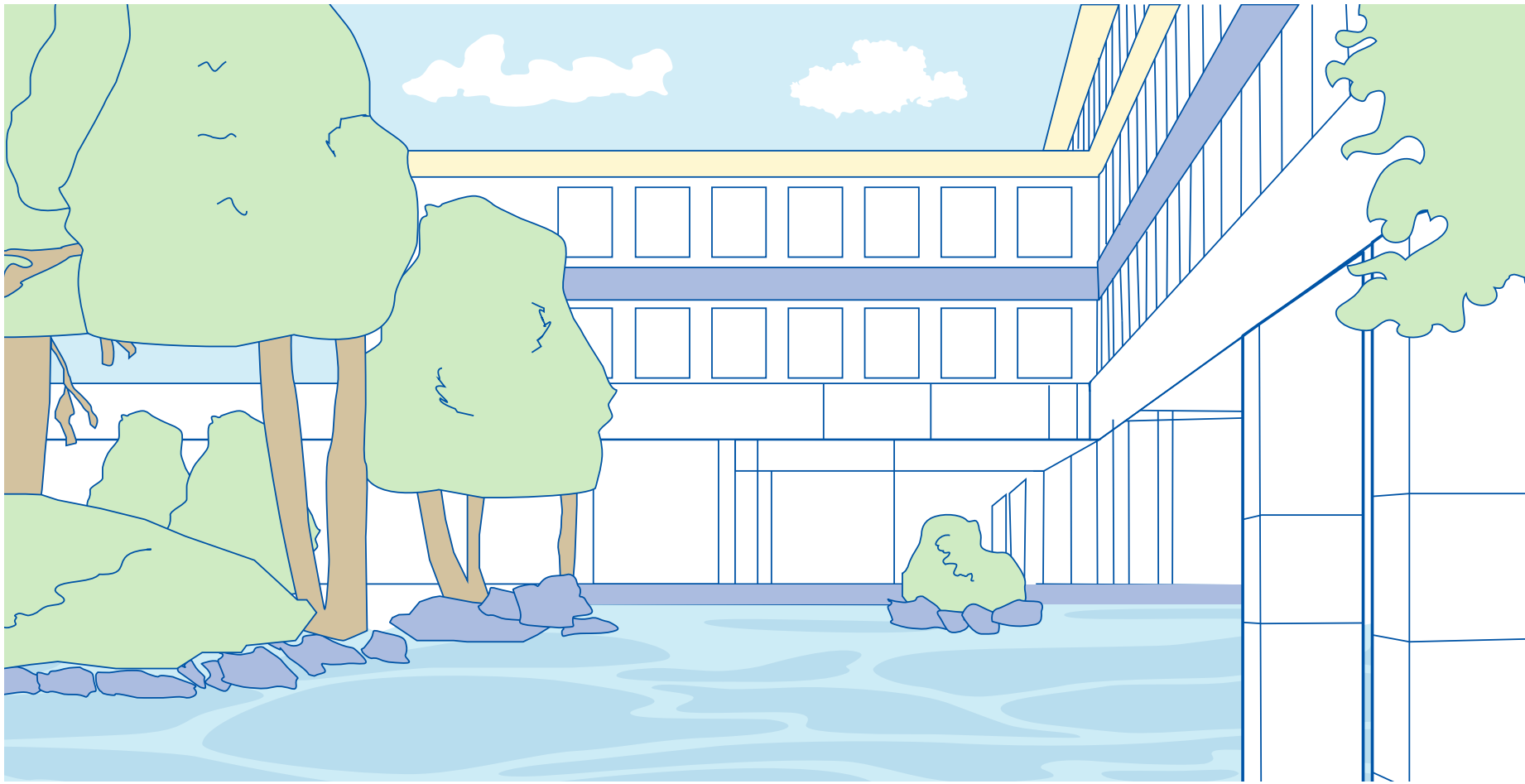
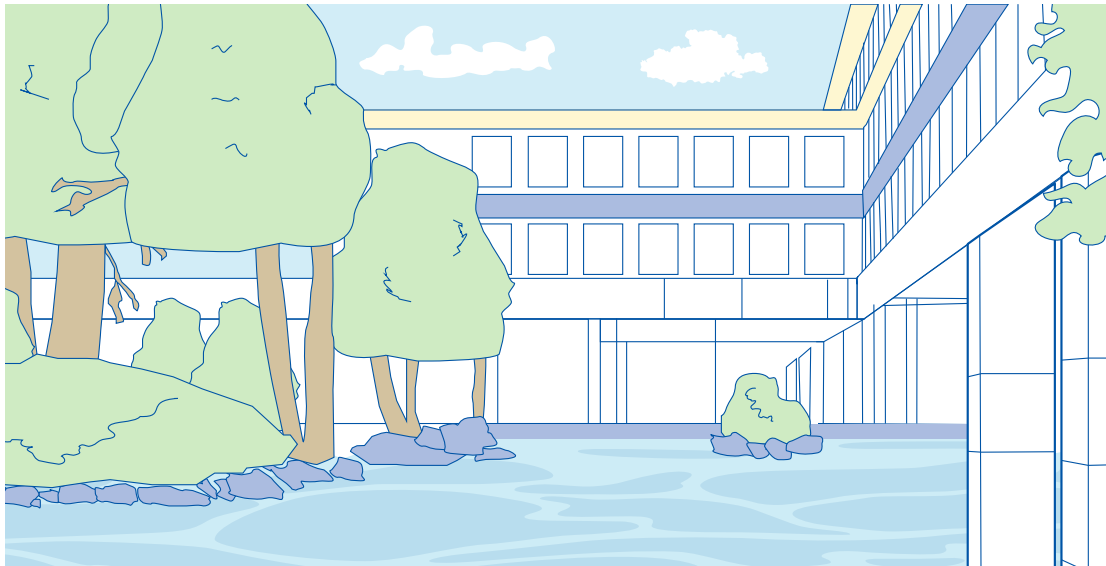


Integrating environmental considerations in real estate underwriting

Professional Standards Paper

Contents



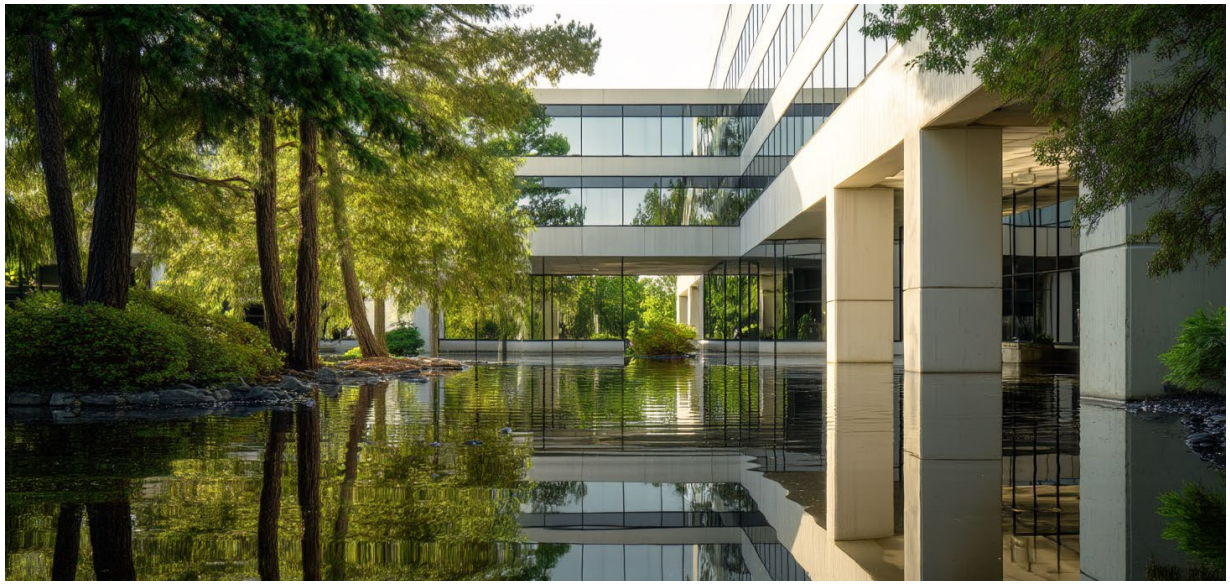
Key highlights

- Investors and investment managers are assessing environmental impacts to protect long-term value, but there is no consistent approach
- Six key factors, including energy efficiency, carbon intensity, and physical climate risk are among the most quantifiable for underwriting
- Market practices such as shadow carbon pricing and green IRR modelling reflect a growing focus on evaluating sustainability in real estate strategies
- Four illustrative scenarios are proposed, ranging from 'No defined environmental goals' to 'Ambitious environmental goals', to model how different levels of commitment impact future value and returns
- Data gaps and inconsistent measurement methods create challenges for integrating environmental factors into underwriting and valuation. Greater transparency and clearer disclosure can support more consistent incorporation into financial models

