

Carbon Risk Real Estate Monitor



CRREM Report of “lessons learned” on Best-practise Users

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EXECUTIVE SUMMARY



The *Carbon Risk Real Estate Monitor (CRREM)* project has developed a science-based downscaling methodology to derive decarbonisation pathways that are consistent with the goals of the Paris Climate Agreement. **These pathways have been derived at the level of specific building types in individual countries** (for further details please see www.crrem.org/pathways and <https://www.crrem.eu/publications/reports>). In order to make this information immediately actionable by real estate portfolio managers and institutional investors, **CRREM has constructed a freely available and easy-to-use tool** (to directly download the tool please visit www.crrem.eu/tool).

The *CRREM* Risk Assessment Tool offers the possibility for its users to evaluate the progress of a **commercial real estate portfolio's carbon reduction performance against decarbonisation targets in line with the Paris Agreement** (i.e., limiting global warming to 2°C or 1.5°C) as well as individual target setting.

The CRREM tool helps to identify which properties will be at risk of stranding due to the expected increase in stringent building codes, regulation, shifting market expectations and increasing carbon prices. Climate risks addressed by CRREM are also referred to as **transition risk**. The tool also enables an analysis of the (positive) effects of refurbishing single properties (energetic retrofit) on the total carbon performance of a company. Also, the trade-off between operational savings and embodied carbon related to refurbishment measure can be analysed.

The *CRREM* Risk Assessment Tool was designed in close collaboration with several scientific- and stakeholder committees and was subject to comprehensive moderated testing. After the release of the final version, there was a further steep increase in CRREM and CRREM tool users. As outreach increased the stakeholder engagement further expanded, leading to collaborations with e.g., with **SBTi, DEEP, BREEAM, PCAF, E-CREDA, E-CORE, WGBC & UNEP FI and many others**. To date a wide stakeholder engagement was reached with more than **2.200 assets and over 12 million square meters of lettable space analysed**. Investors and asset managers responsible for more than **400 Bio. Euro Assets under Management (AuM)** made use of the tool and pathways to date.

Stakeholder & best-practice user feedback was defined through:

1 The ongoing & continuous CRREM project support & feedback	2 CRREM dissemination & promoting further global outreach	3 Transparent & strategic input on sources, methodology & pathways
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The heterogenous group of users represent a wide variety of the most relevant investors and stakeholders that are using the CRREM tool and pathways. These include institutional investors and asset owners; fund managers, REITs, and other property companies, asset operators, certification bodies, relevant industry bodies, and academia.

The major conclusions of CRREM “best-practice” users include:

- ❖ The tool clearly provides an added value for the industry, for example enabling a **transparent analysis of carbon risks, calculation of abatement costs** and evaluating the correct **timing of future retrofit measures**.
- ❖ The tool provides the perfect opportunity to start a very important **dialogue between investors and fund managers** about the carbon performance of their assets and possible ways to reduce the carbon footprint.
- ❖ The tool is useful for **setting science-based, Paris-aligned** targets for individual commercial real estate properties with regards to the carbon intensity of their assets.
- ❖ The tool can help asset managers **report carbon risks in line with other major reporting initiatives**, including the TCFD and the EU Taxonomy and PCAF.

Due to the high level of interest generated over the course of the *CRREM* project and the utility of the tool for commercial real estate in the European Union, the *CRREM* project has received a follow-up funding from the Laudes Foundation and further strategic partners. **The additional scope now focuses on the annual update of the**

decarbonisation pathways and on global dissemination activities. The European **CRREM** project matured and is now a truly global CRREM initiative.

CRREM and **GRESB**, the **ESG** benchmark for real assets, have partnered to make the **CRREM** tool even more accessible to its expansive network of commercial real estate portfolios. **By integrating the CRREM tool into the GRESB Portal**, **GRESB** members will have more information on the Paris alignment, performance, and transition risks of their assets than ever before.

This is a lesson learned report on best practices for 2-Degree readiness in real estate. As per Grant Agreement, this deliverable summarizes the lessons learned based on the “2-degree ready” reports that have been prepared by participating investors and CRREM Global Scientific & Investor Committee (former EIC) members (1). From the completion of the “2-degree ready” reports (2) on company level and consultation records, a basis is formed for best practise communication within the industry. In addition to feedback from investors and GIC members, further feedback has been gathered from companies, asset managers and developers, **presented as “Case studies” in this report.** The case-studies highlight experiences of CRREM and the reasons why investors use CRREM. This report concludes with the industry best-practises and challenges remaining.

¹ Note: Please see deliverable D8.3 Report with feedback from consultation with stakeholders from the real estate sector for further information on “2-degree ready” reports. Additionally, deliverable D7.3 “Report on Completion of Pilot Testing Phase” includes feedback from the EIC & industry stakeholders as well as detail on the alignment with CRREM and major initiatives such as GRI, EPRA, etc.

² Note: Please see deliverable D8.3 Report with feedback from consultation with stakeholders from the real estate sector for further information on “2-degree ready” reports.

INTRODUCTION



As the effects of climate change are already increasingly being felt around the world in the form of more frequent and severe extreme weather events and troubling climatic patterns, the social impetus to transition to a low-carbon economy is increasing. The large-scale economic rebalancing required to mitigate the scenario of **catastrophic climate change introduces what is called ‘transition’ risk**, encompassing not only the risk of rising costs due to the pricing-in of carbon emissions on various national and international scales, but also market effects, technological disruptions, legal liabilities, and reputational risks. In the case of the real estate sector, the transition risks of carbon pricing and energy efficiency regulations loom large.

The Carbon Risk Real Estate Monitor (CRREM) project provides an elegant solution to the challenges of the commercial real estate sector with regard **to aligning with Paris targets and mitigating transition risk. CRREM delivers a science-based, methodically rigorous, industry supported, and framework aligned way for the commercial real estate sector to understand international contexts, set science-based targets, benchmark specific real assets, and analyse portfolio performance.** Using the statistical framework of the *Sectoral Decarbonisation Approach (SDA)*, a downscaling methodology also used by the *Science-Based Targets Initiative*, CRREM has derived Paris-aligned decarbonisation pathways for commercial real estate assets that can be used to benchmark the current and future performance of commercial real estate assets against the long-term international targets. The Carbon Risk Real Estate Monitor (CRREM) project has derived decarbonisation (GHG intensity) and energy reduction (energy intensity) pathways (i.e. trajectories from 2020 to 2050). The purpose of these pathways is **to translate the goals of the Paris Agreement (to limit global warming to 2C with ambition to 1.5C by the end of the century) into regionally- and property-type-specific trajectories against which real estate assets and portfolios can benchmark themselves.** Such century-long temperature targets have come to be associated with specific global carbon budgets and emissions pathways.

Further funding from APG, PGGM, and NBIM, has allowed CRREM to expand its pathways to cover the majority of the global real estate markets (not just EU) and also residential real estate. These pathways are also finalized and publicly available. The Tool remains limited to EU/commercial real estate, users may use however the CRREM Guide “Using the CRREM Risk Assessment Tool outside the EU”³, which **explains how the tool can be easily adapted for the use of non-EU member states and residential property.**

After inputting specific information about particular assets in the CRREM Tool, real estate portfolio managers can **analyse their commercial real estate portfolios** in a number of different ways, from **alignment with Paris goals, to identification of assets at risk of becoming stranded due to potential regionally-specific climate policy, to understanding of costs of future energy consumption and carbon emissions, to design of retrofit strategies in an effort to comply with future regulation.** This benchmarking exercise allows asset managers, institutional investors, and other stakeholders to estimate not only **when a particular asset might be stranded as a result of non-compliance with national carbon intensity and energy efficiency regulations**, but also, upon aggregation, what this means at the portfolio level. With major global investors, industry bodies and academics recommending the use of CRREM for the real estate sector (e.g., IIGCC, UNEP FI, ULI Greenprint, NZ AOA and many more), CRREM is now the standard for the real estate market’s net zero ambitions.

This report provides examples of how CRREM is being used by some of the **most advanced players in the real estate industry.** Through their various investment philosophies, objectives, and experiences, we hope to extract lessons on how to best leverage CRREM to specific use cases, as well as establishing a way forward for how **CRREM could best serve the industry in the future.** Due to the wide usage and global outreach achieved to date, this **report presents success stories and best-practices** to further pave the motivation for additional new users of the CRREM tool and pathways.

CRREM is no longer a project but has now become an initiative that is continuously gaining new members and partners - do not wait and **join the CRREM initiative!**

³ Guide available via. <https://www.crrem.org/wp-content/uploads/2020/10/CRREM-Guide-to-using-the-Tool-outside-the-EU-v1.2-15.10.2020.pdf>



THE RIGHT TOOL FOR THE JOB: *EXPERIENCE OF PARTICIPANTS*

THE RIGHT TOOL FOR THE JOB: EXPERIENCE OF PARTICIPANTS

“The CRREM tool and pathways allow us to better understand our portfolio’s exposure to climate related risks and the management of these by enabling target-setting aligned with a 1.5C trajectory.

It is an important part of integrating climate related risks into investment decision making and risk management.”

Peter Sandahl, Head of Sustainability, Nordea Life & Pension, Representative for the UN convened Net-Zero Asset Owner Alliance



“CRREM is a useful tool for a global investor to understand where the portfolio sits against the pathway that aligns with the Paris Agreement in a globally consistent manner.

Therefore, GPIF supports the expansion of CRREM to include major real estate markets outside the EU.

We expect more fund/asset managers will be encouraged to assess their own portfolios and disclose the result to investors, through which we hope the market as a whole will become more transparent in terms of carbon risk in the long run.

Hideto Yamada, Head of Global Real Estate, GPIF (Government Pension Investment Fund)





“CRREM helps to mitigate the transitional risk of real estate portfolios by offering the possibility to evaluate the progress of a portfolio’s carbon reduction performance in line with the Paris Agreement (i.e., limiting global warming to 2°C / 1.5°C).

For stranded assets, the tool quantifies CAPEX needed on a top-down level to bring the assets back on-line with carbon pathways as per location as well as it guides the environmental risk of the asset for new investment deals.

We at Asset Owner Alliance (AOA) recommends the CRREM tool as our recommended approach for risk assessment for one’s portfolio. We are also very thankful for the team behind the tool for their valuable support.”

Sadaf Stutterheim, Real Estate Strategist, Investment Management, Zurich Insurance Company Ltd

“UNEP FI is working with leading financial institutions globally to set norms and practices for integrating climate risk into management and governance practices and capital allocation.

CRREM is a valuable tool for moving institutions beyond just disclosure of risk toward alignment with the Paris agreement objectives.”

Matthew Ulterino, Principal, UNEP FI



“The work done so far is impressive, my respect for that.”

