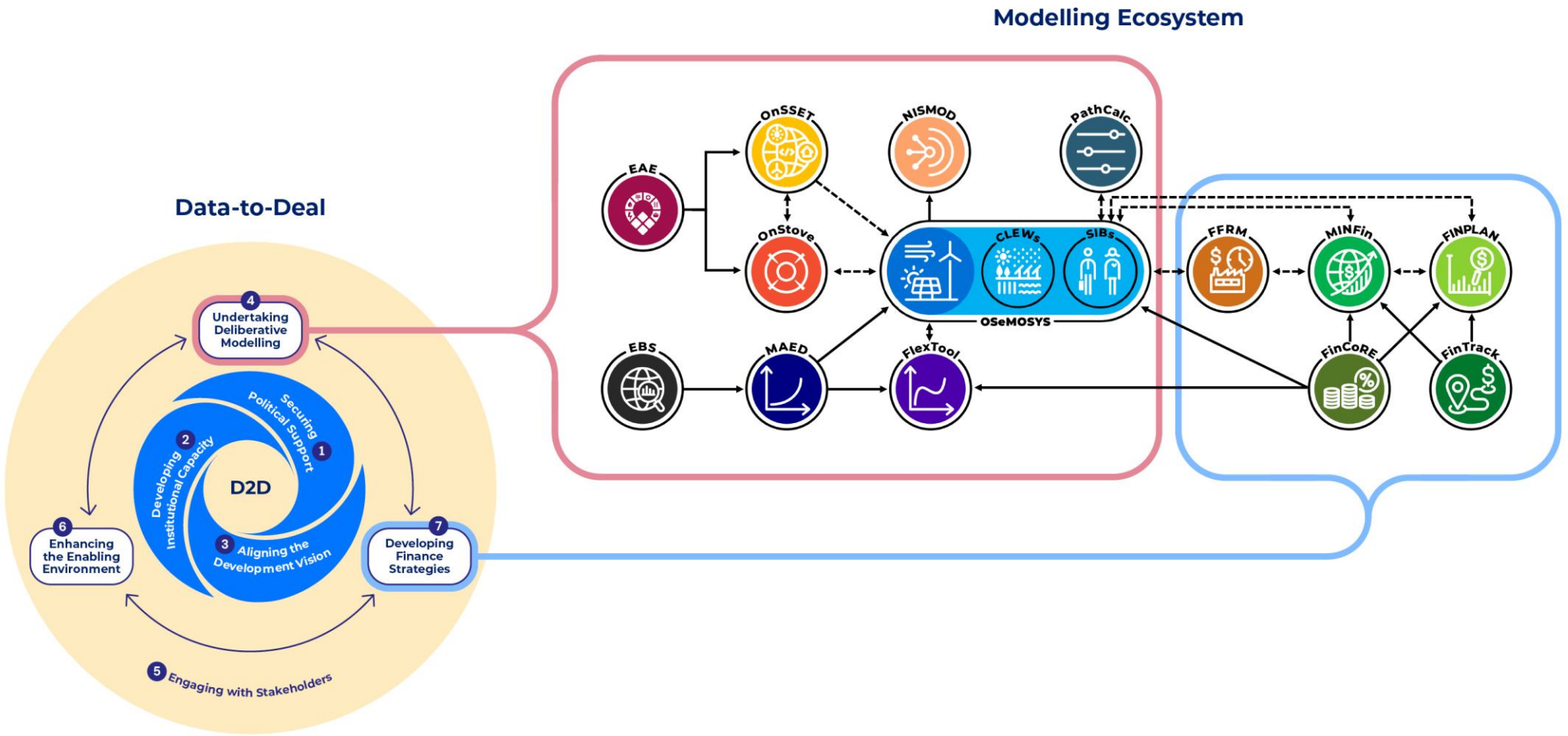
CCG's Finance Tools

"The views expressed in this material do not necessarily reflect the UK government's official policies."

University Partnership:

CCG's ecosystem of interlinked open-source modelling tools to support implementation of D2D



CCG – GIS Geospatial Tools

Category	Modelling Tool or Framework	Description	Developer(s)
GIS	**EAE** – Energy Access Explorer	Identifies high priority areas for energy access interventions based on energy supply and demand	World Resources Institute
	OnSSET – Open-Source Spatial Electrification Tool	Optimizes the expansion of electricity access whilst considering locations and infrastructure constraints	Multi-agency collaboration, coordinated by KTH Royal Institute of Technology
	OnStove – Open-Source Spatial Clean Cooking Tool	Compares the relative potential of different cookstoves based on their costs and benefits	KTH Royal Institute of Technology
	NISMOD – National Infrastructure Systems Model	Analyze infrastructure systems across different sectors. Assess their resilience, risks, and screen adaptation investment needs	University of Oxford

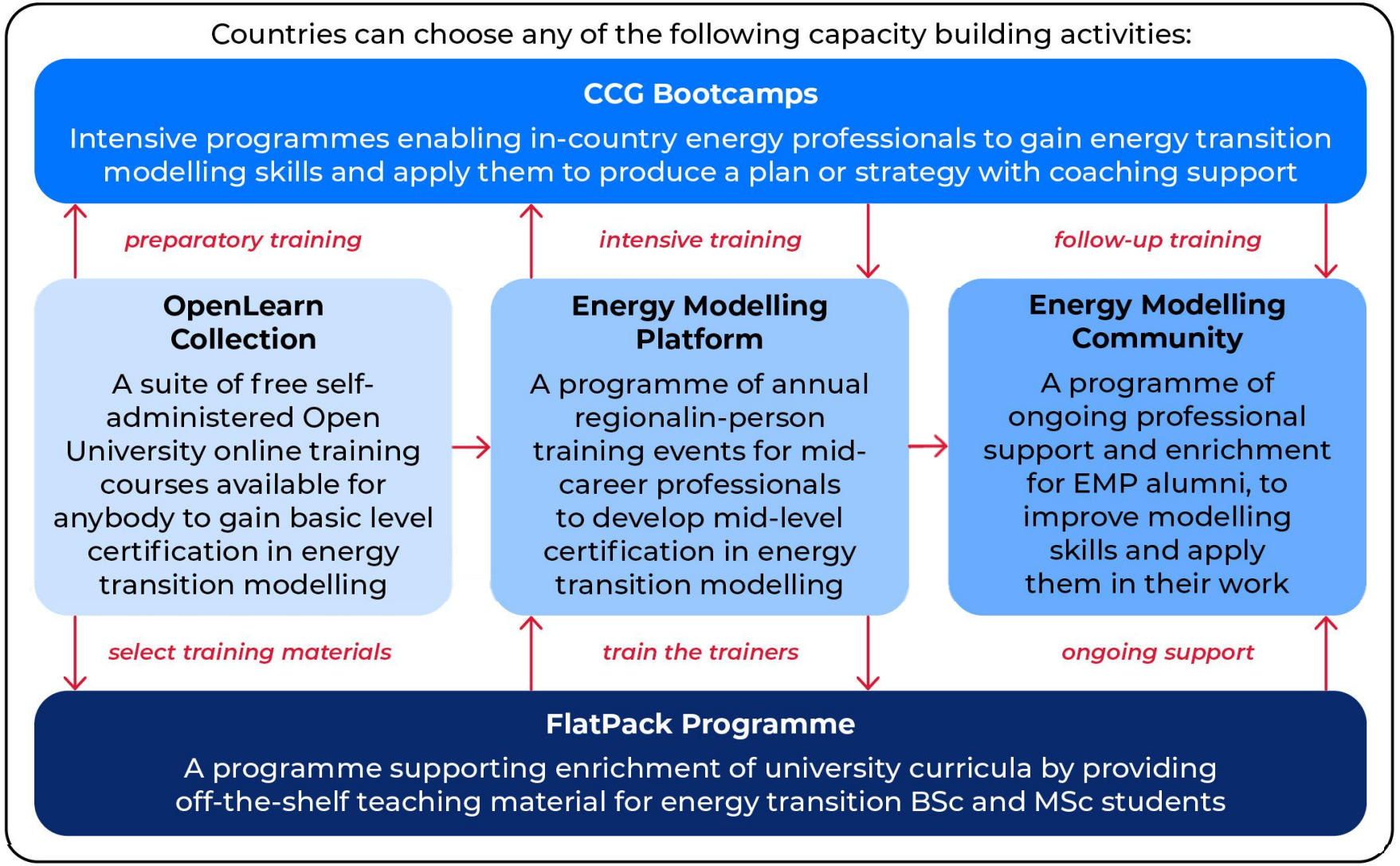
CCG – Techno Economic Tools

Category	Modelling Tool or Framework	Description	Developer(s)
Techno-economic	**EBS** – Energy Balance Studio	Offers a systematic framework for organizing energy statistics data, ensuring data consistency, accuracy, and comparability	International Atomic Energy Agency
	MAED – Model for Analysis of Energy Demand	Evaluates future energy demand based on assumptions on demographic, socioeconomic, and technological developments	International Atomic Energy Agency
	OSeMOSYS – Open-Source Energy Modelling System	Optimizes the least-cost capacity expansion plan based on a pre-defined demand	Multi-agency collaboration, coordinated by KTH Royal Institute of Technology
	CLEWs – Climate, Land, Energy and Water Systems (CLEWs)	Analyze the interdependencies between climate, land use, energy, and water systems	Multi-agency collaboration, coordinated by KTH Royal Institute of Technology
	SIBs – Social Impacts and Benefits (SIBs)	Quantify the social and environmental implications from a capacity expansion plan	KTH Royal Institute of Technology
	FlexTool	Optimizes least-cost power system flexibility assessments based on national capacity investment plans	International Renewable Energy Agency
	PathCalc – Pathways Calculator	Leverages ambition levels and levers to show the impact of various choices on demand, investments, and emissions	Department for Energy Security & Net Zero, Imperial College London

CCG – Financial Tools

Category	Modelling Tool or Framework	Description	Developer(s)
Financial	**FFRM** – Fossil Fuel Retirement Model	Quantifies the foregone revenue resulting from early shut down of fossil fuel plants, ensuring asset owners are reimbursed for lost revenues	Imperial College London, University of Oxford, World Bank Group
	MINFin – Model for Informed National Financing	Simulates strategies to close the energy sector financing gap between financing costs and sector cashflows	University of Oxford, Imperial College London
	FINPLAN – Model for Financial Analysis of Electric Sector Expansion Plans	Simulates financial performance of power plant projects over their lifetime by comparing the cost components with available financing sources	International Atomic Energy Agency
	FinCoRE – Financing Costs for Renewables Estimator	Estimates international commercial cost of capital for different power technologies, by year and country	Imperial College London
	FinTrack – Climate Finance Tracker	Maps available development and climate finance envelopes by country, detailing concessionality, access conditions, and utilisation rates	Imperial College London

CCG's Capacity Building Offer



Financial modelling capability

What funds are currently available to meet the needs predicted by climate modelling, and how can the country improve access to maximise access to funds?