Introduction

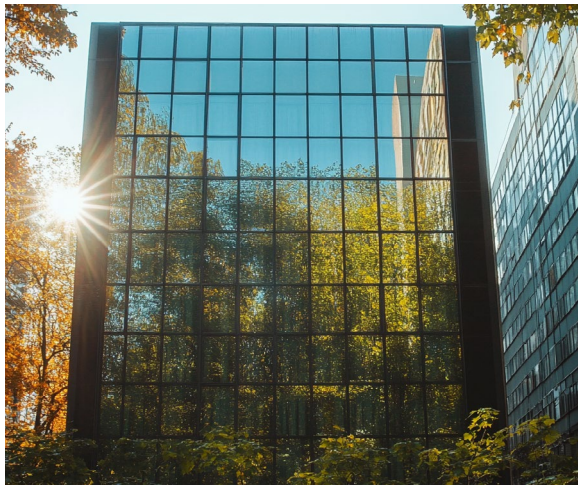
Real estate is an important part of institutional investors' portfolios. It offers diversification, steady income, provides inflation protection, and can make a societal impact by shaping the places where people live and work.[1]

Long-term investors carefully consider risks that can affect value over time. Because real estate assets are held for long periods, they face risks from stricter regulations, particularly in Europe, and from climate-related concerns and events. Real estate is especially exposed due to its physical nature. Managing these risks early helps protect long-term value, but the market remains unclear on how environmental factors should be priced.



1 INREV. (2021). Characteristics of Non-Listed Real Estate in Investment Portfolio.

In real estate valuation, traditional methods have evolved to include more sophisticated approaches that account for environmental integration. Nevertheless, it is difficult to incorporate these factors into valuations due to a lack of evidence-based data on their impact and that of changing regulations. While newly built assets may comply with the latest standards, transactions involving environmentally advanced buildings are limited in number, making their impact on market value hard to observe or quantify. Investor and occupier approaches to financially underwriting environmental factors are also not consistent. As a result, valuers face challenges in reflecting these approaches and tend to focus on tangible metrics, such as energy consumption, which directly influence NOI.[2]



Valuation standards, such as IVS from the IVSC and the RICS Valuation - Global Standards (Red Book) set by RICS, now require valuers to identify, document and report significant environmental factors in valuation conclusions while ensuring they are informed about relevant frameworks and legislation.[3] Terms of engagement should outline, for example environmental requirements, including inspections, data access, and consultation with environmental experts. Valuers should also disclose any limitations on their environmental expertise.

The paper builds on existing INREV guidance, such as the INREV Property Valuation Guidelines, which outline best practices for the governance and oversight of the valuation process and define the roles and responsibilities of those involved. It also draws on the INREV Sustainability Guidelines which provide best practices for developing ESG strategies and integrating them into day-to-day operations.

Scope of the paper

This paper aims to raise awareness of how environmental factors are underwritten in investment decisions. It looks at the ways investors, investment managers and lenders assess environmental goals, the challenges they face in quantifying them, and the assumptions they use.

This is the first phase of a larger INREV project aimed at bringing more transparency and consistency to integrating environmental factors in underwriting and valuations.

The paper uses the INREV ESG SDDS as a reference for identifying key environmental factors relevant to underwriting. To illustrate current market practices and challenges, it includes insights and experiences from 11 interviews with investors, investment managers, and a lender, representing a broad range of geographies, organisation sizes, and investment strategies across Europe.

The next phase, planned for Q4 2025, will test underwriting model to assess which environmental factors have the greatest influence on value and returns, and which have less impact for different scenarios and ambition levels. The objective is to bring greater clarity to these differences and enhance transparency for investors.

The project is guided by a focus group made up of senior experts from across the industry, including institutional investors, investment managers, valuers, and Big Four representatives. EY Luxembourg was appointed to support this project. More details on the project and the focus group are available on the INREV website.

2 Palm, P. (2025). Practice Briefing: Environmental, social and governance (ESG) and real estate valuation - the case of Sweden.

3 RICS. (2025). Red Book Global Standards, and IVSC. (2021). ESG & Real Asset Valuation.

Valuation vs underwriting

Real estate valuations rely strictly on relevant, observable market information, and transaction-based, comparable evidence. Market values serve as the starting point for investment underwriting and are determined through physical inspections, resulting in a single number as of a specific date.

Underwriting, on the other hand, extends beyond regulated valuations by incorporating risk assessment and return expectations to estimate future value. It involves investment analysis and forward-looking assumptions to evaluate potential returns, cash flows, and the risks associated with the asset's business plan.

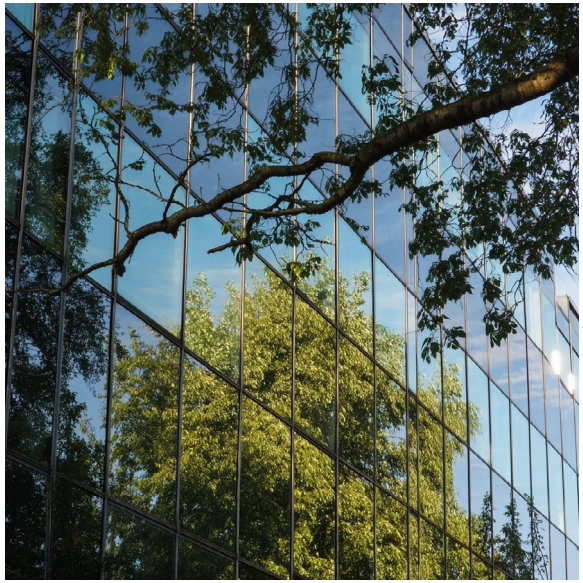
Environmental focus

Environmental criteria are the most directly quantifiable and financially material for real estate valuation.[4] This paper, therefore, focuses exclusively on environmental factors, where the impact on cash flows, Capex, and risk profiles can be integrated into underwriting models.

However, these factors also bring additional underwriting complexities, as they require the assessment of potential regulatory changes, operational performance, and evolving investor demand for sustainable assets. While key European regulations[5] play an important role in how environmental considerations are included in long-term real estate investing, a detailed review of these regulations falls outside the scope of this paper.

Implementing environmental goals

Environmental goals should be set up at both portfolio and asset level. Balancing carbon emissions, with the core goal of reducing them to zero over time can be challenging for investment managers with diverse portfolios containing various asset types with different energy intensities and usage patterns. Some assets may not materially affect total emissions at the portfolio level if small in size, but they could still face downside risk. The decision to postpone the transition of such assets towards carbon neutrality should take account of economic feasibility.



For detailed guidance on aligning portfolio and asset-level decision-making with NZC objectives, see the INREV paper Implementing a Net Zero Carbon Strategy.

Who should consider this paper?