*Prof. Andy van den Dobbelsteen, PhD MSc
Professor of Climate Design & Sustainability
Faculty of Architecture and the Built Environment
Delft University of Technology*





“I’d like to commend the authors on an exceptional tool and the breadth of its considerations and its practical capacity for implementation into business and real estate life cycle analysis and planning.

The ability to be able to examine individual assets and then to a portfolio level provides great capabilities in providing additional guidance to decision-makers in the real estate or funds management areas.

Particularly, in identifying stranded assets, but also being able to assess a likely timeframe in which the asset should be retrofitted, or sold on.”

Dr. Georgia Warren-Myers, Senior Lecturer in Property, Faculty of Architecture, Building and Planning, Melbourne School of Design

“I think the CRREM tool is especially notable because it approaches carbon risk from the stance and perspective of real estate portfolio owners and managers, presenting results in a manner that is relevant and meaningful for portfolio decision-makers.

Two other key strengths of the tool are:

- a) it allows for inputs and analysis at both the asset and portfolio level; and*
- b) it includes pathways for a host of countries – which is important for companies with global portfolios.*

I think the integration with GRESB reduces the data entry burden and improves adoption potential. I’ve observed growing interest in CRREM from various US stakeholders which bodes well for its application in the US and beyond.”

Dr. Paul Mathew, Staff Scientist and Department Head of Whole Building Systems, Lawrence Berkeley National Laboratory (LBNL)





“The CRREM tool helps us to improve our understanding of climate related transition risks in our portfolio, by allowing for an insightful comparison of our portfolio’s carbon intensity against targets in line with the Paris Climate Agreement.

All in all, an excellent tool to assess transition risks of real estate investments and with that enhance investment decision making. Special thanks to all involved in its development as well as in the much-appreciated ongoing support.”

*Dario Bryner, CFA, Investment Analytics Specialist,
Assistant Vice President, Group Asset Management, Swiss Re Management Ltd*

“As in all other parts of the world, the Japanese real estate sector is looking for a practical way to assess their climate risks. There, CRREM is a promising tool with global pathways having been published recently, and the EU tool being already linked to the GRESB participant portal.

We, at CSRD, are proud to be a local supporter for CRREM to provide technical inputs from Japan.”

*Dr. Tomoko TAKAGI, Executive Officer, Partner, CSR Design
Green Investment Advisory, Co., Ltd.*





“The current climate crisis and its associated risks pose significant economic threats to investors and investees in the listed real estate sector.

As a trade association, we value open access tools like CREEM which enables property companies to assess climate risks and to communicate their carbon exposure to shareholders for better investment decisions.”

Gloria Duci, ESG Manager, EPRA

“BuildingMinds leverages data-driven insights for corporates and real estate investment companies to make the best possible decisions for the present and future.

Providing a single, centralized and secure platform with a dynamic Digital Building Twin, BuildingMinds consequently integrates decarbonisation strategies for the real estate sector: transparency of carbon emissions, resource efficiency and future-proofing buildings against climate risk, applying CRREM decarbonisation pathways to identify stranded assets.”

Jens Hirsch, Domain Expert Sustainability, BuildingMinds



Full List of Testimonials:

The complete list of testimonials and experience of participants can be found on our homepage via <https://www.crrem.eu/tool/experience-of-participants/>.

Note: *Please contact us if you would like to get in touch with these CRREM users for a direct exchange in experiences!*

CRREM

**CASE STUDIES OF SOME OF THE
MOST ADVANCED INDUSTRY
PLAYERS**



SECTION A CASE STUDIES OF SOME OF THE MOST ADVANCED INDUSTRY PLAYERS

A.1 CASE STUDIES & INDUSTRY FEEDBACK

To date over **12 million m² of space was analysed via the CRREM tool**. The Assets under Management (AuM) owned and/or managed by the testers and CRREM users reached over 400 billion Euros and over 2.200 assets analysed via the CRREM tool.

As outreach increased the stakeholder engagement further expanded, leading to collaborations with many industry organizations/ NGOs like e.g., **SBTi, DEEP, BREEAM, PCAF, E-CREDA, E-CORE, WGBC & UNEP FI and many others**.

The **heterogenous group** of users represent a **wide variety of the most relevant stakeholders in the tool's audience**. These include institutional investors and asset owners; fund managers, REITs, and property companies, asset operators, certification bodies, relevant industry bodies, and academia.

“Transitioning large real estate portfolios toward a lower carbon future requires access to science-based, easy-to-use, and industry-specific tools to prioritize efforts and set concrete targets.

The CRREM tools provide a unique and useful response to this challenge and we look forward to being able to apply these tools to our global property portfolio.”

**Stéphane Villemain, Vice-president,
Corporate Social Responsibility**

“The CRREM tool helps us to improve our understanding of climate related transition risks in our portfolio, by allowing for an insightful comparison of our portfolio's carbon intensity against targets in line with the Paris Climate Agreement.

All in all, an excellent tool to assess transition risks of real estate investments and with that enhance investment decision making.

Special thanks to all involved in its development as well as in the much-appreciated ongoing support.”

Geert Paemen, Group Sustainability Director

A selection of investors which have been using the CRREM decarbonisation pathways and the CRREM risk assessment tool, provided further extensive feedback regarding different aspects such as their experience and best-practice methods in industry.

The feedback has been structured and provided in the form of **case-studies from industry**. Nordea Life and Pension, Castellum, DEKA, Aberdeen Standard Investment Management, AEW, Nuveen, Grupo Valero and Hijos de Benlliure Empresa Constructora S.L. stated their objectives in using CRREM and described their **experience to-date, highlighting key take-away** points as well as stating how **CRREM assists in reporting and disclosure requirements**. CRREM users include the most advanced players in the real estate industry. As users provide transparent and strategic feedback, best-practices can be learned from these key players.

Other feedback mechanisms to ensure a robust methodology and a functional and for daily use practical tool included especially⁴:

Public consultation process: After thorough internal quality assurance as well as review and feedback from the GIC, SAC and guided testing, CRREM published a press release inviting all stakeholders to provide written feedback. The press release was published on various media-channels on the 11th of May 2020, calling on all relevant market participants, including investors, managers, real estate investment trusts (REITs), green rating systems and other stakeholders, to share their views on the methodology of the decarbonisation pathways and their usefulness in understanding and managing long-term climate-related transition risk in the global real estate sector. The written responses were submitted to the CRREM team by the 15th of June 2020. A summary of the consultation responses was publicly released via a second press release on the 3rd of August 2020. Particularly extensive perspectives and input were obtained for the USA, UK and Japan. All consultation feedback has been exhaustively reviewed and (if needed) implemented, ensuring alignment with industry expectations and scientific standards. Compared to the version released for consultation, the final version accounts for slight changes regarding starting figures for energy intensity based on additional data sources in some countries, the adoption of a more ambitious overall decarbonisation agenda in some markets and therefore more ambitious decarbonisation of energy sources over time (especially electricity), improved clarity and document structures, verification and utilization of additional country-specific sources.

Scientific Advisory Committee (SAC) providing feedback: The Scientific Advisory Committee (SAC) operates as an advisory board to the CRREM project consortium. External members are accomplished scholars at universities and think-tanks with relevant professional and policy experience and bring in industry-based expertise to the CRREM project. The SAC consists of at least one representative from each region; Europe, North America, and Asia. The SAC serves as expert reviewers and provides independent consolidated statements of assessments and advice of the project methodology and challenging outcomes to ensure market acceptance and credibility. SAC engaged in project meetings in order to share specialized technical expertise throughout and review existing project documentation including assumptions and data sources.

Investor Workshops: The CRREM consortium presented over 20 workshops and seminars, including for example the Asset Owner Alliance workshop, a workshop with DGBC, the CRREM-ERES London industry seminar, an investor workshop for E-CREDA, UNEP-FI CRREM workshop and many others. A huge audience of various real estate companies and international investors were reached, as the workshops were mostly attached to other, large real estate events. The huge number of requests and invitations indicate the high interest in the CRREM project and its findings and shows the large interest of the relevant audience.

Global Scientific & Investor Committee (GSIC) providing feedback: The CRREM Global Scientific & Investors Committee has gained over 40 members. The former EIC has now been changed into a Global Scientific & Investor Committee due to the huge success and global outreach that the CRREM initiative has achieved. The GSIC helped to ensure that the CRREM tool and pathways fulfil industry needs by ensuring contextual relevancy and alignment to industry expectations.

Individual calls with real estate managers and experts: Individual calls were scheduled with several real estate investment managers, amongst others CBRE Global Investors. CBRE Global Investors specifically provided portfolio carbon data, which enables testing some assumptions with their office portfolio. Further testers and users for example included AEW, Alstria, Nordea Life & Pension, DWS, LEG and Castellum. This diverse and wide range of industry stakeholders enabled feedback from various perspectives.

GRESB governance groups: The CRREM Methodology and development of the tools were discussed with the regional GRESB Benchmark Committees and Advisory Board. Particularly the Advisory Board, consisting of limited partners looks

⁴ Full list in the CRREM deliverable D7.4 on feedback regarding WP2-6.

at the tool favourable, arguing that next to an ESG benchmark you also need a nominal target to assess progress towards the internationally agreed climate goals.

Panels and events: The CRREM consortium frequently received feedback during panels and events. Amongst others the methodology was discussed during the ULI Product Council Day in Copenhagen, the European GRESB Advanced Trainings, and university seminars. Feedback was overwhelmingly positive.

Unsolicited feedback: After the CRREM Report ‘Stranding Risk & Carbon – Science-based decarbonising of the EU commercial real estate sector’ was published, a review of the report was published in a blog by Adam Smith and Robert Cohen, from Verco Global, a sustainability consultancy. Further feedback was received on the second period of the project during the publication of further CRREM reports and numerous articles and papers. The CRREM papers have been industry reviewed and feedback has been included. Further, the decarbonisation pathways were challenged by various industry stakeholders and experts outside the CRREM GIC. Feedback and questions were mainly directed at the starting values in year 2018.

The European Commission: CRREM ‘was identified as a flagship project on financing sustainable energy and climate actions’ by the European Commission; and we have been invited to present CRREM at the Covenant of Mayors' Investment Forum – Energy Efficiency Finance Market Place in Brussels on 18 - 19 February 2020. The project was presented under the thematic strand on Future-proof investments – financing climate adaptation.

Feedback from wide dissemination activity: The CRREM consortium over-fulfilled the dissemination tasks set, enabling a wide range of feedback during activities such as workshops, seminars, publications of articles and scientific papers as well as online activity enhancing the webpage and social media channels.

Feedback through case studies: Case studies on “best-practice” users provided valuable feedback. Case studies have been carried out; the results are displayed in the following section.

A.2 CASE STUDY: NORDEA LIFE & PENSION

Nordea Life and Pension

Nordea Life & Pensions (NLP) is the asset owner arm of the Nordea Group and provides life insurance and pension products and services in the Nordic countries. NLP operates in Finland, Norway and Sweden and has EUR 60bn in assets under management.

