What are the CRREM Pathways and what does the CRREM Misalignment Year mean?

CRREM Explained: Part 1

CRREM
CARBON RISK REAL ESTATE MONITOR

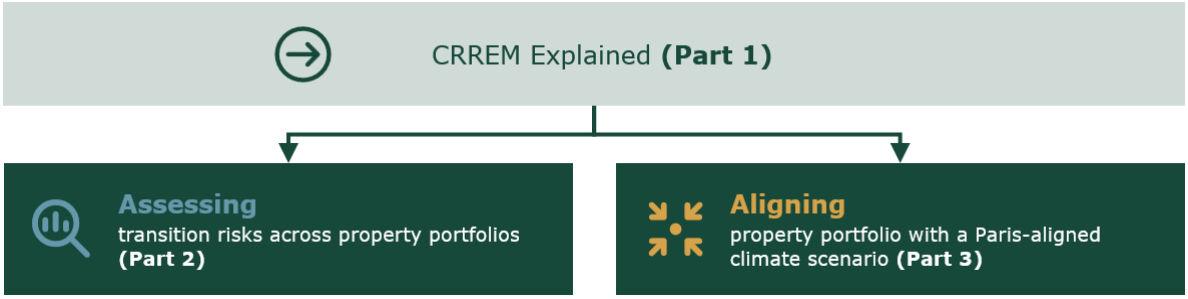
Introduction

The CRREM Pathways are designed to be applied across a wide range of contexts. In practice, however, we see two primary applications: assessing transition risk and setting science-based targets. In our three-part Series, we explore these applications and outline the high-level "need to know" about CRREM.

CRREM Explained: Part 1 introduces the conceptual foundations of CRREM and explains how to correctly read and understand the CRREM Pathways and CRREM Misalignment Year.

CRREM Explained: Part 2 builds on this understanding by showing how CRREM can be used to assess and manage transition risks and support strategic planning.

CRREM Explained: Part 3 outlines how the CRREM Pathways informs science-based targets and climate alignment.



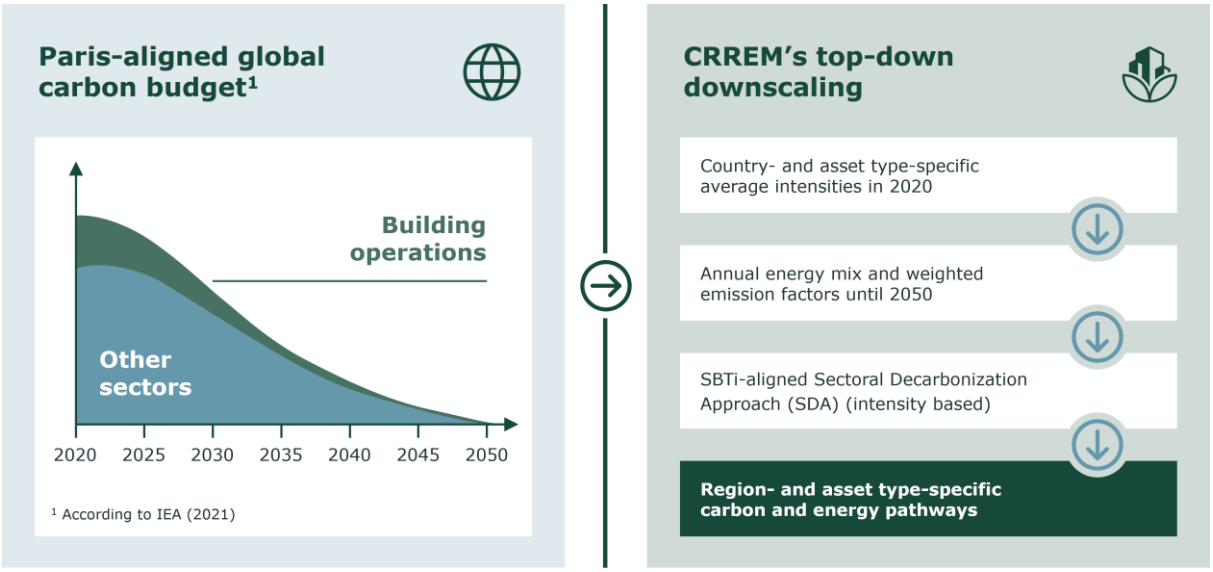
Basis:
The CRREM Pathways

CRREM began in 2018 as a **project** sponsored by the European Union (EU) under Horizon 2020 to help them answer: How much do buildings need to decarbonize to help us meet our net zero targets? Today, it is developed, maintained, and continuously improved by the **independent non-profit CRREM Foundation**.

CRREM can be applied either directly through CRREM's freely available resources or via more than 50 licensor software platforms. CRREM currently provides over 1,000 decarbonization and energy Pathways representing 40+ countries and all major property types.