This paper is relevant for real estate investors, investment managers, lenders, and valuation professionals seeking to understand how environmental factors affect valuation and underwriting. It describes how environmental risks are currently addressed in the industry and highlights practices that can help refine the assessments of market participants. For valuers, it offers context on how investors and investment managers consider environmental issues and long-term value protection, which could lead to clearer dialogue and more consistent valuation outcomes.

The paper considers and builds on existing work done by several industry associations and groups like IVSC, RICS and ULI, aiming to support more transparent and aligned practices across the industry.

4 RICS. (2024). The future of real estate valuations: The impact of ESG.

5 Examples include but are not limited to the EU Taxonomy, SFDR, CSRD, EPBD and EED.

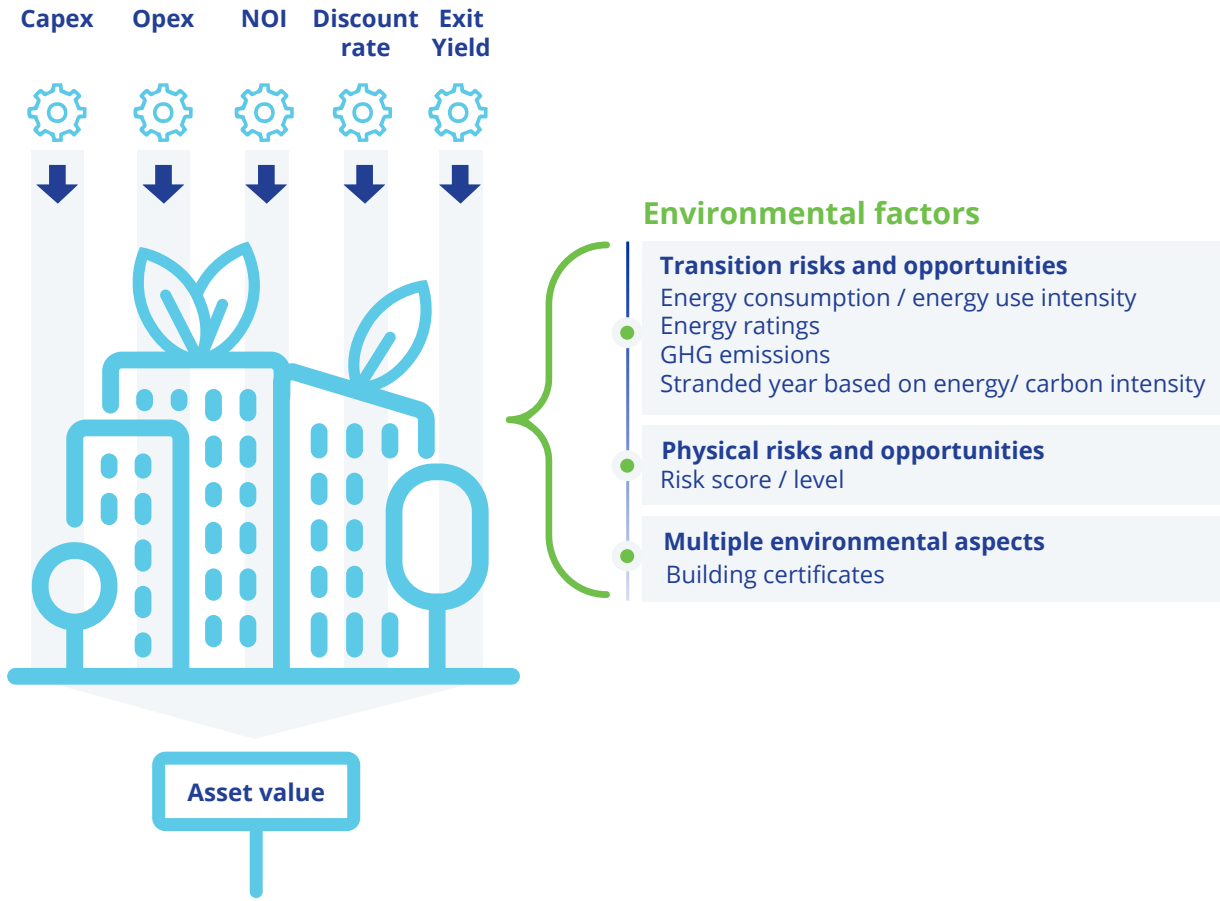
Environmental impacts on underwriting

Environmental drivers can influence asset value through a range of inputs, including but not limited to Capex, Opex, NOI, discount rates and exit yields. These factors can be integrated into underwriting methods using a combination of qualitative and quantitative approaches.

The income-based DCF method, as highlighted below, is generally preferred. However, other established methodologies may be used depending on the scope of modelling and market context.

Table 1 shows the environmental factors most likely to have a quantifiable impact on the asset value, alongside several typical improvement actions and their potential influence on the inputs of a DCF method. These factors are derived from the INREV Reporting Guidelines / ESG SDDS and reference similar factors from the RICS ESG data list for real estate valuations.[6] The table serves as a starting point for assessing how environmental performance may introduce value risk or create upside opportunity.

Figure 1: Inputs and drivers of value



6 RICS. (2024). WBEF ESG and valuation 2024 - data list. See Appendix B for a detailed mapping to the INREV Guidelines /ESG SDDS.

Table 1 - Most relevant environmental factors for underwriting

Environmental factors[8]	Typical actions	Inputs potentially impacting DCF[7] (illustrative, non-exhaustive list)	
		Qualitative	Quantitative
Energy consumption / energy use intensity including renewable energy sources	• Implement energy management systems • Install energy efficiency solutions (eg LED lighting, HVAC upgrades, high-performance insulation and glazing) • Deploy on-site renewables (eg PV panels, storage)	• **Tenant attraction and retention** (↑) for energy-efficient assets • **Market perception** (↑) for ESG-conscious investors • **Regulatory readiness** (↑) due to lower risk of future carbon taxes or regulatory penalties	• **Capex** (↑) for retrofits • **Opex** (↓) and **NOI** (↑) from energy savings • **Discount rate** (↓) due to lower risk
Energy ratings indicating energy efficiency and performance	Upgrade to higher standards (eg EPC labels)	• **Asset competitiveness** (↑) as tenants prioritise energy performance • **Access to green financing** (↑) due to eligibility for green bonds or preferential lending	• **Capex** (↑) for retrofits • **Opex** (↓) from overall system efficiency • **NOI** (↑) from marginal energy cost savings • **Discount rate** (↓) due to lower risk
GHG emissions[8] including scope and methodology	• Electrify systems • Switch to renewables • Adopt low-carbon technologies (eg heat pumps) • Retrofit buildings (see energy efficiency solutions above)	• **Tenant attraction and retention** (↑) as corporate tenants pursue internal decarbonisation targets • **Investor perception** (↑) due to closer alignment with NZC mandates • **Regulatory readiness** (↑)	• **Capex** (↑) for retrofits • **Opex** (↓) and **NOI** (↑) due to improved energy sourcing and operational efficiency • **Discount rate** (↓) due to lower risk • **Exit yield** (↓) due to enhanced liquidity and marketability

7 The impact can depend on sector and geography. Care should be taken to avoid double counting and clarify how environmental factors are incorporated in the market value provided by valuers.

