MODULE 3

CLIMATE FINANCE CASE STUDIES

Regional Training on Climate Finance in Southeast Asian countries

CASES

1) Zambia Climate Finance: Strengthening water security
2) Guyana REDD+ Investment Fund: Climate Finance for Low-Deforestation and Low-Carbon Development
3) Rajasthan, India: Climate finance for concentrated solar power

CASE 1

ZAMBIA CLIMATE FINANCE

A Challenge for Strengthening Water Security

Based on: Savage, M. et al. (June 2015) *Climate Finance and Water Security: Zambia case study.* Oxford: Oxford Policy Management.
**Case commissioned by WaterAid*
http://www.wateraid.org/~/media/Publications/Climate-change-and-water-security--synthesis-report.pdf?la=en

Addressing the Climate Change and Water Security Nexus

- The expected changes to rainfall patterns in Zambia will result in more prolonged dry periods, as well as more intense rainfall during the wet season.
  - *This has already been apparent over the last two decades through the increase in the frequency, intensity and magnitude of both droughts and floods.*
- Zambia is vulnerable to these climate change impacts because:
  - *95% of agriculture is rain fed;*
  - *The lack of water storage and the lack of adequate systems to cope with droughts and floods;*
  - *Reduced ability to generate hydro-electric power;*
  - *High cost of damages to infrastructure from flooding (estimated at a loss of USD 13.8 billion in GDP over the past three decades);*
  - *Loss of drinking water.*

Climate Policy in Zambia

- The Sixth National Development Plan has mainstreamed climate change as a national development policy (i.e. not merely an environmental consideration).
- The Disaster Management Act also includes references to climate change.
- Drafts of both a National Climate Change Policy (NCCP) and a National Climate Change Response Strategy (NCCRS) have been drafted, but are yet to be adopted.
  - *The NCCRS aims for climate proofing of vulnerable economic sectors (including agriculture, tourism, infrastructure, health, forestry, water, and energy)*
  - *It also outlines a number of possible projects and programmes for achieving a low carbon development pathway that mainstreams both adaptation and mitigation into these sectors.*
- The Interim Inter-Ministerial Climate Change Secretariat was established in 2012 to serve in the absence of these above permanent institutional arrangements.
  - *The main budget has come through the Pilot Program for Climate Resilience, funded by the Climate Investment Funds (implemented by the Multilateral Development Banks).*
- There is no formal climate finance structure in the country.

Accessed Funds

Fund	Amount	Key Aspects	Observations
Climate Investment Funds / Pilot Program for Climate Resilience (PPCR)	US $86m approved & US $7m disbursed (3 different components)	Support to institutional coordination arrangements; MoUs with sub-national and intra-ministerial units	Need to achieve broader buy-in and sustainability; IIMCCS closely associated and funded primarily by the PPCR
Global Environmental Facility (GEF)	US $8m approved & disbursed (3 projects)		Funding predominantly for electricity.
Least Developed Countries Fund (LDCF)	US $18m approved & US $4m disbursed (5 projects)	Diverse implementing partners; supported NAPA development	Limited support for coordination arrangements.

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Inflows and Distribution of Climate Finance

Public and Private Climate Inflows (USD million)

	2009	2010	2011	Total	%
Public / international climate finance	**112**	**88**	**86**	**287**	11.1
Dedicated climate finance	3	10		13	0.5
ODA climate finance	109	78	86	274	10.6
Private climate finance	**561**	**1,100**	**645**	**2,306**	88.9
Total	**673**	**1,188**	**731**	**2,593**	100.0