FinTrack is an emerging tool developed by CCG to monitor climate and development fund commitments to countries, including concessionality and historical usage. Using a database of current fund allocation estimates, it helps users identify, rank, and prioritize national-level access based on funding volumes, concessionality, and access barriers tied to fund criteria and project stages.

What is the estimated cost of capital for renewable energy projects in the country?

FinCoRE is an emerging tool developed by CCG to estimate the cost of capital for renewable projects financed by international commercial investors, broken down by year, country, and components like risk-free rate and technology risk. It can be used to examine how macroeconomic conditions, market maturity, and financing structures impact these costs, aiding in renewable energy investment planning.

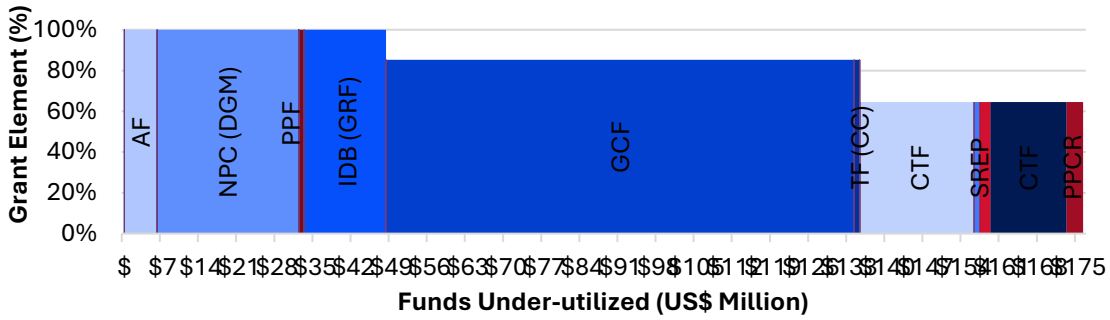
Is a country's energy expansion plan financially sustainable and feasible for the country, considering investment requirements, financing costs and sector cashflows?

MINFin is an emerging tool designed by CCG to support the development of financing strategies for long-term energy investment plans by computing associated financing costs and comparing them to available cashflows. Based on recent history and forward-looking projections, users can determine the viability of implementing climate transition and explore alternative mechanisms for delivering climate finance.

FinTrack: Climate Finance Tracker

MODEL DESCRIPTION:

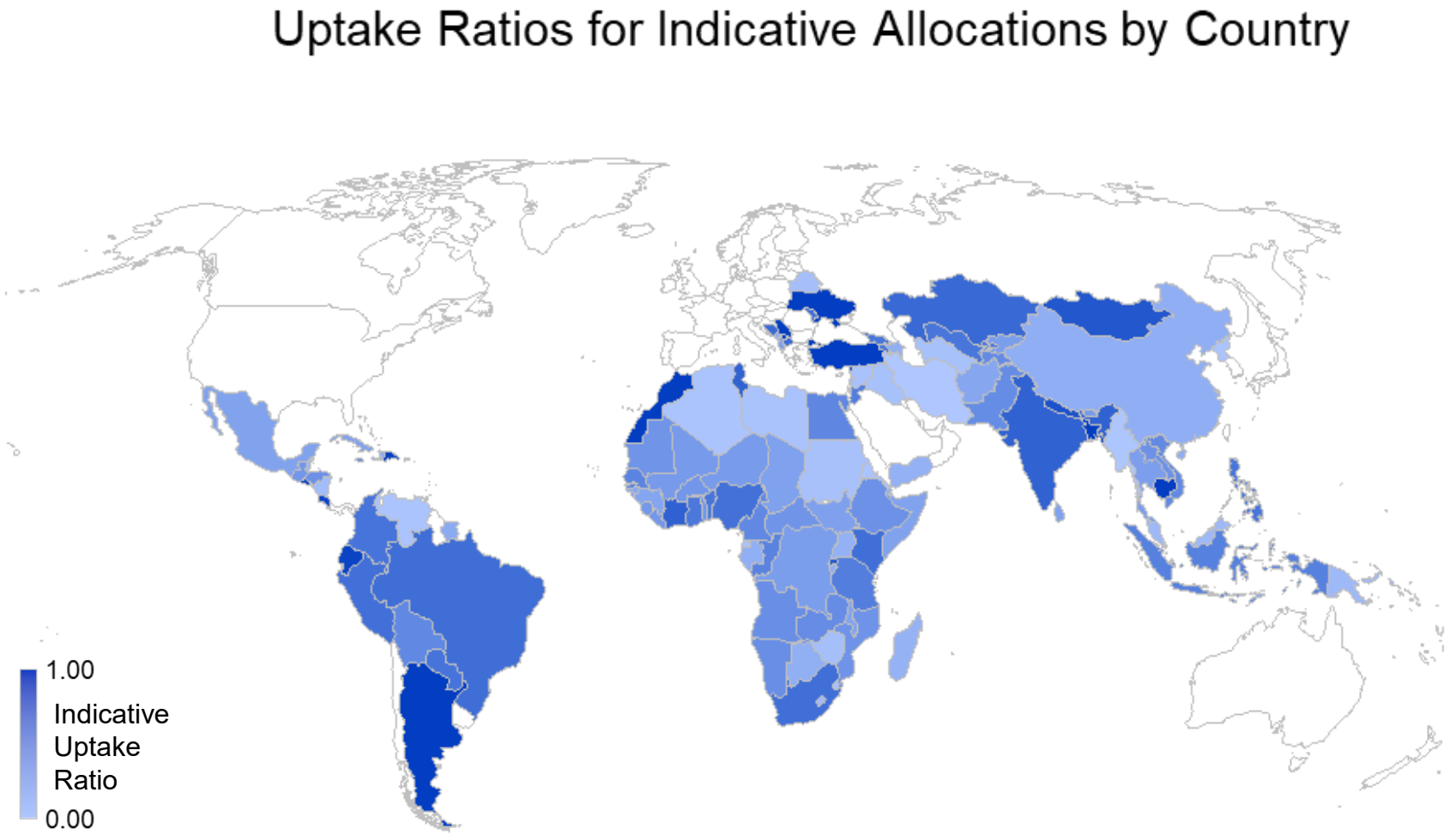
FinTrack is a tool for assessing the availability, accessibility, concessionality and historic use of climate finance offered by climate and development funds.



QUESTIONS:

1. Are countries tapping into the climate funds for which they are eligible?
2. How favourable are the terms of finance from different funds?
3. What are the accessibility hurdles posed by different funds?

Many LMICs, are taking up just a fraction of the climate funds for which they are eligible



FinTrack covers more than 30 Climate Fund Facilities and development finance climate commitments representing 80% of the global total.

Average uptake ratios:

- LICs 30%
- MICs 68%
- SSA 33%

FinTrack dashboard enables identification of funds based on the following characteristics

Fund Type: Climate Funds | Development Funds
Project Stage: Pre-feasibility | Preparation | Investment
Sector: Energy | Transport | Agriculture | Others
Project Target: Mitigation | Adaptation
Finance Type: Grants | Loans / Debt

FinTrack		
Country	**Brazil**	BRA
Fund Type	Climate Funds	
Stage	Investment	
Sector	Energy	
Finance Type	Mitigation	
Target	Loans	
Primary Sort By	Grant Element	
Primary Sort from	High-to-Low	
Display	Normalised Annual Funds	

FinTrack enables funds to be ranked based on the following metrics

Concessionality: level of financial support on interest rates and loan terms, expressed as a grant element (grants = 100%).

Complexity: administrative and eligibility requirements associated with accessing funding.

Scale: potential funding volume available based on fund size and country allocation rules.

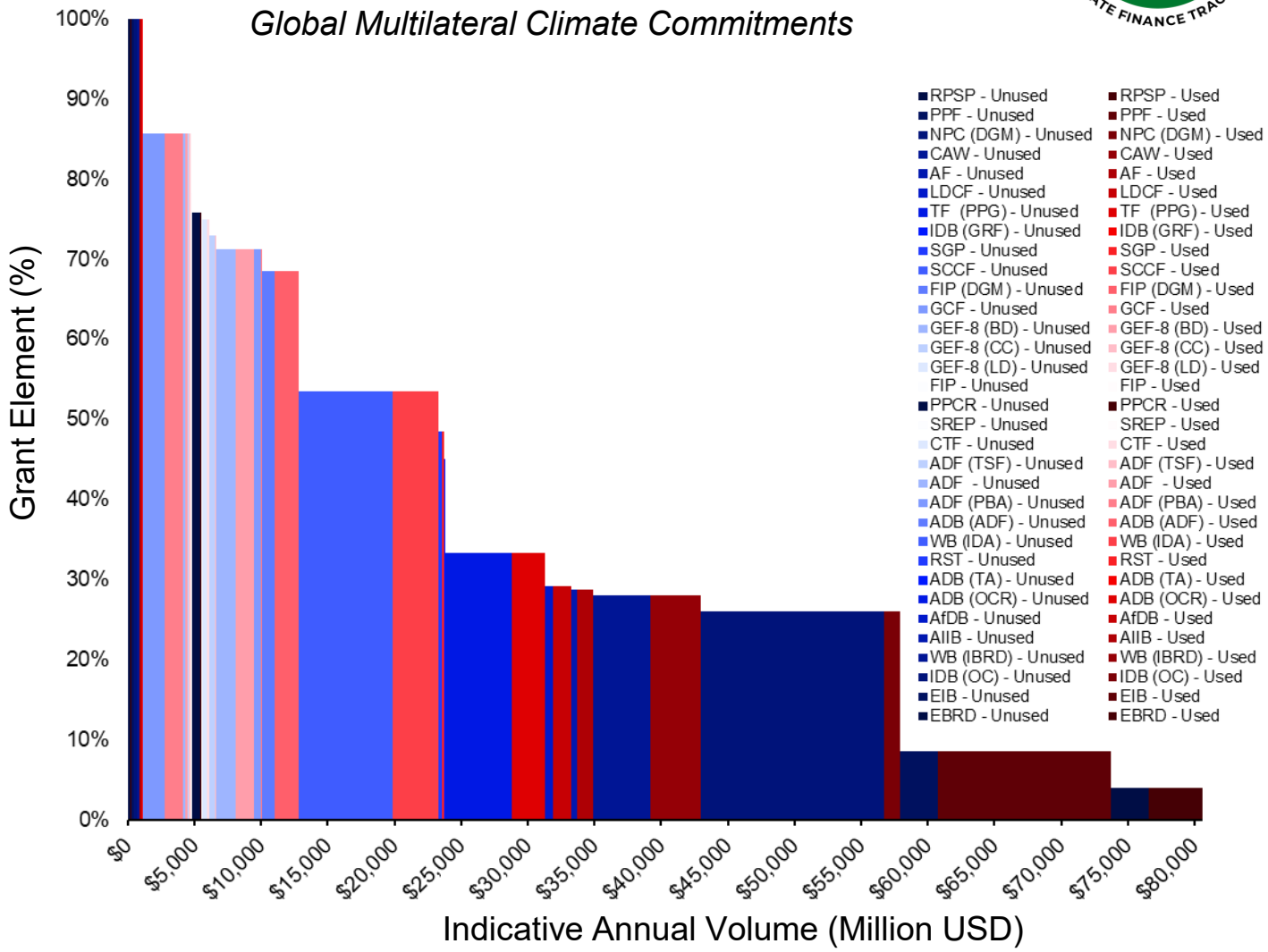
Accessibility: historical ability of countries to access available resources relative to their allocation.

