Low Cost, High Yield: The Adaptation and Resilience Investment Opportunity for Infrastructure

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IFC International Finance Corporation WORLD BANK GROUP

Scientific Climate Ratings
An EDHEC Venture

The A&R Finance Challenge:
Why Resilience Investment Keeps Falling Short

Adaptation & Resilience (A&R) needs for Emerging Markets are rising fast - yet a vast financing gap persists, driven by four structural barriers.

$310-365 billion[1]

Yearly investment needs in A&R by 2035 in Emerging Market & Developing Economies (EMDEs)

~20-25 billion[1]

Current level of yearly investment in A&R

A gap so large that public funding alone cannot close it

Mobilizing private capital requires clearly demonstrated evidence that well-selected A&R measures deliver net financial gains - through avoided losses, reduced costs and improved insurability.

Four barriers constrain investment:



Data gap

Lack of climate risk data to understand and quantify risks & opportunities



Misaligned incentives

Regulatory and financial incentives do not reward resilience



Limited access to long-term capital

Restricted access to capital tied to demonstrated resilience performance.



Coordination gap

To drive systemic, infrastructure-wide change.

[1]United Nations Environment Programme. 2025. Adaptation Gap Report 2025

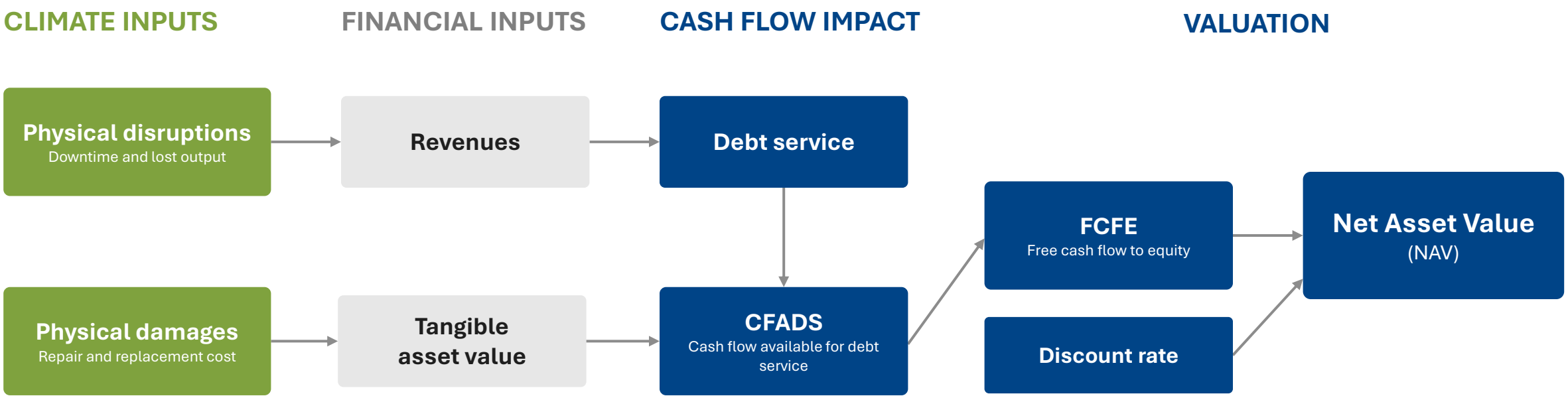
Exploring Real-World Situations:
3 Use Cases From Brazil

	ENERGY TRANSMISSION & DISTRIBUTION	WATER & SANITATION	ROAD
Sector			
Asset	**Transmission Line** *Mato Grosso State, Brazil* +1,000 km 500 kV overhead high-voltage, double circuit transmission line connecting two substations.	**Water Reservoir** *Southeastern Brazil* Principal water source for 9M+. Managed through a water abstraction permit granted by ANA and operated by a private operator.	**Motorway Concession** *São Paulo State, Brazil* Public-Private Partnership (PPP) motorway corridor for freight & commuters. ~75,566 daily users. 30-year concession from 2025.
Climate exposure & vulnerabilities	**Wildfires** are projected to pose a high risk to the full length of the transmission line.. **Flooding** threatens substations and is projected to impact over half of the line. Potential high impact of **storm** events specifically due to downbursts.	Severe **drought** exposure with increased vulnerability due to land use changes, such as deforestation and urban growth. Increased exposure to **wildfires** threatens to impact the reservoir's surroundings. **Flooding** is projected to pose a high risk due to overtopping, spillway stress, and damage to ground-level infrastructure.	**Flooding**, particularly for road segments near rivers, threatens to expose assets such as bridges, culverts, and drainage systems to structural damage and traffic disruption. **Wildfires** threaten both the physical integrity of road surfaces and structures and are projected to intensify.
Financial impacts	**30.3%**	**22.4%**	**28.7%**

Estimated **Net Asset Value (NAV) impact in 2050**, under a high-emissions scenario, without any resilience measures

How do we build up these results?

A step-by-step guide using climate data to generate real financial insights



*Asset-level and **forward-looking***

These are the required inputs before any financial modelling starts.

Climate scenario inputs applied across the chain: interest rates, inflation, sector sales

From Impact to Action:
Identifying and Selecting Adaptation Measures

*Identifying the right strategy for a specific asset type and risk profile requires structured, evidence-based evaluation. This is done by following the **ClimaTech decision tree.***

HAZARD TYPES

- Flood
- Extreme Heat
- Storm & Wind
- Wildfire

01. Core Filters

- Hazard Geography
- Asset Type
- Risk Materiality

02. Corporate Implementation

- Implementation Status

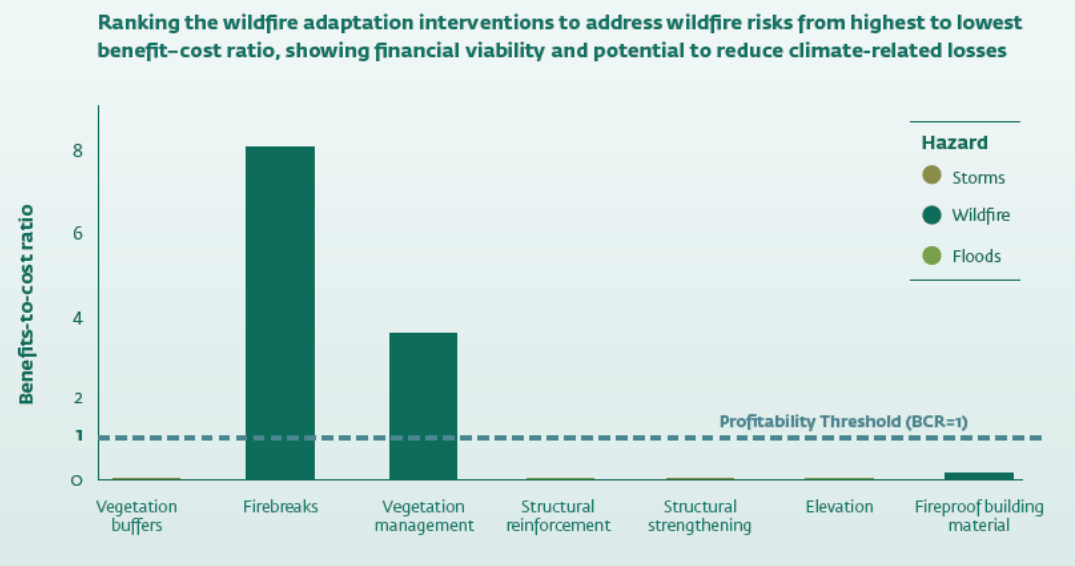
03. Contextual Overlays

- System Level Enablers
- Implementation Feasibility

04. Effectiveness Ranking

- Rank strategies by effectiveness

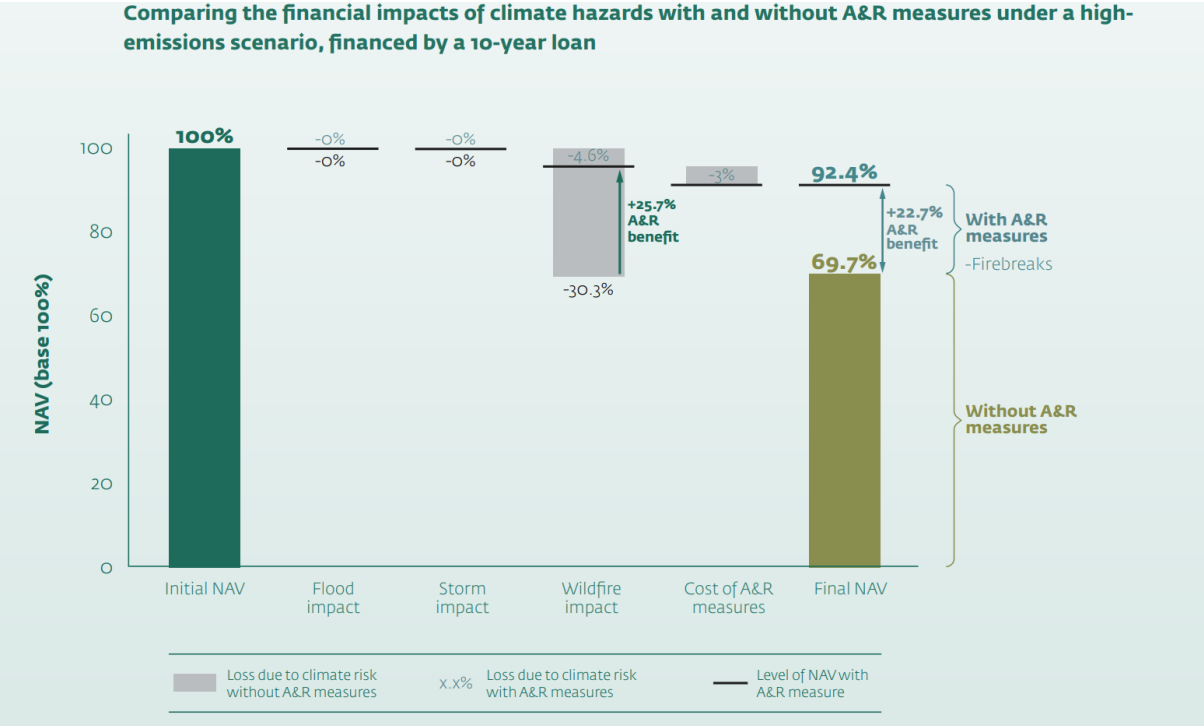
Illustration for the Transmission Line Asset



- 27 measures out of 103 available, before applying decision tree
- 7 measures tested for storms, wildfires and floods
- Final measure selected: **firebreaks**

The A&R Dividend:
Quantifying the Benefits of Investing in Adaptation

Focus on T&D asset



- Impacts of climate hazards evaluated against **Net Asset Value (NAV)**
- Firebreaks implementation **costs:**

  3% of NAV

- Under a high-emissions scenario, firebreaks implementation **benefit**:

  22.7% of NAV

➔ In other words, for every **$1** invested in A&R, **$8.6** of asset value protected

- **Adaptation IRR of the measure: 886%.**

Similar results for other sectors

WATER & SANITATION

Cost of A&R	NAV protected	IRR
2.4%	**12.9%**	**805%**

For every **$1** invested in A&R, **$6.3** of asset value protected

ROAD

Cost of A&R	NAV protected	IRR
8.0%	**9.5%**	**156%**

For every **$1** invested in A&R, **$2.2** of asset value protected

Resilience is a value protection investment, not a climate project or cost

Across the three Brazilian infrastructure cases, targeted measures protected multiples of their cost

Selection matters for A&R

2.4 - 8% of net asset value

Targeted measures

Value protected

$2.2-$8.6 per $1 invested

Avoided NAV losses + capitalized spend

Longer tenor

Stronger bankability

Tenor matters more than interest rate reductions.

Lifecycle assessment

Reveals true value

A&R benefits evaluated across full asset lifespan

THE INVESTMENT LOGIC

01 See the risk

Translate hazards into asset-level exposure

02 Select the measures

Prioritize high-value, feasible interventions

03 Structure long-term finance

Align tenor with asset and benefit life

04 Protect enterprise value

Preserve cash flow, uptime and asset value

From Climate Risk to Investable Resilience

IFC can help across the full journey

Diagnose

Where is value at risk?

- Asset & portfolio analytics
- Forward-looking climate scenarios

Prioritize

What should we fund first?

- Adaptation roadmap & CAPEX
- KPIs, targets and structuring

Finance

How do we make it bankable?

- Long-tenor debt; local currency*, blended finance
- Green, blue, UoP & SLF

**Where available*

Implement

How do we scale delivery?

- Post-financing support
- Project preparation & PPPs

PROOF POINTS

ENGIE Energía Perú

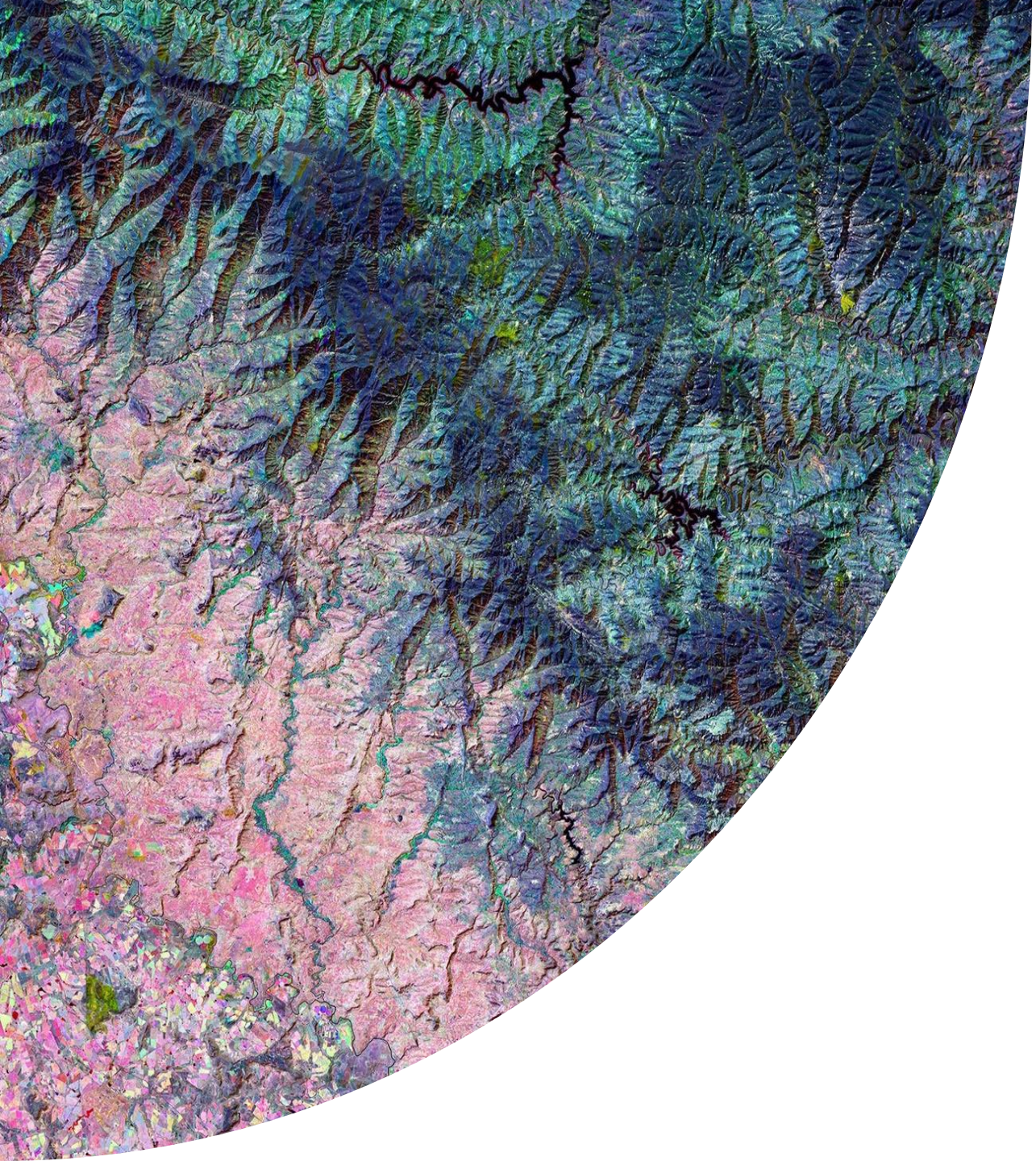
Green & Sustainability-Linked Loan

Adaptation KPI: Site- and asset-specific climate adaptation plans across facilities

GCF-IFC Resilient Water Facility

Preparation + concessional co-finance

- Concessional long-term finance for A&R
- Project preparation funding



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