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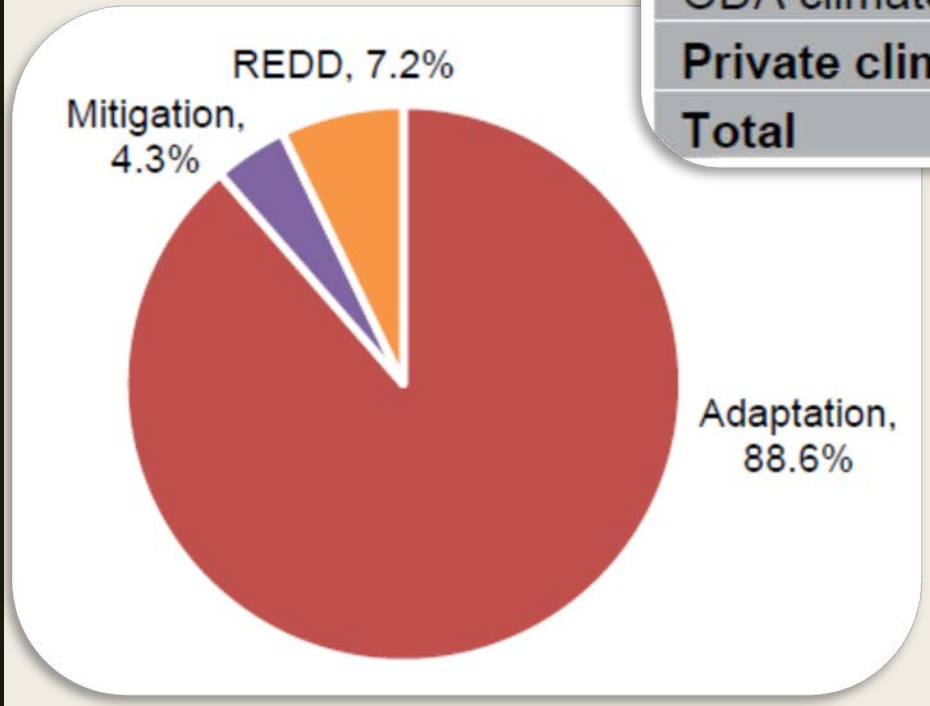


Distribution of Climate Finance

Specific Funders include:

- The Pilot Program for Climate Resilience
- The Least Developed Countries Fund
- The GEF Trust Fund (GEF 4)
- UN-REDD
- Germany's International Climate Initiative
- Japan's Fast Start Finance

Climate Finance Projects in Zambia

- There are 12 reported climate finance projects in Zambia.
  - *1 project is related to Water Supply, Sanitation and Hygiene (WASH) and 1 project is related to Water Security Activities. These two projects account for 3% (or USD 3.5 million) of the total approved climate finance to date.*
  - *4 projects are indirectly related to water security, including the PPCR projects for strengthening climate resilience and reforestation/conservation which may provide water-related co-benefits. These account for 77% (or USD 80.9 million).*
  - *6 other projects are not related to water security and include: expansion of the electricity network; strengthening of early warning systems; and development of national policy. These account for 20% (or USD 20.9 million).*
- The projects in the first two categories are generally regional targeted and locally piloted, while the projects in the last category are generally national-level activities.
- Additionally, the World Bank is funding a National Water Resources Development Project to improve (i) water resources management, (ii) water resources development, and (iii) institutional support, and it is worth USD 50 million but is not accredited as a climate finance project.

Project Example: The national roll-out of the Sustainable Operation Maintenance Programme (SOMAP3)

Funder	Japan International Cooperation Agency (JICA)
Focus	Adaptation
Financial instrument	Grant
Project cost	USD 30,000
Approval/closing year	2011 / 2016

- The Japanese government has been supporting the construction of water supply facilities in Zambia since the 1980s.
- In 2005, they initiated a project to effective Operation and Maintenance systems to ensure sustainable water supplies in rural areas.
- The first phase of SOMAP was piloted in two districts, and during phase 2 it was implemented in four additional districts.
- Phase 3 of this programme aims to support the expansion of SOMAP to all 54 districts in the country through the implementation of the national Operation and Maintenance guidelines prepared during the previous phases of this programme.

Project Example: Adaptation to the effects of drought and climate change in agro-ecological zones 1 and 2

Funder	Least Developed Countries Fund (LDCF)
Focus	Adaptation
Financial instrument	Grant
Project cost	USD 13 million
Approval/closing year	2006 / 2015

- Through integrating adaptation activities in agricultural planning at national, district, and community levels, this project aims to reduce the vulnerability of communities to the impacts of climate change.
- This project focuses on achieving four outcomes:
  1. Climate change risks integrated into critical decision making processes for agricultural management at the local, sub-national and national levels;
  2. Agricultural productivity in the pilot sites made resilient to the anticipated impacts of climate change;
  3. National fiscal, regulatory and development policy revised to promote adaptation responses in the agricultural sector;
  4. Lessons-learned and knowledge management component developed.

**note: each of these outcomes are elaborated based on a set of associated project outputs*

Case Study Conclusions

- Water in Zambia is both a strategic energy resource and vital aspects of the countries rain fed agriculture system, but climate change will put the security of water resources at risk.
- However water security does not appear currently to be a priority area of focus in the country's climate finance projects.
- Institutional and policy frameworks in the country remain weak *(although drafted, major policies remain unapproved)*, and there is no formal structure for climate finance in the country.
- The existing climate change projects and programmes in the country have been supported by international agencies and development partners, while there remains in-country capacity needs for developing climate change adaptation and mitigation ideas into tangible and investable projects.

Source: Savage, M. et al. (June 2015) *Climate Finance and Water Security: Zambia case study.* Oxford: Oxford Policy Management. http://www.wateraid.org/~/media/Publications/Climate-change-and-water-security--synthesis-report.pdf?la=en

CASE 3

GUYANA REDD+ INVESTMENT FUND

Climate Finance for Low-Deforestation and Low-Carbon Development

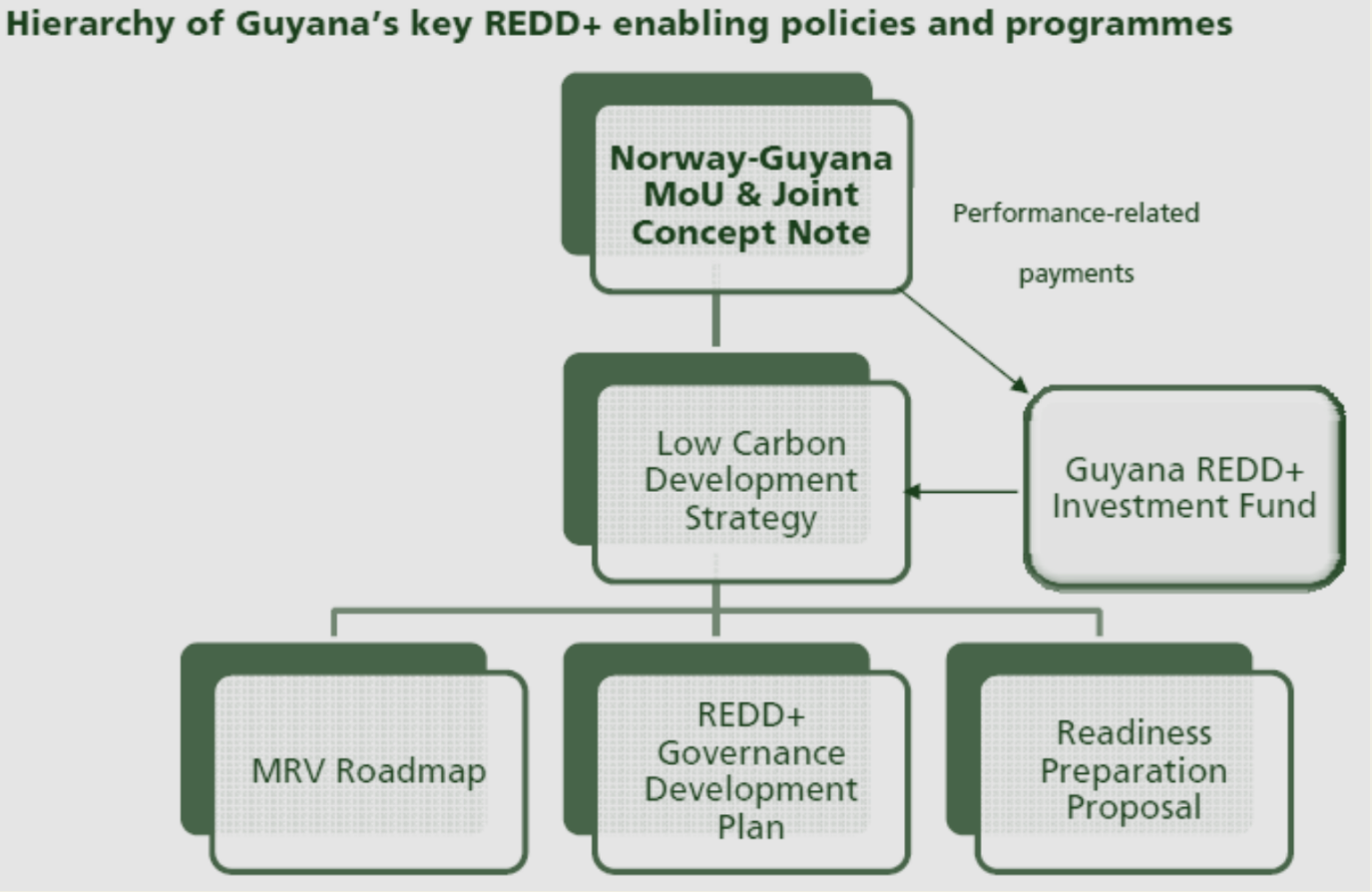
Based on: Frankfurt School – UNEP Collaborating Centre for Climate & Sustainable Energy Finance (2012) *Case Study: The Guyana REDD-plus Investment Fund (GRIF).* Frankfurt: UNEP Collaborating Centre for Climate & Sustainable Energy Finance http://fs-unep-centre.org/sites/default/files/publications/grifcasestudy2012final.pdf

Norway and Guyana join forces for REDD+

- In 2009, the governments of the two countries agree to work together to demonstrate “ relevant, replicable model for how REDD+ can align the development objectives of forest countries with the world’s need to combat climate change”.
- The Guyana REDD-Plus Investment Fund (GRIF) was established as a public finance mechanism in alignment with the country’s Low Carbon Development Strategy (LCDS).
- The LCDS establishes the main framework and direction of the climate finance projects and activities in Guyana.
- Along with the LCDS, the country is strongly guided by its existing national climate change policies, and are jointly headed by the Office of the President and the Office of Climate Change.

A Framework for Performance-Based Financial Support

- Norway and Guyana agreed to a framework for performance-based financial support of up to USD 250 million over five years.
- This was to support REDD+ activities put forth in the LCDS and later formalised in the REDD+ Governance Development Plan



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Three Pillars for Long-Term Economic Growth with Low-carbon, Low-deforestation Development

- **Avoiding Deforestation**: By capitalizing on the REDD+ mechanism, Guyana can avoid cumulative forest-based emissions of over 1.5 GTs of CO2 by 2020 that would have otherwise been produced through economic use of the forest.
- **Low Carbon Development**: REDD+ payments gained through avoided deforestation can be used by Guyana for sustainable economic growth and additional climate change initiatives.
- **Adapting to Climate Change**: REDD+ payments can be used to assist in promoting climate resilience by investing in priority climate adaptation infrastructure and measures e.g. flood control or early warning systems for extreme weather events.

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Guyana's REDD-Plus Investment Fund

- The fund is established for financing activities identified under the country's Low Carbon Development Strategy.
- Norway is providing USD 250 million to fund in performance-based payments over a five year period.
- Independent verification of Guyana's deforestation and forest degradation rates, as well as their progress on implementing REDD+ activities, is required.
- The GRIF represents the first fund to be implemented in a National REDD+ strategy globally.
- Governance: The fund is managed by a secretariat and oversight/decision making is given to a steering committee. The Inter-American Development Bank, UNDP and the World Bank serve as partners for reviewing the activities conducted under this fund; and the World Banks's International Development Association serves as the trustee of GRIF through financial intermediary services.
- The Government of Guyana (and other entities) serve as the implementing entities.

Phased approach to REDD+ under GRIF

- A phased approach is developed that recognises the need for long-term funding beyond Norway's initial support.
- Four main funding categories are identified:
  - *Carbon markets,*
  - *Market-linked mechanisms,*
  - *Voluntary funding mechanisms,*
  - *The UNFCCC-mandated global model for REDD+*

  ** To carry out the global efforts for REDD+ it is recognised that additional private capital will need to be leveraged.*
- Over a four phased approach:
  - *Phase 1 (2009): Launching LCDS and establishing MRV system;*
  - *Phase 2 (2010-2015): Transitional period – investing in capacity building, human capital and efforts to build a low-carbon economy;*
  - *Phase 3 (2013-2020): Continued payments to avoid deforestations will be invested in low-carbon economy, capacity building, and climate change adaptation;*
  - *Phase 4 (beyond 2020): Full-scaled REDD+ mechanism should provide incentives at the economic value to the nation of Guyana's forests and account for periodic increasing value of the forests.*

Enabling Indicators
for measuring interim performance

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GRIF Project Portfolio *(as of June 2012)*

- Amaila Falls Hydropower Project
- Institutional Strengthening in support of Guyana agencies implementing LCDS projects
- Amerindian Development Fund Project
- Amerindian Land Titling Project
- Micro and Small Enterprise and Building Alternative Livelihoods for Vulnerable Groups Project
- Cunha Canal Rehabilitation Project

Project Example:

Amaila Falls Hydropower Project

- Flagship LCDS initiative to provide 165 MW electricity generation through hydropower (~90% of the country's domestic power needs).
  - *This will offset the country's current dependence on imported fossil fuel and a energy system based currently on a 85% petroleum / 15% biomass mix;*
  - *This will also reduce the very high end-user electricity tariffs in the country.*
- It is hoped that the project will encourage economic growth, regional competiveness, and both private sector and foreign direct investment by providing reliable generation of clean energy.
- The total costs of over USD 700 million represent the single largest investment in Guyana to date.
  - *Debt financing is being provided by the China Development Bank and the Inter-American Development Bank & Equity Financing is being provided by the Government of Guyana and the Sithe Global Group at a 70:30 debt/equity ratio*
- Guyana Power and Light will operate the project for 20 year, after which the facilities will revert to the Government of Guyana at no cost. During this 20-year period, the project is expected to yield USD 2 billion in profits.

Case Study Conclusions

- The existing government policies create an important groundwork for the effective establishment of national climate finance funds.
- The use of a formal cooperation agreement between the two countries enabled an innovative and forward-thinking model of performance-based financing for REDD+ activities.
- The mechanism for performance-based payments must be transparent, rules-based and must include a strong system of forest governance, accountability and enforcement.
  - *This must also provide for multi-stakeholder consultations, civil society engagement and inclusion of indigenous and vulnerable communities.*
- An internationally recognised system of measuring, reporting and verification (MRVS) is crucial.
- Finance mechanisms and funds can be designed towards receiving different source and types of funding from a diversity of sources.
- *The challenge for any REDD+ programme is to provide incentives for alternative economic activities to timber and mineral extraction.*

Source: Frankfurt School – UNEP Collaborating Centre for Climate & Sustainable Energy Finance (2012) *Case Study: The Guyana REDD-plus Investment Fund (GRIF).* Frankfurt: UNEP Collaborating Centre for Climate & Sustainable Energy Finance
http://fs-unep-centre.org/sites/default/files/publications/grifcasestudy2012final.pdf

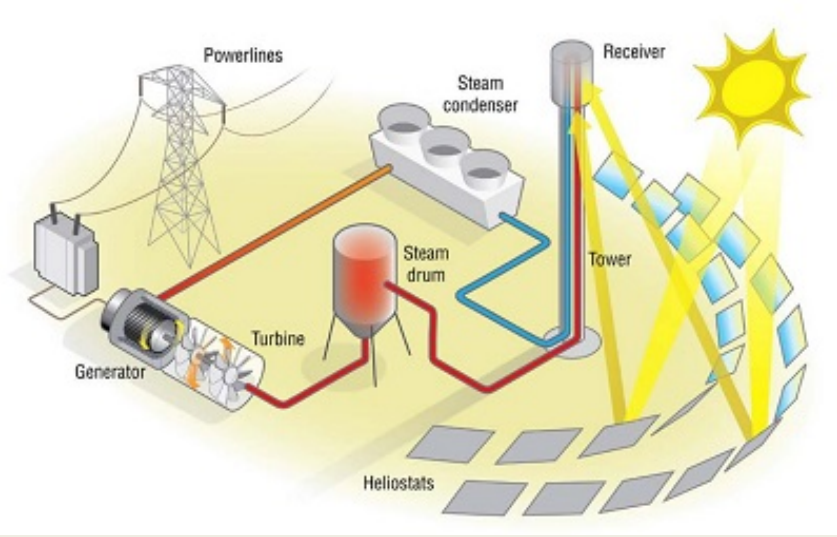
CASE 3

RAJASTHAN, INDIA

Climate Finance for Concentrated Solar Power

Based on: Stadelmann, M. et al. (March 2014) *The Role of Public Finance in CSP – Case study: Rajasthan Sun Technique, India*. San Francisco: Climate Policy Initiative. ** case prepared for the San Giorgio Group and financially supported by the Climate Investment Funds*
http://climatepolicyinitiative.org/wp-content/uploads/2014/01/SGG-Brief-The-Role-of-Public-Finance-in-CSP-Background-and-Approach-to-Measure-its-Effectiveness.pdf

Concentrated Solar Power



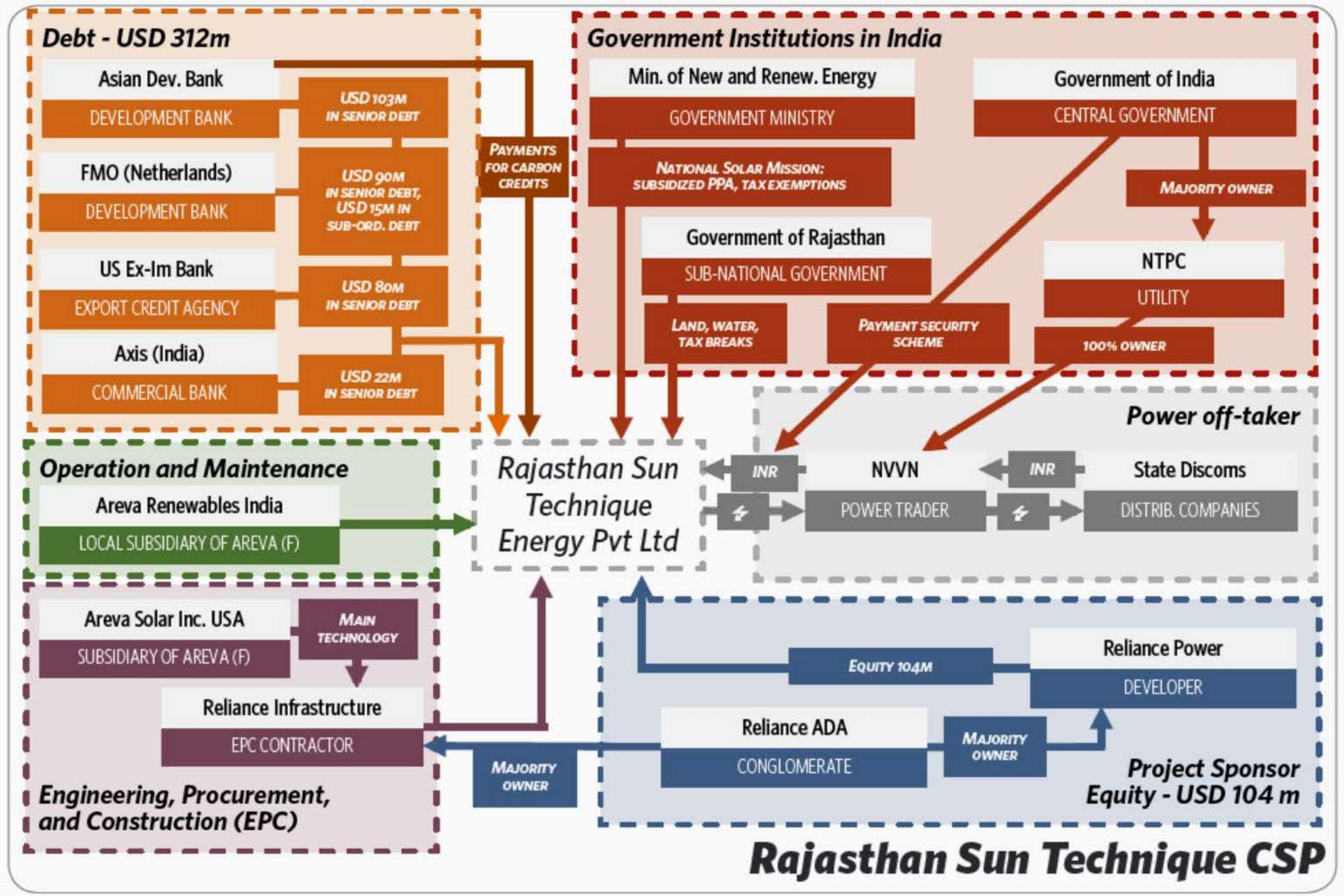
- Using mirrors to concentrate a large area of sunlight, or solar thermal energy, into a small area.
- Electricity is produced by converting the heat from this thermal energy into steam (or other forms of heat engines) to drive a turbine.
- Newer practices are also able to capture and store this heat in fluidized silica sand, thus allowing the thermal storage and heat transfer to be used for electricity generation over a 24 hour period.