FinTrack		
Country	**Brazil**	BRA
Fund Type	Climate Funds	
Stage	Investment	
Sector	Energy	
Finance Type	Mitigation	
Target	Loans	
Primary Sort By	Grant Element	
Primary Sort from	High-to-Low	
Display	Normalised Annual Funds	

FinTrack Metrics: Accessibility

FinTrack highlights volumes of concessional finance that may have historically been under-utilised

With **red** indicating used portions, and **blue** indicating under-used portions, this produces a **"merit order of climate finance"** helping users to prioritize access to larger volumes of concessional finance that has been historically under-utilised.

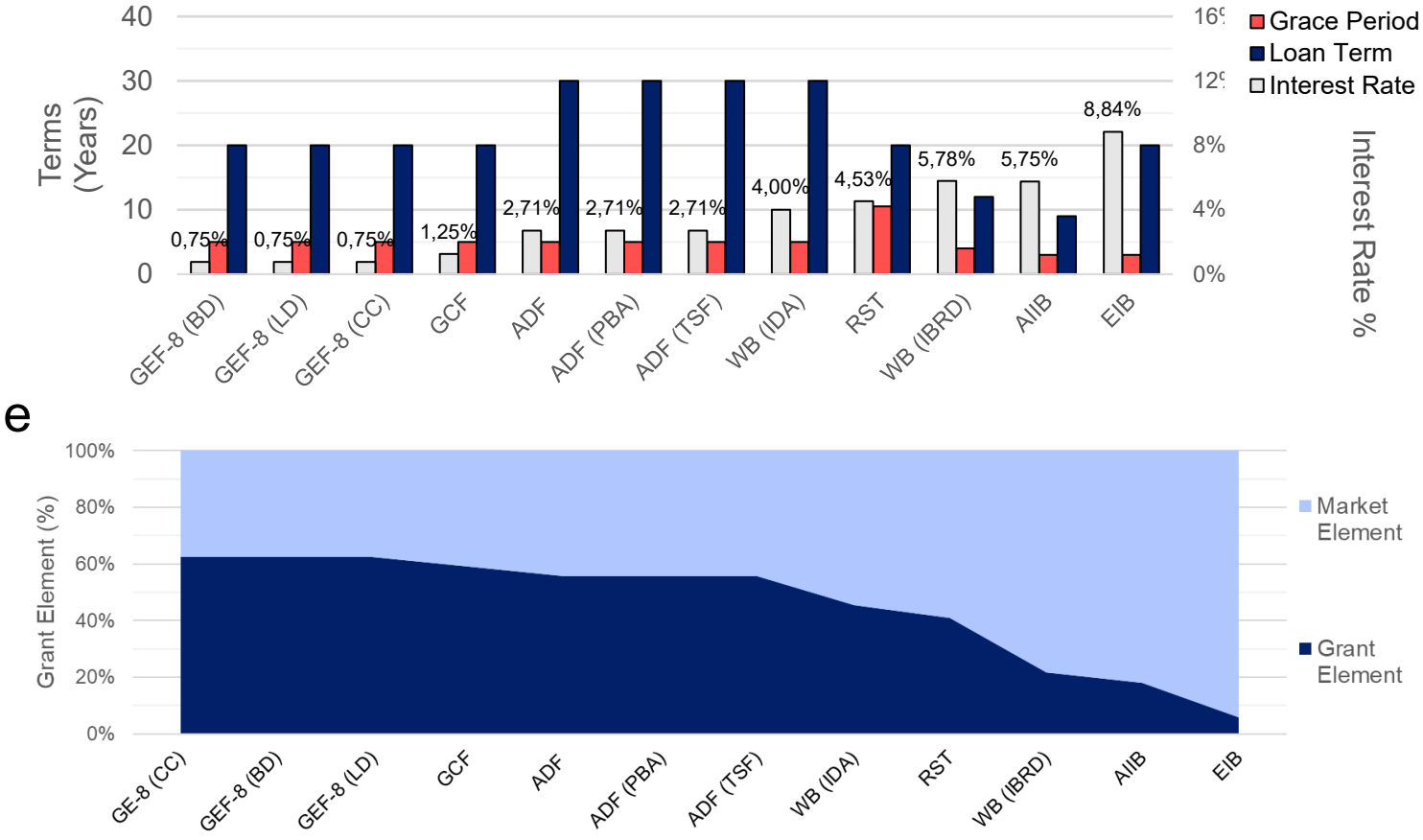


FinTrack Metrics: Concessionality

FinTrack ranks funds based on the **concessionality,** for the selected country

FinTrack outputs **interest rate**, **loan term** and **grace period** for each loan or grant facility

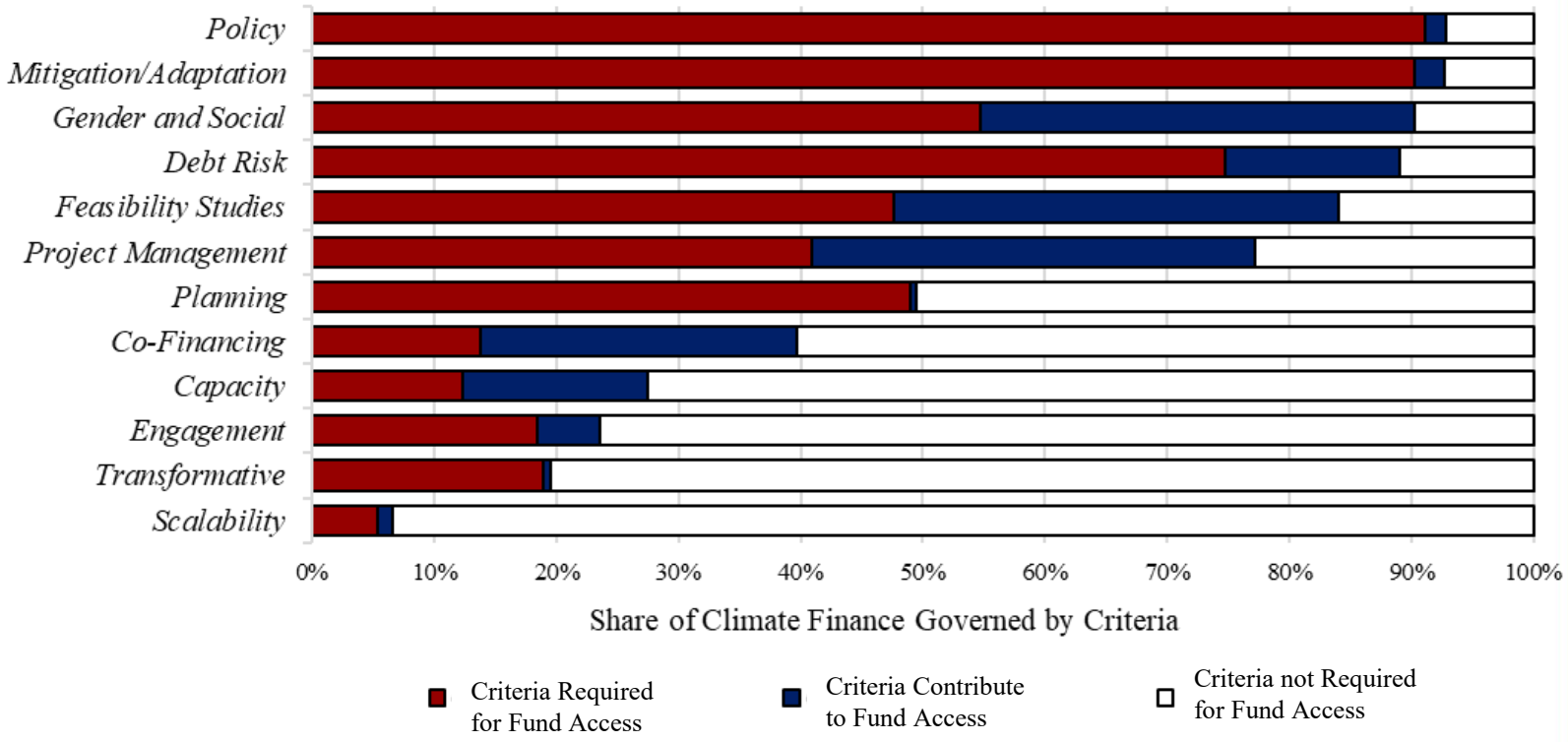
This is all summarised in the single metric of **Grant Element** as outlined by the OECD ODA methodology (*grants = 100%*)



FinTrack Metrics: Complexity

FinTrack maps eligibility criteria outlined by each fund onto 12 universal criteria that cover both the **macro-economic** and **project-level** aspects

This includes criteria that are either **outright requirements** or **contribute to the weighting** of allocations and fund access.

