



ANREV



# Adoption of the CRREM Pathways in Asia Pacific 2022

Pilot testing the CRREM tool for Asia Pacific Real Estate

RESEARCH



May 2022



ANREV is the Asian Association for Investors in Non-listed Real Estate Vehicles Limited. ANREV is a not for-profit organisation driven by Institutional Investors in Asian unlisted property funds. Our aim is to serve as a platform for investors who guide the association's strategy.

ANREV's agenda is driven by the members, in particular institutional investors, and is focused on improving transparency and accessibility through market information, professionalism and best practice. Fund managers, investment banks and advisors provide support in addressing key issues facing the Asian non-listed real estate fund markets.

**ANREV**

1701, 17/F, KINWICK CENTRE, 32 HOLLYWOOD ROAD, CENTRAL, HONG KONG

T +852 3108 2790

E [info@anrev.org](mailto:info@anrev.org)

[www.anrev.org](http://www.anrev.org)

# INTRODUCTION

Approximately 36% of global energy use and 39% of energy-related carbon dioxide emissions are attributable to the buildings and construction sector according to the IEA Global Status Report released in 2021<sup>1</sup>. The real estate industry must address this problem by reducing the energy and carbon intensity of both new and existing buildings.

The Carbon Risk Real Estate Monitor (“CRREM”) initiative aims to “**make decarbonization measurable**” by providing a free-use Excel tool as well as decarbonization pathways which could serve as a benchmark. The CRREM pathways allow the industry to set science-based carbon targets aligned with requirements of the Paris Agreement to limit global warming to 2°C or better 1.5°C by 2050 and effectively measure the transitional risk of climate change for individual assets and portfolios.

In 2021, after an initial phase, CRREM extended its remit to include Asia and North America. All CRREM resources are free of charge and available for download on the [webpage](#).

CRREM has recently partnered with The Science Based Targets Initiative (“SBTi”) <sup>2</sup> and is also recommended by the Net Zero Asset Investment Framework, developed by the Paris Aligned Investment Initiative (“PAII”) <sup>3</sup> amongst others. Within the real estate industry CRREM is rapidly becoming best practice method for assessing *climate transition risk*.

The **objective** of this pilot was to test the tool and relevant pathways for Asia Pacific assets in order to help asset owners, developers, and managers to adopt the pathways as best practice in the region.

This report explains the aims of the pilot, the approach taken, key findings and lessons learned and provides some updates on the next steps for the CRREM pathways.

<sup>1</sup> [https://globalabc.org/sites/default/files/2021-10/GABC\\_Buildings-GSR-2021\\_BOOK.pdf](https://globalabc.org/sites/default/files/2021-10/GABC_Buildings-GSR-2021_BOOK.pdf)

<sup>2</sup> <https://sciencebasedtargets.org/>

<sup>3</sup> [https://www.parisalignedinvestment.org/media/2021/03/PAII-Net-Zero-Investment-Framework\\_Implementation-Guide.pdf](https://www.parisalignedinvestment.org/media/2021/03/PAII-Net-Zero-Investment-Framework_Implementation-Guide.pdf)