- Over the past ten years the power generation from this technology has grown by a factor of 12, from 354 MW_p in 2005 to 4,400 MW_p in 2014

The 100 MW Rajasthan Sun Technique CSP plant

- In March 2015, the new CSP plant was dedicated and is expected to generate 250 GWh of clean energy annually, ~the equivalent to consumption of 230,000 households.
- This plant is the largest linear Fresnel CSP plant in the world, and the largest CSP plant currently in India.
- It contributes towards India's Jawaharlal Nehru **National Solar Mission** (part of the National Action Plan on Climate Change) which aims to increase India's solar electric generation capacity to 100 GW by 2022 (original target was 20 GW when mission was inaugurated in 2010, but increased to the 100 GW target in 2015).
  - *This also takes into account the expanded need of an additional 75 GM of new power generation capacity in the country before the end of the decade, and if this was generated under the current energy mix which is heavily dependent on coal (61% of total capacity) then this would result in a 17% increase of India's total CO_2 emissions*
- The National Solar Mission is supporting both the use of PV and CSP technologies.
  - *While PV is also implemented with the support of state level policies, CSP has been driven mainly by the National Solar Mission*
- The project also benefits from a subsidized power purchase agreement (PPA) and payment security scheme to ensure its financial viability.

Project Stakeholders



From Case document: pp. 4

Project Investment

*Amounts shown in millions

SOURCE	FINANCING TYPE	AMOUNT*	AMOUNT IN USD*	SHARE
Debt				
US Ex-Im Bank	Export Credit Loan	USD 80	80	19%
ADB	Senior Loan	USD 103	103	25%
FMO	Senior Loan	USD 90	90	22%
FMO	Subordinated Loan	USD 15	15	4%
Axis Bank	Senior Loan	INR 1,140	22	5%
Equity				
Reliance Power	Equity	INR 5,500	104	25%
Total Project Cost			414	

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Ensuring Local Benefit

- The tender for this project included specific local content requirements, including the guarantee that a minimum of 30% of the project value would be sourced in the country.
- Through many innovative efforts, it is estimated that 60% of the projects value has been sourced from within the country.
  - *Infrastructure and Project Management has been completely localized.*
  - *Materials, including cement and steel, have been locally sourced.*
  - *The assembly of the solar receivers on site was supported by the training of a highly skilled local workforce.*
  - *These aspects will further support the country in developing a competitive solar industry.*
- Financially, the project benefits from the national government's coupling of the price of expensive solar power with the price of cheap coal power produced by public entities, and thus selling the combined energy package to distribution companies at a market price.
- In return, the project should generate around USD 170 million in tax revenues over its lifetime.

Ways to Address Risks for Future CSP Projects

- Efforts to improve the supporting polies under the National Solar Mission could better ensure the financial strength and implementation of additional projects.
  - *As currently, they are heavily dependent on the strong financial support from private actors and on long-tenor public debt.*
- Incentivize the inclusion of storage in new CSP projects as this would benefit the national power system and is a key advantage of CSP.
- Foreign exchange risk can cause sever limitations for development, and efforts for hedging this exchange risk (e.g. by denominating power tariffs in hard currency and providing lending in local currency) can improve future project feasibility. Additional efforts can be taken to support local financing and lending from national commercial banks.
- Scaling up CSP deployment will support cost reductions, while the promotion of local manufacturing will strengthening the in-country capacity for building a competitive solar industry.

Case Study Conclusions

- Four Important Enabling Elements:
  1) *The subsidized power purchase agreement (PPA) and the payment security scheme – which closed the viability gap and reduced the risks.*
  2) *The longer maturity rate of international debt improved the overall project economics.*
  3) *Comprehensive warranties by the technology provider reduced potential technology risks for both the developer and the investors.*
  4) *An experienced and financial strong private developer was able to mobilise the overall project and to also take on a project with low equity returns to become a first-mover in this new market.*

Source: Stadelmann, M. et al. (March 2014) *The Role of Public Finance in CSP – Case study: Rajasthan Sun Technique, India*. San Francisco: Climate Policy Initiative. http://climatepolicyinitiative.org/wp-content/uploads/2014/01/SGG-Brief-The-Role-of-Public-Finance-in-CSP-Background-and-Approach-to-Measure-its-Effectiveness.pdf

Thank You

for your kind attention!

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