8 For this paper, only operational carbon is considered. Embodied carbon, part of a whole life carbon approach, is more complex and involves LCAs, consideration of biobased materials, and building design optimisation. For more, see the INREV paper Real estate's carbon footprint: addressing embodied emissions

Environmental factors[8]	Typical actions	Inputs potentially impacting DCF (non-exhaustive list)	
		Qualitative	Quantitative
Stranded year based on energy/ carbon intensity according to the chosen decarbonisation pathway (eg CRREM)	• Increase on-site and off-site renewables • Improve operational energy performance (see energy efficiency solutions above) • Offset residual emissions, as a last resort	• **Tenant attraction and retention** (↑) • **Risk of long-term value loss** (↓) due to future proofing against energy or carbon regulations	• **Capex** (↑) for retrofits • **Opex** (↓) due to operational efficiency • **NOI** (↑) due to minor savings on Opex • **Discount rate** (↓) with decrease in long-term transition risk • **Exit yield** (↓) due to future proofing and wider buyer pool
Risk score / level based on industry recognised climate risk methodology	• Conduct asset-level climate scenario analysis • Implement targeted measures (eg flood defences, heat-resistant materials)	• **Risk exposure** (↓) lower likelihood of disruption from acute climate events • **Tenant confidence** (↑) due to higher operational reliability • **Insurance premiums** (↓) since asset is better prepared to deal with climate events	• **Capex**: (↑) for retrofits • **Opex** (↑) due to higher maintenance of resilient features • **NOI** (↓) due to increased spending • **Discount rate** (↓) due to lower risk • **Exit yield** (↓) from stronger resilience
Building certificates indicating overall asset quality	Pursue voluntary green building certifications (eg BREEAM, LEED)	• **Tenant attraction and retention** (↑) • **Access to green financing** (↑)	• **Opex** (↑) **and NOI** (↑) via rent uplift • **Exit yield** (↓) with higher exit pricing due to positive market perception

Note: While the focus is on environmental factors with clear financial impact, social factors identified in the INREV ESG SDDS may also affect long-term asset performance. These are outside the scope of this paper but are summarised in Appendix C. Governance factors are excluded from this analysis.

Illustrative example

To highlight how improvement actions can be applied to simulate a 'green' case, a hypothetical example using fictional figures is presented for illustrative purposes only. This helps indicate the sensitivity of the different actions, some of which will be tested during the Phase 2 of the project.

For simplicity, adjustments to baseline assumptions and DCF inputs are generally applied consistently to avoid a single action appearing more impactful than others.

In our example, to reduce energy consumption and GHG emissions, an additional €0.5M in Capex for retrofit interventions could lower Opex by 10% due to energy efficiency gains and renewable sourcing, slightly increasing NOI. Lower risk exposure could lead to, for example, 10-basis point reduction in the discount rate (to 6.4%), and a 20-basis point reduction in the exit yield (to 4.3%), due to widening of the buyer pool.

Using the same baseline, adaptation measures to address physical risks could require an additional €0.5M in Capex. Opex may increase by 10% due to added maintenance for climate-adaptive features, slightly reducing NOI.

	Investment value/ Action(s)	Capex	Opex	NOI	Discount rate	Exit Yield
Baseline	€135M	€1M	€0.45M	€7.5M	6.5%	4.5%
Potential impacts	Mitigation actions (Energy/ GHG emissions)	↑ €0.5M	↓ 10%	↑	↓ 10 BPS	↓ 20 BPS
	Adaptation actions (Physical) risk)	↑ €0.5M	↑ 10%	↓	↓ 10 BPS	↓ 20 BPS
	Building certifications	-	↑ 10%	↑	-	↓ 10 BPS

Note: The figures used in this illustrative example are intended to show a potential scenario analysis and do not reflect the performance of any specific asset or actual transactions.

However, improving the asset's long-term risk profile through a lower risk climate classification could lead to, for example, a 10-basis point reduction in the discount rate (to 6.4%) and a 20-basis point reduction in exit yield (to 4.3%) reflecting stronger market confidence in the asset's ability to withstand physical climate events.

In addition to mitigation and adaptation measures, securing a recognised building certification could increase Opex by up to 10%, reflecting higher operational standards.

However, this may be offset by rental uplifts and stronger tenant demand, resulting in an increase in NOI. Beyond improved risk perception, the enhanced attractiveness and marketability of a certified asset may also support, for example, a 10-basis point adjustment in the exit yield (to 6.4%), reflecting a premium associated with certified buildings.

How the market integrates environmental factors

Market participants are adopting diverse approaches to embed environmental factors into underwriting, portfolio management, and credit assessment. Investors adjust return expectations for transition risks, investment managers include environmental Capex in their financial planning and underwriting assumptions, and lenders consider environmental scoring into their credit frameworks. While the level of integration varies, emerging practices include the use of decarbonisation pathways, such as CRREM, modelling green IRRs or shadow carbon pricing, and a growing focus on physical climate risks and rising insurance costs from extreme weather events.

The summaries below reflect common practices shared in interviews but are not intended as a market standard.

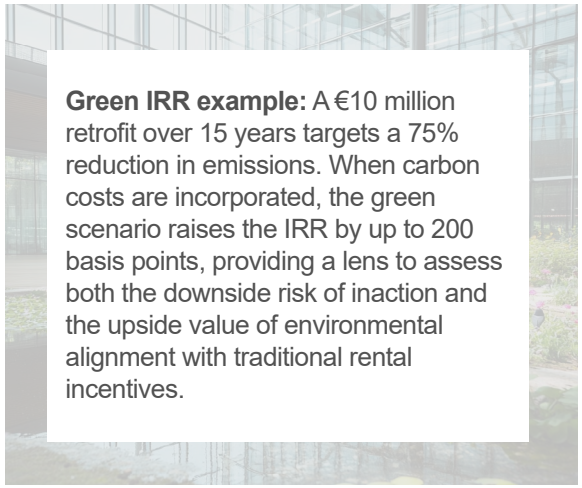
Investors

Investors have started to integrate environmental factors into both portfolio construction and asset-level underwriting. One interviewed investor described using an internal ESG scoring framework that rates each asset on a 0-5 scale, based on energy use intensity, CRREM pathway alignment, and EPC ratings. These scores are used to adjust return assumptions and help identify downside risks across the asset portfolio.

Green IRR

Another investor incorporates environmental factors through a green IRR approach. This method enhances traditional IRR calculations – which typically assess the financial performance of a real estate asset over a 5-10 year period – by applying a 'green lens'. Environmental considerations are embedded into return projections and capital allocation decisions, creating two distinct scenarios:

- Brown scenario (the cost of inaction): Assets may face obsolescence, regulatory risk, and reduced tenant demand, leading to brown discounts / potential value loss.
- Green scenario (value creation opportunities): Assets may benefit from lower operating costs, added revenue from renewables, higher rents, and potential green premiums. Investments in energy efficiency and electrification can lead to stronger carbon-adjusted returns, making green IRR a key input in brown-to-green (B2G) transition strategies.



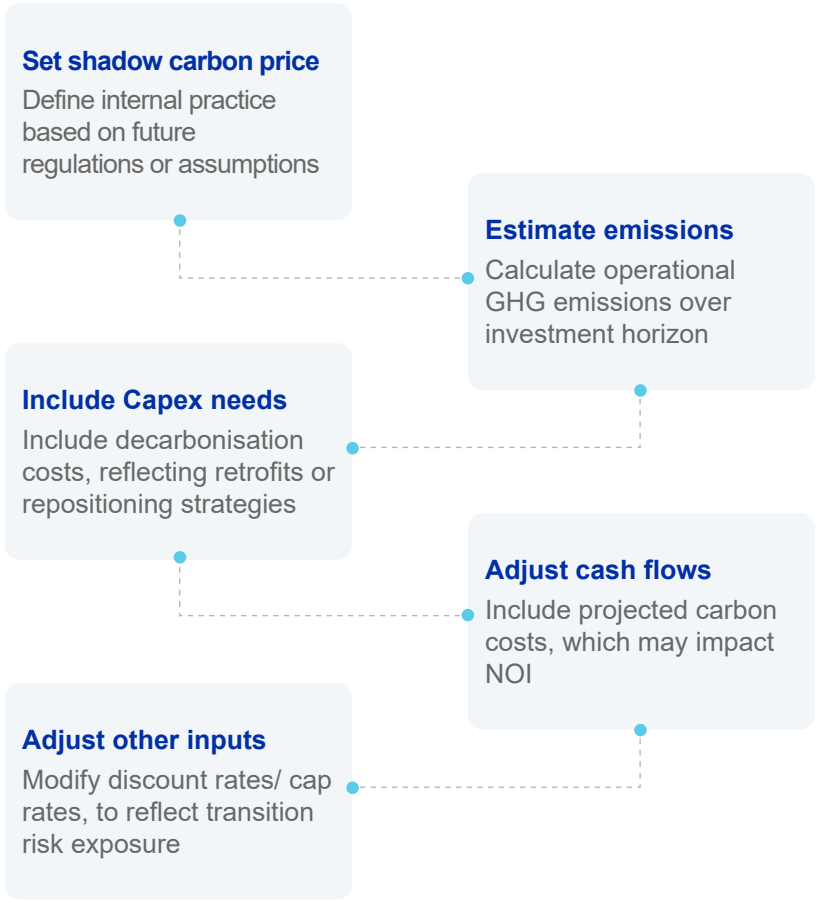
Green IRR example: A €10 million retrofit over 15 years targets a 75% reduction in emissions. When carbon costs are incorporated, the green scenario raises the IRR by up to 200 basis points, providing a lens to assess both the downside risk of inaction and the upside value of environmental alignment with traditional rental incentives.