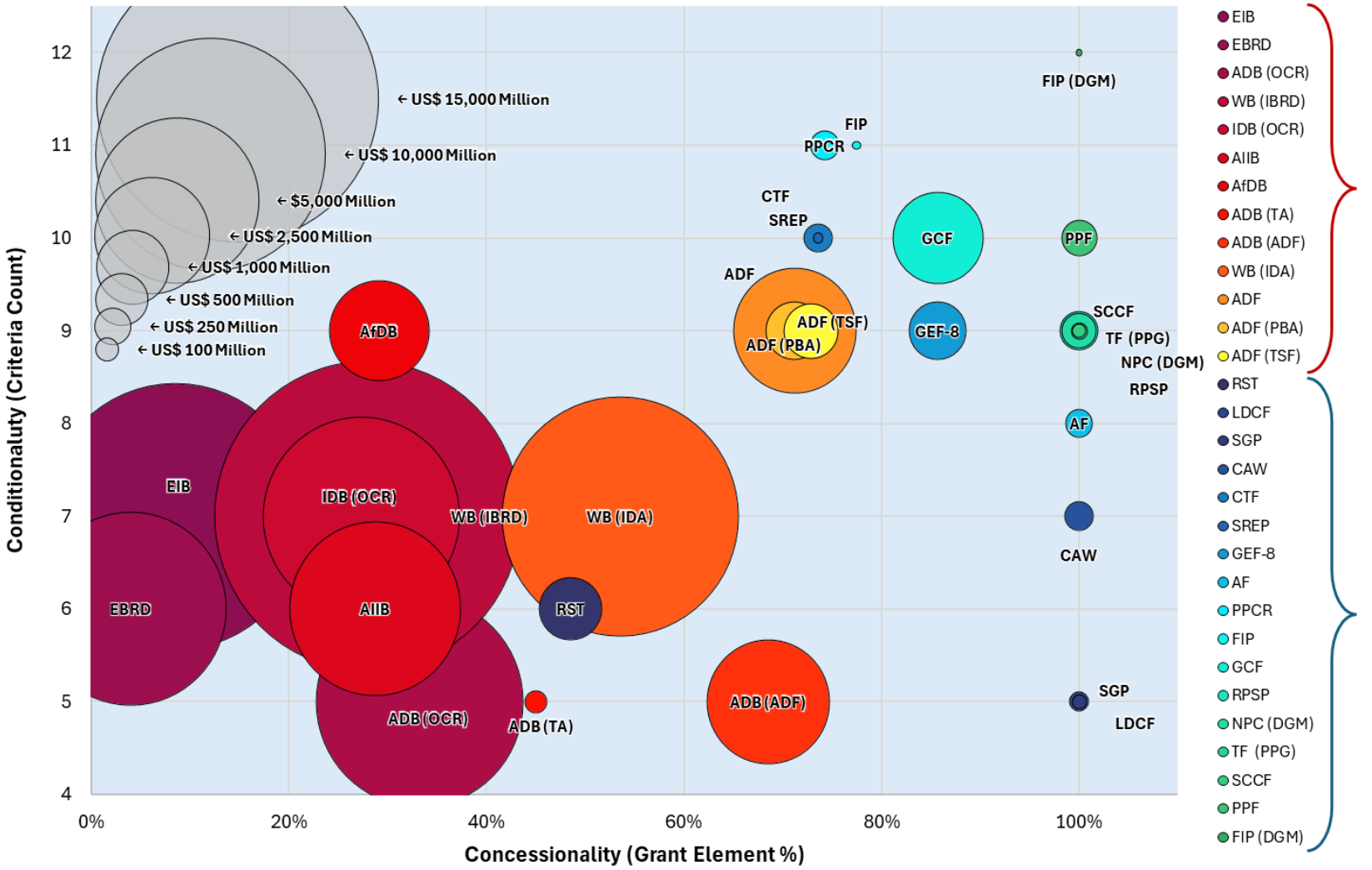


This helps to **prioritise funds that require lower institutional capacity** to access, and **prioritise efforts on criteria that may be most impactful** in leveraging additional finance.

FinTrack Metrics: Complexity

Criteria	Description	Level
1. Debt Risk	Countries should demonstrate that additional debt burdens are sustainable, and would not exacerbate debt destress in heavily indebted countries	National
2. Engagement	Countries should have proof of successful prior engagement with funds and existing interactions or implementing agencies for the fund operating within the country.	
3. Capacity	Countries should demonstrate either sufficient existing institutional capacity, or plans to develop capacity, to ensure knowledge transfer and country ownership.	
4. Policy	Projects proposed should align with climate targets and support progress towards achievement of climate targets such as the Paris Agreement	National/Project
5. Planning	Projects should be underpinned by country ownership and evidence-based research, demonstrating alignment with science and long-term planning.	
6. Mitigation/Adaptation	Projects proposed should align with fund specified targets with regards to mitigation and adaptation potential	
7. Scalability	Projects proposed should pave the way for further opportunities to scale technology deployment and amplify regional impact.	
8. Transformative	Projects should demonstrate potential for transformative change, by driving down regional technology costs and strengthening policy environments.	
9. Feasibility Studies	Projects should present evidence of Environmental and Social Impact assessment studies, as well as potential feasibility studies.	Project
10. Gender and Social	Projects proposed should report on gender inclusion, and take steps to ensure stakeholder engagement and transparent decision-making	
11. Project Management	Projects should be cost-effectively managed and be constituted as independent legal entities held accountable for their financial obligations.	
12. Co-Financing	Projects should maximise cofinancing from domestic and international private sector funds to catalyse further investor interest in the market.	

FinTrack Metrics Scale



- EIB
- EBRD
- ADB (OCR)
- WB (IBRD)
- IDB (OCR)
- AIIB
- AfDB
- ADB (TA)
- ADB (ADF)
- WB (IDA)
- ADF
- ADF (PBA)
- ADF (TSF)

Development Fund Climate Commitments

- RST
- LDCF
- SGP
- CAW
- CTF
- SREP
- GEF-8
- AF
- PPCR
- FIP
- GCF
- RPSP
- NPC (DGM)
- TF (PPG)
- SCCF
- PPF
- FIP (DGM)

Climate Fund Commitments

This can also be visualised to highlight **larger volumes** of **accessible** and **concessional** finance.

This allows administrative efforts towards fund applications to be more effectively targeted.

FinCoRE: Estimator of Cost of Capital for Renewables

MODEL DESCRIPTION:

FinCoRE is a tool to estimate the CoC for projects financed by international commercial investors, broken down by year, country, and components like risk-free rate and technology risk.

QUESTIONS:

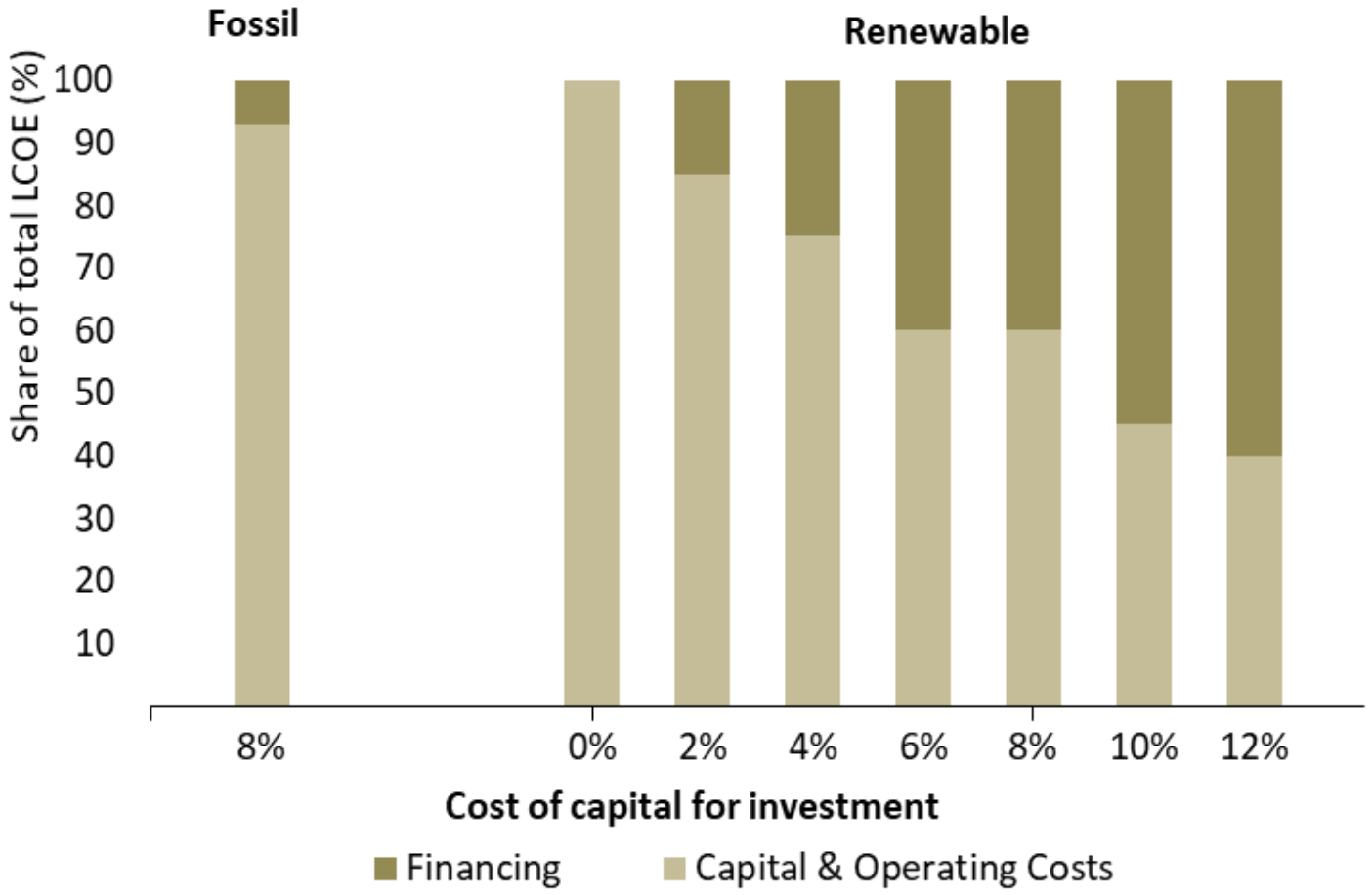
1. What are the likely costs of capital facing energy project developers?
2. How do these vary between technologies, and what are the principal driving factors?
3. How is the cost of capital likely to change in the short term out to 2030?