# INTRODUCTION TO THE CRREM PATHWAYS

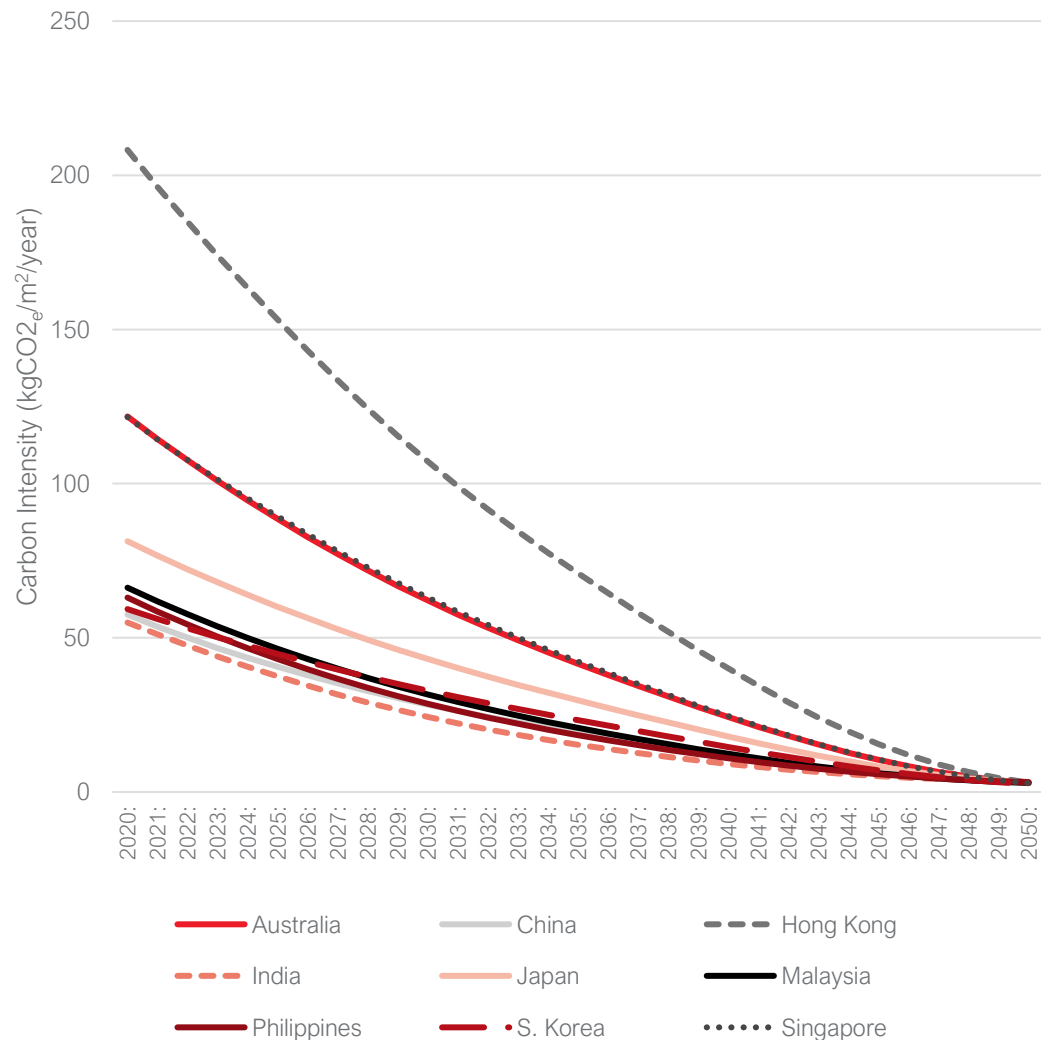
The CRREM Risk Assessment Tool and related pathways allow asset owners, managers, and investors to understand the **transition carbon risks** inherent in their real estate portfolio and ultimately to transition to a net-zero emission portfolio.

*Transition carbon risk: “Transitioning to a lower-carbon economy may entail extensive policy, legal, technology, and market changes to address mitigation and adaptation requirements related to climate change. Depending on the nature, speed, and focus of these changes, transition risks may pose varying levels of financial and reputational risk to organizations”<sup>4</sup>.*

Assets that have not considered the risk appropriately may be considered ‘stranded’ whereby returns can no longer be generated or the value of the asset is significantly reduced due to the risks of climate change. These risks include more stringent building codes and regulations, carbon taxes etc.

Figure 1 shows the different carbon pathways in this case *commercial office* for different countries some of which have a steeper path for decarbonization than others, based on their existing assets carbon emission – typically those with the highest emissions have the steeper pathways. See Appendix I for full list of countries and pathways.

