

ZAMBIA CASE STUDY:

*Aligning Climate Finance and Water Security*¹

This case reviews the nature of climate finance programmes in Zambia and identifies the type and scale of the existing national and sub-national projects. It specifically considers how climate finance in the country is supporting the challenge of local water security.

Climate change is predicted to dramatically influence rainfall patterns in Zambia, and this will lead to prolonged dry periods as well as more intense rainfalls 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.

Water security is thus an important issue for Zambia, and there are several significant vulnerabilities related to water security that make this a priority for climate change adaptation. Zambia is vulnerable to the climate change impacts on water security, including:

- Agriculture in the country is 95% rain fed;
- There is a lack of water storage and adequate systems to cope with droughts and floods;
- This could also reduce the country's ability to generate hydro-electric power which could lead to both energy insecurity and an increase in fossil fuel based power generation;
- The high cost of damages to infrastructure from flooding could further increase (which is estimated at a loss of USD 13.8 billion in GDP over the past three decades);
- Finally, the changes in precipitation could also strain the availability 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. A National Climate Change Policy (NCCP) and a National Climate Change Response Strategy (NCCRS) have been drafted, but are yet to be adopted.

The draft 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 and implemented by the Multilateral Development Banks. However, the country does not have a formal climate finance structure in place.

¹ This case provides a summary compilation of information original prepared for WaterAid by Matthew Savage, Ana Mujica, Federica Chiappe and Ian Ross of Oxford Policy Management and presented in the following report: 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>

Climate Funds that have been accessed

The Pilot Program for Climate Resilience is supporting three major projects for strengthening climate resilience and currently accounts for 72% of all climate finance that has been accessed. The next largest amount accessed is from the Least Developed Countries Fund (LDCF) at 17%. While the Global Environmental Facility and the UN-REDD have both provided smaller amounts, they are the only two that have fully disbursed their funds committed to date.

Specific Funds accessed include:

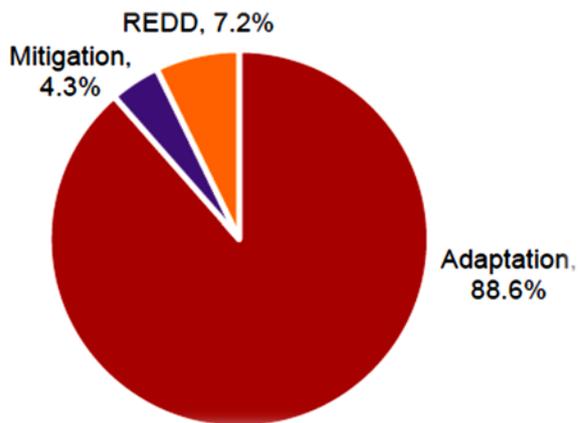
- The Pilot Program for Climate Resilience
- The Least Developed Countries Fund
- The GEF Trust Fund (GEF 4)
- UN-REDD
- Germany's International Climate Initiative
- Japan's Fast Start Finance

| Fund | Amount | Key Aspects | Observations |
|---|--|--|---|
| Climate Investment Funds / Pilot Program for Climate Resilience (PPCR) | US \$86m approved & US \$7m disbursed (for 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 |

From: Case report (p.10)

Since 2003, a total of US \$105.31 million has been approved from international climate finance resources. Of the total funds approved to date, the majority are being targeted to adaptation activities (89% or US \$93m), followed by REDD+ (7% or US \$8m), and mitigation (4% or US \$5m). These resources have been given mainly in the form of grants (79% or US \$83m), with the remaining funds being approved as concessional loans (21% or US \$23m).

Distribution of Climate Finance



From: Case report (p.11)

Between 2009 and 2011, the climate finance has come 89% from private sources (US \$2.3 billion) and 11% from public or international stakeholders (US \$0.3 billion). The majority of public / international resources have been allocated to disaster risk management, followed by environmental and natural resources, energy and water, and agriculture.

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 |

From: Case report (p.11)

Climate Finance Projects in Zambia

There are 12 reported climate finance projects in Zambia. One project is related to Water Supply, Sanitation and Hygiene (WASH) and another 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. Four other 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). The projects in these categories are generally regionally targeted and locally piloted.

Six 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). These projects 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 in-country there remains 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>

GUYANA REDD+ INVESTMENT FUND CASE STUDY:

Climate Finance for Low-Deforestation and Low-Carbon Development²

The governments of Norway and Guyana agreed to work together from 2009 towards developing and demonstrating a “relevant, replicable model for how REDD+ can align the development objectives of forest countries with the world’s need to combat climate change”. This led to the establishment of the Guyana REDD-Plus Investment Fund (GRIF) 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.

