IIGCC

Physical Climate Risk Divergence: PCRAM for investors

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Disclaimer

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Executive Summary

IIGCC recently published the *Physical Climate Risk Assessment Methodology (PCRAM) in practice report* which showcased case studies that demonstrated the potential of PCRAM to assess physical climate risk (PCR) at the asset level. This paper proposes ways that investors could consider integrating PCRAM into existing investor processes, including portfolio design, project and deal origination, due diligence, credit and investment committee approval, stewardship and engagement, as well as ongoing risk and portfolio management.

It also outlines how the PCRAM methodology could be applied (subject always to individual investors own due diligence) by real estate and infrastructure investors throughout the investment processes and has the potential to assist investors in moving beyond a sole risk management lens to a value creation exercise.

The paper, developed in discussions with IIGCC members as part of our Adaptation and Resilience working group, outlines:

- How the 'PCRAM steps' map to existing investor processes
- How these relate to broader thinking around managing physical climate risks (PCR) and resilience, as defined by leading climate science[1]

The outcomes this paper hopes to work towards are:

1. **Supporting standardisation of assessments**

   Standardising PCR assessments and disclosures using PCRAM-like approaches, as already recommended by several policy advisory papers.[2,3] This could help stakeholders of an asset better collaborate on addressing PCRs, leading to better adaptation and resilience outcomes for investors, their assets and the communities in which they operate.

2. **Standardised PCR assessments will form the basis of IIGCC's Climate Resilience Investment Framework (CRIF)**

   Following on from our discussion paper in 2022, it was clear that a framework for investors to integrate climate adaptation and resilience into their strategies could not be devised until the industry broadly agreed upon a PCR assessment process. IIGCC's work in continuing PCRAM's development has been guided mainly by this need.

3. **Opportunities for value creation in resilience investment**

   Supporting investors to move beyond the sole view of risk toward investment opportunities. Current practice provides a binary choice between ongoing investment and divestment/exclusion. Instead, investors could adopt a more measured and nuanced approach to PCR by optimising resilience strategies with a range of resilience measures for when and how best for them to invest in resilience throughout an asset's lifecycle.

[1] IPCC, 2012: https://www.ipcc.ch/report/managing-the-risks-of-extreme-events-and-disasters-to-advance-climate-change-adaptation/

[2] Transition Plan Taskforce, 2024: https://transitiontaskforce.net/wp-content/uploads/2024/04/Adaptation.pdf

[3] California Climate-Related Risk Disclosure Advisory Group, https://law.stanford.edu/wp-content/uploads/2021/09/Developing-Climate-Risk-Disclosure-Practices-for-the-State-of-California.pdf

Introduction

Background

Since the advent of the Taskforce for Climate-related Financial Disclosures (TCFD) in 2015, investors have been asked to assess and disclose PCRs on their assets in holding and how they manage them. However, transition risks and opportunities have received most of the attention since then. There has been a significant focus on climate metrics such as emissions and alignment, including via standards and frameworks like the greenhouse gases (GHG) protocol, Partnership for Carbon Accounting Financials (PCAF) and IIGCC Net Zero Investment Framework (NZIF).

As rising temperatures continue to affect asset cashflows, they have the potential to impact credit quality and asset valuations. Consequently, many investors are beginning to understand that PCR assessments could be a key factor in helping them to understand the risk adjusted returns that underpin their objectives.

IIGCC's Adaptation and Resilience workstream was established in 2021. In 2023, IIGCC agreed to take forward the development of PCRAM from the Coalition for Climate Resilient Investment (CCRI), with the ambition to work with investors on how this approach could be better integrated into their practices. This four step process methodology showcases the potential benefits from investing in resilience across the lifespan of an asset by assessing sensitivities to future cashflows based on projected material climate events affecting the Key Performance Indicators (KPIs) specific to the asset.

