



Investing in resilient infrastructure

The Physical Climate Risk Assessment Methodology (PCRAM)

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#InfrastructureInvestment
#SustainableInfrastructure
#ClimateResilience

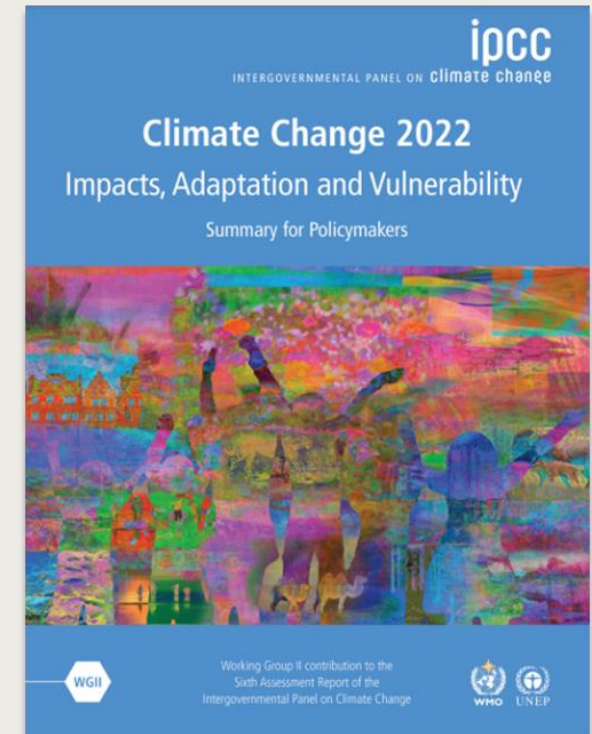


International Context

The need for investment in climate adaptation and resilience

"Even if we were to stop emitting today, the infrastructure sector would need to implement climate resilience measures for decades to come."

Carlos Sanchez
Executive Director, CCRI



3.3 to 3.6 billion people live in contexts that are highly vulnerable to climate change (IPCC)

Why do we need PCRAM?

1

Physical climate risks (PCRs) are **not consistently integrated** in infrastructure investment decision-making. Infrastructure is being built which may not be fit for the future.

2

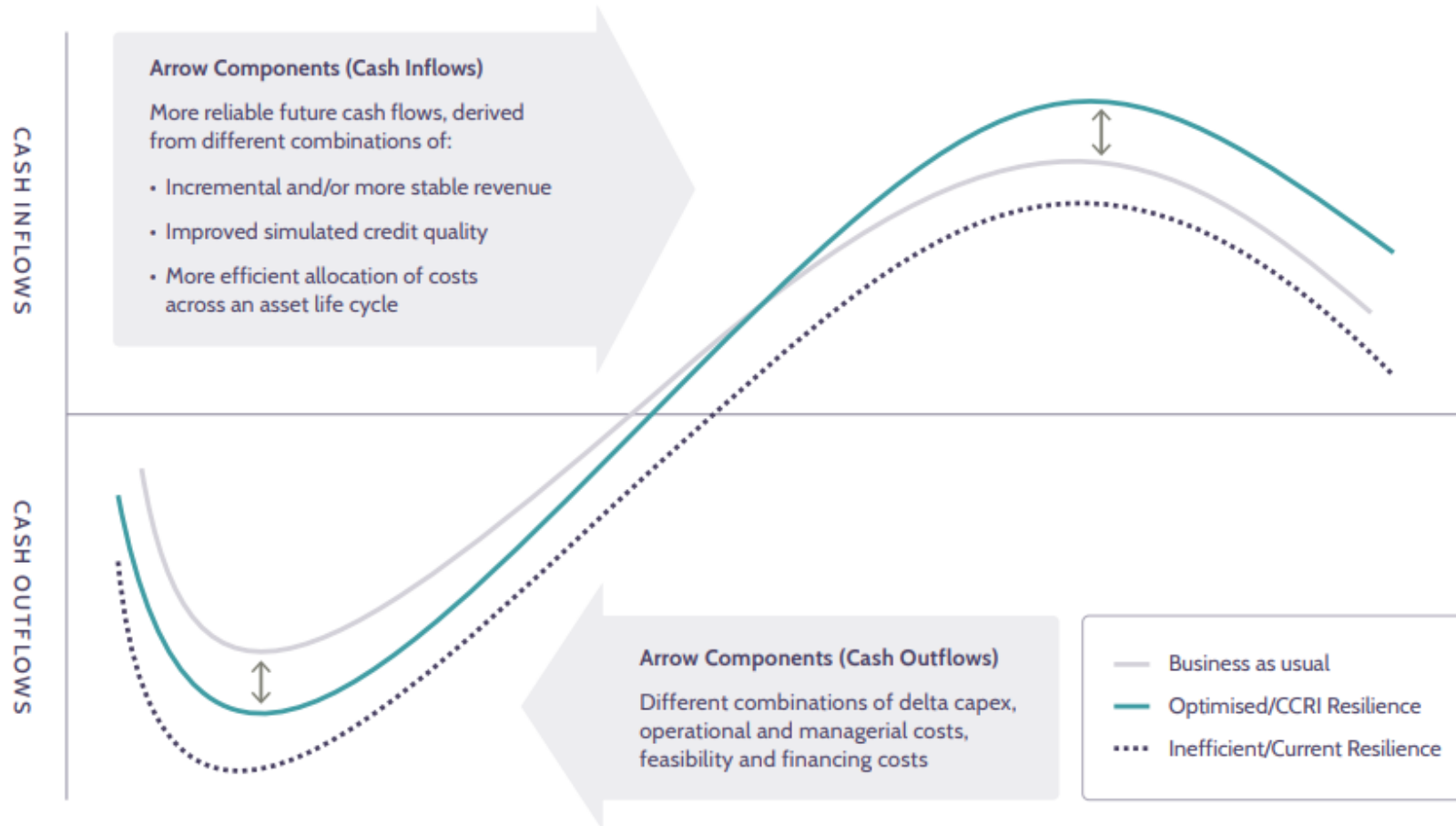
Building non resilient infrastructure **reduces long-term value** at the asset level and **increases costs** to future generations at the societal level.