Figure 1 – Commercial Office Pathways (1.5 Deg C) (kgCO<sub>2e</sub>/m<sup>2</sup>/year) for different APAC countries



<sup>4</sup> <https://www.fsb-tcfd.org/>

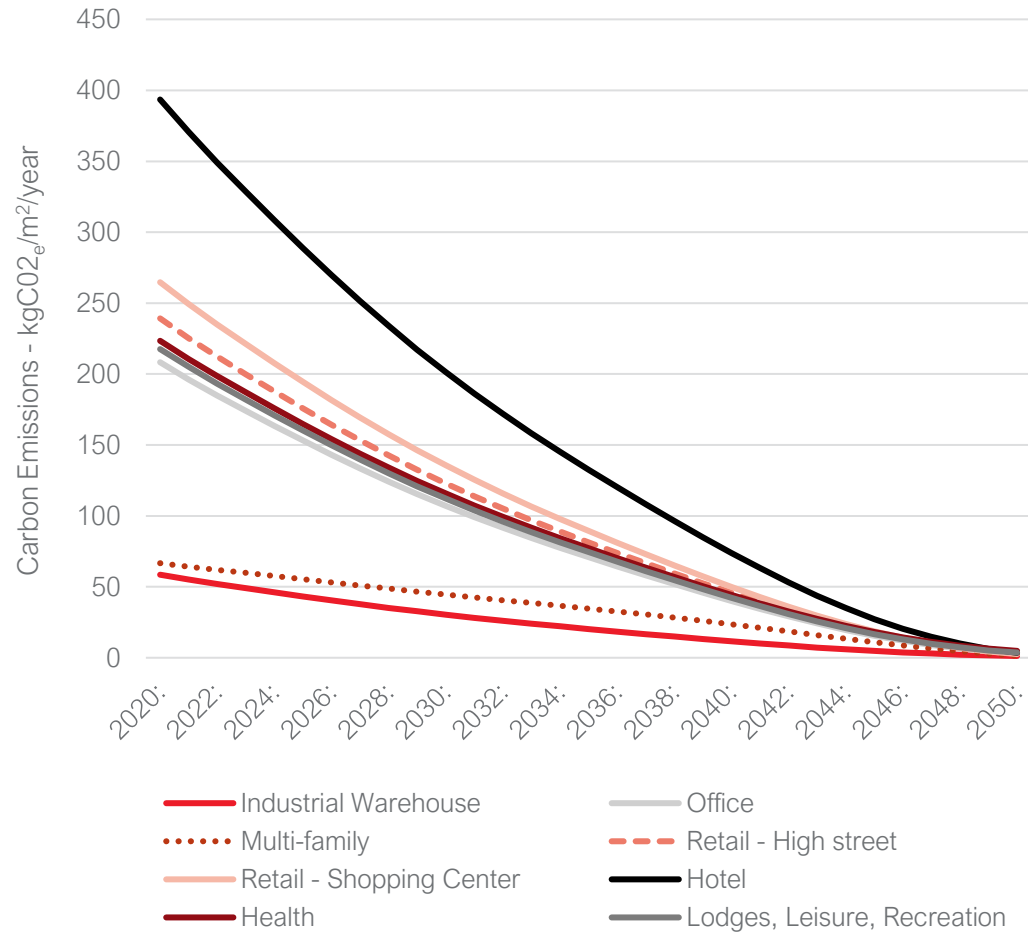
<sup>5</sup> CO<sub>2e</sub> = Carbon dioxide equivalent

# INTRODUCTION TO THE CRREM PATHWAYS

*Pathway data:* CRREM has derived decarbonization pathways by breaking down the global anthropogenic GHG emissions budget consistent with the *Paris Climate Agreement* for individual countries and property types using the SDA methodology<sup>6</sup>. The CRREM tool offers the possibility to evaluate the progress of a portfolio's carbon reduction performance against reduction targets (the developed "pathways") in line with the Paris Agreement (i.e., limiting global warming to 2°C and ideally 1.5°C).