CRREM's science-based pathways reflect **whole building** emissions and energy intensity levels that real estate must meet to stay within a Paris Aligned global warming scenario of 1.5℃. The start values of the CRREM Pathways in 2020 are derived from the **market-average energy intensity** for the specific asset class and geography under consideration (e.g. French office or Ontario warehouse buildings).

From there, the CRREM Pathways' trajectory out to 2050 indicates how the **average building** will need to improve its operational performance over time to remain aligned with the IEA projections of global carbon reduction and sequestration required to achieve the Paris Agreement. This process: translating global and sectoral carbon budgets into granular, property-type and location-specific trajectories, is referred to as CRREM's *downscaling approach*.



Application:
The CRREM Misalignment Year

Users of the CRREM Pathways calculate a metric called the **CRREM Misalignment Year** for individual buildings and/or portfolios of buildings.

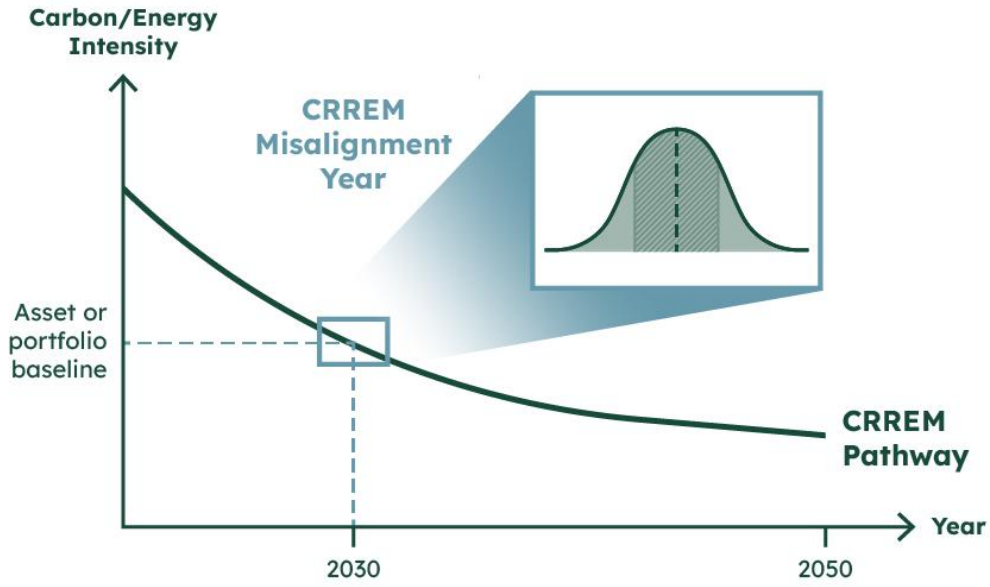
This metric identifies the year in which real estate assets' current energy or carbon intensity exceeds its CRREM Pathway (and thereby, its carbon budget). In other words, it marks the year when the asset becomes "misaligned," to the Paris Aligned global warming scenario of 1.5℃.

CRREM is the global standard for building carbon and energy performance. It is derived from a science-based carbon budget. The CRREM Misalignment Year serves as a powerful measure of transition risk, which is defined as the financial impacts that a company or portfolio may face by falling behind the global transition to a low carbon economy. Transition risks can materialize through regulatory (e.g. government mandated carbon limits on buildings,) market (e.g. capital raising, access to financing, buyers and tenants who seek low carbon assets), technological, and reputational impacts.

Many of the world's largest institutional investors are using CRREM to assess the transition risk of buildings and portfolios that are in pre-acquisition due diligence, and/or to identify assets in their existing portfolio that require capital improvements, including energy efficiency upgrades to meet future regulatory and market demands.

One globally active institutional investor that manages roughly $40B of global real estate uses CRREM to prioritize retrofits across its real estate portfolio.

In 2023, the investor found 43% of its unlisted portfolio was aligned with the CRREM Pathway through the same year, and 31% of the portfolio was projected to remain aligned through 2030 — a share expected to increase as planned improvements are implemented.



Interpretation: How to read the CRREM Misalignment Year?

The following generalizations are intended to provide a starting point for interpreting the CRREM Misalignment Year results.

Assets with a CRREM Misalignment Year that is…

Near-term

Between 2020 and current year:

Indicates the building's performance has fallen behind the ideal carbon or energy intensity for an average building of its type and location to stay within the 1.5℃ warming scenario. Thus, a CRREM Misalignment Year in the past may indicate the building has transition risks that need further analysis, or that it's off track to meeting investors' and Limited Partners (LP's) climate ambitions.

Conversely, such a building may also present an investment opportunity: targeted interventions to improve operational efficiency and reduce emissions could expand the buyer pool, lower operating costs, and improve leasing by aligning asset performance to market and regulatory demands. Investors

pursuing shorter-hold or value-add strategies should evaluate their expected exit timing, as the proximity of a Misalignment Year may influence buyer perception and, ultimately, the asset's sale price.