3

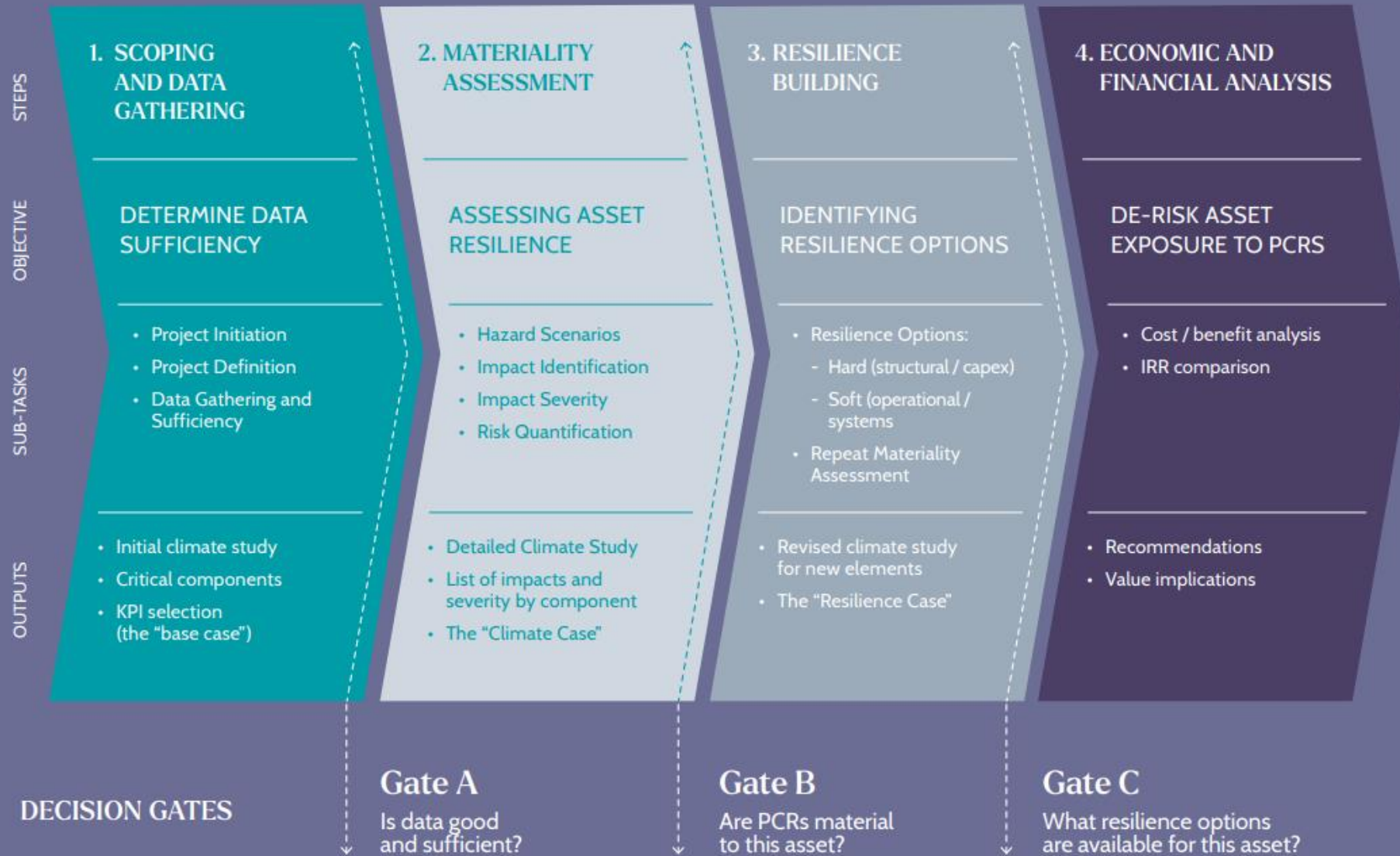
Currently there is **no standard methodology** for assessing PCRs in asset management and investment decision making. This results in ad-hoc approaches and solutions.