The PCRAM Process

Steps	1 Scoping and data gathering	2 Materiality assessment	3 Resilience building	4 Economic and financial analysis
Objective	Determine data sufficiency	Assessing asset vulnerability	Identifying resilience options	De-risk asset exposure to PCRs
Sub-tasks	→ Project initiation → Project definition → Data gathering and sufficiency	→ Hazard scenarios → Impact identification → Impact severity → Risk quantification	Resilience options: → Hard (Structural/Capex) → Soft (Operational/ Systems)	→ Cost/benefit analysis → IRR comparison
Outputs	→ Initial climate study → Critical components → KPI selection (the Base Case cashflow forecast)	→ Detailed climate study → List of impacts and severity by component → The Climate Case cashflow forecast	→ Repeat materiality assessment → Revised climate study for new elements → The Resilience Case cashflow forecast	→ Recommendations → Value implications
Decision gates	**Gate A** Is data good and sufficient?	**Gate B** Are PCRs material to this asset?	**Gate C** What resilience options are available for this asset?	

Key challenges identified

Through our discussions with members and the broader industry, a number of challenges have been identified, which we aim to address in this paper and which will form the basis of our ongoing work with investors:

- Current approaches to assessing PCR appear fragmented and inconsistent, and the assessments themselves are often insufficient to understand the risks and opportunities presented by increased climate-related physical risk frequency and severity.
- The lack of standardisation across the different PCR disclosure regimes[4] results in PCR disclosures that are often very high-level and do not encourage a holistic approach focused on building resilience and adaptive capacity within assets.
- Different actors within the investment value chain are often uncoordinated. They often lack incentives to understand and assess PCR in a standardised way and to invest in resilience. This may be due to governance factors such as lack of board level governance, short transaction timelines, lack of capacity (both time and knowledge), and lack of a clear expectation from stakeholders, including from clients, boards, policymakers and regulators. These factors could mean that investing in resilience is not prioritised and is passed down the value chain.
- A lack of integrated governance could lead to PCR approaches that often overlook the opportunities to invest in building asset resilience. Globally, the alignment of private capital with developing climate resilience is essential for achieving the goals of the Paris Agreement[5] and meeting the ever-widening adaptation finance gap.[6,7] This is particularly relevant in Emerging Markets and Developing Economies (EMDE).
- Investors are at different stages of integrating PCR and resilience into their investment strategies. Investors at more advanced stages assess asset-level vulnerability, identify and implement resilience-building measures and, in some cases, undertake a systems-level analysis. However, physical climate risks and resilience investment are not priced in. PCRAM in Practice report and related case studies revealed that traditional discounted cashflow analysis can fail to accurately account for the impacts of PCR by not accurately reflecting their potential effects on future cashflows or by not adjusting discount rates. There is no clear framework for analysing the asset value enhancement potential of investments in resilience. During asset acquisition, many investors do not request detailed PCR information as part of their due diligence. Pricing PCR and resilience investment could create new rewards and incentive structures. Mainstreaming requests for PCR information could encourage project developers to provide this information as standard.

Most investors recognise that current PCR analyses and integration into the asset lifecycle are at a starting point and many aim to make their approach and decision making more sophisticated and informed with time. There is a recognition that current Climate Value at Risk (CvaR) analytical tools are not conducive to reducing an asset's vulnerability to PCRs and enhancing long-term value.

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[4] Depending on geographical coverage and asset class investors follow different regimes. European regulations covering PCR include the EU Taxonomy, TCFD, Solvency II, SFDR and CSRD; Asian PCR regulation includes The Monetary Authority of Singapore (MAS) and The Securities and Futures Commission (SFC) in Hong Kong.

[5] Specifically articles 2.1 (b) and (c)

[6] UNFCCC, Paris Agreement, 2015: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

[7] UNEP, 2023: https://www.unep.org/resources/adaptation-gap-report-2023

Scope: Infrastructure and Real Estate

This paper focuses on infrastructure and real estate assets, or real assets, as a natural entry point stemming from the PCRAM infrastructure approach. PCRAM has been practically applied to a number of infrastructure case studies by industry across public and private market structures, including blended finance facilities for projects in EMDEs. These are explored in our recently released report 'PCRAM in Practice'.