Figure 2 shows different asset type pathways for a single market, in this case, Hong Kong, see Appendix I for details of all countries with pathway data.

Figure 2 - Hong Kong Pathways (1.5 Deg C) (kgCO<sub>2e</sub>/m<sup>2</sup>/year) for different asset types



# THE PILOT

The pilot was an 8-month long initiative led by APG Asset Management Asia (“APG”) and the Asian Association for Investors in Non-Listed Real Estate Vehicles (“ANREV”) and supported by several real estate investors, developers, and managers with the intention to understand both the barriers and opportunities for the adoption of the CRREM pathways in the Asia Pacific region.

Technical advice and guidance were provided by the Institute for Real Estate Economics (“IIOE”) the administrators of CRREM, the participants involved provided asset level data as well as general feedback throughout the pilot on the functionality of the tool and pathways, and the experience in collecting and analyzing data.

As strong supporters of the CRREM pathways since inception, and with a target to have a ‘Paris aligned’ real estate portfolio by 2040, APG initiated the pilot with the aim to increase awareness of the CRREM pathways in the Asia Pacific region and to help a range of companies understand the tool and asset data collection requirements. Table 1 below summarizes the scope of the pilot.

The pilot also acted as a forum whereby participants shared their own experiences with data collection and analysis among themselves, as well as with IIOE, APG and ANREV.

**Table 1 - Scope of Pilot (Participants, Asset Types, Countries)**

Participants	Asset types (number of assets)	Country (number of assets)	Assets in pilot
CBRE Investment Management	Office (23)	Japan (9)	80
ESR	Residential (2)	South Korea (8)	
Greystar	Warehouse/logistics (41)	Hong Kong SAR, China (16)	
Macquarie	Retail (12)	China (40)	
New World Development	Mixed Use (2)	Singapore (1)	
QIC		Australia (6)	
LaSalle Investment Management.			
Swire Properties Limited			
UBS Asset Management			

# RESULTS

The primary aim of the pilot was to spread awareness and upskill the participants, however, some of the results from the analysis are shown below for information - recognizing that the data set is too low to make sector or countrywide judgments.

Table 2 below shows the average (mean) year the assets from each country, or each asset type exceeded the relevant pathway – this could be considered the “stranding” year for a portfolio, the closer the date is to 2050 the lower the transition risk.

Figure 3 on the right shows, on a yearly basis the cumulative percentage (left hand axis) of assets that exceed the relevant CRREM pathway - 38% in 2021, 70% in 2036 to 100% by 2046 . Figure 3 also shows the number of assets (right hand axis) within the pilot that exceed the CRREM pathway in that year only, 27 assets in 2021, 3 assets in 2022 etc. This shows that 50% of the assets in the pilot will be considered “stranded” by 2027 as they will have exceeded the CRREM pathway.

Figure 3 - Assets in the pilot “stranded” (exceeding the 1.5 Deg C CRREM pathways) pathway by year