Guyana’s REDD+ Governance Development Plan (RGDP)

As part of its agreement with Norway, financial support is, among other objectives, intended to support Guyana in building capacity for its REDD+ and LCDS efforts. Realizing the objectives laid out in its LCDS, Guyana adopted and implemented an RGDP.

The purpose of the RGDP is the development of a transparent, rules-based, inclusive forest governance, accountability and enforcement system. The RGDP outlined key activities to be carried out to assess and improve the capacity of relevant agencies for the governance of forests and Amerindian lands, and indicated the implementation time-frame and responsible agencies.

Framework support programmes: Readiness Preparation Proposal (R-PP)

Guyana has engaged itself as a pilot country under the World Bank’s Forest Carbon Partnership Fund (FCPF), which builds the capacities for implementing a REDD+ strategy. The purpose of the R-PP is to “identify and conduct analytical and diagnostic studies relevant for designing Guyana’s REDD+ strategy...” which includes the design of a Monitoring, Reporting and Verification System (MRVS) and work on forest cover reference levels, conducting consultations with relevant stakeholders, and lastly

² This case provides a summary compilation of information original prepared by Christine Grüning and Laura Susanne Shuford of the Frankfurt School – UNEP Collaborating Centre for Climate & Sustainable Energy Finance with funding from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and presented in the following report:

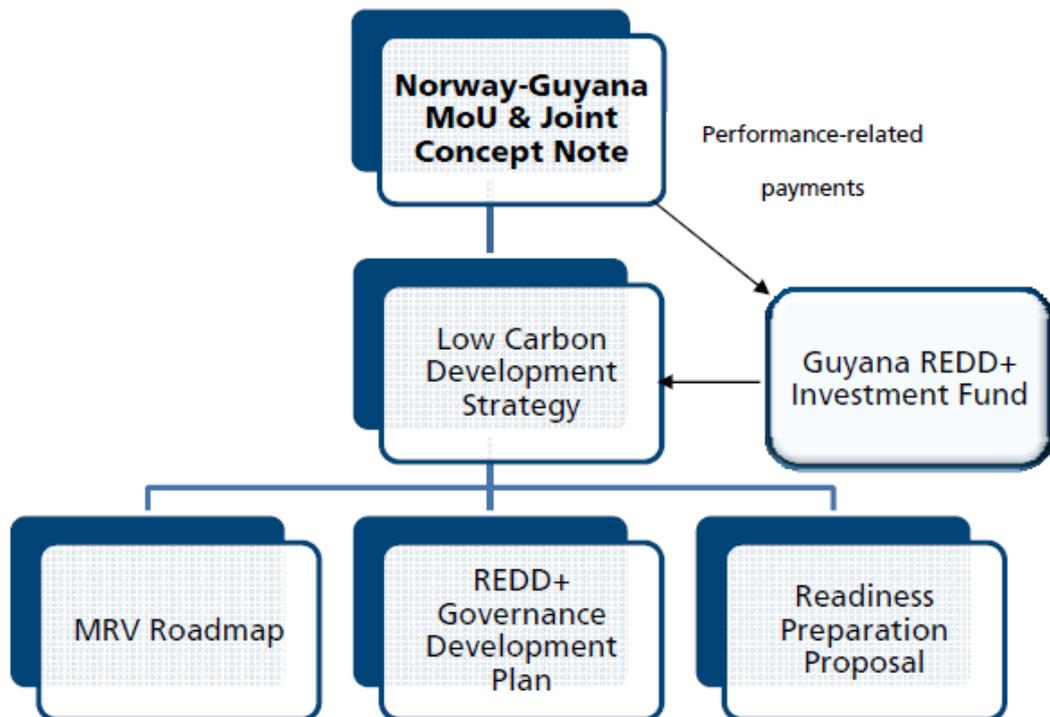
Frankfurt School – UNEP Collaborating Centre for Climate & Sustainable Energy Finance (2012) *Case Study: The Guyana REDD-plus Investment Fund (GRIF)*. Frankfurt: UNEP Collaborating Centre for Climate & Sustainable Energy Finance. <http://fs-unesp-centre.org/sites/default/files/publications/grifcasestudy2012final.pdf>

the establishment of an implementation framework for REDD+ activities such as those listed under its LCDS.

Guyana's MRV Roadmap

The roadmap timeframe consists of three phases over a three-year period and includes both near-term and long-term targets. To ensure accountability and transparency, Guyana created a Monitoring, Reporting and Verification System (MRVS) Steering Committee to oversee the implementation of Guyana's MRVS; comprised of representatives from the government, private sector, academia and indigenous groups. Furthermore, Guyana's legal framework for forest protection and to uphold the rights of Amerindians who reside in and rely upon the forests for their livelihoods forged the path to implement the LCDS and subsequent REDD+ activities under the GRIF.

