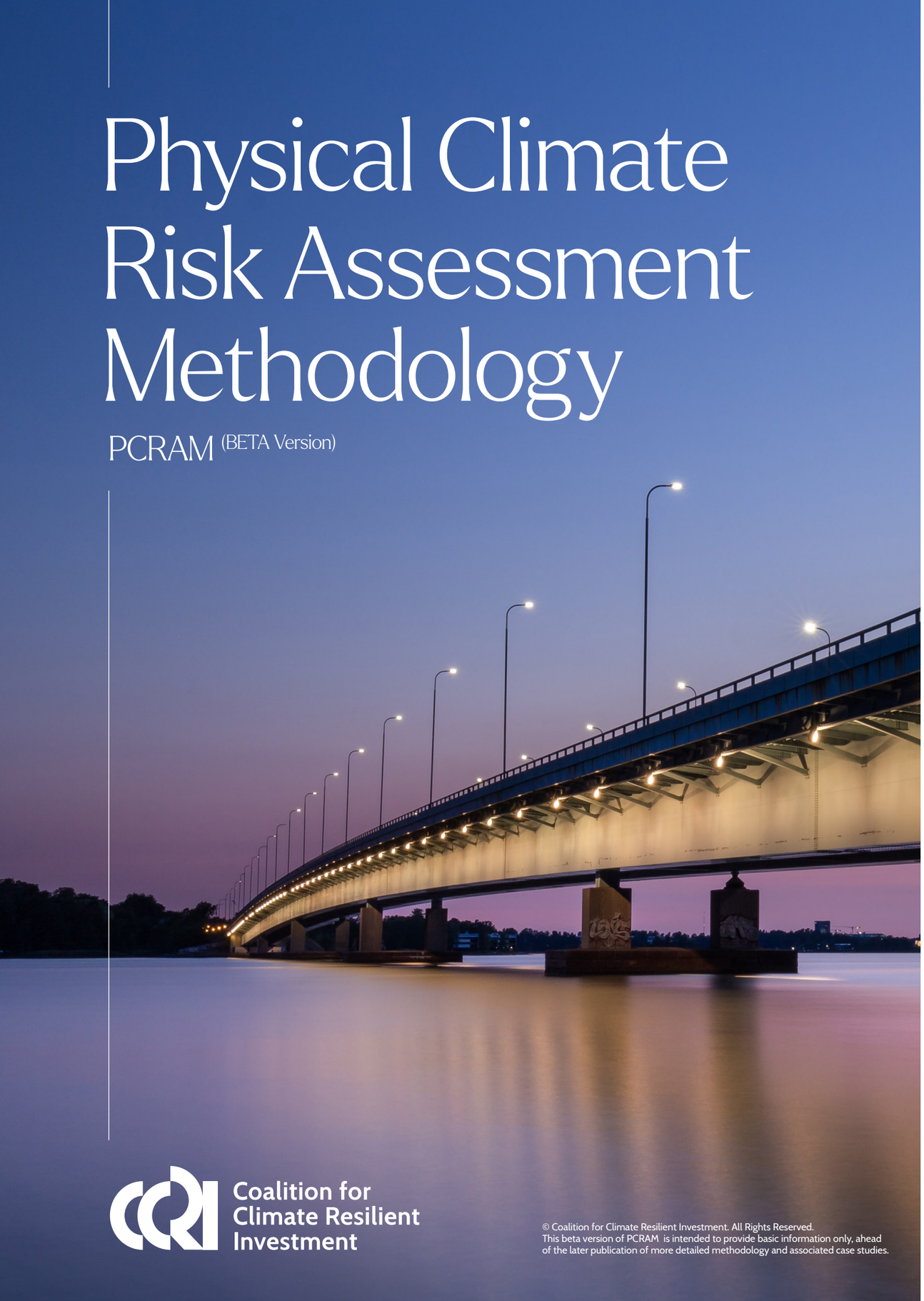
Physical Climate Risk Assessment Methodology

PCRAM (BETA Version)



Coalition for Climate Resilient Investment

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This beta version of PCRAM is intended to provide basic information only, ahead of the later publication of more detailed methodology and associated case studies.