The investor calculates a green IRR by applying carbon cost assumptions to projected emissions (using OECD country-specific price forecasts). These adjustments influence rental income, vacancy assumptions, and capex planning, depending on geographic and sectoral characteristics. Green IRR projections are systematically discussed during internal investment committee reviews. Under current market conditions, the investor noted that brown discounts at exit remain more observable than green premiums. In the future, green IRR could come closer to normal IRR, as environmental considerations are incorporated into asset appraisal.

Shadow carbon pricing

In addition to green IRR, other investors mentioned the use of shadow carbon pricing for internal scenario analysis. A hypothetical internal carbon price is applied to projected operational emissions to estimate future financial impacts of carbon taxation or potential regulatory changes. These projections are primarily used for internal risk assessment rather than formal underwriting.[9]

A structured framework for shadow carbon pricing typically involves:



9 INREV is collaborating with ULI and other industry associations on a set of carbon pricing principles for real estate.

Physical risk

As highlighted during one of the interviews, an investor uses insurance data, based on historical frequency and damage functions, to estimate average expected costs, which are then incorporated into the discount rate. Physical climate risks were also acknowledged by several other investors. However, their systematic integration into underwriting models remains limited, due to the complexity of reliably translating these risks into financial projections at the asset level.

Investment managers

Several investment managers reported that they integrate environmental factors into underwriting. Their approaches focus on transition risk, physical climate risk and environmental-related Capex planning.

> **"Physical climate risks were also acknowledged by several other investors. However, their systematic integration into underwriting models remains limited, due to the complexity of reliably translating these risks into financial projections at the asset level."**

Transition risk

Investment managers interviewed primarily focus on managing downside risk associated with tightening decarbonisation requirements. A common approach is to build proprietary decarbonisation pathways, based on CRREM, to assess whether assets are likely to deviate from decarbonisation targets within their investment horizon. Where an asset appears at risk, a Capex plan is put in place to bring it back to the desired trajectory. These projections are typically embedded in 10-year DCF models and reviewed at investment committee level. Where public data is limited, investment managers benchmark assumptions against internal proprietary models or sector-specific datasets.

Another approach taken by some managers is rating assets according to specific performance indicators such as energy use intensity, carbon emissions, and EPC ratings. Assets failing to meet internal targets are flagged for further review, often triggering adjustments to financial assumptions. For example, exit yields may be revised, sometimes by up to 50 basis points. Transition risk assessments are also embedded into Capex planning. One of the investment managers interviewed requires all new acquisitions to be CRREM-aligned for at least 15 years post-acquisition, consistent with capital replacement cycles.

Environmental investments are calculated as the cost needed to reach targets and prioritised according to lease expiries or regulatory deadlines. Investment managers consistently report that yield or value adjustments vary by asset type and market. For instance, offices in high-sensitivity locations are more likely to be penalised for non-alignment than retail or logistics assets in secondary, or less regulated markets. These considerations can have broader implications for portfolio strategy.

Physical risk

Investment managers also identified physical climate risk as a key consideration in underwriting. A common method of analysis involves using third-party data providers or insurers to assess risks, such as flooding, extreme heat, and rising sea levels. For instance, an asset flagged for flood risk during due diligence would undergo a detailed evaluation to determine whether appropriate resilience measures, such as flood barriers, have been implemented. If deficiencies are found, Capex will be allocated for targeted interventions. These decisions are often made in collaboration with portfolio teams and are aligned with fund-level investment strategies.

Some managers reflect physical risk through adjusted discount rates rather than isolating them as discrete Capex allocations. One example includes using insurance data to estimate annual risk costs, which are then built into underwriting models. This method helps account for long-term exposure in a way that avoids unreliable or overly specific assumptions in annual cash flows, enabling a continuous appraisal of the asset's risk-adjusted value.

Investment managers also factor physical risks into insurance cost estimates, which are incorporated into NOI forecasts, and may implement resilience upgrades; but underwriting assumptions only change if risks remain unaddressed.

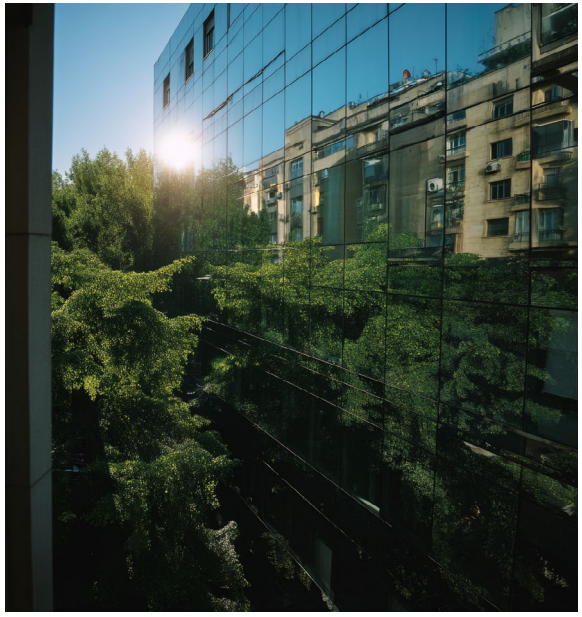
Environmental Capex planning

A number of managers reported treating environmental Capex separately from routine maintenance, typically defining it as the 'delta' required to align assets with transition risk or physical resilience standards. The investment needs are determined through engineering assessments and environmental audits carried out by third-party consultants.

One manager uses sensitivity matrices to prioritise interventions, aligning environmental Capex with key asset lifecycle events such as lease renewals or upcoming regulatory deadlines. Another applies internal thresholds, such as limiting environmental Capex to 5% of

an asset's gross value, to assess whether an asset should be held or sold. In some cases, environmental Capex planning is also used to inform lease negotiations, where sustainability upgrades are offered in place of traditional rental incentives.

To strengthen internal capital allocation decisions, several managers are testing shadow carbon pricing frameworks This involves applying a carbon price to projected emissions to estimate future cost exposures and inform investment strategies. In one instance, outputs from the shadow pricing analysis were shared with valuers, although the immediate financial impact proved lower than anticipated.



Portfolio-wide ESG screenings are also conducted annually by some to flag assets with elevated environmental risk. These insights feed into hold/sell decisions and help sequence Capex planning.

Environmental Capex is systematically integrated into financial models, impacting NPV and IRR projections. However, rental premiums associated with sustainability upgrades remain inconsistent across markets, making the financial case highly dependent on the individual asset or local market context.

Financial modelling approaches

When underwriting environmental performance, most investment managers make adjustments to exit yields, discount rates, and ERVs. Tools such as decision-trees and sensitivity matrices are used to guide assumptions. For example, one manager runs 'what-if' scenarios to see how Capex interventions could impact cash flows, asset quality, and exit strategy.

Although some investment managers have formalised these environmental adjustments internally, there is still no consistent approach across the market. Interviewees also noted inconsistency in how these inputs are treated in external valuations. While managers typically provide valuers with Capex plans that include environmental interventions, the extent to which these factors are incorporated into market value varies from case to case.