Moving forward, we hope that a good understanding of PCR assessments in real assets will inform and lead to a better understanding of PCR assessments for corporate assets whose operations, supply and value chains often rely on infrastructure and real estate assets. Whilst this paper has been developed with real estate and infrastructure investors in mind, PCRAM's applicability to banks and other capital providers (e.g., DFIs, Governments, multilateral funds, etc.) has been explored through their participation in CCRI and the first iteration of PCRAM. It could also be integrated into their existing approaches. For example, the UNEP FI Adaptation and Resilience Investors Collaborative (ARIC)'s physical climate risk investor playbook is referencing PCRAM as sector guidance for infrastructure.[8]

[8] UNEP FI ARIC, Physical Climate Risk Assessment and Management: an investor playbook, October 2024, p.33

Current practice

Institutional investors' perspectives on PCR differ depending on whether they are asset owners or asset managers, whether it is equity or debt finance, or their investment mandate, structure, capability or strategy. The asset class and particular strategy also influence perspectives. For example, real estate is often held for a shorter period than infrastructure, resulting in different time horizons when considering PCR.

Perspectives also differ by geographical coverage and regulation. Even though regional impacts and regulations differ, the transboundary and cascading nature of physical risks means that investors could benefit from a global systems view. For example, Southeast Asia is an international manufacturing hub with cascading impacts via supply chain stress and might be considered in European portfolio management analysis relating to PCRs. We will explore this concept further in an upcoming paper exploring the systemic impacts of PCRs.

The siloed nature of risk, sustainability and investment teams in some organisations further hinders investors' ability to integrate PCR and invest in resilience. Risk and portfolio management teams may lack the knowledge and capability to integrate PCR, and as a result, this is often coordinated by sustainability professionals. The risk team could be involved at the earlier due diligence stage but less throughout the investment's life cycle.[9]

Sustainability teams (both at investor and investee companies) often coordinate environmental and social risks throughout the business. However, these teams do not always have the capability to translate PCR into financially expressed investment risks and opportunities. There is a gap between assessing PCRs, which is typically done by sustainability teams, and translating their impacts on cashflow adjustments, which is under the responsibility of investment teams. For example, factoring in resilience benefits from avoided damages through the vulnerability assessment means that the exposure initially identified as 'high' may in fact be more manageable than previously assumed.

The type of organisation often correlates with technical capability; for example, insurers who manage their own asset pools may have a better understanding of PCR due to their insurance lines with catastrophe modelling capabilities and, as a result, have access to more capabilities at group level.

External stakeholders, such as project developers, data providers, (re)insurers, and banks, could be enablers in addressing PCR. For example, lenders are perhaps not yet fully reviewing PCR impacts on bankability and debt capacity and insisting that borrowers make relevant incremental resilience investments. This ecosystem should also be considered when assessing the opportunity for resilience investment.

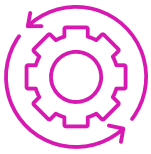
[9] World Economic Forum, 2020: https://www.weforum.org/publications/embracing-the-new-age-of-materiality-harnessing-the-pace-of-change-in-esg/

Real assets investment value chain

Actors	Time Horizon	Key concern
Project Developers	Short term Often 2-3 yrs	▪ Securing financing and navigate regulatory approvals to complete construction on time and within budget
Operators (managing the asset)	Medium to Long term Often 10+ yrs	▪ Maximise efficiency and profitability of assets ▪ Maintain operational reliability ▪ Minimise downtime
Investors - Asset Owners (AO)	Medium to Long term Often 10+ yrs	▪ Ensure asset performance and diversification to meet portfolio objectives and risk tolerance ▪ Ensure long-term asset viability ▪ Fiduciary duty in line with legal and regulatory requirements
Investors - Asset Managers (AM)	Depends on strategy Often 5-7 yrs	▪ Ensure asset performance and diversification to meet portfolio objectives and risk tolerance ▪ Fiduciary duty in line with legal and regulatory requirements
Investors - Risk Management team	Bias to short term	▪ Identify, assess, and mitigate financial, operational, and regulatory risks
Investors – Sustainability team	Bias to long term	▪ Ensure ESG risks and opportunities are appropriately understood and managed, grounding their work in financial materiality
Investment consultants	Lie between AO and AM on horizon and concerns	▪ Responding to investor advisory demand
Data providers	Bias to short term	▪ Responding to investor demand led by regulator currently asking them for a single figure on portfolio exposure
(Re)Insurers	Policy renewal at 1 or 3 yrs	▪ Ensure profitability within reserving capacity and capital requirements ▪ Fiduciary duty in line with legal and regulatory requirements
Banks	Medium to Long term Often 10+ yrs	▪ Ensuring that loans are protected, and payments can be made ▪ Fiduciary duty in line with legal and regulatory requirements

Investment stages and processes

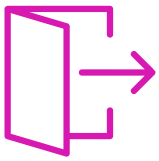
Asset acquisition: Due diligence and technical due diligence analysis are often outsourced to external providers. Compressed transaction timelines and competitive deal environments could apply pressure for streamlined analysis.