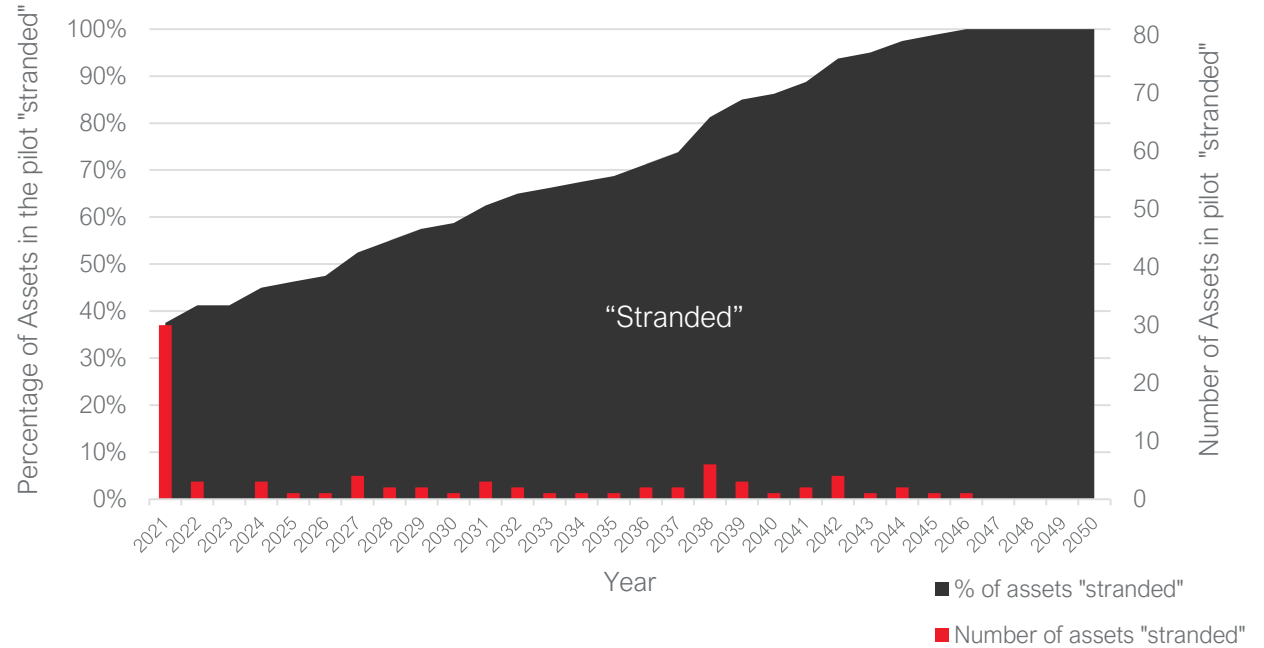


Table 2 - Average Year Assets Exceed Pathway “stranding year”

Country	Year
South Korea	2021
Hong Kong	2026
China	2029
Singapore	2030
Australia	2032
Japan	2035

Asset Type	Year
Retail, Shopping Center	2022
Mixed Use	2026
Office	2028
Residential	2030
Industrial Warehouse	2033

# FINDINGS AND LESSONS LEARNT

Table 3 below sets out the key findings from pilot and provides some recommended interventions or solutions.

Table 3 - Findings and Lessons Learnt

	Description of Finding	Potential Interventions
Data Collection	<b>Energy Data</b>   ability to collect accurate and complete “ <u>whole building</u> ” data from assets was a challenge for several participants, especially multi-family residential or mixed-use developments with multiple tenancies.	<p>Lease provisions to allow regular energy data collection from tenants by landlords.</p> <p>Metering and sub metering infrastructure to be designed in or retrofitted to provide data to both landlord and tenant.</p>
	<b>Fugitive Emissions</b>   Refrigerant data – often not measured or not routinely collected at asset level but can have a significant contribution to the carbon intensity of an asset.	<p>Facilities management to record refrigerant replacement during maintenance – including FM contracts.</p> <p>Install refrigerant leak detection - on large central chiller systems.</p>



	Description of Finding	Potential Interventions
<p><b>Data Quality</b></p>	<p>The quality of the data output is dependent (as always) on the data input.</p> <p>The typical <u>mistakes</u> made when first using the tool had a significant impact on the assets measured performance were,</p> <ul style="list-style-type: none"> <li>• Parking areas are included</li> <li>• Net lettable area (NLA) used instead of Gross floor area (GFA)</li> <li>• Vacant tenancies are not accurately included and can have an impact on year-on-year analysis</li> <li>• Incomplete data coverage</li> <li>• Renewable energy (not stated correctly)</li> </ul>	<p><b>Parking:</b> Indoor &amp; outdoor parking areas should be excluded from floor space figures.</p> <p><b>Vacancy:</b> Input of actual annual vacant area will improve the output accuracy from the tool</p> <p><b>Data availability:</b> Data coverage vs max coverage should be entered correctly if e.g., tenant data is not available.</p> <p><b>Renewable energy:</b> If off-site generated renewable electricity is consumed on-site, then the market-based emission factors may be entered in the settings tab for the specific asset. However, this makes the comparison between asset emission performance difficult and is therefore not recommended. Asset owners should optimize energy performance (“efficiency first”) and not just “buy its way out” with green energy. Supporting green energy procurement is however an important aspect to ensure decarbonization. Likewise renewable energy production on-site should be increased.</p> <p>Third party audits of asset data are highly recommended, ideally in conjunction with an “in use” green building certification such as LEED O+M / BREEAM-in-Use et al.</p>