Mid-term

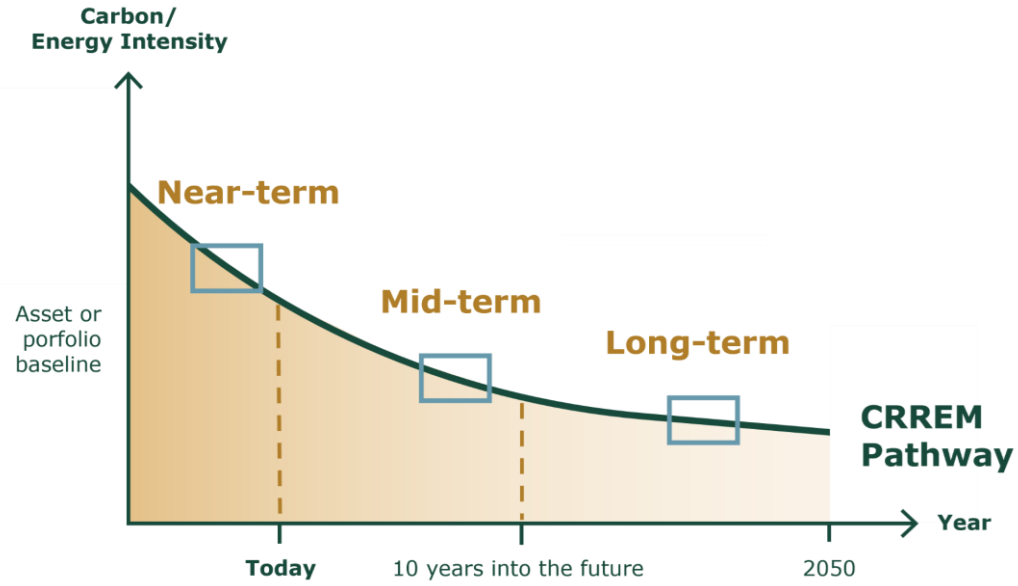
Between today and 10 years into the future:

Indicates the property has a low transition risk profile for the duration of most institutional hold periods. However, the building should have active capital planning in place to ensure energy and carbon reducing measures are implemented at the end of life of existing building systems, especially those with long lifespans such as HVAC systems or boilers. As most core investment horizons fall within this period, it is essential for owners to assess how CRREM Misalignment Year should influence capital expenditure planning or exit strategies.

Long-term

10+ years into the future:

Indicates the asset is significantly outperforming today's market expectations and is projected to remain well-ahead of the pathway over the long term. Such assets are likely not in need of significant capex or efficiency improvements within a typical investment hold period. However, long-term monitoring and reinvestment may still be necessary to maintain alignment with CRREM Pathways through 2050.



The Explanation:
What drives the CRREM Misalignment Year?

Users should treat the CRREM Misalignment Year as a starting point for deeper analysis, not a definitive verdict. It is an early-warning signal that only becomes meaningful once it is interpreted in context. Looking at any one element in isolation can create misleading conclusions. High-performing assets may be unfairly labelled as weak, while underperforming assets may mistakenly appear risk-free or high performance.

It is essential to understand the factors that influence the CRREM Misalignment Year indicator

Performance-based factors

A CRREM Misalignment Year that is in the past or near future signals a need for further investigation in an asset's energy efficiency or electrification. When evaluating the Misalignment Year, financing partners should consider whether it reflects the building's inherent quality/ characteristics relative to the market average or, indeed, is indicative of a lack of investment in energy-related improvements.

Key questions include:

- Have all commercially viable energy efficiency measures been implemented?
- Has fossil fuel–based heating been replaced with low-carbon alternatives?
- Has on-site renewable energy been deployed to its full extent?
- If not, why not?

Design- and usage-based explanations:

A property's CRREM Misalignment Year should also be interpreted in the context of key operational factors such as tenant load, occupancy patterns, and other on-site activities that may lead to energy or carbon intensity levels that differ from the market average (e.g. higher or lower). It is important to understand whether the data has been normalized or calibrated in any way to align with average consumption.

The critical task for investors and managers is to distinguish between performance-based deviations, which indicate that operational improvements are still achievable, and design- or usage-based deviations, which may simply reflect asset-specific conditions. This process of contextualization and understanding why misalignment occurs, turns CRREM from a static metric into a practical foundation for transition risk assessment and target setting, which are explored further in Parts 2 and 3 of this guidance series.

The Practicalities: Where can I find the CRREM Pathways?

The CRREM Pathways and CRREM Risk Assessment Tool (to calculate the CRREM Misalignment Year) are freely available via www.crrem.org. These tools are open access for all market participants, such as investors, fund managers, listed real estate companies, and lenders. Market participants are welcome to use the CRREM Pathways in investment committee memo documents and/or internal analysis and valuation work. The CRREM Foundation also has software license partners that support market participants with calculating CRREM Misalignment Years for larger portfolios of assets, and that offer deeper-dive analyses for single assets.