Asset operations and management: The dynamic nature of PCR means that it should be considered during the operational phase of assets and considered in the operating expenses (OPEX) and capital expenditure (CAPEX) plan. Resilience investment could also have decarbonisation co-benefits. For example, there is a carbon cost to flood recovery and if this is quantified and costed, the implementation of flood resilience measures provides decarbonisation benefits as well as flood alleviation.[10] Equally, resilience measures could be considered when investing in real assets decarbonisation, e.g. for real estate or renewable energy infrastructure.

Climate & Sustainability disclosures: Most climate and sustainability disclosures are focussed on emissions, decarbonisation, and asset-specific impacts. Currently, disclosures around PCR can be rudimentary, typically focusing on a qualitative risk score or average annual loss. In most cases, related analyses do not inform resilience investment opportunities – barring some sophisticated cases and sectors. For example, some consumer staples large caps might have a good understanding and traceability of the PCR impacts on their supply chains and operations. Such positive practice is a useful reminder that existing risk practices can be built on. However, there is little incentive to disclose these risks without a process for understanding how to address PCRs (analogous to targets and transition plans for transition risk).

Refinancing: Long-term PCR impacts are not necessarily taken into account by lenders during their due diligence. This, in turn, results in a lack of real incentive for borrowers, project developers and operators to embed resilience options.



Exit: PCR is generally not priced in asset valuation; often, the seller doesn't have the incentives to justify the cost to carry out resilience investment and address the risk and, buyers are not asking for that information. Current versus future perceptions of the asset value will be dependent on whether resilience investment is priced in.

[10] Aviva methodology for the carbon cost of flood recovery; Aviva, 2023: https://www.aviva.co.uk/risksolutions/news-and-insights/the-carbon-cost-of-restoring-a-flooded-home--building-future-com/

Integrating PCRAM alongside investment processes

Outlining how using the four PCRAM steps throughout different investor processes could help embed 'resilience building' and a dynamic understanding of PCR into core investment strategies and operations.

While future physical climate risk is a complex topic, it doesn't have to be complicated. With the help of 'climate translators', i.e. professionals who could communicate between the distinct disciplines of climate risk analysis, engineering and financial analysis, the PCRAM approach could be useful in bridging the gap between disciplines. PCR analysis could be simplified and streamlined to be decision useful in the same way that PCRAM outlines a step-by-step approach.

Strategic identification of key drivers of uncertainty

Projecting potential future risk events is inherently an exercise in dealing with uncertainty. This type of exercise, however, is already a key part of building an investment strategy and managing risk.

The extent to which uncertainty could be managed by investing in resilience depends on understanding what drives the uncertainty. Drivers may include the asset itself, its location and the nature of material hazards.

PCRAM is an asset-level assessment methodology, but investors could benefit from applying it throughout their portfolio investment processes to support them in assessing drivers of uncertainty and unlocking value creation. PCRAM could provide a useful framework to navigate uncertainties via each step:

- **Step 1:** Scoping and data gathering helps investors ascertain asset data availability and quality, which might help to quantify, understand and reduce asset and location uncertainty.
- **Step 2:** Materiality assessment enables investors to ascertain if PCRs are material to assets and locations, which might reduce hazard uncertainty.
- **Step 3:** Resilience building enables investors to understand what could be done and when to address risks
- **Step 4:** Economic and financial analysis can help identify the cost & benefits associated with options of decision-making and when a full PCRAM assessment (e.g., by an engineering consulting firm) might be undertaken. It could also be used to assess residual risk transfer to insurance (the point at which resilience investment is providing diminishing returns – to be refined with PCRAM 2.0).

These may be undertaken at significant project milestones, such as during project development and fundraising, prior to financial close, when an asset begins operating, when seeking refinancing or exit (change in ownership), during a major expansion and/ or during a significant maintenance programme.

The table below maps the PCRAM steps that investors could consider across their investment processes and highlights their benefits.