	Description of Finding	Potential Interventions
Data Analysis	<p><b>Benchmarking and Comparisons</b>   Each country and use type have an individual pathway (see Figure 1 and 2) which means a comparison between individual assets' carbon emissions or energy use intensity (not in the same country or asset class) is limited to whether they exceed or are below the pathway.</p> <p>CRREM offers a first global benchmarking reference point to understand an asset's energy or carbon performance relative to the market – since the CRREM pathways will be updated regularly more granularity and robustness can be expected.</p>	<p>Carbon emissions intensity and net energy demand intensity make up the asset's total performance. Comparisons should be made using both metrics.</p> <p>Energy use pathways should be used for setting targets for new buildings –with an asset should comply with the pathways for at least 10-15 years post completion. Dynamic energy modelling at both initial and final design stages is recommended to ensure operational performance matches the design.</p> <p>Inclusion of the age of the asset would provide a useful data point to users when considering which assets in a portfolio require investment to improve performance.</p>
	<p><b>Asset Type</b>   The 'Industrial, Distribution Warehouse' use type pathway does not make a distinction between storage types (dry vs. cold) which can have widely different energy use demands and therefore carbon emissions intensity. Also, in this respect updated CREEM versions will be more granular.</p>	<p>Net energy demand data should be used as a comparison between similar asset types. Ensure the percentage of cold storage is known for any logistic assets to ensure valid comparisons between individual assets can be made with regards to actual performance – noting that cold storage as a sector is inherently more exposed to transitional risks than dry storage.</p>
	<p><b>Scenario choice</b>   the option of using either '1.5 deg C' or '2 deg C' pathways requires alignment with the company's overall ambition and targets related to mitigation.</p>	<p>The use of the 1.5 deg C scenario is recommended as this is more stringent and aligns with SBTi and The Net Zero Asset Managers Initiative and many more.</p>

# SUMMARY

The key findings were,

**CRREM Tool:** Participants found the tool easy to use in part due to the format (excel), the relatively simple data input requirements, and the clear pathway performance graphs. The tool offers a range of functionality including asset and portfolio performance graphs and diagrams as well as retrofit cost analysis etc.

**Data Collection:** The ability to collect accurate whole building data as well as influence the energy consumption of tenants was identified as a challenge by participants, but one that can be overcome by 'green' lease provisions, good tenant engagement and the installation of metering systems. Alignment between tenants and owners on energy or carbon targets is critical.

**Analysis:** Properties with a very high (or low) energy-intensity should be double-checked for data validation, as with all tools - poor data in equals poor data out. The lack of reliable industry energy or carbon benchmarks in APAC was also identified as a challenge, as many participants were keen to understand how an asset performed relative to the market as well as the pathway – in that sense CRREM is a valuable step in the right direction.

APG and ANREV would highly recommend the use of third-party audits of energy data to ensure accuracy and reliability of the information provided - preferably through integration with green building rating systems such as LEED O+M, BREEAM-in-Use, CASBEE, Greenstar, etc.

**Upskilling:** Participants' understanding of the methodology and logic behind the pathways was increased during the pilot. Several participants felt it very important to understand the 'downscaling methodology' details and to understand the regional differences between asset types in order to effectively apply the pathways to a regional portfolio. In some markets with 'dirty grids' the pathways may encourage the use of gas as a transition energy source, so users should be aware of the broader issues of compliance for their respective markets. Participants agreed that compliance with the pathways should be part of a wider strategy of emissions and energy reduction.