Being a responsible investor is a central part of NLP's investment philosophy. Integrating sustainability across asset classes, throughout the investment decision making processes and in the active ownership practices is an essential part in meeting our objective to maximise long-term returns in a responsible manner and offer compelling products and solutions with an enhanced focus on sustainability. Our ambition is to be in the forefront of sustainable investing in our industry and in the markets where we operate. NLP's real estate portfolio consists of approximately 100 commercial and residential buildings distributed across Finland, Norway and Sweden. The environmental standards are generally high and sustainability is a central part of the management and strategy. The data coverage and quality are overall very good and the cooperation with tenants is an important part to continuously improve the environmental standards and gathering of high-quality data for reporting and decision making.

“The CRREM tool and pathways allow us to better understand our portfolio’s exposure to climate related risks and the management of these by enabling target-setting aligned with a 1.5C trajectory. It is an important part of integrating climate related risks into investment decision making and risk management.”

Peter Sandahl

Head of Sustainability, Nordea Life & Pension, Representative for the UN convened Net-Zero Asset Owner Alliance

COMPANY NAME: NORDEA LIFE & PENSION

OBJECTIVES

Nordea Life & Pensions (NLP) is a co-founder of the UN Net-Zero Asset Owner Alliance and has committed to transition its investment portfolios, across all asset classes, to net-zero by 2050, at the latest. NLP will set emission reduction targets with 5-year intervals, with the first targets for 2025 being announced in Q1 2021.

NLP has worked intensively with the CRREM methodology over the past year and is also represented in CRREM's Global Scientific & Investor Committee. We have primarily used the CRREM tool and pathways with two different objectives in mind; 1) enable target-setting for the real estate portfolio using CRREM 1.5C pathways, and 2) integrate the CRREM tool in our risk management practices to further enhance our capabilities to assess transition risks in our real estate portfolio.

EXPERIENCE

Using CRREM pathways for target-setting

In order to create a robust and science-based emission reduction target for 2025 (EOY 2024) we started by outlining a benchmark pathway. To do this we created "Nordic" CRREM pathways for commercial and residential buildings respectively. This was done by combining the national pathways for Finland, Norway and Sweden (where are buildings are located) and weigh it according to the regional distribution. As a second step we used the Sectoral Decarbonisation Approach (SDA) to construct a regionally weighted pathway for our total portfolio – divided between residential buildings and commercial buildings. We included full scope 1 and 2 emissions and scope 3 emissions from tenants' energy and electricity consumption. Location-based emission factors were used.

This approach resulted in a 19.9% reduction requirement (EOY 2024 vs 2019) in the emission intensity for the commercial portfolio. This can be compared with a 25.5% reduction requirement for the Nordic CRREM commercial benchmark. The reduction requirement for the residential portfolio was 22.8% with a 28.3% reduction requirement for the Nordic CRREM residential benchmark. The lower reduction requirements reflects the lower starting point our portfolios have. We also created reduction requirements for each country using CRREM's national pathways. **Figure 1** shows the decarbonisation pathways for our total commercial portfolio, including the Nordic CRREM benchmark. National pathways are also outlined (without their respective CRREM benchmark) to visualise the significant differences between countries. **Figure 2** shows the aggregated pathways for our residential portfolio.

We have assessed different target-setting options using CRREM pathways and also explored pathways from other sources and providers. Although further work remains we believe that CRREM provides the most robust foundation for setting emission reduction targets for our real estate portfolios.

Using CRREM tool in risk management

We believe it is important to distinguish between using CRREM for target-setting purposes and risk management purposes and to understand that, while interlinked, different these need different approaches and methods.

With the high degree of renewable energy sources, the structure of the energy systems and the ambitious national climate pledges, GHG emissions are not always a good proxy for assessing transition risk in the built environment in the Nordic countries. Energy performance will likely play a relatively more important role. Despite this, assessing and understanding transition risk from an GHG emission perspective still yields valuable insights.

Figure 1; Decarbonisation pathways, commercial portfolio (location-based), **Figure 2;** Decarbonisation pathways, residential portfolio (location-based)

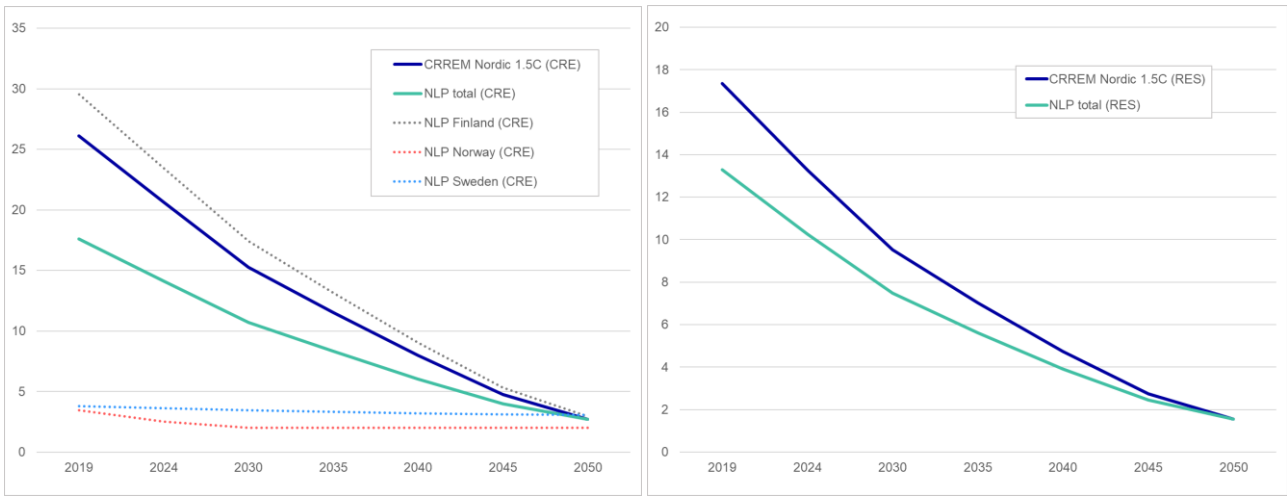


Figure 3; share of stranded assets in a 1.5C scenario (gross floor area, location-based method)

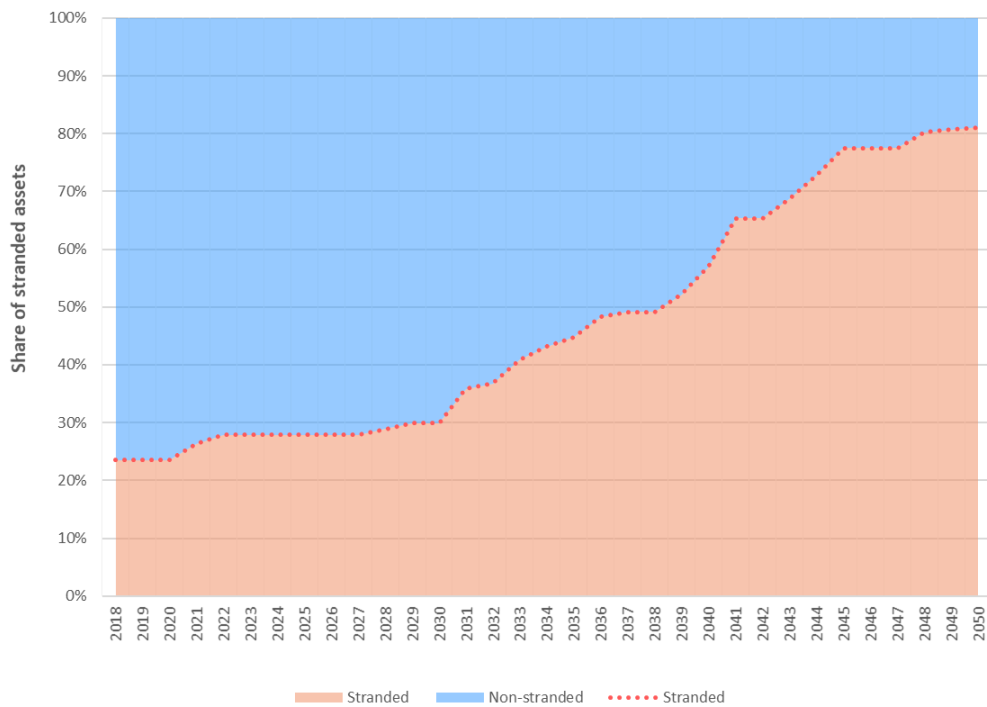


Figure 3 shows the share of stranded assets until 2050 for the combined Finnish and Swedish portfolios. Currently, approximately 20% of the gross floor area is stranded according to the chosen approach and assumptions. This share increases to 30% in 2030 assuming no changes are made to energy performance or the energy mix.

Furthermore, the analysis showed that 56% of the buildings are already 2C ready (i.e. aligned to a 2C scenario) and 16% are already aligned to a 1.5C scenario. The aggregated Carbon Value at Risk is -0.2% in a 1.5C scenario and +2.5% in a 2C scenario (using 3% discount rate).

It is important to note that a location-based approach was used with national/regional emission factors. As almost 100% of all buildings are using green electricity and a majority uses green heating an analysis using market-based approach would yield a significantly more positive result.

TAKE-AWAYS

Working with CRREM has indeed supported us and enhanced our capabilities and understanding when it comes to risk management and target-setting for our real estate portfolios. The combination of a strong scientific foundation, transparency, the very high level of granularity and the practical usability is, in our opinion, a unique feature within the real estate area at the moment.

The complete openness and transparency in the tool – and related methodology documents - have been very helpful to understand the underlying assumptions and methodology. The possibility to adjust the full range of underlying variables also allows for adjusting to different assumptions regarding for example energy and carbon prices, HDD/CDD and emission factors.

In terms of development needs we believe it would be beneficial to focus on continuing to expand the country coverage in the tool and to find a new technical setup for the tool (replacing the existing Excel-based solution). In addition, as CRREM now is being widely recognised and used, we believe that partnering with national organisations would further help to provide even more granular estimations and requirements on national level.

REPORTING/DISCLOSURE

The results from CRREM support us in both setting and reporting on our emission reduction targets. In addition, the CRREM outputs will act as an essential part of our TCFD reporting, other mandatory disclosure requirements and internal reporting frameworks.

Contact

Peter Sandahl

Head of Sustainability, Nordea Life & Pension

Member of the CRREM Global Scientific & Investor Committee



A.3 CASE STUDY: CASTELLUM

**CASTELLUM**

Castellum is one of the largest listed real estate companies in the Nordic market with 642 assets under management valued at a total of approx. 10 bn euro. Castellum's business idea is to create successful and sustainable workplaces in Nordic growth regions by really keeping close to customers, while staying on the cutting edge of innovation and expertise.