One manager looked at how environmental Capex can lead to lasting reductions in Opex,

"While managers typically provide valuers with Capex plans that include environmental interventions, the extent to which these factors are incorporated into market value varies from case to case."

with the aim of showing evidence for uplifts in yield or NOI. However, external valuers remain cautious of reflecting these improvements unless the Opex savings can be structurally proven.

It was also noted during interviews that buildings with high certification levels can still perform poorly from an environmental perspective if mismanaged, highlighting the risk of relying too heavily on design specifications or labels for valuation purposes.

This misalignment in approach can be partly attributed to the different contexts within which an internal assessment of value and risk is conducted relative to a regulated valuation. Valuers require clear and consistent market evidence to make adjustments that can reasonably be demonstrated to reflect a 'market approach'. This is still hard to achieve in most markets today.

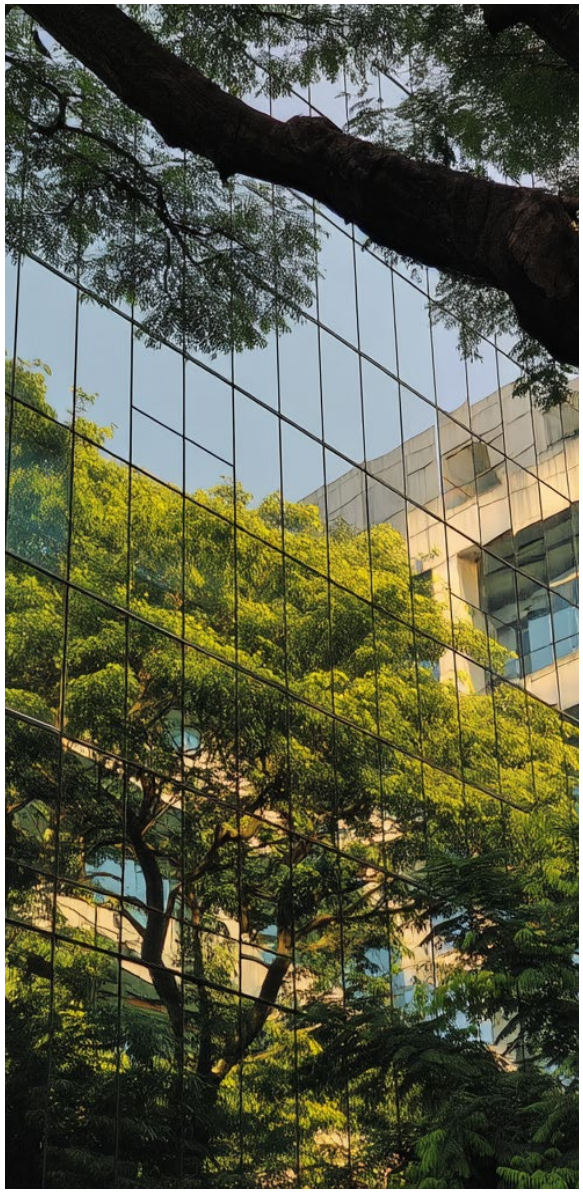
> Whilst an investment manager can have a high level of freedom in their cash flow assumptions, and tailor them to their needs and sensitivities, a valuer is required to 'reflect markets, not lead them'.

Investment managers also stressed that, across many sectors and geographies, traditional value drivers, such as location and tenant demand, continue to outweigh environmental characteristics in valuation outcomes. While sustainability credentials are increasingly reviewed, they are rarely decisive when strong fundamentals such as location prevail.

Nevertheless, one interviewed manager noted that regulatory alignment, such as with the EU Taxonomy, can support upside value potential. In one case, an EU Taxonomy-aligned asset received approximately a 2% year-on-year uplift in market value, as the valuer applied an additional adjustment to reflect ESG-related features.

Lenders

A European bank shared that it incorporates environmental and market transition risks in its real estate credit assessments and risk management process. Environmental scores are used alongside the traditional credit risk assessments and can influence loan decisions. In some cases, they are linked to financial incentives for clients.



EPC ratings are an important input, especially for residential mortgages. In some countries, they are required to be tracked and are linked to loan conditions. The bank is also working to improve borrower awareness of energy efficiency improvements through advisory services.

Physical risks, such as flooding, are assessed using third-party tools, geoportals, and internal scoring systems, which can also affect loan pricing. Environmental commentary is now more common in valuation reports reviewed by the bank, though they remain largely qualitative. These insights are considered in the credit decision-making process, and real estate portfolios are reviewed annually.

While the bank's approach remains risk-based, it is exploring ways to introduce positive incentives for sustainable upgrades. In addition, the bank also emphasised the importance of cross-industry collaboration to develop more consistent environmental assessments methods across finance and real estate sectors

INREV is collecting case studies and examples showcasing sustainability initiatives and their impact on business performance. To read more, visit the Global ESG library.

Key challenges in the market today

This section outlines the main barriers to integrating environmental factors into underwriting models. Challenges include poor data quality, inconsistent measurement, and differing approaches in assessing transition and physical risks.[10]

Data gaps

Many market participants face data challenges. Asset-level metrics on energy use, carbon emissions, and climate risk exposure are often incomplete or inconsistently reported. In addition, reports may not show if figures include tenant areas, common spaces, or auxiliary facilities such as parking. Third-party certifications provide a general sustainability signal but lack the granularity needed to assess the true performance of an asset.

To fill these gaps, investment managers use estimated data or create their own environmental scoring systems, which vary considerably in scope, weighting, and assumptions, even within the same organisation. External environmental ratings also rely on proprietary methodologies, often leading to conflicting assessments for the same asset, particularly in the case of physical risk assessment. The result is a fragmented landscape where data is hard to compare or apply consistently.

Over the years, INREV has made efforts to promote industry standardisation in data exchange and released a standardised reporting template for ESG KPIs at the end of 2023.

> The INREV ESG SDDS is designed to facilitate ESG data exchange and standardise reporting for real estate investment vehicles. The template covers the required and recommended environmental KPIs of the INREV Guidelines. It contains vehicle and asset level data fields and definitions. For more information, visit the INREV ESG SDDS page.

Inconsistent measurement

Assessing climate risk accurately is difficult. Reliable data is often hard to find or access, leading to less confidence and a more cautious approach to decision-making.

Transition risk

Buildings with poor energy performance face real financial penalties: stricter loan conditions, lower marketability, and potential regulatory issues (eg local levies or difficulties in obtaining permits). Yet the way these risks are reflected in underwriting is not consistent. While a few managers adjust yields or rental assumptions to reflect carbon performance, others mostly rely on energy thresholds without linking them to cash flows.

10 See Appendix 1 of the INREV Sustainability Guidelines for a summary of specific climate-related risks to consider in a risk management framework.

Frameworks to define NZC, like CRREM, are frequently used but are often applied differently across the market. Some investment managers integrate them directly into business plans, while others use them more as a general guide.

CRREM was the most referenced during the interviews but also has limitations that add complexity. It does not address embodied carbon and does not cover all asset types or geographies. In addition, it applies energy intensity benchmarks per square metre but ignores building height. This means that similar buildings can end up with very different values, leading investors to create internal benchmarks or rely on technical assessments that more accurately reflect actual performance.

Physical climate risk

The lack of measurement standards limits the ability to incorporate physical risks such as floods or extreme heat into underwriting models. Investors and investment managers adjust discount rates using insurance data modelling, or directly via Capex, such as installing passive cooling systems or flood barriers. While these efforts may extend the (economic and technical) lifespan of the asset, ultimately generating returns for investors, they might not always increase the asset value and protect it. In this context, insurance premiums in locations subject to environmental hazards may lead to increases in Opex and lower asset value.

It is also unclear how to measure the impact of these upgrades or when to include their costs. Regulations and building codes vary by country, making it difficult for investment managers with cross-border portfolios to apply a uniform underwriting approach to physical risk.