	PCRAM steps	Investor processes	Benefits
Step 1	Scoping and data gathering	Proposal writing, Due Diligence, Risk Reviews, Stewardship and Engagement	Having PCRAM in mind during this process allows investors to interact with internal and external stakeholders with a 'problem solving' approach, as opposed to a box-ticking exercise.
Step 2	Materiality assessment	Due Diligence, Scenario Analysis, Risk Reviews, Investment Selection	Understanding asset and stakeholder KPIs helps align incentives. Integrating the impacts of chronic PCRs on cashflow forecasts and sensitivities to acute risks. It quantifies costs to each KPI based on the risk.
Step 3	Resilience building	Stewardship and Engagement	Engagement on future-proofing assets could be both appreciative for the asset value and could be value accretive for other stakeholders. It quantifies benefits and potential returns based on the cost and efficiency of resilience measures. However, the scoring of resilience measures is not currently standardised. This step helps prepare the Resilience Case cashflow forecasts.
Step 4	Economic and financial analysis	Investment Committee, Credit proposals, Portfolio Management, Stewardship and Engagement	Traditional discounted cashflow analysis can undervalue PCR impacts (impact in future cashflows and/or the discount rate). Cost-benefit analysis helps optimise resilience cost throughout the asset lifecycle. Done on a dynamic basis, it could help manage changing perceptions of risk both via internal and external changes in the environment.

The PCRAM process provides three (or more) scenarios to support decision making.

1. **The Base Case / Counterfactual:** A cashflow* projection given by the project developer/ asset provider or operator. In most of current cases, it excludes the PCR impacts and is dependent on asset appraisal to date.
2. **The Climate Case:** A cashflow projection containing sensitivities of asset and financial KPIs to different warming scenarios, determined through analysis of the evolution of material risks in climate scenarios (a mix of transition, physical risk and socio-economic). Different hazards materialising in acute events may lead to different sensitivities, which could be assessed separately or aggregated.
3. **The Resilience Case:** A cashflow projection that accounts for capital or operational expenditure in building resilience against material PCRs, as well as the potential uplift against the Base and Climate Case cashflows due to increased asset resilience.

*Impact or social KPIs (e.g., homes with access to power, water or communications) that do not easily translate to project cashflows could still be mapped over time and compared to financially expressed KPIs for a more holistic picture across stakeholder groups.

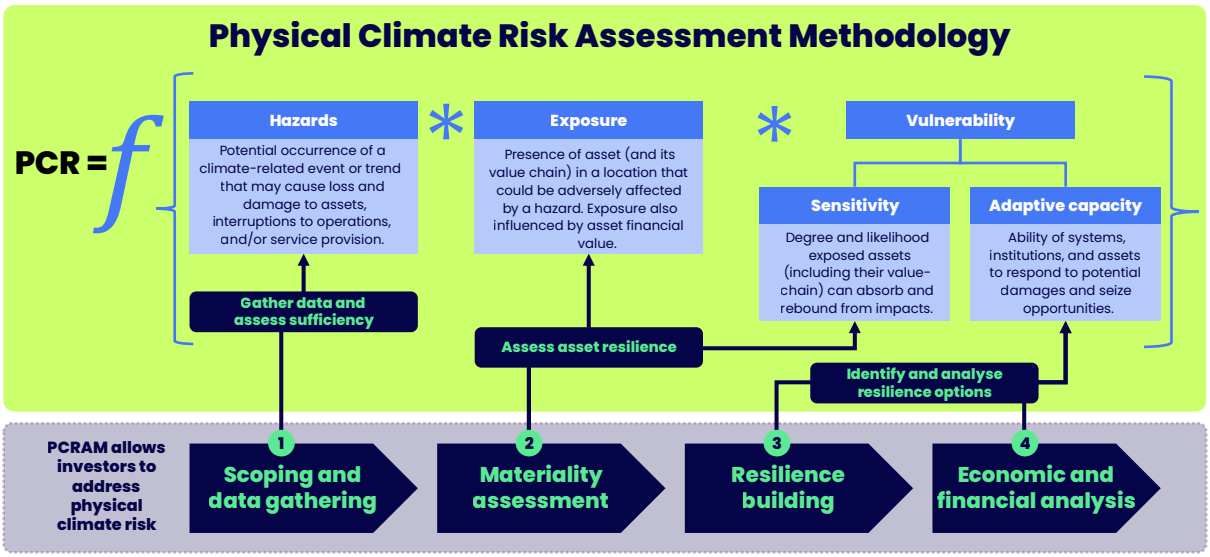
How PCRAM maps with the PCR equation

A traditional risk-based approach could lead to a shrinking investable universe if the approach is geared towards divestment or exclusion policies. However, a risk-based approach that includes resilience investment has the potential to unlock a broader investment universe and create value.