In response to growing demand from investors for comprehensive solutions for improving the integration of physical climate risks (PCRs) into investment appraisal practices, **CCRI** has developed the **Physical Climate Risk Assessment Methodology** (**PCRAM**). PCRAM will deliver both the principles and practical support needed, leveraging growing awareness and availability of climate risk data, to infrastructure investment practitioners. It will provide users with guidance on climate risk analytics, engineering, credit quality and the investment appraisal.

The PCRAM is an output of the Asset Design & Structuring Working Group of CCRI. This ADS group is composed of 27 organisations including pension funds, asset managers, banks, rating agencies, insurers, engineers, climate risk analysts and consultants.

We are grateful to Mott MacDonald for having played the lead role in the first stage development of PCRAM and for assigning a dedicated team to work on it for over a year.

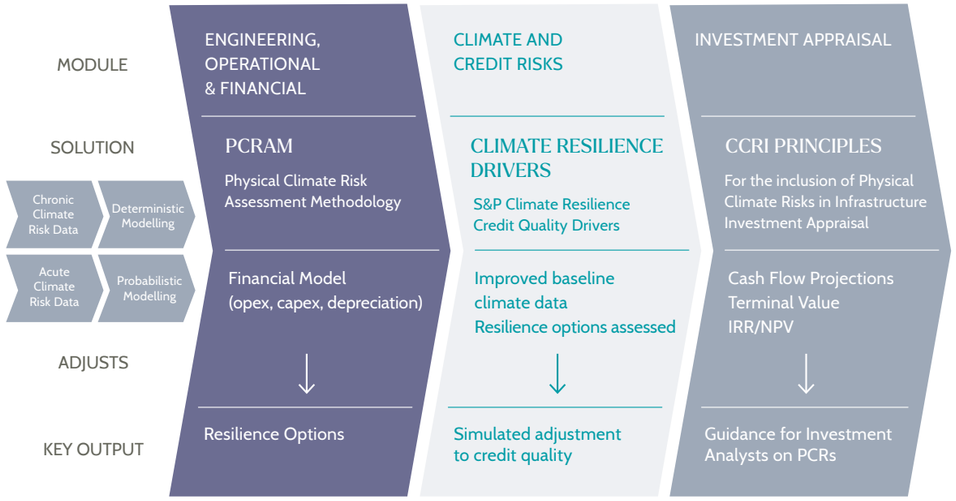
Future iterations and versions of PCRAM will involve additional engineering and consultancy firms within the CCRI membership. PCRAM was born from real life infrastructure projects using real time engineering, climate and financial data. To date, four case studies have been developed, selected to ensure a diversification of asset, location, hazard, and investment type. Additional case studies will follow to inform future versions of PCRAMs.

EARLY USERS

CCRI has already generated interest and is being adopted, even in its beta version. The State of California's Climate-Related Risk Disclosure Advisory Group, following an executive order from Governor Newsom, has recommended, in a report outlining improvements to climate risk practices that *"Project-level physical risk disclosure should align with PCRAM, or other best practices, for physical risks assessment, as endorsed by the State in the future."* Other public and private investors have recently indicated interest in adopting PCRAM and in structuring financing facilities based on the methodology.

THE CCRI ADS FRAMEWORK

PCRAM is the core component of the Framework of the Asset Design and Structuring Working Group of CCRI. The other two components are the **S&P Resilience Credit Quality Drivers** and the **CCRI Principles** for Inclusion of Physical Climate Risks in Infrastructure Investment Appraisal.



AD HOC ASSESSMENTS

REVENUE	INSURABILITY
• Macroeconomic assumptions • User preferences	• Risk Transfer Solutions to enhance cash flow predictability

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ATTRIBUTES

PCRAM's core attribute is its **practicality** and the efforts which have been made to translate highly complex components from a range of critical professional disciplines. It is also an **iterative** and **'live' methodology**, which will be refined and enhanced as case studies develop and it is piloted by public and private entities.

APPROACH

A **'bottom-up'** approach was selected, based on user feedback, where component-based risk assessments (at individual asset or system level) were assessed using climate projections, engineering and financial modelling data. Practitioners aimed for clarity of inputs, process and output across the different analytical stages. To reach this stage, PCRAM has benefited from a genuine and open **collaboration** across critical industries and sectors. It will continue to be **open-source** and parties involved in its development are unable to use it for their own exclusive commercial interests.

KEY OUTPUTS

1. **Climate Case** – quantifying the effective impact of climate change to the asset based on a range of climate projections
2. **Resilience Options** – identifying the resilience options to be considered by decision-makers
3. **Cost Benefit Analysis** – the basis for in-depth financial analysis to compare resilience options

METHODOLOGY

Four critical stages in the PCRAM analytical methodology, when used in sequence, provide practitioners with a comprehensive assessment of climate risk.

1. **Data Audit** – Understanding asset, climate and financial data sets and whether they are sufficient to undertake the analysis.
2. **Materiality Assessment** – Identifying which climate hazards will have the most impact for each component of the asset and assessing the asset managers operational objectives. Impacts are quantified in terms of the following changes and are then fed into the financial model to evaluate financial materiality.
   - Performance (e.g. availability or efficiency)
   - Lifecycle (e.g. early replacement)
   - Maintenance (e.g. additional maintenance)
3. **Resilience Options Identification** – Identifying potential resilience options and quantifying their costs, expressed as % capex and/or % opex, and the potential financial benefit. These are integrated into financial models to evaluate financial impact.
4. **Economic and Financial Analysis** – Running cost-benefit scenarios to decide on which resilience options should be adopted, prioritised and funded, and which are to be monitored for future consideration.

The PCRAM methodology can be applied to any real asset (or portfolio of assets) for any set of climate hazards.

PRACTITIONERS CURRENTLY INVOLVED IN THE DEVELOPMENT OF PCRAM

PRODUCERS

ENGINEERING	REVENUE IMPACT	INSURABILILTY	COST OF CAPITAL	ASSET VALUATION
Mott MacDonald	B Capital Partners	Prudential	HSBC	Aberdeen Standard Investments
Arup	WSP	Zurich	Wells Fargo	Australian Super
AECOM	Accenture		Legal & General Investment Management	CalSTRS
Resallience	Cambridge Econometrics		Macquarie	DWS
	KPMG		Green Investment Group	IMPAX Asset Management
			S&P Global Ratings	KPMG
				CBRE Global Investors
				Willis Towers Watson

CLIMATE RISK DATA PROVIDERS

AIR A Verisk Business · one concern · lobelia. · TRUCOST · JUPITER · XDI Cross Dependency Initiative

REVIEWERS

UNEP FINANCE INITIATIVE · Imperial College London · CLIMATE FUND MANAGERS · Invesco · GREEN CLIMATE FUND · GRESB

Department for Business, Energy & Industrial Strategy · Climate Policy Initiative · Investor Group on Climate Change · IIGCC The Institutional Investors Group on Climate Change · European Bank for Reconstruction and Development · A4S Accounting for Sustainability · Global Infrastructure Facility

NEXT STEPS

The **Guidelines to Incorporating Physical Climate Risks into Infrastructure Investment**, which will include the use of PCRAM, will be published in early 2022.

These guidelines will include updated case studies and an updated version of PCRAM.

Subsequent versions of PCRAM will follow during 2022 along with additional case studies, when leading roles will be assigned to additional ADS members.

ABOUT CCRI

A United Nations Climate Action Summit and COP26 flagship initiative, The Coalition for Climate Resilient Investment (CCRI) represents the commitment of the global private financial industry, in partnership with key private and public institutions, to foster the more efficient integration of physical climate risks (PCRs) in investment decision-making. The diagram below outlines the supporting institutions involved with the ADS working group.

For additional information, please visit www.resilientinvestment.org