Environmental Capex

Another operational challenge is the lack of clarity around what qualifies as environmental Capex.

Many upgrades, such as new boilers or better lighting, also fall under regular maintenance. This makes it difficult to link the spending directly to environmental goals. In multi-tenant buildings, unclear cost-sharing makes it challenging to plan and carry out improvements, even when they make sense technically.

Even when upgrades improve performance, they are often only deemed to be environmentally related after the fact, and not always consistently. This makes reporting to investors difficult and weakens their case for demonstrating value impact.

Additionally, showcasing the operational benefits is challenging when new systems are not properly set up, maintained, or used, as this can lead to lower than expected energy savings and reduce reliability of forward-looking cash flows.

The valuation impact is further limited by the absence of consistent pricing evidence. Better sustainability performance does not consistently lead to higher pricing at sale, and lower-performing buildings are not always discounted. Without observable market evidence, linking environmental-related Capex to higher valuations relies more on personal judgement.

For further insight into challenges and solutions when implementing NZC strategies, see the INREV paper.

Modelling approach

The way in which environmental factors can influence underwriting inputs is illustrated in Chapter 2. The assumptions are derived from existing market practices, mainly linked to brown-to-green repositioning strategies, where environmental upgrades unlock value through improved financial performance.

Underwriting scenarios

These dynamics can be explored further using a 10-year underwriting model and applying multiple scenarios. Table 2 outlines four illustrative scenarios for consideration. These range from 'Ambitious environmental goals', involving full CRREM compliance, NZC targets, and full alignment with frameworks such as the EU Taxonomy, to 'No defined environmental goals', which underscores downside risks[11] associated with future regulatory misalignment and shifting market expectations.

In this context, an 'Ambitious' scenario (full CRREM alignment) could project a yield improvement by year 10, while the 'No Goals' scenario might reflect a discount.

The modelling of these scenarios should take into account variables such as property type development stage (new build vs existing stock), holding strategy, and location to reflect local regulations. Broader macro trends, such as tightening regulation, evolving tenant demand, advances in building materials and construction technologies, as well as cleaner and cheaper energy, can influence overall modelling outcomes.

Table 2 - Illustrative underwriting scenarios for assessing environmental factors

Scenarios		Potential features
1.	Ambitious environmental goals	• Net zero/carbon positive • CRREM compliant across all time periods; full EU Taxonomy alignment
2.	Economically feasible environmental goals	• Specific performance targets eg ASHRAE • End target CRREM compliant; partial EU Taxonomy alignment
3.	Compliance-only limited environmental goals	• Minimum regulatory requirements eg EPC, carbon limits
4.	No defined environmental goals	• Downside risk of assets/portfolio

Note: The four scenarios are subject to change and can be adapted by market participants. They are not necessarily tied to a specific expected value impact. Scenarios could overlap or even reverse over time if incentives/market expectations for going beyond minimum requirements decrease or if meeting regulations becomes too costly in some markets or for certain assets.

11 CRREM. (2022). CRREM initiative´s definition on stranding risk and stranded assets in the build environment.

How to get started with the integration of environmental factors

Incorporating environmental factors into underwriting is complex and requires careful consideration; the steps below can support a consistent approach.

1 **Engage with external valuers**

When sharing their opinion of value / market value with clients, external valuers are expected to disclose whether environmental factors, such as energy efficiency, GHG emissions, and physical or transition risks, have already been reflected in the estimated amount provided, including comparable market transactions where available. Investment managers should confirm this with their external valuers to avoid the risk of double counting, especially if investment managers or investors plan to apply their own adjustments or overlays.

2 **Identify most relevant environmental factors**

Review the six environmental factors in Table 1 to identify which are most relevant, in line with the asset's business plan and overall portfolio strategy. It is important to assess whether these measures are practical, depending on the asset lifecycle. For existing assets, technical or financial limits may restrict what can be actioned. For new developments, improvements can be planned early on and aligned with long-term portfolio goals.

3 **Assess performance and estimate environmental Capex**

Evaluate energy use, carbon intensity, and physical climate risk exposure. Following this assessment, Capex needs can be estimated based on transition goals or resilience requirements and incorporated into financial models, as relevant.

4 **Test scenarios**

A DCF underwriting methodology can be used for the base case and various scenarios can be tested to frame environmental ambition levels. Tools such as shadow carbon pricing or green IRR can be explored to test sensitivity to future carbon costs and regulations.

5 **Monitor and review**

Asset business plans should be regularly updated based on ESG screenings of the portfolio to prioritise those assets that require retrofitting, mitigation or adaptation measures. These should be supported by market evidence or consideration of any regulatory changes.

6 **Increase transparency**

Investors should be informed about the extent to which environmental factors are reflected in market values as well as in the underwriting assumptions used in the business plans, where applicable.

The INREV Property Valuation Guidelines emphasise that investment managers should ensure external valuers comply with international valuation standards and consider sustainability factors in the valuation process. Appendix 2 of the Guidelines provides examples of sustainability-related disclosures related to valuation inputs.

Takeaways and next steps

This paper aims to raise awareness of the various ways investors, investment managers and lenders currently assess environmental factors to understand both potential risks to value and opportunities for value creation. Approaches vary significantly. Some are actively integrating environmental considerations into underwriting, while others remain cautious due to data limitations and measurement challenges.

The interviews confirmed that indicators such as energy efficiency, carbon intensity, and climate risk are already influencing underwriting inputs, including Capex, Opex, and exit yields. Decarbonisation pathways, such as CRREM, along with proprietary tools developed by investment managers, are being used to assess downside risk exposure.

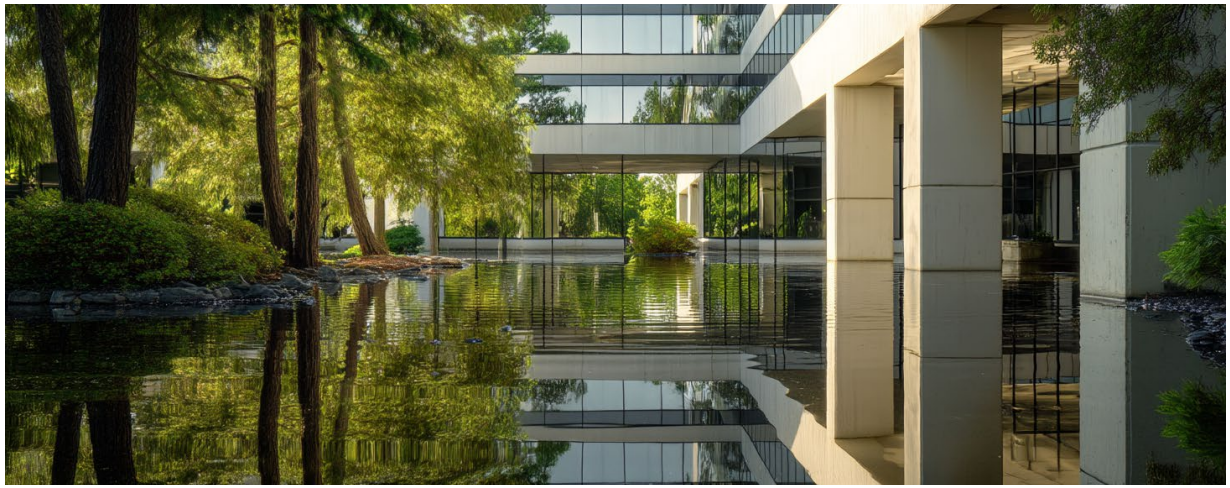
Efforts are also underway to link environmental Capex to long-term Opex savings and value creation but proving these links remains difficult. Isolating environmental upgrades from other capital improvements adds complexity to financial modelling.

Energy ratings, such as EPCs, and certifications, such as BREEAM, are useful benchmarks, but they represent a snapshot in time. Real asset performance remains dependent on tenant behaviours and operational practices.