As has been experienced in implementing net zero considerations into broader investor strategies, effective change management is key for investors in properly integrating climate considerations. Governance establishes the basis and legitimacy for investors to address PCR. It is currently uncommon for investors and their assets to have a Board-level PCR strategy. Instead, oversight of physical risk often takes place in quarterly investment committees. Improving governance, for example, with Board-level oversight and mandate, could enable greater investment into resilience.

PCRAM could have application as the integrating governance tool to build adaptive capacity and standardise currently divergent PCR assessments. This section elaborates on how PCRAM steps and upcoming improvements (such as multi-hazard function, insurability function, and quantifying systems benefits) could be embedded into PCR assessments to manage the risk and potentially create value.

The PCR equation is the foundational framework utilised to assess PCRs.



The PCRAM approach moves beyond value at risk and average annual loss metrics. It repositions the relationship between investing in resilience and asset value protection and growth, and asset credit quality. To reflect PCRAM and its anticipated improvements (multi-hazard function, insurability function and systems benefits), the three terms of the PCR equation could be refined from current practice to seek out the investment opportunity:

PCRAM step 1: Assessing baseline uncertainty

PCRAM steps 2 and 3: Quantifying vulnerability and resilience building

PCRAM step 4: Identifying optimum thresholds to refine exposure

PCRAM step 1: Assessing baseline uncertainty

On the hazard factor, there are different drivers of uncertainty in the PCR assessment process. Investors often take decisions with inherent levels of uncertainty, this shouldn't be a barrier; instead, it could be harnessed as a tool for innovation and adaptive capacity.

Hazard uncertainty drivers:

Navigating climate scenario analysis remains an issue that needs to be solved for adequate PCR assessment and ultimately, standardisation of practice – both from the investors' and data providers' perspectives. The choice of climate scenarios is directly linked with different sets of hazard probabilities and severity of impacts. There are three drivers of hazard uncertainty for current and future exposure:

- Firstly, dynamic materiality should be considered i.e. uncertainty in future change around a key climate change assumption considering how tail risk distribution shift matters.[11]
- Secondly, accounting for uncertainty in baseline means positioning a portfolio on a realistic baseline that doesn't underestimate real economy risks. Accounting for these two uncertainty drivers means assessing current baseline uncertainty to refine current exposure and better estimate change and future exposure.[12]
- Thirdly, being able to communicate confidence levels and divergence in models (sensitivity testing to evaluate the potential range of risk) is key to driving transparency and standardisation for quality assurance and compliance purposes. Sensitivity analysis will help identify the factors that are most influential in the model predictions.

[11] Institute and Faculty of Actuaries, 2024: https://actuaries.org.uk/media/g1qevrfa/climate-scorpion.pdf; also see: https://www.iigcc.org/member-events/scenarios-roundtable-investor-decision-making

[12] Journal of Catastrophe and Resilience, 2024: https://journalofcrr.com/research/01-01-jewson/

Adaptation pathways[13] could help investors make decisions in the face of uncertainty and offer a dynamic response to a changing risk environment. These could be applied to any type of PCRs (e.g. acute vs chronic) over the short term (2 years) to long term (10 years) as per the World Economic Forum Global Risks Perception Survey 2023-2024.[14] Adaptation pathways could help review the level of ambition of investments based on the evolving risk. It could help real assets stakeholders to make informed decisions on how best and when to adapt. IIGCC welcomes other valuable resources like the FCA, Bank of England Climate Financial Risk Forum (CFRF) Adaptation Working Group ABC Framework. IIGCC welcomes valuable resources such as the FCA and the Bank of England's Climate Financial Risk Forum (CFRF) Adaptation Working Group's ABC Framework.

Asset uncertainty drivers:

Asset condition and characteristics are material, especially for operations and maintenance purposes.