**Renewable Energy:** Asset owners should optimize energy performance ("efficiency first") and not just rely on "buying its way out" with green energy tariffs. Supporting green energy procurement is however an important aspect to ensure decarbonization On-site renewables should also be considered.

# CONCLUSION

APG and ANREV strongly support the adoption of the CRREM pathways in the Asia Pacific region and believe the use of the pathways will play an important role in achieving the 'net zero' ambitions of the sector. We recommend that all asset owners analyze the performance of their portfolio and use this knowledge when developing 'net zero carbon' strategies. Legislative and regulatory requirements for curbing emissions to ensure net-zero compliance by 2050 are ever more likely, with an increasing focus on measures that target both tenants and owners

Users of the CRREM tool and pathways can identify whether their real estate holdings are already compliant with a 1.5°C or 2°C degree Paris-aligned decarbonization pathway. By identifying which properties will be at risk of *stranding* asset improvement plans can be put in place to ensure that the portfolio remains aligned to net zero by 2050. The pathways will be updated on a regular basis allowing asset owners to stay informed in an ever-changing regulatory environment.

In summary, the tool, and pathways,

- provide added value for the industry - enabling a transparent analysis of carbon risks, calculation of abatement costs and evaluating the correct timing of future retrofit measures.
- provides the opportunity to start (or continue) the dialogue between investors and fund managers about the carbon performance of their assets and possible ways to reduce the carbon footprint.
- assist in setting science-based, Paris-aligned targets for individual commercial real estate properties with regards to the carbon intensity of their assets.
- help asset managers report carbon risks in line with other major reporting initiatives, including the TCFD, the STBTI and the EU Taxonomy and PCAF, among others.

# CONTACT

Jonathan Waite | APG Asset Management Asia | [jon.waite@apg-am.hk](mailto:jon.waite@apg-am.hk)

Amélie Delaunay | Director of Research & Professional Standards | [amelie.delaunay@anrev.org](mailto:amelie.delaunay@anrev.org)

# APPENDIX 1

## Property Types with CRREM pathways available:

Office, Retail (High Street, Shopping Center), Warehouse, Distribution Warehouse, Hotel, Healthcare, Residential, Mixed Use

## Countries with CRREM pathways available

Country Codes			
AT	Austria	SK	Slovakia
BE	Belgium	SI	Slovenia
BG	Bulgaria	ES	Spain
CY	Republic of Cyprus	SE	Sweden
CZ	Czech Republic	UK	United Kingdom
DK	Denmark	HR	Croatia
EE	Estonia	CH	Switzerland
FI	Finland	NO	Norway
FR	France	AUS	Australia
DE	Germany	BRA	Brazil
GR	Greece	CAN	Canada
HU	Hungary	CHI	China
IE	Ireland	HK	Hong Kong
IT	Italy	IND	India
LV	Latvia	JAP	Japan
LT	Lithuania	MAL	Malaysia
LU	Luxembourg	MEX	Mexico
MT	Malta	NZL	New Zealand
NL	Netherland	PHI	Philippines
PL	Poland	SGP	Singapore
PT	Portugal	KOR	South Korea
RO	Romania	USA	USA

# APPENDIX 2

## CRREM Global Scientific & Investors Committee

- Abrdn
- AEW Europe
- Alstria
- APG Asset Management
- BNP Paribas Real Estate
- DWS
- Metro AG
- NBIM
- Nordea
- PGGM
- Savills Investment Management
- Union Investment

## Industry Bodies, Academics and Collaborators

- CDP
- PCAF
- ULI
- INREV
- DGNB
- DGBC
- GRESB
- UNEP FI
- TCFD
- IIGCC
- NZAOA
- E-CORE etc.