PCRAM working thesis

To prove that resilience projects are not more costly projects but rather more reliable sources of future cash flows



The Physical Climate Risks Assessment Methodology



Case studies



Asset: hydro power plant
Location: non-OECD
Lifecycle: under construction
Climate hazard: drought



Asset: wind farm
Location: non-OECD
Lifecycle: under construction
Climate hazard: cyclones



Asset: reservoir
Location: OECD
Lifecycle: concept
Climate hazard: drought, flooding



Asset: railway
Location: OECD
Lifecycle: operation
Climate hazard: extreme temp, coastal flooding

Case study: hydro project

General considerations

- Run-of-river hydropower project
- Development funding for construction
- Lifetime of 40 years

Production

- 40MW+ capacity
- Significant CO₂E/year reduction

Impact

- Significant construction jobs
- 0.6m people reached

Climate variables

- Drought and precipitation analysed for two future climate horizons

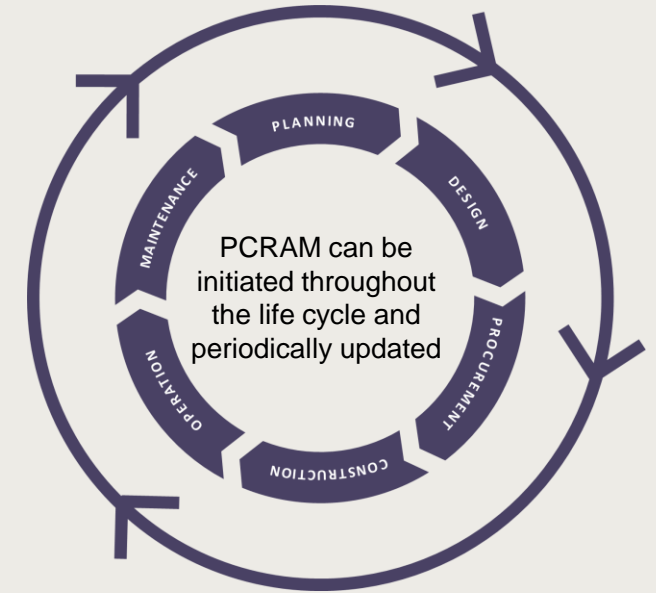


Key findings and lessons learned:

- Asset not materially impacted up to 2040 because of projected dry season flow increase
- Materially impacted beyond 2040 - significant loss of energy production year on year. Significant impact of 3-month drought in wet season.
- Asset management objective is financial, so wider benefits not expressed

Benefits of PCRAM

- + PCRAM is a robust four-step process that translates PCRs into quantifiable impacts to asset performance.
- + It allows asset managers to make informed decisions on how best to build resilience into infrastructure assets.
- + Injecting a consistent method in marketplace with a common language.
- + PCRAM quantifies the resilience needs of infrastructure assets and translates them into benefits.