New approaches, like shadow carbon pricing and green IRRs, are being tested in asset underwriting to better account for future carbon costs and potential return impacts, though they are not yet widely used in transaction-based valuation models due to regulatory uncertainty, the theoretical assumptions involved, and market inconsistency.

As environmental considerations become increasingly integrated into investment decision-making processes, interest lies in how valuers will factor these inputs into their established and regulated valuation frameworks. This could signal a gradual shift from traditional, reactive valuation approaches based on observable market evidence to more forward-looking, scenario-informed methods that can account for regulatory developments, investor expectations, and long-term environmental performance.

To support this transition, better data, more consistent methods, and clearer links between environmental performance and pricing are necessary. The next steps of this project will include testing the return impact of different environmental scenarios and ambition levels, with the goal of improving comparability and transparency across the real estate market.



INREV welcomes input on market experiences and feedback on the four modelling scenarios introduced in Chapter 6. Visit Environmental considerations in underwriting to learn how to get involved and contribute to the next phase of this important industry initiative.

Appendix

Appendix A. Definitions and abbreviations

- **Environment, Social and Governance (ESG):** ESG refers to a set of factors related to environmental, social and governance issues. They may present both risks and opportunities for a particular investment, and can be used to define investment strategies, performance and risk metrics, and criteria for investment. Taking them into account in the investment process as well as in the ongoing operations, can help improve future financial performance.

  Environmental criteria may include climate change and carbon emissions, air and water pollution, biodiversity, deforestation, energy efficiency, waste management and water scarcity.

  Social criteria may include tenant satisfaction, gender and diversity, employee engagement, community relations, human rights and labour standards.

  Governance criteria may include board composition, audit committee structure, bribery and corruption, executive compensation, lobbying, political contributions and whistleblower schemes.

  The UN PRI defines ESG integration as “the explicit and systematic inclusion of ESG issues in investment analysis and investment decisions”. It is more than a decision about doing what is environmentally or socially responsible or morally right. Instead, it is about generation of long-term returns which is dependent on stable, well-functioning and well-governed social, environmental and economic systems.

  Ultimately, integrating ESG into investment decision making contributes to better long term decisions for stakeholders through visibility of risk and structured management of material risks.

For more definitions, refer to the INREV Global Definitions Database.

Abbreviation	Full form
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineer
BREEAM	The Building Research Establishment Environmental Assessment Method
Capex	Capital Expenditure
CRREM	Carbon Risk Real Estate Monitor
CSRD	Corporate Sustainability Reporting Directive
DCF	Discounted Cash Flow
EED	Energy Efficiency Directive
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Certificate
ERV	Estimated rental value
ESG SDDS	Environmental Social Governance Standard Data Delivery Sheet
GHG	Greenhouse gases
HVAC	Heating, Ventilation, and Air Conditioning
IRR	Internal rate of return
IVS	International Valuation Standard
IVSC	International Valuation Standard Council
KPI	Key Performance Indicator
LCA	Life Cyle Assessment
LEED	Leadership in Energy and Environmental Design
NOI	Net Operating Income
NPV	Net Present Value
NZC	Net Zero Carbon
OECD	Organisation for Economic Co-operation and Development
Opex	Operating expense
RICS	Royal Institution of Chartered Surveyors
SFDR	Sustainable Finance Disclosure Regulation
WBEF	World Built Environment Forum

Appendix B. Most relevant environmental factors for underwriting: IDs from INREV Reporting Guidelines, ESG SDDS, and RICS ESG data list

Environmental factors	INREV Reporting Guidelines	ESG SDDS	RICS ESG data list
Energy consumption / energy use intensity	ENV4 ENV6	ESG3.1.4 ESG3.1.6	02 Energy consumption 03 Renewable energy production (onsite)
Energy ratings	ENV27 ENV28	ESG3.8 ESG3.8.1	01 Energy rating
GHG emissions	ENV18 ENV42 ENV43	ESG3.3.9 ESG3.3.10 ESG4.3 ESG4.3.1 ESG4.3.1.1	05 Greenhouse gas emissions
Stranded year based on energy/ carbon intensity	ENV 48	ESG4.4.1 ESG4.4.1.1	06 Emissions pathway analysis
Risk score / level	ENV23	ESG3.4.2 ESG3.4.2.1 ESG3.4.2.2	07 Physical climate risk
Building certificates	ENV26	ESG3.7	04 Labels and certificates

Appendix C. Social factors

Despite not being part of the focus on this paper, below is also a list of key social factors which may in the future also be considered for integration within underwriting practices:

- **Diversity, Equity and Inclusion (DEI):** In relation to the employment practices of the vehicle (or of the manager) and also in relation to engagement with suppliers and occupiers
- **Health, Safety and Wellbeing (HSW):** HSW initiatives of the vehicle (or of the manager) that involve both prevention of physical and mental harm, and promotion of stakeholders' health.
- **Stakeholder engagement:** The process of involving stakeholders (tenants, community, suppliers etc.) who may be affected by the decisions made or can influence the implementation of the decisions. Engaging with stakeholders helps the manager identify and manage its negative and positive impacts.
- **Employee development:** In relation to working conditions for employees as well as in the supply chain.
- **Human rights:** Rights inherent to all human beings, whatever their nationality, sex, ethnic origin, colour, religion, language or any other status. These cover issues such as child labour, forced labour etc.
- **Social impact:** In relation to real estate, social impact can be achieved through initiatives such as developing affordable housing, social housing, healthcare, or education facilities in areas where they are lacking.[12]

For a full range of social KPIs and their recommended reporting, see the INREV ESG SDDS.

12 See INREV Global Definition Database.

Appendix D. Key industry stakeholders in relation to the integration of environmental factors in valuation and underwriting

- **Regulators:** Governments and standard-setting organisations driving environmental compliance.
- **Industry associations:**
  - RICS provides valuation standards through the RICS Valuation – Global Standards (Red Book – Latest Edition, February 2025), which acknowledges environmental factors as emerging in property valuation. While environmental considerations are not yet fully integrated, RICS has issued guidance on environmental factors in valuation, emphasising the importance of risk assessment related to climate change, regulatory shifts, and market expectations. Building upon RICS' foundational work involves moving from high-level guidance to practical implementation. This includes developing methodologies for quantifying environmental risks in valuation models, establishing standardised environmental-adjusted discount rates, and integrating environmental factors into long-term property value assessments.
  - ULI has as mission to shape the future of the built environment for transformative impact in communities worldwide. ULI's C Change programme was formed in 2021, with the objective to mobilise the industry to speed up and scale up decarbonisation of the built environment in Europe. The programme identified system interventions which have the potential to drive industry-wide change, with transition risk assessment in property investment models being one of them.[13] Currently ULI is developing the Preserve tool which aims to streamline the implementation of the guidelines and to enable real estate professionals to quantify the financial impacts of transitioning to a net-zero economy.
- **Investors and investment managers:** Their evolving expectations and practices.
- **Valuation and audit professionals:** Roles and challenges faced by valuers, including the evaluation conducted by auditors of processes, systems, and data for assurance purposes.
- **Lenders:** How banks are assessing environmental value at risk in their real estate portfolios.
- **Energy performance ratings:** Including but not limited to ENERGY STAR or EPCs etc.
- **Green building certifications:** Including but not limited to BREEAM, LEED etc.
- **Other non-profit organisations:**
  - IVSC develops and maintains the IVS, which serve as a global framework for real estate valuation practices. IVSC has recognised the growing importance of environmental factors and their implications for asset valuation, highlighting the need for valuers to assess climate-related risks and environmental metrics. While environmental integration remains an evolving area, IVSC has issued guidance on how environmental risks should be factored into valuation assumptions. Building upon IVSC's work involves moving from broad principles to structured valuation methodologies, ensuring that environmental considerations are systematically integrated into underwriting practices and risk assessments.

13 ULI. (2024). C Change Survey: Decarbonisation and Transition Risk in Real Estate Investment