1. Notably, some investors have highlighted inaccuracies for spatially linear assets due to the transboundary nature of risk for infrastructure. Models may be downscaled to asset level, but this additional granularity will not necessarily yield greater accuracy.[15]
2. A split in asset data ownership and oversight responsibility could lead to complications in data management, accountability, and decision-making. Asset owners may rely on asset managers' information or engineering assumptions to factor in vulnerability and exposure portfolio analysis. Stewardship and engagement could help reduce asset uncertainty and refine vulnerability toward resilience investment.
3. Accurate asset data could come from different stakeholders in the PCR real estate value chain, for example, insurers who hold asset data on reinstatement costs and building typology may have a role to play. This will be explored further in a subsequent paper on portfolio PCR considerations.
4. Currently, existing resilience measures or adaptation plans for an asset might be over-looked; however, it is likely that investors aren't starting from a blank page, yet resilience may be unaccounted for. Using engagement strategies could fill that gap and inform the overall PCR portfolio investment strategy from a baseline which includes existing resilience measures.

Location uncertainty drivers:

Access to open data of public infrastructure and real estate assets is key to understanding the local context's resilience, for example, determining whether flood defences are in place. Additionally, open data could act as one source of truth, which doesn't hinder a commercial market but enables further innovation. Open data examples include Resilient Planet Data Hub, OASIS Loss Modelling Framework, the diamond open-access peer-reviewed Journal of Catastrophe Risk and Resilience, and ND-GAIN Country Index Notre Dame Global Adaptation Initiative. This will lead to an improved understanding of the best places to invest and highlight the benefits of public sector investment to attract private sector funding.

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[13] Netherlands public sector expertise is applicable in the private sector: https://www.deltares.nl/en/expertise/areas-of-expertise/sea-level-rise/dynamic-adaptive-policy-pathways.The Dynamic Adaptive Policy Pathways (DAPP) approach aims to support the development of an adaptive plan that is capable of dealing with conditions of deep uncertainty. The approach is developed by Deltares and TU Delft. It has inspired the Adaptive Delta Management concept of the Dutch Delta Programme, and is an emerging approach for adaptation decision making worldwide; https://www.sciencedirect.com/science/article/pii/S1462901116309339. BSI standard adaptation pathway https://knowledge.bsigroup.com/products/adaptation-to-climate-change-using-adaptation-pathways-for-decision-making-guide?version=standard

[14] World Economic Forum, 2024: WEF Global Risks Perception Survey 2023-2024, p8, Figure C

[15] American Meteorological Society, 2024: https://journals.ametsoc.org/view/journals/bams/105/7/BAMS-D-23-0169.1.xml; Escape From Model Land, Erica Thompson, 2022: https://www.ericathompson.co.uk/books/

PCRAM steps 2 and 3: Quantifying vulnerability and resilience building

A refined approach to vulnerability could identify, quantify and help disclose sensitivity to PCRs relative to asset performance over time according to the level of risk. This may result in monetised resilience benefits. Resilience measures could become investable, and a more accurate residual risk understanding would be in line with risk appetite. The overall aim is optimised resilience investment. A missing key component is the standardisation of resilience metrics across the industry.

Data availability and quality relating to asset location and exposure, as well as condition and performance across a range of climate scenarios throughout its life cycle, is a key component of refining the assessment of asset vulnerability to hazard occurrence. The benefits of improved asset and physical risk data in the PCRAM process could be applied at different stages of an asset life cycle and, therefore, potentially lead to better OPEX and CAPEX allocation over time.[16]

The transboundary nature of PCRs requires a systemic approach that includes both real economy and intangible costs. Systems thinking is key to understanding how climate hazards materialise and the potential damage to assets from interconnected risks. For example, a property may become uninsurable as the risk of experiencing an extreme flood event increases and the cost of implementing associated property-level resilience measures becomes a prohibitively large proportion of their rental income. Investigating the implications of a combination of multiple hazards occurring concurrently[17] is an important consideration. Furthermore, the correlation between climate hazards and climate-related risks and other economic risks should be considered.[18] The multi-hazard approach, quantifying systems benefits, and insurability will be featured as improvements of the PCRAM 2.0 methodology.