Where PCRAM can be applied?

1. Assets in any infrastructure sector
2. It can be applied to any type of PCRs
e.g. acute vs. chronic
3. It incorporates a variety of business objectives
e.g. performance, economic, financial, social, and environmental

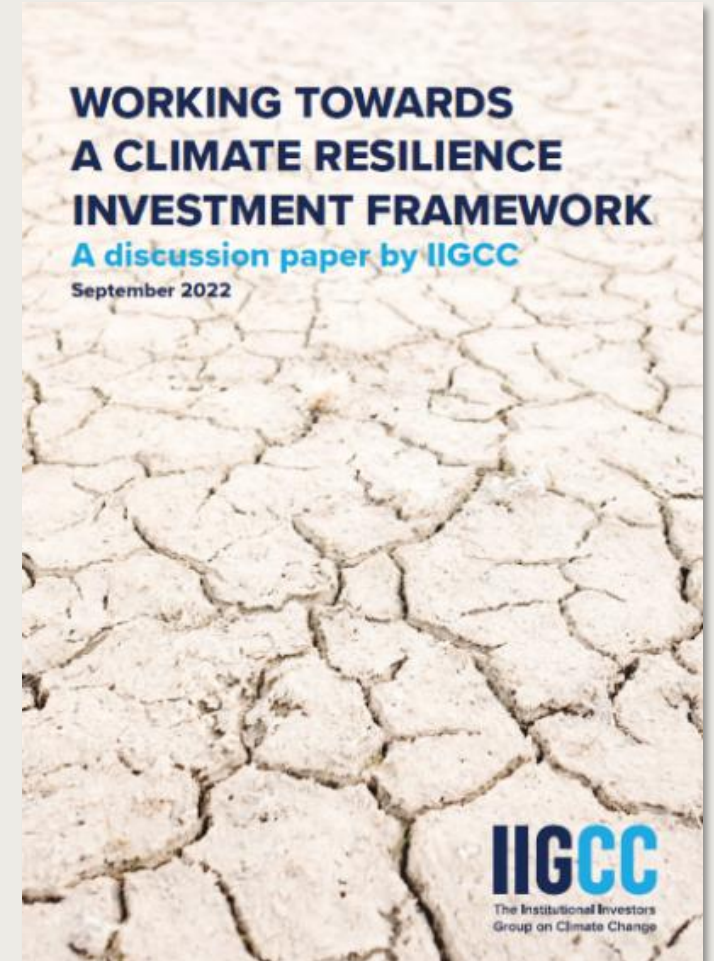
Who can use PCRAM?

Infrastructure asset owners or investors that are:

- Planning big capex investment
- Managing existing assets & investing in renewal, repair and maintenance
- Seeking confidence incorporating resilience into decisions

Next steps

- CCRI Legacy Partners – International Investors Group on Climate Change (IIGCC)
- Building on work to support investors pursue a resilient net zero
- Focus on adoption and uptake of PCRAM
- PCRAM 2.0 – improvements to the method based on lessons learned from initial case studies



PCRAM 2.0



Multi-hazard and network modelling

Current: PCRAM can look at multiple hazards, but discretely

Suggested development: intra & inter-dependencies are brought into analysis



Non-financial metrics

Current: other metrics can be considered but

Suggested development: Embed further metrics i.e. Socio-economic, jobs created, triple bottom line analysis, alignment with standards (i.e ISSB),



Resilience options

Current: in theory NbS and other non-structural options can be included

Suggested development: test this and the practicalities



Streamlining

Current: Expert lead, cost and time intensive

Suggested development: improve the overall process and timing of delivery
Augmented delivery



Modifications to step 4

1. Financial and insurance innovations
2. Iterate the process to further support investors decide how to model

[Not for MM to develop]



Contact details

Thank you



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