Castellum has a long history of sustainability reporting going back to early 2000 and is today a global sector leader in sustainability according to the GRESB benchmark. Castellum is the only Nordic company listed on the prestigious Dow Jones Sustainability Index and also included on the A-list in CDP. For three years Castellum has also presented climate risks according to TCFD including climate scenario analysis.

COMPANY NAME: CASTELLUM

OBJECTIVES

Our aim is to go beyond expectations and to create workplaces where people and enterprises thrive. Investments and development of commercial premises is managed in a decentralized and customer focused organization. Castellum focuses on cash flow and operates with low financial risk. Castellum's operations are focused on cash flow growth, which along with a stable capital structure provide the preconditions for solid growth in the company, while at the same time offering shareholders a competitive dividend. The objective is an annual growth in cash flow, i.e. income from property management per share, of at least 10%. Castellum is the Nordic region's most sustainable property company. Sustainability initiatives are fully integrated into our operations and are ingrained in the ownership, management and development of our property portfolio as well as our customer relations, employees and financing. Sustainability initiatives have always been a natural part of Castellum's operations. Sustainability involves creating long-term solutions from economic, ecological and social perspectives, and refining these values through our operating processes. In addition to acting responsibly and creating value for our society, the planet and future generations, Castellum's sustainability efforts also provide the Group with a competitive advantage. Moreover, well integrated sustainability efforts contribute to better management and improved control of our properties. This means more satisfied customers, dedicated employees and increased profitability. In other words, sustainability is about making the right decisions today so that the stakeholders – on whom Castellum's operations depend – will choose Castellum in the future. Castellum acknowledges the scientific evidence that human activity accelerates climate change. Breaching the planet's environmental limits poses great risks for our future. To contribute to the global agenda, Castellum will therefore guide and target business operations in accordance with the UN Sustainable Development Goals and the Global Climate Change Agreement. To guide us there, Castellum has set up a Science Based Target to be carbon neutral in our own operation and our whole value chain by 2030.

EXPERIENCE

Due to the company's leading position within sustainability, Castellum was invited to take part in the EU financed project Carbon Risk Real Estate Monitor (CRREM). CRREM offers the real estate industry a comprehensive framework focused on carbon risk exposure and potential strategies on how to reduce this risk.

TAKE-AWAYS

Climate change poses serious threats to economic growth, poverty reduction, quality of life and political stability in the world. It will also impact the quality and value of buildings and infrastructures. In fact, climate change may endanger the business of real estate companies if no measures are taken to transform the property. Therefore, a stronger focus on climate change risk management is essential. Risks and uncertainties must be adequately understood, and measures taken to identify clear, long-term and credible incentives in the process of stopping climate change. Strategy and risk management must ensure that individual efforts to mitigate CO2 within their portfolio are sufficient to fulfill EU targets - or risking not to meet future market expectations and becoming "stranded assets".

REPORTING/DISCLOSURE

Results from CRREM are supporting our climate risk reporting aligned with TCFD and our sustainability reporting in general.

"We feel honoured and happy about being selected for this important project. As one of the pilots, we were involved in the public consultation phase of the framework. By sharing our experiences and ideas on how to reduce CO2 emissions in the operations with CRREM, Castellum will keep contributing to a new industry standard,"

Filip Elland, Head of Sustainability at Castellum

Contact

Filip Elland

Head of Sustainability, Castellum

Member of the CRREM Global Scientific & Investor Committee



A.4 CASE STUDY: ABERDEEN STANDARD INVESTMENT MANAGEMENT

Managing \$45.7bn in real estate assets, we are one of the largest real estate managers globally committed to sustainable investing and innovative solutions for clients. We manage approximately 1600 properties globally across all sectors including offices, residential and retail. As well as managing direct real estate assets, we invest indirectly using listed and non-listed funds, multi-manager strategies and real estate debt.

COMPANY NAME: ABERDEEN STANDARD INVESTMENT MANAGEMENT

OBJECTIVES

Aberdeen Standard Investments has committed to achieve net zero carbon across our real estate assets by 2050. We have published a framework, which outlines how we will start to tackle the transition risks associated with climate change by targeting net-zero carbon by 2050 for our real estate investments. This is aligned with the UK Better Buildings Partnership (BBP) climate change commitment, which is focused on:

- Publishing a net-zero carbon framework that outlines our trajectory towards net-zero carbon for new and existing buildings
- Addressing operational and embodied (whole life) carbon within the fabric of the building
- Addressing emissions from leased spaces
- Annual disclosure of progress

We will deploy the CRREM tool and pathways as part of each fund net zero pathway to:

1. allow us to understand the rate of decarbonisation of the assets within each fund,
2. identify any assets that are at risk of stranding risk, and
3. ensure that, as part of our acquisition strategy, any newly acquired assets can meet the fund's net zero aspirations.

EXPERIENCE

We have deployed CRREM on a number of our funds to-date and will continue to do so as we implement our strategy. We have had a number of challenges for example:

- **IT:** dealing with such a large (file size) tool is cumbersome.
- **Current tool scope:** The CRREM tool does not cover all sectors (e.g., residential), or countries globally, preventing a complete assessment of a fund's carbon risk.
- **Data challenges:** The availability of whole building data is patchy and not always available. We have had to develop a robust and consistent methodology to estimate tenant emissions.
- **GRESB integration:** While the GRESB pre-fill function is useful, it can, of course, only transmit data held in GRESB, which is typically only landlord data as no estimations are permitted. This then required manual intervention to ensure a complete dataset.
- **Carbon Emission Factors:** We have found differing opinions with technical experts and with clients in terms of which emission factors to use – market based or location based. A different factor could mean the difference between stranding and not stranding, so developing industry consistency is key.

Contact

Dan Grandage

Head of ESG, Private Markets, RE Global Listed & Investment Strategy,

Aberdeen Standard Investments

Member of the CRREM Global Scientific & Investor Committee



A.5 CASE STUDY: AEW EUROPE

AEW Europe is a real estate investment manager focused on long-term value creation through an environmentally and socially responsible approach. It currently has EUR 69 bn under management globally across all major property types.

COMPANY NAME: AEW EUROPE REAL ESTATE INVESTMENT MANAGEMENT

OBJECTIVES

At AEW Europe, there is great appreciation for the fact that the decarbonisation pathways represent a proxy for transition risk insofar as national governments align their regulations and legislation to align with Paris ambitions.

Therefore, AEW uses CRREM to:

1. Help align with a 2°C target, and
2. Help prioritise where the most urgent GHG action is needed.

EXPERIENCE

Result of using CRREM tool was not reflecting:

1. all necessary assumptions to describe the decarbonisation pathway of the portfolio specifically the renovation plan of the assets
2. the distribution of the GHG emissions between the landlord and the energy mix of each country
3. the distribution of the GHG emissions between the tenants and the landlord

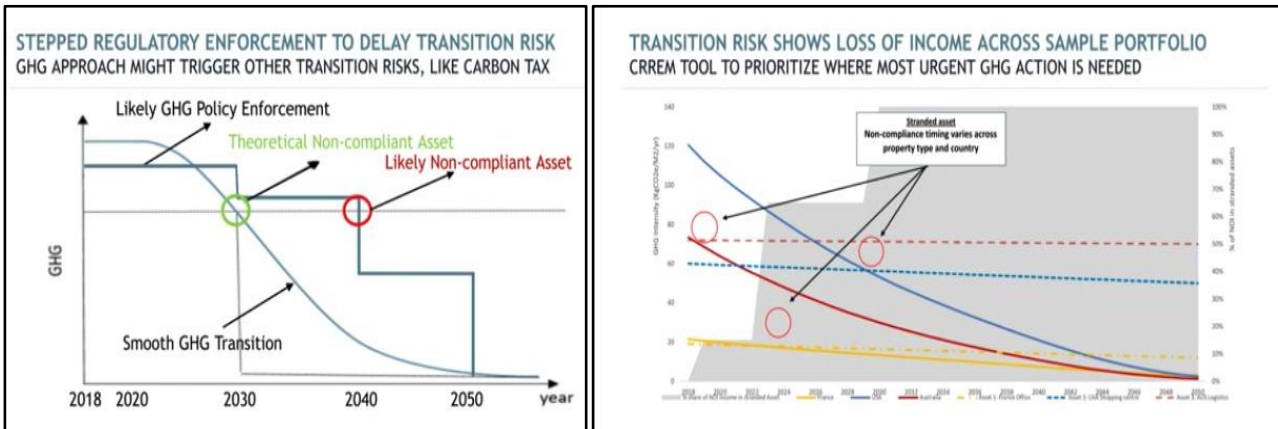
TAKE-AWAYS

We have been reducing the GHG emissions of our portfolio since 2011, and this ongoing process mobilizes all the teams from asset management, investment managers, the technical team and the sustainable team.

The CRREM tool helps us to have a systematic and long-term approach.

REPORTING/DISCLOSURE

CRREM should use the GHG calculation produced for the GRESB Assessment and not recalculate the emission, which could be a source of confusion.



AEW recently published an article referencing CRREM (RE Issues: Managing Climate Change-Related Risks in Global Real Estate)⁵. Mentioning that CRREM, funded by the European Union under its Horizon 2020 programme for Research and Innovation, delivers a science-based, methodically rigorous, industry-supported, and framework-aligned way for the commercial real estate sector to understand international contexts, set science-based targets, benchmark specific real assets, and analyse portfolio performance.

Energy reduction and GHG intensity play a crucial role in transitional risk. The GHG intensity can be measured by the CRREM. Future regulatory change on Current GHG intensity varies widely between EU countries due to their existing energy mix. As a result, there are different starting points for landlords in different countries and their future requirement to reduce GHG intensity.

Contact

Thierry Laquitaine

*Head of Socially Responsible Investment | Separate Accounts, Fund Management and Operations
Member of the CRREM Global Scientific & Investor Committee*

Hans Vrensen

*Managing Director, Head of Research & Strategy
Member of the CRREM Global Scientific & Investor Committee*



⁵ Available via. https://www.crrem.eu/wp-content/uploads/2021/01/2020_Dec_RE_Issues_Article_Real-Estate-Issues-Climate-Change-Risks_FINAL.pdf



A.6 CASE STUDY: NUVEEN

Nuveen is an Asset Manager with a mission statement to be a top tier real estate manager investing in tomorrow's world for the enduring benefit of our clients and society. We have global coverage (USA, Europe, and Asia Pacific) over multiple real estate sectors (office, multifamily, retail, industrial, and alternatives).

COMPANY NAME: NUVEEN

OBJECTIVES

Nuveen sees CRREM as a mechanism to:

1. assess which assets are most at risk (transition risk)
2. assess progress against its net zero target
3. use as a comparison for asset risk as Nuveen produces TCFD reports for investors.

EXPERIENCE

The main challenge that we find is due to a lack of tenant energy consumption data for some assets and a difficulty in verifying energy consumption data where we do have it. This means that we cannot use the tool as effectively as we would like for some of our portfolios. Currently, the CRREM tool uses quite a crude methodology for estimating missing energy consumption data, which could paint a misleading picture to investors. There is also a challenge around how applicable the pathways are to buildings with atypical uses or unique features such as heritage buildings.