The cost of capital for energy technologies is a key driver of absolute and relative development cost

Many clean technologies are capital-intensive with minimal operating costs

Cost of capital therefore makes up a substantial share of the levelised cost of electricity (LCOE)

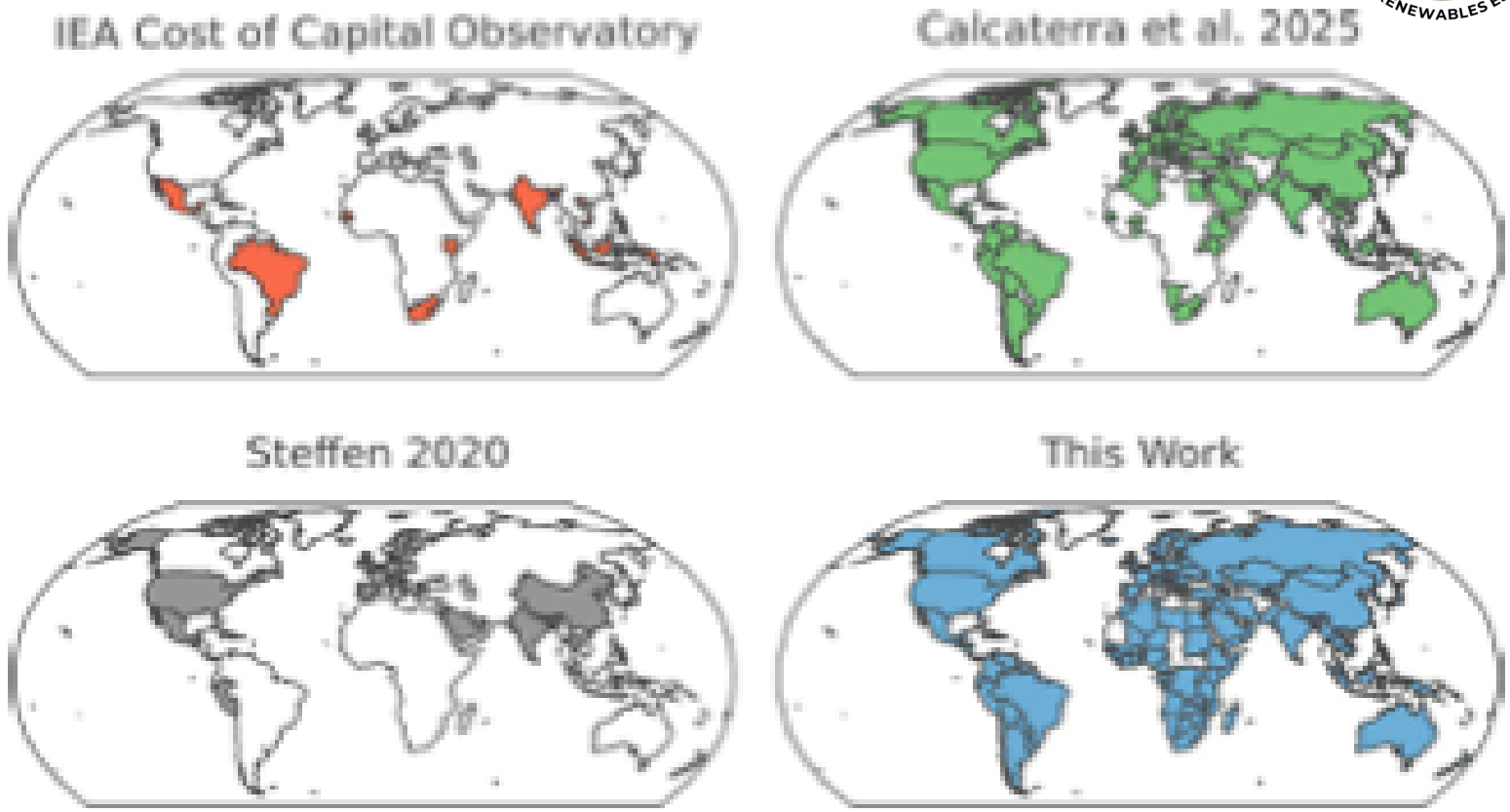
Inaccurate assumptions over the cost of capital bias model results and insights and can affect relative competitiveness of different technologies



FinCoRE models cost of capital across 176 countries

Empirical project-level data is typically limited, out of date and geographically concentrated

FinCoRE covers a total of 176 countries, with increased coverage of developing economies (including 31 of the 47 Least Developed Countries).



Geographic coverage of the estimates presented in FinCoRE, compared to selected works.

FinCoRE estimates risk components in the cost of capital

Disaggregation of the contributing factors to cost of capital for energy technologies in FinCoRE:

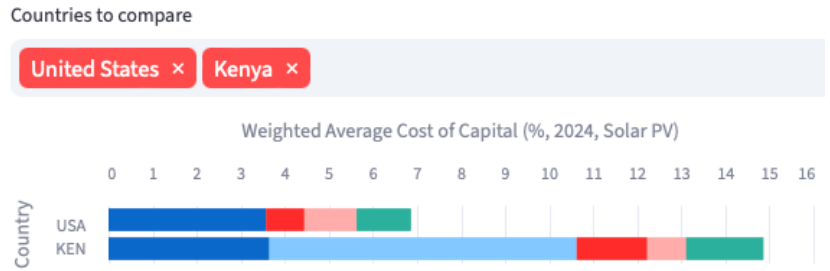
- Risk-free rate
- Country risk
- Equity risk premium
- Lenders margin
- Technology risk

A schematic of the approach used in this work to calculate the cost of capital for a given year, country and technology combination.

FinCoRE estimates cost of capital across three dimensions

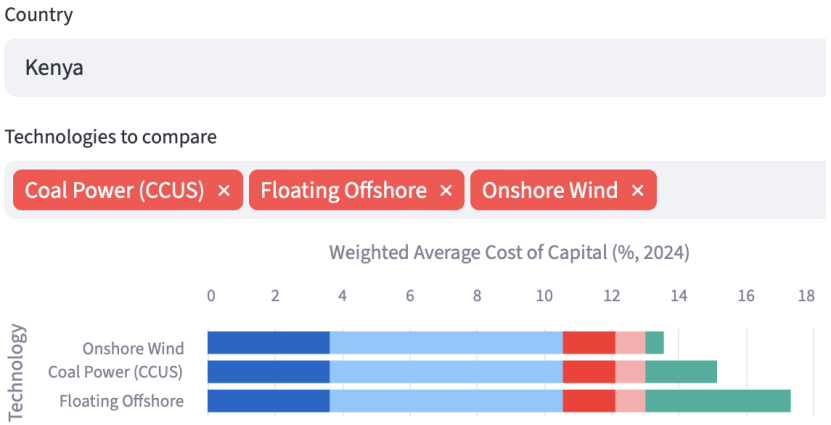
Spatial

Comparisons across countries



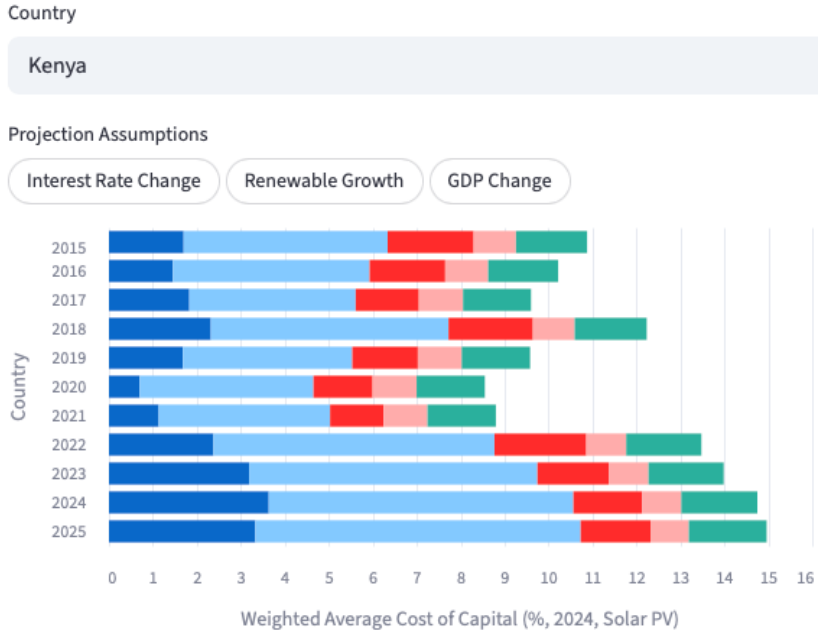
Technological

Comparisons across technologies



Temporal

Historical and projected estimates over time



Factor
- Risk Free
- Country Risk
- Equity Risk
- Lenders Margin
- Technology Risk