[16] Some investors have pointed to insurance loss control reports at the due diligence stage which could offer an opportunity to identify adequate resilience measures for the asset as insurance would have access to average reinstatement costs. Furthermore, as resilience measures are monetised, it could lead to easier justification of upfront CAPEX allocation internally.

[17] NGFS upcoming updates on PCR short term scenarios and compound risk: https://www.ngfs.net/en/communique-de-presse/ngfs-publishes-conceptual-note-short-term-climate-scenarios

[18] Top100funds, 2023: How to rewrite Modern Portfolio Theory to integrate climate risk

PCRAM step 4: Identifying optimum thresholds to refine exposure

As PCRs increase in frequency and severity, exposure is likely to continue to rise in ways that are hard to predict due to the non-linear nature of PCR. Looking beyond qualitative or scoring approaches will be vital to unpacking resilience investment opportunities. The question may not be 'Am I at risk?', but instead, 'Could I manage potential risks now and in the future?'[19] Furthermore, different actors along the investment value chain could help establish thresholds for estimating how long and to what extent risks could be managed or otherwise be transferred.

Factoring in resilience benefits from avoided damages through the vulnerability assessment means that the exposure initially identified as 'high', may be more manageable than previously assumed. This means that not all material risks should be immediately transferred. Investors could potentially create value by investing in resilience. Furthermore, given the time horizon distinctions for real estate compared to infrastructure assets outlined earlier in the paper, it is worth considering the question of whether the high risks possibly be more manageable in the long term, assuming CAPEX is spent? If they are, then the shorter-term time horizon of the real estate investment could mean the risk remains material.

Insurance is becoming increasingly expensive and, in some cases, may not be available. Identifying thresholds for insurance risk transfer could become a key element of an optimised resilience strategy. Where investment in an asset's resilience is not feasible, Investors may need to think about innovative risk transfer, such as parametric insurance while remaining practical about insurability[20] (this is important, as insurability is a measure of affordability in credit quality assessments[21]). This might only apply to direct investment strategies, and for investors that deal with securities or broader assets, the value creation opportunity remains to be defined.

Transferring risks has its limits, particularly from a systems perspective – a universal owner mindset and resilience investment should be prioritised. However, tools are being developed for investors[22] that incorporate the PCRAM methodology and help to identify the optimum threshold, i.e. the point beyond which tail risks could be transferred to insurance.

If financial and physical resilience are integrated, resilience investment has the potential to protect and create value as well as unlock otherwise un-investable or uninsurable assets.

[19] Managed = broader view of risk screen and exclude, resilience investment at the source, or transfer when possible.

[20] In 2023, for the first time in the Interconnected Disaster Risks report, the UN classified an economic area – the un-insurability of homes and property – at the same level of systemic risk as the extinction of species. It was identified as a tipping point, a threshold beyond which irreversible and abrupt changes occur in socio-economic and ecological systems.

[21] S&P Global, 2024: https://www.spglobal.com/_assets/documents/ratings/research/101601706.pdf

[22] Howden, 2024: Howden launches the Resilience Laboratory supported by Microsoft to measure and evaluate climate risks (howdengroup.com) & https://www.howdengroup.com/uk-en/IIGCC-investor-insights

Conclusion and next steps

Aligning investor practices through governance by standardising PCR assessments using the PCRAM approach will form the basis of IIGCC's upcoming Climate Resilience Investment Framework (CRIF), the NZIF sister framework.

PCRAM 2.0 will seek to refine and expand the current 4-step process by looking at system benefits and producing outputs that may be relevant to CRIF. Recognising that the benefits of resilience are often shared and extend across multiple actors and users of critical infrastructure and real estate assets, a new "Step 5" will also be explored. This entails the developing of a process to assess the full value and benefits of climate-resilient assets to a range of stakeholders beyond investors. Depending on the asset ownership and financing model, beneficiaries could include businesses, local governments, national governments, households and communities. Step 5 will aim to devise a potential approach to identifying system beneficiaries and monetising resilience benefits.

If embedded in investor practices and governance, a systematic adoption of PCRAM by investors as a basis for a sound physical climate risk assessment that includes options for building real-world asset resilience could spur a shift to resilient investment. This shift could, in turn, deliver assets with more predictable future cash flows and/or optimised life cycle costs, helping to build systemic resilience from the "bottom up" in asset portfolios and the communities in which they operate.

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