TAKE-AWAYS

There is a huge range with some buildings already 'stranded' and others not stranding until the 2040s.

The range of variations between countries is quite surprising - the ease of achieving compliance with a net zero carbon pathway in some countries is vastly different to others - and the 2050 targets for some sectors and some countries will not be achievable suggesting that entire real estate sectors in some countries will become stranded. For those sectors, there is a question as to whether there will still be value differentiation for better performing buildings even if none of them are performing below the pathway - or if the whole sector will lose value. As a result of using the CRREM tool, there is even more need to focus efforts on getting accurate tenant procured energy consumption data and coming up with an effective model for estimation of tenant data.

We are also focusing efforts on looking for evidence of value shift related to net zero carbon pathway compliance.

REPORTING/DISCLOSURE

Once we have solved some of the data gap issues, we are planning on using the CRREM pathways to report on % of portfolios that have stranding dates in different time periods and this will be a very effective way to communicate risk to our investors and also to internal stakeholders. We see the CRREM pathways as a helpful tool in our TCFD compliance and reporting and also in monitoring progress towards net zero carbon.

Contact

Richard Hamilton-Grey

Director Sustainability, Real Estate, Europe and Asia Pacific

nuveen
A TIAA Company

A.7 CASE STUDY: GRUPO VALERO

Grupo Valero is a sustainable materials producer, focused on research and production of low-energy construction materials. It also hosts a consultancy branch to assess building interventions and evaluating how they influence operational building energy performance with the aim of reducing GHG emissions. Grupo Valero works with all building types.

COMPANY NAME: GRUPO VALERO

OBJECTIVES

The CRREM decarbonisation pathways are of great importance to Grupo Valero because they serve to determine whether or not particular building interventions are sufficient to maintain buildings below specific GHG intensity thresholds. As such, they may be used to fulfil the needs of its clients, be it transition risk assessment, stranding risk avoidance, 2°C or 1.5°C target setting, or compliance with net zero commitments.

EXPERIENCE

Good experience using the tool. The Grupo Valero found the tool useful for their purposes.

The calculation is easy and the main attraction is that little information is required and there are many aids in the tool, with useful definitions. It is perfect for estimating the years in which its clients can reduce the carbon risk and delays it, helping to achieve the emissions reduction target.

The various types of intervention for reducing emissions remain to be defined to establish investment categories in line with business/investment needs. New techniques like carbon capture are not included, and their adaptation to the building is relevant.

TAKE-AWAYS

Company contributes to building the 2-degrees clients' portfolios by assessing the best investment to do with the emissions level required.

A key issue raised after using CRREM tool is the time their materials can reduce the emissions enough. The life cycle of materials is a relevant component, and it is not included in the tool. EMBODIED CARBON of retrofits and required materials. Research in energy efficiency in the construction materials. Second, client assessment in the energy-efficient use of materials in order to decide the level of reduction. It is essential the ability to advise clients on the level of emission reductions associated with different materials, which enable them to achieve energy efficiency targets in line with regulation.

REPORTING/DISCLOSURE

CRREM tool contributes to giving statistical and graphic information very precisely to demonstrate the effect of building interventions, so is very relevant and useful in the reporting.

Contact

Jorge Valero

Director, Grupo Valero



A.8 CASE STUDY: HIJOS DE BENLLIURE EMPRESA CONSTRUCTORA S.L.

Hijos de Benlliure Empresa Constructora S.L. (Hijos) is a real estate investor, rental manager and builder. A small company, and is focused on its local market in Spain. It is a private company looking for maximization of the investment return and promoting sustainable energy buildings in private activity but also promoting and building social housing. They are very interested in adopting energy efficiency materials and construction techniques to achieve high energy efficiency. It has housing properties and thus is focused on the residential market.

COMPANY NAME: HIJOS DE BENLLIURE EMPRESA CONSTRUCTORA S.L.

OBJECTIVES

Hijos used the tool to evaluate and inform the investment plans and ensure that they fulfil energy regulation requirements. Thus, the CRREM decarbonisation pathways were to serve as a way to benchmark the investment horizon of its portfolio.

EXPERIENCE

There is an easy data entry in the tool. The possibility of changing present parameter values (e.g., energy savings) to adapt to specific examples was valuable for Hijos and a method that can be considered good practice. Additionally, fact that the tool was downloadable and that private information could not be recorded anywhere were benefits. Finally, the open code makes it easy to understand the calculation and trust the methodology.

TAKE-AWAYS

The CRREM tool gives numerical and graphical information to Hijos that clearly plans future investment and takes decisions and reporting. The statistical results are conclusive and rich on clarifying the emissions fall process and support the efficient, sustainable investment in the assets.

Hijos was able to inform its investment horizon plan with very low information requirements from CRREM. While the overall conclusion was that the current portfolio is not yet “2-degree ready”, CRREM enabled an estimation of what would be required in order to become Paris-aligned. The portfolio is mainly formed by old buildings on rent which require decisive intervention. The intervention of insulating roof and façade is already done as part of the long-term renovation project, but it still requires next steps regarding the building envelopes and windows. In particular, a strong investment will be required over the next two years of an estimated lower bound of EUR 80k per building.

REPORTING/DISCLOSURE

Figures related to reducing emissions are very interesting for both reporting to clients and public reporting, and could significantly increase awareness of the evolution of energy efficiency interventions that would be required of buildings to make an overall portfolio more robust to transition risks.

Contact

Hijos de Benlliure

Director, Hijos de Benlliure Empresa Constructora

A.9 CASE STUDY: DEKA IMMOBILIEN INVESTMENT GMBH



Deka Immobilien Investment GmbH is a German real estate investment manager with Euro 42.5 bn assets under management, which has a worldwide diversified portfolio of different asset classes and has a considerable history of 11 years in sustainability reporting.

COMPANY NAME: DEKA IMMOBILIEN INVESTMENT GMBH

OBJECTIVES

Deka Immobilien Investment GmbH long-term investment strategy focuses on sustainable real estate investments in the world's leading real estate markets and financially important metropolises.

The company strategy is committed to achieve climate neutrality by 2050, meaning a reduction of the overall energy consumption and CO₂-Emission in order to have more sustainable and resilient real estate funds. Furthermore, being a subsidiary of DekaBank, the company is highly determined to offer ESG products to investors in the future, aiming to integrate these into the long-term strategy.

Deka Immobilien Investment GmbH commits to align with the disclosure regulation or voluntary sustainable regulation as UN PRI. The company considers CRREM benchmark energy and CO₂ Reduction pathways to measure the transitional risks associated with its portfolio.

EXPERIENCE

The CRREM tool is the best real estate benchmark tool to develop a portfolio align with the Paris agreement on climate change. Additionally, it considers all relevant asset classes in calculating the respective pathways.

CRREM in its pathway-calculation methodology includes also the occupancy rate of a building, the tenant energy consumption and also different RCP Scenarios which all have a significant effect making an asset align with the Paris Agreement on climate change. Having a projection of retrofit costs and carbon pricing would help fund managers allocate their budget in order to have their products comply with Paris Agreement on climate change and have in their portfolio sustainable and value stabilised properties.

TAKE-AWAYS

We will further work on using the CRREM tool as the main real estate benchmark in conducting different market-based analysis.

CRREM tool uses country rather than city-based CO₂ emission and energy consumption data, which could make difficult to evaluate a portfolio, which has a high concentration of assets in a country, in different cities. We would suggest to take this possible improvement into account, in order to further conduct a comprehensive market-based analysis for a portfolio in different cities.

REPORTING/DISCLOSURE

The CRREM approach will guide us in our investment decisions. Additionally, different building measures to the respective acquired properties would be allocated according to CRREM pathways. Given that CRREM tool derives and records the CO₂ Emission in two categories; direct and indirect emission; these results would be supporting us when we consider reporting in line with GHG Protocol. Our reporting will be further strengthened by CRREM providing quantitative results, insights and further analysis relevant to our investors.

“CRREM provides a holistic view on the energy and environmental performance of a portfolio aiming to align with the Paris agreement on climate change. It assists portfolio managers to create a well-diversified portfolio of sustainable and resilient assets fulfilling one aspect of the ESG long-term strategy for their investors. Through its pathways, investors can undertake capex projects today in order to minimise the transitional risks that might arise in the future. Adhering to such an initiative would make the international real estate market more attractive for international investors.”

says Enis Hasimi, ESG Manager at DEKA Immobilien Investment GmbH.

Contact

Enis Hasimi

ESG Manager, DEKA Immobilien Investment GmbH



CRREM

**BEST PRACTICES & REMAINING
CHALLENGES**



SECTION B BEST PRACTICES & REMAINING CHALLENGES

Testing and further CRREM engagement and tool usage was undertaken by a heterogeneous group of stakeholders from across the industry. Just focussing on the Assets under Management (AuM) owned and/or managed by the testers is over 400 billion Euros with over 12 million m² of space analysed via the CRREM tool. From this wide outreach and feedback, industry “best-practices” can be concluded, these include:

B.1 BEST PRACTICES

“CRREM is a comprehensive tool, that is very helpful in defining the individual carbon reduction pathways of each of our assets and calculating the associated carbon risk, in line with our ambition to work towards science-based targets.”

Geert Paemen, Group Sustainability Director

Objectives: The CRREM pathways, while primarily used to align with various Paris and Net Zero targets and commitments, may also be used as proxies for “transition risk” (in this case, the risk of assets being stranded due to regulatory incompliance or market obsolescence). This, of course, must be done with a deep appreciation that the pathways can only serve as a proxy for stranding risk insofar as the covered nations follow similar decarbonisation strategies.

In terms of using the CRREM tool, the comparison of asset and portfolio performance against the CRREM

decarbonisation pathways were, of course, the main objectives. However, an additional practice was the ability to identify the “most-at-risk” assets. While the estimation of financial value at risk is difficult to estimate accurately, the ability to identify which assets require the most attention from a large selection is already a strong value proposition.

Reporting/Disclosure: The outputs (i.e., metrics and figures) produced by the CRREM tool are useful for supporting reporting efforts. In order to minimise the impact of these risks in the value of portfolio and specific assets, the emissions of each asset need to be address and mitigated. However, the responsibilities over these emissions, and subsequently the reporting requirements, are usually distributed amongst different stakeholders – mainly landlords and tenants. To reconcile these divided responsibilities and ensure that organisations can report their exposure to climate change, CRREM project has developed various sets of reporting templates that define the best-practice standards for climate change derived risks. This report details the process followed in the development of the **CRREM reporting templates**, including the selection of the most relevant disclosure initiatives and how CRREM project helps investor overcome the barriers commonly found in quantifying and reporting climatic risk.