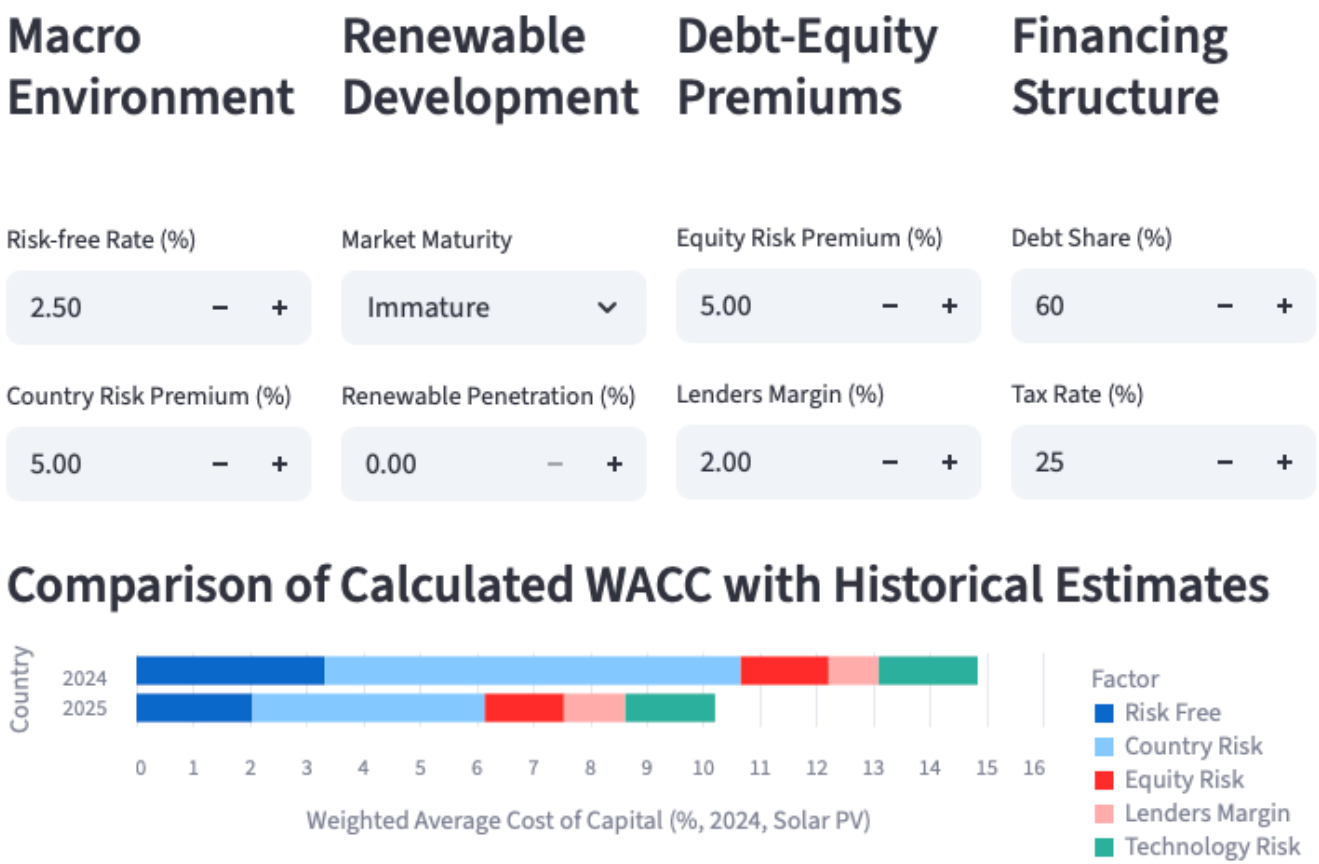
FinCoRE explores policy scenarios

Macroeconomic risk: impact of risk-free rates and country risk.

Market development: role of market maturity and penetration.

Investor and lender risk: equity risk premiums and lending margins.

Financing structure: debt share and tax effects on project costs.



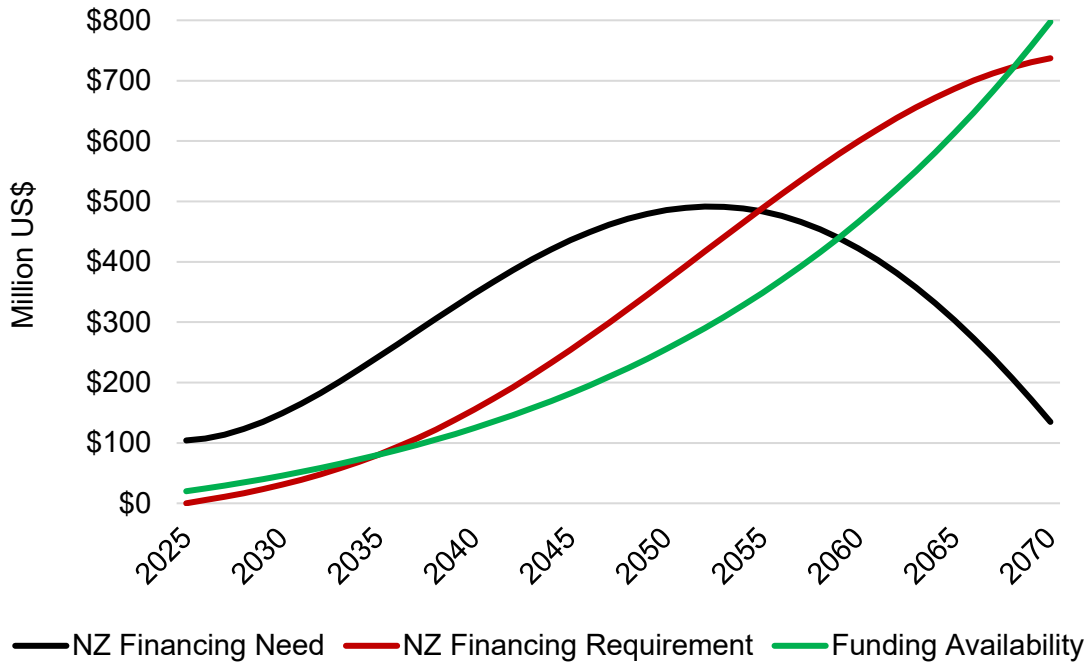
MINFin: Model for Informed National Financing

MODEL DESCRIPTION:

MINFin is a model to support the development of financing strategies for climate transition plans. Users can determine whether implementation of a given plan is financially viable under local financing and funding conditions, identify potential financing gaps, and explore strategies to mitigate them.

QUESTIONS:

- How affordable is the net zero transition and what is associated burden?
- How can associated climate finance gaps best be closed?
- How can concessional/domestic capital best be allocated to maximize bankability?



MINFin: Model for Informed National Financing

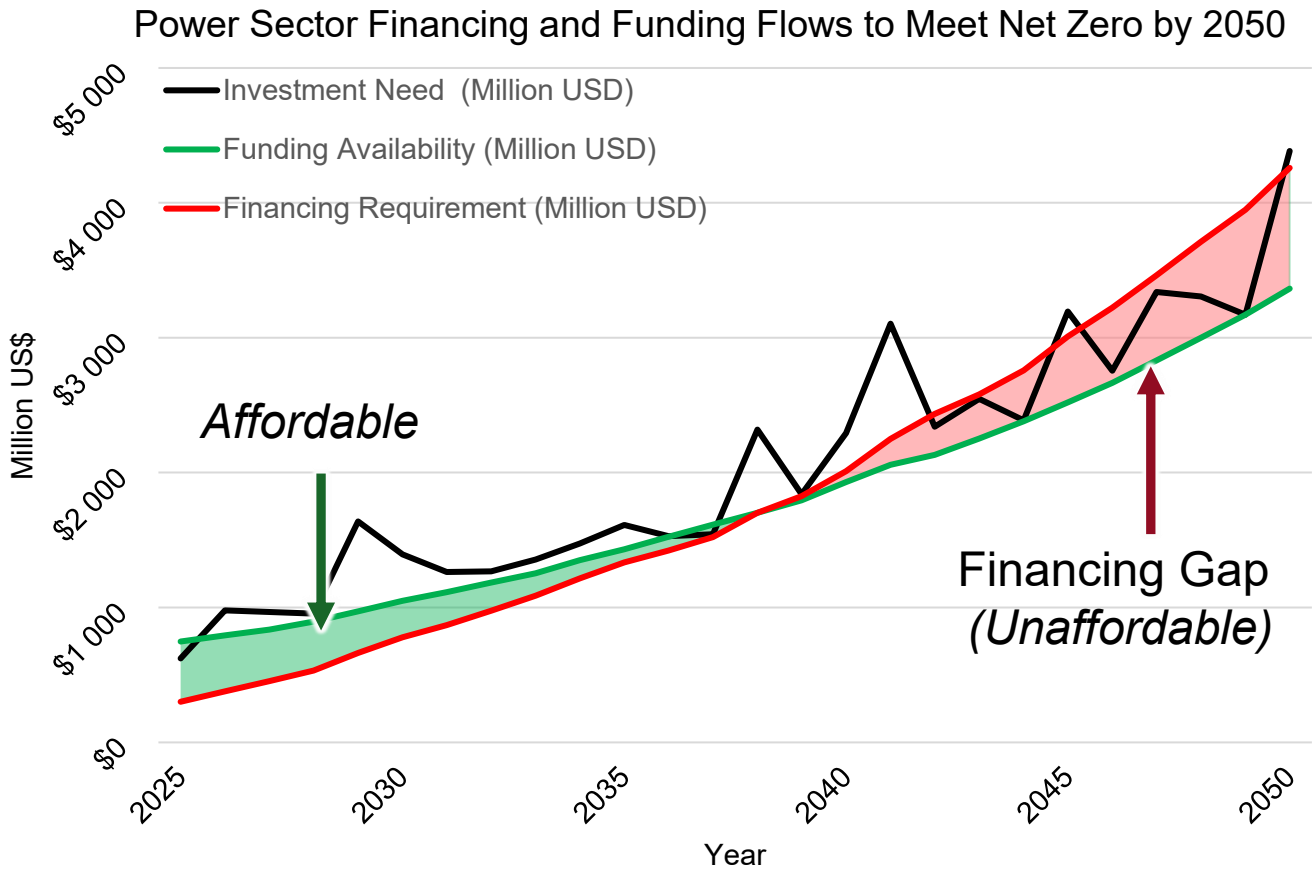
- **Power sector transition plans are typically developed using techno-economic models.** These models optimise generation expansion to **meet electricity demand at least cost**.
- **However, least-cost plans are not always financially feasible.** Planning frameworks generally **do not consider financing conditions, capital availability, or the cashflows required to service investment and this ultimately may impact the merit order of technologies.**
- **Financing constraints can therefore limit implementation.** Different technologies face **different costs of capital**, access to finance may be constrained, and sector revenues may be insufficient to repay large capital investments.
- **This creates a gap between planned investments and financially viable transitions.** MINFin is designed to **evaluate whether transition plans can realistically be financed over time.**

MINFin projects finance gaps associated with transition plans

Black line: The model ingests an existing transition investment plan providing year on year capital requirements.

Red line: Based on locally available and technology-specific costs of finance, the model projects the annual repayment of finance that would be required

Green line: Based on local conditions (including tariff trajectories, public expenditure, international grants and other sources), MinFin projects available cashflow for finance repayment.