Hierarchy of Guyana's key REDD+ enabling policies and programmes



From: Case report (p.9)

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

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 for demonstration of performance.

The GRIF represents the first fund to be implemented in a National REDD+ strategy globally. 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 Bank'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 future categories are identified as part of this approach for accessing future funds, i.e. *carbon markets, market-linked mechanisms, voluntary funding mechanisms, and the UNFCCC-mandated global model for REDD+*. To carry out the global efforts for REDD+, it is also recognised that additional private capital will need to be leveraged.

This approach highlights four distinct phases for climate finance and REDD+ activities in Guyana:

- **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.

Monitoring and evaluating performance

Interim performance of the fund, during its initial establishment and capacity building phases (i.e. phases 1 and 2), is to be monitored based on a set enabling indicators. While, long-term performance is tracked through the establish MRV system. Independent overall evaluation of the progress made under the fund will be carried out on an annual basis. Furthermore, eligibility criteria are also established for the fund's project application process.

Enabling Indicators



From: Case report (p.21)

GRIF Project Portfolio *(as of June 2012)*

Six projects are currently identified under the GRIF portfolio:

- 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

This project is a flagship of Guyana's LCDS initiative to provide 165 MW electricity generation through hydropower (equal to ~90% of the country's current domestic power needs). This will offset the country's current dependence on imported fossil fuel and an energy system based currently on an 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 competitiveness, 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 years, 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 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 also crucial.

Finance mechanisms and funds can be designed towards receiving different source and types of funding from a diversity of sources, but 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>

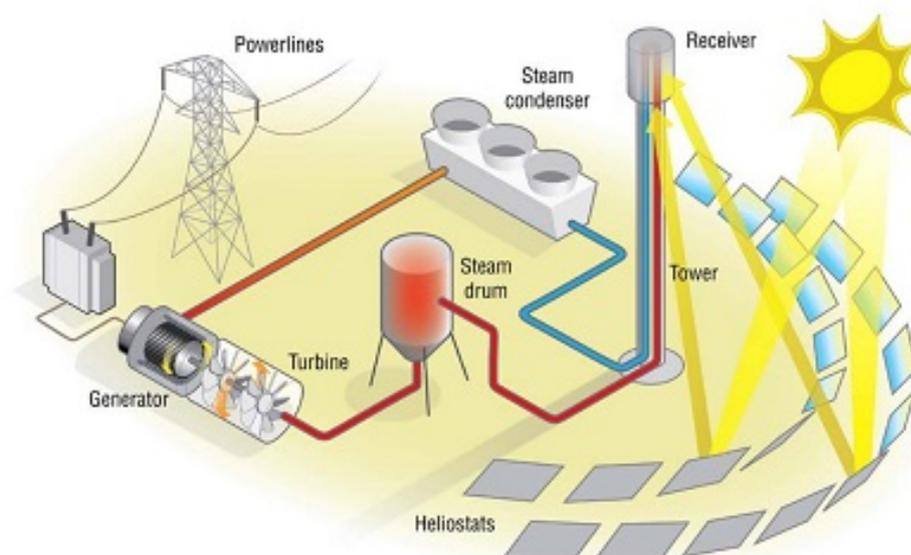
CLIMATE FINANCE FOR CONCENTRATED SOLAR POWER: Case Study of Rajasthan, India³

Concentrated Solar Power

Concentrated solar power uses 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

Schematic of CSP system



³ This case provides a summary compilation of information original prepared for the San Giorgio Group and financially supported by the Climate Investment Funds by Martin Stadelmann, Gianleo Frisari, and Charith Konda of the Climate Policy Initiative and presented in the following report:

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>

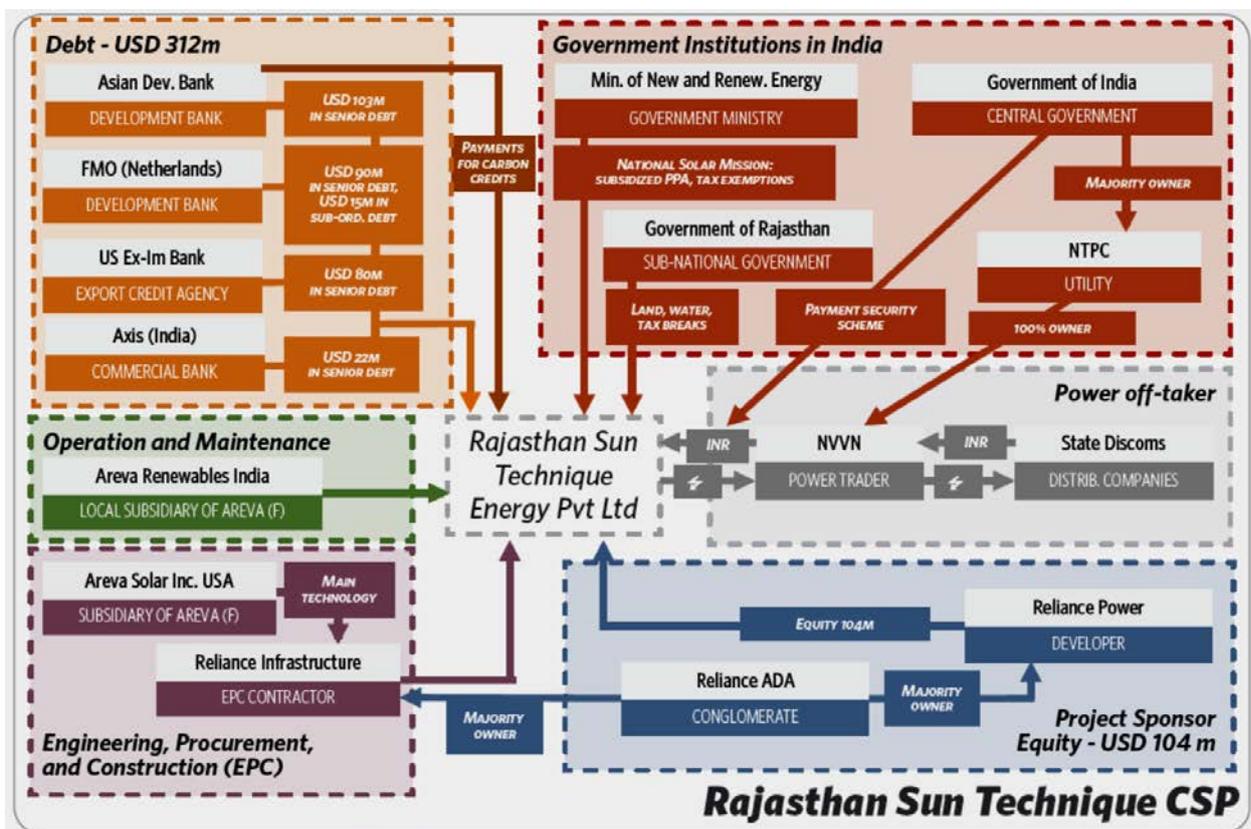
The 100 MW Rajasthan Sun Technique CSP plant

In March 2015, the new CSP plant in Rajasthan, India was dedicated and is expected to generate 250 GWh of clean energy annually, i.e. 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 CO₂ 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 the Government of India's subsidized power purchase agreement (PPA) and payment security scheme to ensure its financial viability. By awarding a subsidized Power Purchase Agreement (PPA) through a reverse auctioning scheme, the government covered the cost gap between conventional power and CSP technology.

Project Stakeholders



From: Case report (p.4)

Project Stakeholders

The project involves a series of public and private stakeholders, each having a specific role in financing the CSP plant. Reliance ADA, a large Indian conglomerate, developed the project through its subsidiary Reliance Power, holds the full equity and is responsible for engineering, procurement and construction. A US-based subsidiary of a large French energy company (Areva) provides the Linear Fresnel technology and ensures operation and maintenance through an India subsidiary. The other key stakeholders are two national public bodies (MNRE and NRVN) responsible for policies and power purchase, and a consortium of domestic private and international public investors, including FMO (Dutch Development Bank), Asian Development Bank and Export-Import Bank of the United States.

Investments: who pays for what

The 100 MW Rajasthan Sun Technique CSP plant gathered total financing of approximately USD 414 million. Foreign investors provided for 70% of financing, a local Indian bank 5%, and the project developer 25% in equity contributions.

Financing from foreign investors is denominated in USD and mostly in the form of senior debt with long-term maturities of 18 years. The Export-Import Bank of the United States provided a loan tied to U.S. Treasury pricing, provided that the project purchase goods from U.S. exporters, in this case Areva Solar Inc. Conversely, the debt provided by the ADB and the FMO contained no subsidies. They provided loans at rates consistent with the cost of capital for these Development Finance Institutions (DFIs).

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 | |

From: Case report (p.7)

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, including:

- *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

From this project, it is possible to identify several apparent risks and consider ways in which those risk could be eliminated in future CSP projects. Efforts to improve the supporting policies under the National Solar Mission could better ensure the financial strength and implementation of additional projects. *As currently such projects are heavily dependent on the strong financial support from private actors and on long-tenor public debt to become viable, so the conditions created by the public system are not quite adequate for large scale replication of such projects.*

Incentivizing the inclusion of storage in new CSP projects would be beneficial as this is one of the key advantage of CSP over other forms of solar power, and it would increase power grid security as the country moves towards a larger energy mix from renewable sources. 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.

Foreign exchange risk can cause severe 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.

Case Study Conclusions

This case demonstrates 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.

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