CRREM assists in overcoming barriers in climate risk reporting:

Carbon reporting boundaries: Corporate reporting boundaries differ from building (asset) reporting boundaries. The assessment of stranding risk happens at asset and portfolio level, and it requires information of all carbon emissions emitted within the building boundary. The climatic risk of organisations is different than the climatic risk of their assets, even though both are linked.

Corporate reporting data collection: Carbon reporting initiatives usually limit reporting to the boundaries defined from the reporting organisations’ perspective, measuring their financial and non-financial performance (including carbon and climate risk assessment) within these boundaries. Therefore, organisations usually do not, and often cannot, collect enough data to estimate the exposure of their assets to stranding risk. This challenge impacts similarly the organisations’ efforts to aggregate data to portfolio level.

Metrics and conversion factors: Organisations often focus their data gathering efforts on energy consumption [kWh] and related intensity metrics. These metrics help organisations differentiate amongst energy consumed from different sources and vectors. However, climatic risk is defined in carbon metrics [kgCO₂e] and therefore, selecting the right conversion factors (and disclosing the sources) becomes critical to assess and report climatic risk.

Setting carbon reduction targets: Different boundaries (organisation or assets) will require different decarbonisation targets. The decarbonisation trajectories required to reduce the stranding risk of buildings affect the entirety of the building and they are independent of who owns or controls the energy consumption in each area of the building. All stakeholders within the building boundary need to understand their degree of responsibility and consequently target, reduce and report them accordingly as part of their specific reporting commitments. The owner of the building will need to liaise with the rest of stakeholders whether the decarbonisation targets and efforts undertaken by each of them will also meet the decarbonisation target required to mitigate the stranding risk of the asset.

Climate risk management: Asset owners may adopt different approaches to manage climatic risk. Mitigation (usually through retrofit) is the most evident one, but owners may decide to explore alternative options such as transferring the risk (e.g., insurance), retain the risk (e.g., purchasing offsets) or avoiding the risk (for example selling certain assets at higher risk).

Assumptions and data modelling: The calculation of climatic risk and the impact of risk mitigation actions in the real estate sector are based on future estimations and models. These estimations and models are usually expected to require revisions when more updated data becomes available, and the level of reliability of the used source is critical for stakeholders to understand the level of risk exposure. Transparency is the critical factor that ensures both comparability and the capacity to interpret results by investors.

CRREM & PCAF COLLABORATION

The **Partnership for Carbon Accounting Financials (PCAF)** is an industry-led initiative that aims to help financial institutions to assess and disclose greenhouse gas emissions from their loans and investments through carbon accounting, at a fixed point in time and in line with financial accounting periods. Their Standard assists in the measure and disclosure of Greenhouse Gas (GHG) emissions for six financial asset classes, including commercial real estate. It helps the real estate sector to set targets, develop strategies and take actions to align their emissions with the commitments of the Paris Agreement. PCAF considers the ratio of the outstanding loan or investment amount at the time of carbon accounting to the total construction cost or property value (equity plus debt) to attribute carbon emissions.

CRREM data can also be used by banks **to unlock the necessary carbon emissions data**. Since, whether an asset (or balance sheet) is financed with equity and/or debt, should (and does) not influence the environmental performance of an asset (or RE company). For example, for floor space, we promote the international accepted **standard IPMS for consistency**. In your report, the kind of space should be clarified, as well as the approach for its measurement.

- ❖ Collaboration with the Partnership for Carbon Accounting Financials to measure CO₂ in the Real Estate Sector
- ❖ Ensuring alignment of the CRREM Reporting documents / results for PCAF (Score 1 of data quality for CRE)
- ❖ Upcoming: Establish together „Guidance for Carbon Reporting in Real Estate“

CRREM ALIGNMENT WITH TCFD

The TCFD **recommendations aims to disclose** “the actual and potential impacts of climate-related risks and opportunities on the organization’s businesses, strategy, and financial planning where such information is material, (..) by taking into consideration different climate-related scenarios, including a 2°C or lower scenario”. In the case of disclosures around strategy and forward-looking scenarios, companies should disclose material information in those portions of their annual report or integrated report dealing with strategy, management discussion and analysis of the company, and risks.

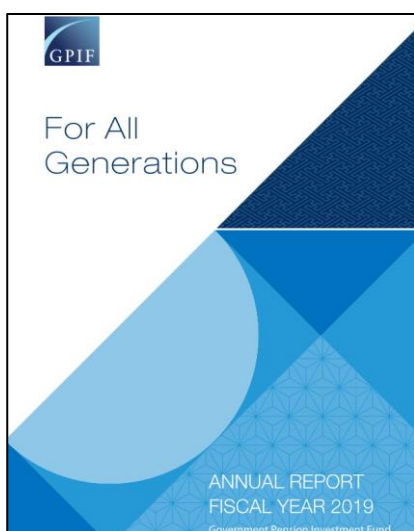
Material financial implications related to company’s strategy should be disclosed in the appropriate financial statements or notes to the financial statements. Task Force emphasized the importance of transparency in pricing risk — including risk related to climate change.

CRREM set of templates based on the TCFD recommendations identifies the outputs from the CRREM tool that can be used to disclose the financial impact of climatic risk following the TCFD requirements. The CRREM set of templates also align these disclosure requirements with the main ESG corporate reporting initiatives.

- ❖ CRREM reporting templates and best-practice TCFD reporting for real estate
- ❖ CRREM input can be directly used for operational carbon and resulting transition risk reporting
- ❖ Especially carbon intensities and stranding risk figures relevant

B.2 CRREM REFERENCES OF BEST-PRACTICE

CRREM has achieved a wide global outreach to date and through the dissemination activities of the consortium and GSIC members, the CRREM project to date has already been **referenced in numerous annual reports and ESG best practice papers. Some examples and extracts are listed below.**



The CRREM project and the CRREM decarbonisation pathways have already been **adopted by various industry players**. Numerous stakeholders have now already referenced CRREM and the decarbonisation pathways for real estate in their **annual reports or company reports on ESG and sustainability topics**.

An intensive and thorough testing phase enabled the consortium to incorporate feedback and adjustments for a heterogeneous group of stakeholders.

CRREM has now been widely adopted by the market. Two extracts from reports are shown below. The first image is from the Real Estate Investments section from the **GPIF ESG Report 2019**. CRREM has also been mentioned in GPIF’s annual Report for the fiscal year 2019. The second image shows CRREM mention in the **Alstria Sustainability Report 2019/20**.

Participation in Global Initiatives for the Real Estate Market

GPIF has joined GRESB as a Real Estate Investor Member.

GRESB is a mission-driven and investor-led ESG benchmark for real assets. GRESB works in collaboration with the industry to provide standardized and validated ESG data to the capital markets. The 2019 real estate benchmark covered more than 1,000 property companies, real estate investment trusts (REITs), funds, and developers. GPIF engages in dialogue with managers to encourage them to actively use GRESB Assessment in their real estate investment and management processes to enhance the disclosure of ESG information and constructive dialogue across the market.



Carbon Risk Real Estate Monitor (CRREM) Phase2

The real estate sector is exposed to significant climate-related transition risk as governments are likely to impose increasingly stringent regulations on energy use and emissions from buildings to meet their own climate goals.

GPIF supports the expansion of CRREM to include major real estate markets outside the EU. CRREM provides the industry with science-based decarbonization pathways for 44 countries in Europe, North America and Asia-Pacific for the different asset classes such as office and residential sector. The pathways published on the CRREM Phase2 website identify annual energy- and carbon-intensity



trajectories until 2050 across real estate markets and sectors that are consistent with keeping global warming below 2 degrees Celsius.

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Double checking our decarbonization pathway

In addition to the well-established science-based targets method, we track our annual emissions per lettable area with the CRREM Tool. The tool provides companies with Paris-aligned decarbonization and energy reduction pathways defined by country and building type. The distinction between types of property use is particularly relevant for real estate owners such as alstria, whose portfolio is almost entirely offices. alstria was an early baker of CRREM. www.crrem.eu/tool/

Acting: Low-carbon design principles

We recently introduced a series of low-carbon design principles providing our developers and service providers with a framework to balance and test the different components of a low-carbon design. The recommendations reflect the EU's current climate strategy and offer our industry a low-carbon pathway to potentially reach carbon neutrality.

Decarbonization pathway for office buildings in Germany – CRREM Tool, version 1.4

in kgCO₂e/m²a



Year	Maximum carbon emissions per GIA	Decarbonization pathway
2020	86.3	86.3
2030	53.8	53.8
2040	26.1	26.1
2050	2.8	2.8



[alstria's low-carbon design principles](#)

To begin, we identified five core concepts to guide our employees in applying our low-carbon design principles in all future refurbishment projects. These concepts are as follows:

- I.

We do not define climate change policies, but we apply them.
- II.

alstria is a for-profit organization.
- III.

We need to maximize the use of carbon that has already been spent.
- IV.

Less construction is the way forward.
- V.

Compensation is not the answer.

alstria Sustainability Report 2019/20

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Further reports with references and best-practices of CRREM are shown in the list below. Some examples include CRREM being announced as a **strategic partner** in the ULI Greenprint report, IIGCC report, Vonovia annual report, PRI report and UNEP FI reports, etc. Additionally, the CRREM initiative will further **collaborate and align** with SBTi, DEEP, BREEAM, PCAF, E-CREDA, E-CORE, WGBC & UNEP FI and many others.

LIST OF REPORTS WITH REFERENCE TO CRREM (EXTRACT):

- ❖ **ULI:** Greenprint Performance Report, Volume 11
- ❖ **UNEP FI:** Beyond the Horizon, New Tools and Frameworks for transition risk assessments from UNEP FI's TCFD Banking Program
- ❖ **IIGCC:** PARIS ALIGNED INVESTMENT INITIATIVE: Net Zero Investment Framework
- ❖ **BBP:** NET ZERO CARBON PATHWAY FRAMEWORK, Supporting Signatories of the BBP Climate Change Commitment
- ❖ **PRI:** Inaugural 2025 Target Setting Protocol U.N.-Convened net-zero asset owner alliance monitoring reporting and verification track
- ❖ **GPIF:** ESG Report
- ❖ **GPIF:** Annual Report
- ❖ **Alstria:** Sustainability report 2029/20
- ❖ **EU TEG:** Technical Report: Taxonomy: Final report of the Technical Expert Group on Sustainable Finance, March 2020
- ❖ **CDP, GRI:** Driving Alignment in Climate-related Reporting - Year One of the Better Alignment Project
- ❖ **ANZ:** WorldGBC Net Zero Carbon Buildings Commitment
- ❖ **UNEP FI:** Changing Course – Real Estate TCFD pilot project report and investor guide to scenario-based climate risk assessment in Real Estate Portfolios
- ❖ **DWS:** Green, healthy buildings as economic stimulus - EU policy recommendations on starting a paradigm shift

B.3 CHALLENGES

This large economic and social rebalancing required to mitigate the risk of reaching potential scenarios of catastrophic climate consequences has introduced the concept '**transition risk**': the risk of certain assets to lose value due to policy changes, reputational impacts, and shifts in market preferences, norms and technology. In the commercial real estate sector, this transition risk will be induced by meeting tighter policies, carbon and energy costs, market preferences and challenges to achieve energy efficiency, and it will threaten to largely impact asset values.

CRREM assists in mitigating transition risk, however faces some challenges and limitations:

Project coverage: One of the major challenges is the that tool itself is (due to the initial project for the EU) limited to EU countries and the UK, as well as to commercial real estate. This has been overcome by developing a guide “CRREM Guide to using the tool outside the EU”. Additionally, CRREM has released global decarbonisation pathways – available via. www.crrem.org/pathways.

Data for “whole building” view: Another challenge is the fact that it is difficult for some fund managers to collect data on tenant energy consumption. While the tool is able to handle this data gap by extrapolating energy consumption to floor areas for which energy consumption data is unavailable, this extrapolation must be accepted by the user regardless of whether tenant consumption follows the same patterns as those for base building consumption.

Allocation of responsibilities: Since the tool operates at a whole building level, investors are unable to disaggregate the emissions for which they are in “operational control” from the emissions that are “tenant-controlled”. While the scope of reporting is still that which has been publicly supported by both the IIGCC and UN-convened NZ AOA, such additional level of detail could potentially be useful.

Corporate reporting data collection: Carbon reporting initiatives (and their data gathering requirements) usually limit reporting to the boundaries defined from the reporting organisations perspective, measuring their financial and non-financial performance (including carbon and climate risk assessment) within these boundaries.

Overcoming barriers in climate risk reporting within real estate:

CRREM can assist in overcoming barriers and challenges going forward, having learnt from “best-practice” users.⁶

CRREM includes all the data sources used to build internal databases, normalise input, complete data gaps, develop calculation methodologies, etc. In most cases, these assumptions can be overridden or adjusted by users to ensure that they can adopt more reliable, relevant or updated sources and methodologies that meet their assessment criteria.

CRREM encourages users to always transparently disclose their sources and methodologies.

The CRREM project has researched EU-wide data sources to build a database able to fill these gaps. This database includes assumptions on average energy consumption of different building uses in each EU country. The database also includes country-specific factors that affect the climatic risk assessment of real estate’s assets (e.g., grid decarbonisation projections). Assumptions are always transparently disclosed and can be overridden by users if assessors prefer to use alternative data sources to complete gaps.

⁶ Full list of „Best-practices” & detail on how CRREM assists in overcoming barriers in the CRREM Report “CRREM support to corporate reporting in the real estate sector”.

CRREM

A WAY FORWARD



SECTION C A WAY FORWARD

C.1 USING THE TOOL FOR REGIONS OUTSIDE THE EU

CRREM has produced a set of guidance to help stakeholders understand the current scope of the tool, and all the steps that need to be taken in order to modify the tool to fit the target use case. **Due to the great success of the project and the tool itself, there have been repeated enquiries about the applicability of the tool outside the EU and for residential use.**

This request was expressed intensively, especially in the wake of the publication of the global decarbonisation pathways for the real estate industry (sponsored by PGGM, APG and Norges Bank, see the “Global downscaling pathways” via www.crrem.org/pathways/). This document takes up the request and explains in detail which adaptations have to be undertaken by the users in order to make **all functions in the EU-version usable for other regions to obtain regional specific and reliable results.**

GUIDE TO USING THE CRREM TOOL OUTSIDE THE EU – AVAILABLE ONLINE:



The Guide for application of the CRREM Risk Assessment Tool Outside the EU is available online via:

<https://www.crrem.org/wp-content/uploads/2020/10/CRREM-Guide-to-using-the-Tool-outside-the-EU-v1.2-15.10.2020.pdf>

In principle, the tool can **also be used outside the EU** and also applicable for other building types. The excel-based solution is **flexible and not limited to the EU or commercial real estate**. Nevertheless, the following aspects have to be considered, which are automatically selected (default-values) by the tool starting from the data in the back-end and included in the calculation: Climatic conditions (HDD/CDD), country- and property-type specific decarbonisation pathway, emissions factors, energy and carbon prices.

C.2 MAINTAINING THE PATHWAYS & CRREM TOOL

CRREM has secured funding from the Laudes Foundation to maintain the pathways and the tool, ensuring that the **pathways stay relevant and the tool remains operational and useful to the global real estate community.**



Main project targets include:

- ❖ Update Pathways/targets for the industry (1x yearly)
- ❖ Update Software (e.g., in respect of embodied carbon) for the industry
- ❖ Produce content via reports, scientific articles
- ❖ Engage with net zero and other initiatives to ensure multipliers
- ❖ Set up a governance structure
- ❖ Engage with local GBCs in order to ensure local data provision

The CRREM Tool has recently **been expanded to allow asset level data input for the year 2020** in addition to data input for years 2018 and 2019. All updates are displayed in the version history in the overview tab of the tool. You may find the latest version online via. www.crrem.eu/tool.



The consortium will continuously update the tool and the underlying data such as the decarbonisation pathways, emission factors as well as default values such as carbon- and energy prices. A governance structure will be defined for the **yearly update of the CRREM decarbonisation pathways**. This will include the **definition of data points required** for an update, leading to countries being selected and respective **data partners to assist data collection and for quality assurance**. Before the updated pathways are released, there will be an **internal quality assurance, approval by the CRREM “Global Scientific & Investor Committee” and local partners.**

C.3 FURTHER INTEGRATION WITHIN GRESB

CRREM and GRESB, the ESG benchmark for real assets, have partnered to make the CRREM tool even more accessible to its expansive network of commercial real estate portfolios. **By integrating the CRREM tool into the GRESB Portal, GRESB members will have more information on the Paris alignment, performance, and transition risks of their assets than ever before.** Similarly, the **commercial real estate market is in need of a legitimate, credible, and salient transition risk methodology and tool.** As GRESB membership represents a significant share of that market, integrating CRREM into GRESB will directly serve that need. Integrating the tool into the GRESB Portal will solve this challenge for those users already reporting their asset data to GRESB.

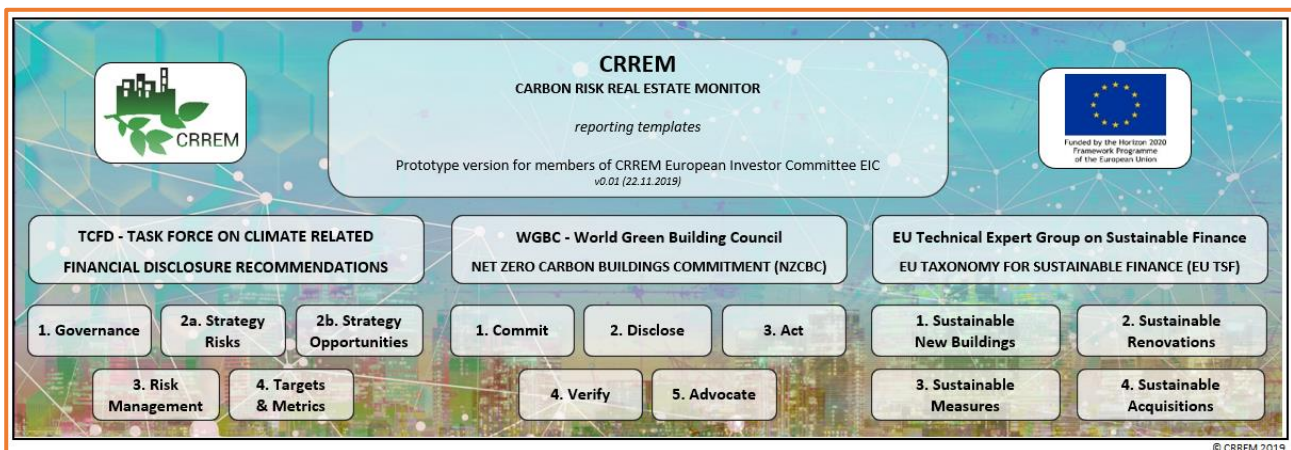
The **CRREM Risk Assessment tool** is now available for download from the **GRESB Portal**. After all asset-level data is uploaded and all consistency warnings are resolved, the user may download a pre-filled *CRREM Tool*, that is already loaded with all of the assets in a given fund.

Further developments will include a *CRREM Results Page* within the *GRESB Asset Portal*, which will provide an overview of assets with key outputs from the tool such as stranding date (per pathway), remaining carbon budget, and percentile performance within property type and country. Finally, a further integration of *CRREM* and *GRESB* will enable users to benchmark own assets or portfolios with peers.

The *CRREM* decarbonisation pathways, stranding diagrams, and remaining carbon budget per portfolio, which is useful as an engagement tool for (limited partners) LPs, can be displayed in the *Energy* or *Climate Risk Sections* of the *GRESB Benchmark Report*. These may be based on: 1.5°C or 2°C scenarios, asset count, floor area, possibly GAV, per property type, or multiple portfolios. Such aggregation will be particularly useful for LPs. The approach for illustrating the remaining carbon budget may also include statistics on how quickly carbon budget will be depleted at current emission rate.

C.4 CRREM REPORTING TEMPLATES


In order to minimise the impact of these risks in the value of portfolio and specific assets, the emissions of each asset need to be address and mitigated. However, the responsibilities over these emissions, and subsequently the reporting requirements, are usually distributed amongst different stakeholders – mainly landlords and tenants. To reconcile these divided responsibilities and ensure that organisations can report their exposure to climate change, **CRREM project has developed three sets of reporting templates that define the best-practice standards for climate change derived risks.** This report details the process followed in the development of the **CRREM reporting templates**, including the selection of the most **relevant disclosure initiatives** and how CRREM project helps investor overcome the barriers commonly found in quantifying and reporting climatic risk.



According to the EU regulations, most listed companies must prepare consolidated financial statements. However, these statements are mostly based in past performance, while climatic risk requires the analysis of the impact of future scenarios. Currently, carbon emissions, amongst wider environmental metrics, are reported within non-financial disclosures - Environmental, Social and Governance criteria, which only large public-interest companies must report.

Firstly, the publication of the recommendations from the **Task Force on Climate-related Financial Disclosures (TCFD)** linked both corporate financial reporting with climate-specific ESG reporting, acknowledging that climatic risk and carbon emissions will have a direct impact in the future financial performance of organisations and encouraging

organisations to calculate and disclose this risk. Secondly, the European Commission set up a Technical expert group on sustainable finance (TEG) as part of their objective to support the transition to a climate-neutral economy. **The TEG has developed a taxonomy or classification system that defines what economic activities can be labelled as environmentally sustainable.** The taxonomy sets performance thresholds for the different economic activities (including buildings and real estate) that make substantial contributions to climate change mitigation or adaptation. Complying with these thresholds will label an activity as ‘Sustainable’, and sustainable activities will have easier, preferential or exclusive access to future funding opportunities. Future revision of these thresholds will separate the activities that demonstrate compliance with the commitments to the Paris Agreement. Finally, the **World Green Building Council (WGBC)** established the building-centred **Advancing Net Zero (ANZ) initiative**, which encourages building stakeholders to only develop, own and occupy Net Zero Carbon Buildings by 2050. The ANZ initiative, together with the Net-Zero Carbon Buildings Commitment (NZCBC) requests organisation to collect, assess and disclose climatic data, shifting the focus from the organisations’ boundary towards to the building perspective and boundary.



STRANDING RISK REPORTING AND DISCLOSURE: TCFD DISCLOSURE

This set of templates helps CRREM users disclose the stranding risk of their assets and portfolios according to the Task Force on Climate-related Financial Disclosure (TCFD) recommendations. TCFD recommendations encourage investors to disclose both physical and transition risks. This set of templates include all Core Elements defined by the TCFD, but focus only on transition risks as defined by CRREM scope. Please refer to the full TCFD recommendations to complement disclosure with physical risks.


Source: <https://www.fsb-tcfid.org/publications/final-implementing-tcfid-recommendations/>

4. TARGETS AND METRICS: Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities.

A. Metrics, GHG emissions, performance and targets

Commercial Real Estate: CRREM metrics and targets

Financial category	Risk management strategy	Metric	Unit of measure	Current measure	Target	p
Revenues	Risk Adaptation & Mitigation	Revenues/savings from investments in low-carbon alternatives	€ _{tenant} € _{owner}			
Revenues	Risk Adaptation & Mitigation	Avoided energy consumption costs against baseline	€ _{tenant} € _{owner}			
Expenditures	Risk Adaptation & Mitigation	Expenditures (OpEx) for low-carbon alternatives	€			
Expenditures	Energy/Fuel	Total energy consumption	kWh			



STRANDING RISK ANALYSIS: COMPLIANCE WITH THE EU TAXONOMY FOR SUSTAINABLE FINANCE (EU TSF)

This set of templates helps CRREM users disclose the stranding risk of their assets and portfolios ensuring compliance with the definition of ‘Sustainable Activity’ according to the to EU Taxonomy Technical Report. Economic activities disclosed on these templates must also ensure that they do not cause significant harm to all remaining environmental objectives, as defined by the EU taxonomy.

Source: https://ec.europa.eu/info/files/200309-sustainable-finance-teg-final-report-taxonomy_en

3. SUSTAINABLE INDIVIDUAL RENOVATION MEASURES

Asset name	Eligible measures	Description of measure
Asset name 1		
Asset name 2		
Asset name 3		

The Partnership for Carbon Accounting Financials (PCAF) is an industry-led initiative that aims to help financial institutions to assess and disclose greenhouse gas emissions from their loans and investments through carbon accounting, at a fixed point in time and in line with financial accounting periods. Their Standard assists in the measure and disclosure of Greenhouse Gas (GHG) emissions for six financial asset classes, including commercial real estate. It helps the real estate sector to set targets, develop strategies and take actions to **align their emissions with the commitments of the Paris Agreement**. PCAF considers the ratio of the outstanding loan or investment amount at the time of carbon accounting to the total construction cost or property value (equity plus debt) to attribute carbon emissions.

Lastly, the **INREV Asset Level Index (ALI) will be fully aligned with GRESB and CRREM**. INREV aims to facilitate integration of sustainability performance metrics with real estate financial performance. Following the analyses on financially material sustainability metrics for the real estate industry, the ESG Committee has identified a number of **environmental data fields to be added to the INREV Asset Level Index (ALI), which focus on three major areas: building certificates, energy consumption and GHG emissions**.

Phase 1: INREV kindly requests member companies to populate sustainability data in the specified fields added in INREV ALI. The ultimate aim is to create a platform that enables participants to interpret the performance of their assets in relation to environmental factors. With phase 1, INREV aims to understand the user experience and asks feedback from participants together with the data.

Phase 2: The future goal of this project will be linking financial data and non-financial data and measuring and comparing the performance with a more holistic approach.

Industry alignment: To support the harmonisation of the sustainability reporting for real estate industry, the environmental data **fields are aligned with the GRESB Asset Portal and the CRREM asset level input**.

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GIC MEMBERS

The **CRREM Global Scientific & Investors Committee** has gained over 40 members by the end of the project, and will now continue as an initiative. The former EIC (European Investors Committee) has now been changed into a Global Scientific & Investor Committee due to the huge success and global outreach that the CRREM initiative has achieved. The GSIC helped to ensure that the CRREM tool fulfils industry needs by ensuring **contextual relevancy and alignment to industry expectations**.

The core tasks of the GSIC have been specified as the following:

- ❖ Give **non-binding strategic input** and feedback to the Consortium regarding the establishment of clear Science Based Targets for the commercial real estate industry and the development of a CO2 Property risk assessment tool for stranded assets.
- ❖ Provide **feedback on the output** of Work Packages, contributing to identify ‘must haves’ and ‘nice to have’ features needed for the risk assessment tool ensuring a successful adoption by the market.
- ❖ **Test** the pilot version of the risk assessment tool, provide practical feedback on potential improvements, and promote the use of the tool with relevant internal and external stakeholders upon successful completion.

To achieve this, the GSIC members engaged in project meetings, **sharing specialised technical expertise** throughout the design and development process and **promoted the use of the tool** within industry during the testing phase and promoted dissemination after publication of the final tool and decarbonisation pathways. The following table lists all GSIC members:

ORGANISATION	NAME	POSITION
Aberdeen Standard	Ruairi Revell	ESG Manager, Real Estate
AEW Europe	Hans Vrensen	Managing Director, Head of Research & Strategy
AEW Europe	Thierry Laquitaine	Head of Socially Responsible Investment
alstria	Alexander Dexne	CFO
alstria	Robert Kitel	Head of Sustainability & Future Research
APG	Derk Welling	Senior Responsible Investment & Governance Specialist
Better Buildings Partnership	Christopher Botten	Programme Manager
BNP Paribas Real Estate Consult	Hermann Horster	Regional Director, Head of Sustainability
BRE Group	Christine Pout	Principal: Net Zero Solutions
BuildingMinds	Jens Hirsch	Domain Expert Sustainability
CDP	Alberto Carrillo Pineda	Director Science Based Targets and Renewable Energy

CSR Design	Tomoko Takagi	Executive Officer, Partner, CSR Design Green Investment Advisory, Co., Ltd.
DGBC Dutch Green Building Council	Martin Mooij	Head of Certification and Project manager DGBC Deltaplan sustainable renovation
DGNB German Sustainable Building Council	Dietmar Geiselmann	Leiter Zertifizierung Bestand
DGNB German Sustainable Building Council	Anna Braune	Director Research and Development
DWS Real Estate GmbH	Matthias Naumann, Murray Brit	CIO
ECE Projektmanagement	Maria Hill	Director Sustainability & Internal Services
EEFIG De-risking Energy Efficiency Platform	Carsten Glenting	Head of Strategy, Finance, and Economics
EPRA	Gloria Duci	ESG Officer
Finance Ideas	Vincent van Bijleveld	Director ESG
GBC Australia	Jorge Chapa	Head of Market Transformation
Grosvenor	Emily Hamilton	Sustainability Manager
Guidehouse / PCAF	Giel Linthorst	Associate Director
INREV	Federica Miano	Public Affairs Manager
INREV	Bahar Celik	ESG Analyst
ista International GmbH	Hans Martin Hermann	Senior Manager Public Affairs
LandSecurities	Fernanda Amemiya	Sustainability Reporting Manager
Madaster	Patrick Bergmann	Managing director
METRO AG	Olaf Schulze	Director Energy Management, Investments & Technical Solutions
NBIM	Christopher Wright	Sustainability Manager, Real Asset Risk
Nelson Group	Carlos Morgado / Marny Di Pietrantonio	Project Manager
Nordea	Peter Sandahl	Head of Sustainability
PGGM	Mathieu Elshout	Senior Director Private Real Estate
RE-sponsibility	Michael Ullmann	Managing Director
Savills Investment Management (Germany) GmbH	Barbara Linnemann	Head of Asset Management Germany

Savills Investment Management (Germany) GmbH	Lucy Auden	Managing Director
Savills Investment Management LLP	Gerhard Lehner	Managing Director, Head of Fund Management
ULI Greenprint	Marta Schantz	Senior Vice President
UNEP FI	Matthew Ulterino	Principal, UNEP FI
Union Investment	Jan von Mallinckrodt	Head of Sustainability, Head of Segment Development
University of Cambridge	Franz Fürst	Professor of Real Estate and Urban Economics
WGBC World Green Building Council	Stephen Richardson	Technical Lead - Energy Efficiency Mortgages
ZIA German Property Federation	Philipp Matzke	Consultant Energy and Climate Protection, Facilities Engineering
Zurich Insurance Group	Roger Baumann	COO Global Real Estate & Head Product Development

ACRONYMS AND ABBREVIATIONS

ABBREVIATION	MEANING
ANZ	Advancing Net Zero
AuM	Assets under Management
BBP	Better Building Partnership
Bn	Billion
°C	Degrees Celsius
CDP	Carbon Disclosure Project
CO ₂	Carbon dioxide
CO ₂ e(q)	Carbon dioxide equivalent. The unit is used to make the <i>Global Warming Potential (GWP)</i> of <i>Green House Gases (GHG)</i> comparable to the <i>GWP</i> of CO ₂
CRREM	Carbon Risk Real Estate Monitor
Carbon VaR	Carbon Value-at-Risk
EF	Emission Factors
EIC	European Investors Committee
ESG	Environmental, Social, and Governance
EPBD	Energy Performance Building Directive
EPRA sBPR	European Public Real Estate Association Sustainability Best Practices Recommendations
EU	European Union
EU TEG	European Union Technical Expert Group on Sustainable Finance
EUR	Euro
FSB	Financial Stability Board
GHG	Greenhouse Gas
GRESB	Global Real Estate Sustainability Benchmark

GRI	Global Reporting Initiative
IIGCC	Institutional Investors Group on Climate Change
INREV	European Investors in Non-Listed Real Estate
IT	Information Technology
Kg	Kilogram
kWh	Kilowatt hour
LP	Limited Partner
m²	Square meters
NZCBC	Net Zero Carbon Building Commitment
PRI	Principles for Responsible Investment
REIT	Real Estate Investment Trust
SBTi	Science-Based Targets Initiative
SDA	Sectoral Decarbonisation Approach
TCFD	Task Force on Climate-related Financial Disclosures
UK	United Kingdom
UN	United Nations
UNGC	United Nations Global Compact
USD:	US-Dollar
WRI	World Resources Institute
WWF	World Wide Fund for Nature