Note: All numbers are illustrative

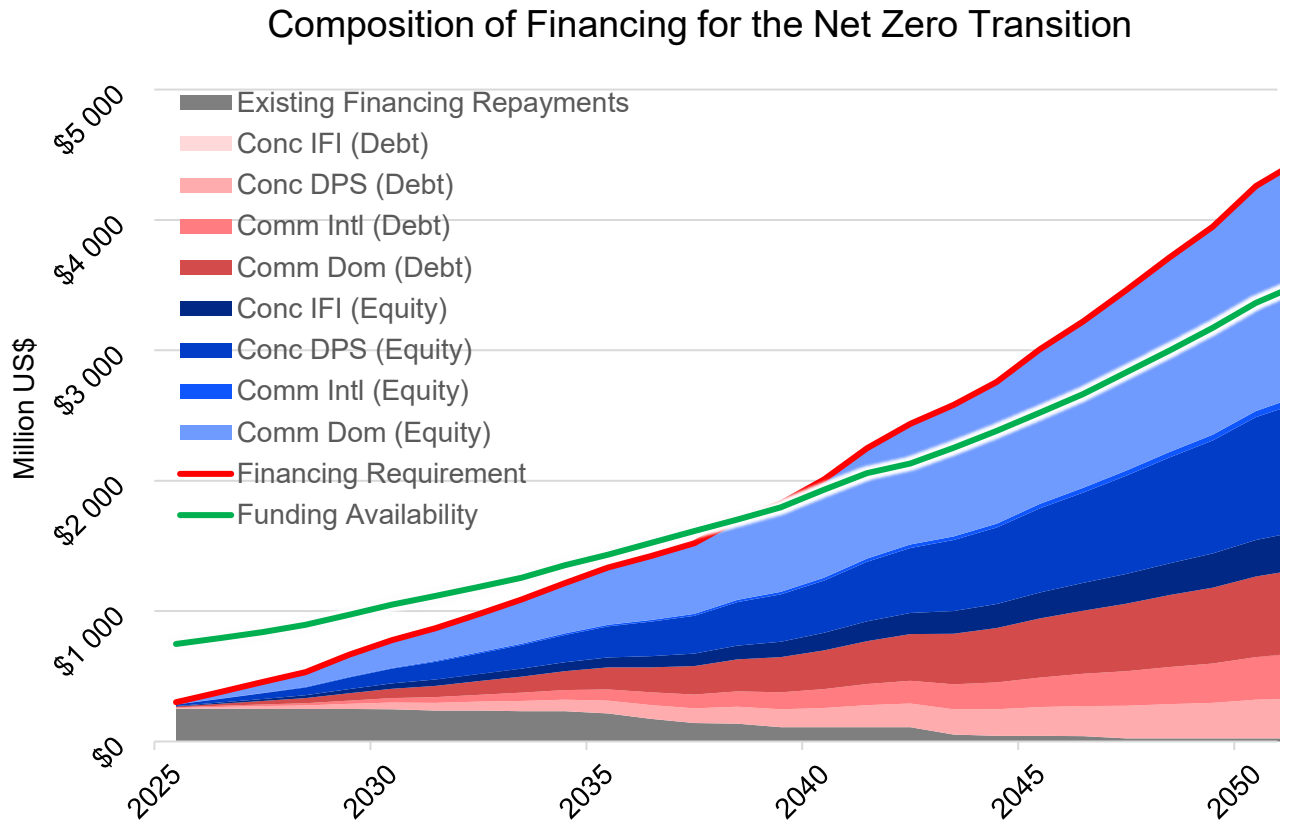
MINFin translates investment needs into financing requirements

Red line: MINFin converts the investment needs of the transition plan into **annual financing obligations over time**.

New infrastructure financing: Investment in new assets is assigned technology-specific financing structures.

Existing financial commitments: The model also accounts for repayments associated with existing infrastructure, which continue to impose obligations during the transition.

Different sources of capital can be represented, including **domestic and international** finance from both **commercial and concessional** providers.



Note: All numbers are illustrative

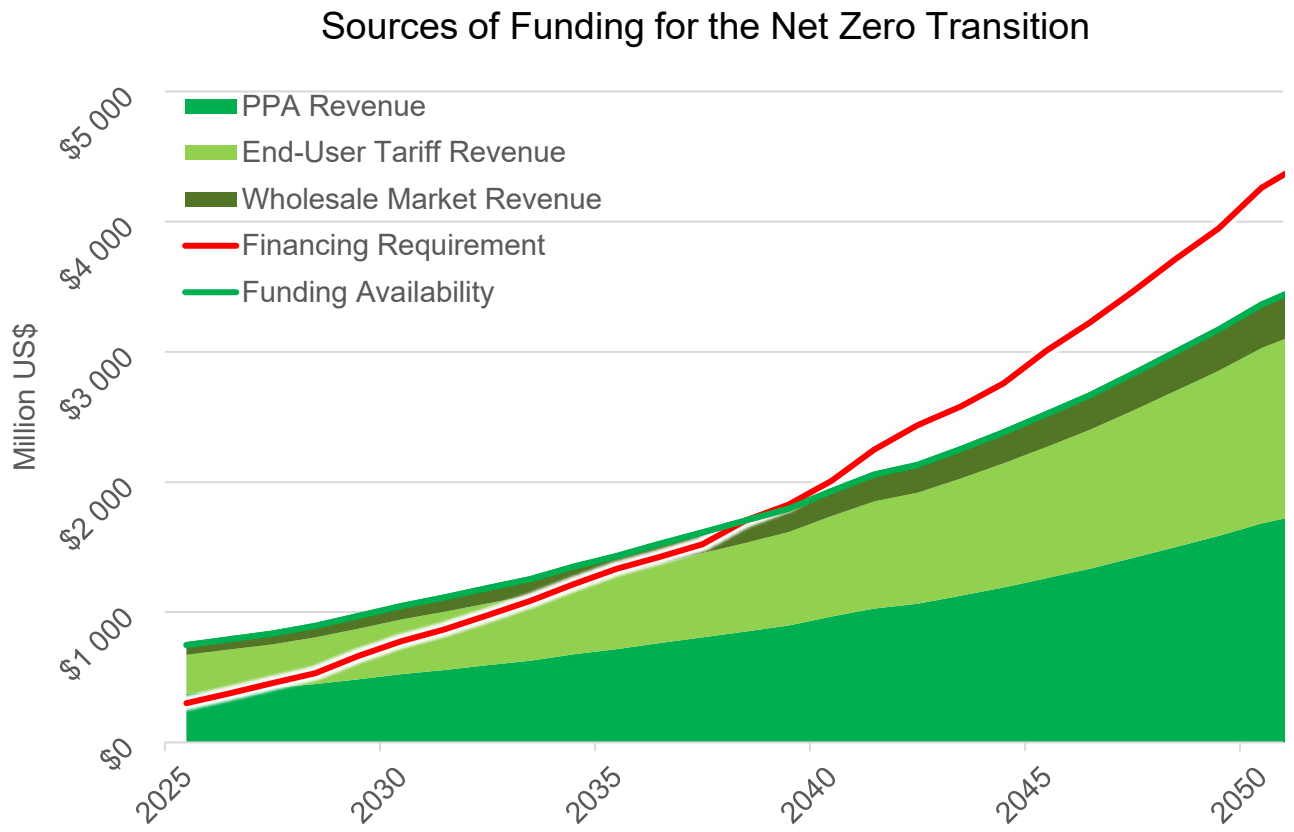
MINFin estimates funding available to service financing requirements

Green line: MINFin estimates the **cash revenues generated across the power sector that can be used to service financing obligations.**

Revenues arise from **electricity sold through PPAs, wholesale markets, and end-user tariffs.**

Operating costs, taxes, and power purchase expenses are deducted to determine net cashflows available for financing repayment.

The model can also incorporate **grants, capital injections, or carbon credit revenues** as supplementary sources of funding.



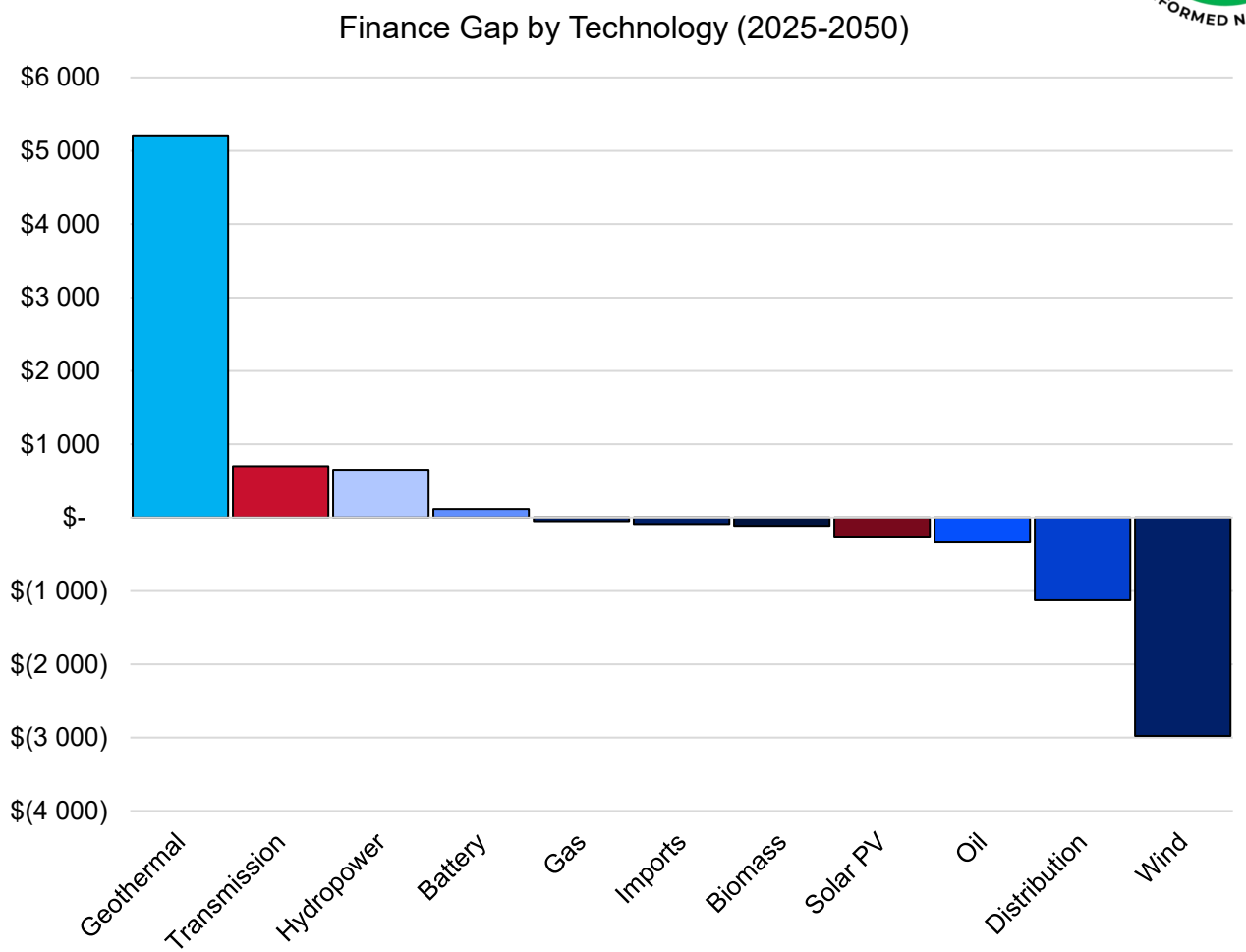
Note: All numbers are illustrative

MINFin assesses technology-level bankability

MINFin evaluates the **financial viability of individual technologies within the power system transition**.

Different technologies generate **very different financing pressures**, reflecting variation in capital costs, revenue structures, and financing conditions.

This helps identify **which technologies may require concessional finance, grants, or policy support** to remain financially viable within the transition plan.

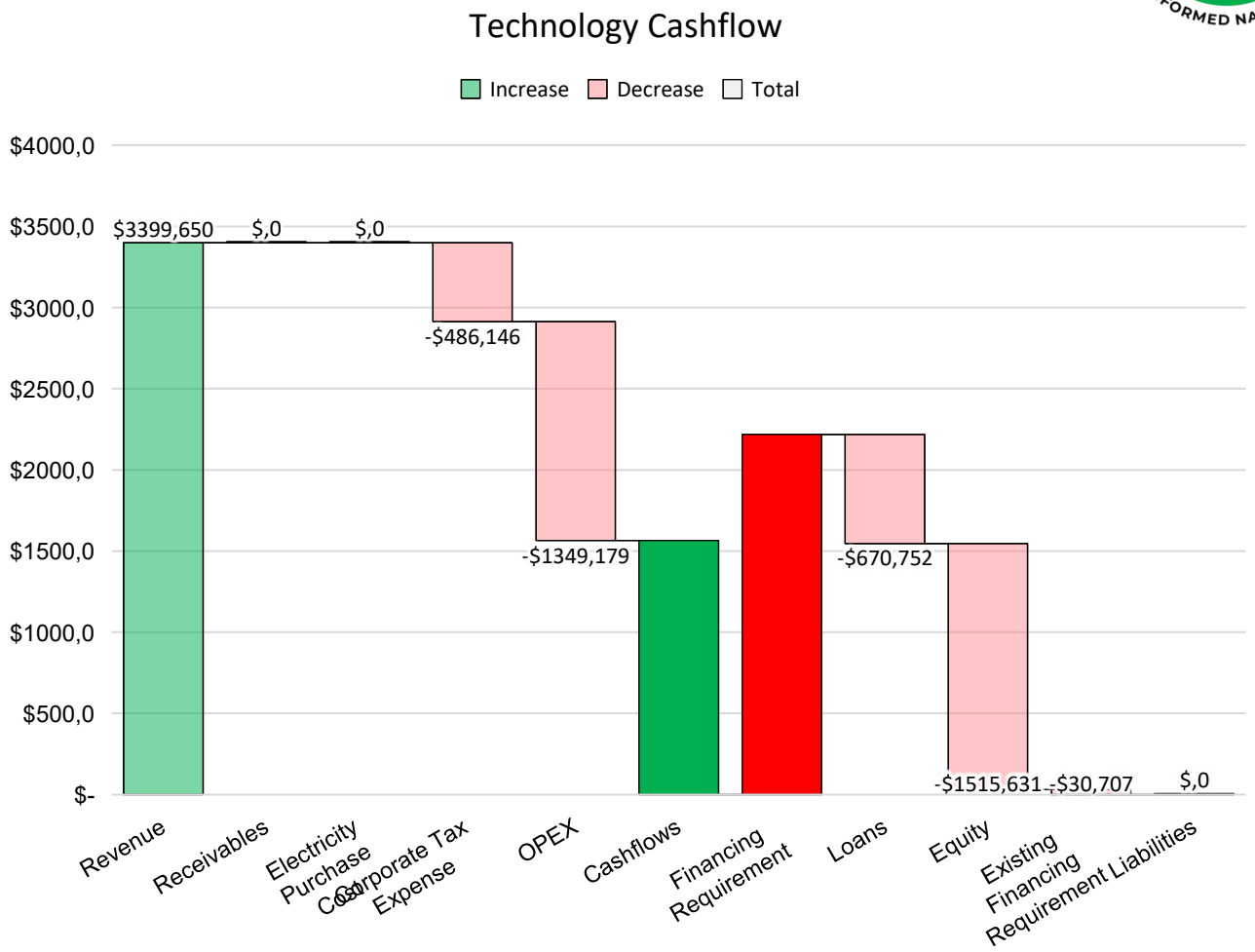


Note: All numbers are illustrative

MINFin reveals technology-level financial structures

MINFin breaks down the **full financial structure of each technology**.

This allows policymakers to **identify the specific drivers of financial pressure for each technology**, supporting more targeted policy and financing interventions.



Note: All numbers are illustrative

MINFin evaluates measures to close financing gaps

	Burden sharing	Speed of implementation	Ease of implementation
Reduce *Financing Requirement*			
A. Reduce WACC for commercial finance	Efficiency gain	Slower	Lower
B. Increase share of concessional finance	International community	Faster	Higher
C. Adopt a lower cost investment plan	International community	Slower	Higher
Increase *Funding Availability*			
A. Raise government expenditure	National population	Faster	Lower
B. Increase energy tariffs	National population	Faster	Lower
C. Restructure utility financially	Unclear	Slower	Higher
D. Monetize carbon credits	International community	Faster	Higher

A Financing Strategy and Roadmap for Zambia's IRP

- Co-developed with the Ministry of Energy and CIG Zambia
- Uses **MINFin, FinTrack, and FINCoRE** to assess financial feasibility at both project and sector levels within ongoing market reform

Key outcomes:

- Strategic allocation of limited concessional and domestic capital across the IRP pipeline to maximise bankability
- Tariff pathways across consumer segments to ensure cost reflectivity and fairness
- Sequenced policy and regulatory actions with clear responsibilities across sector actors

Officially launched next week!

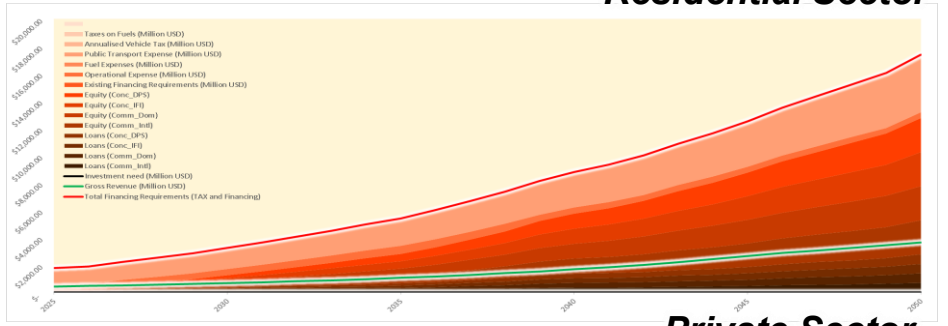
Uganda – Assessing Uganda's Transport Transition

- Developed in parallel to CLEWs modelling undertaken in-country to assess mitigation pathways in Uganda
- Uses **MINFin, FinTrack, and FINCoRE** to assess financial feasibility across consumer segments, and commercial operators.

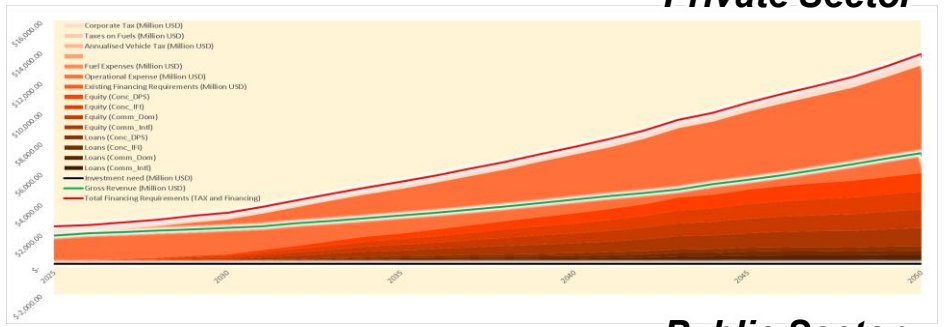
Key outcomes:

- Perspective on government fiscal policy and interventions required to finance low-carbon transport pathways.
- Assessment of Transport Fares, Freight Value and Tax policy on the costs of both purchase and operation of Fossil Fuel and Electric Vehicles.
- *Pre-print publication of this work forthcoming*

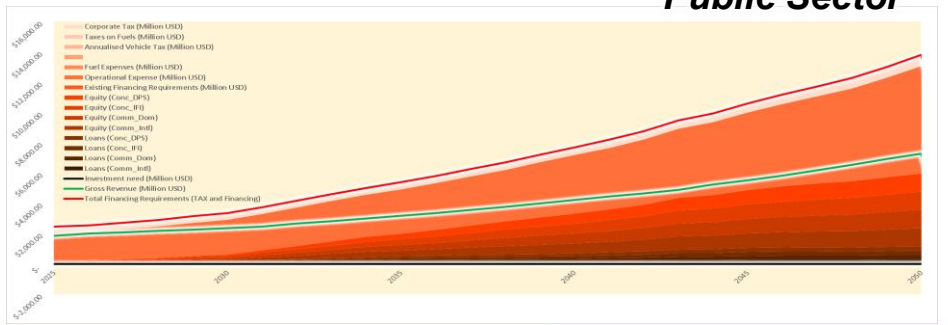
Residential Sector



Private Sector



Public Sector



How to access the tools:

FinTrack – Climate Finance Tracking Tool

Excel-based dashboard, download the tool from **Zenodo**

https://zenodo.org/records/14872116

FinCoRE – Cost of Renewables Estimator Tool

Interactive **web interface**, accessible **online** (no installation required)

https://wacc-forecaster.streamlit.app/

MINFin – Model for Informed National Financing

Excel based model, download the model from **GitHub**

https://github.com/MINFinModel/MINFin-Excel/releases

Climate Compatible Growth

UKaid from the British people

"The views expressed in this material do not necessarily reflect the UK government's official policies."

University Partnership:

University of Cambridge · The Open University · Climate Parliament · University of Strathclyde Glasgow · University of Oxford · Centre for Global Equality · UCL · Loughborough University · STEER – Centre for Sustainable Transitions: Energy, Environment and Resilience · KTH Vetenskap och Konst · Imperial

Thank you

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University Partnership: