



CASE STUDY

The Democratic Socialist Republic of Sri Lanka

Climate Finance: Mechanisms, Frameworks and Challenges in Sri Lanka

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Introduction

The Government of Sri Lanka (GoSL), with the assistance of the International Development Association (IDA) of the World Bank and the Global Environment Facility (GEF) initiated two programmes, the “Energy Services Delivery Project” (ESD) (1997-2002) and the follow-on “Renewable Energy for Rural Economic Development Project” (RERED) (2002-2011), to promote private sector investments in on-grid and off-grid power generation using environmentally sustainable renewable energy technologies (RET). Both projects aimed to develop on-grid RET based generation capacity and to provide RET based off-grid energy services to households and communities that lacked access to the national grid. The projects were supported by credit lines from IDA, grants from GEF and at a later stage (2003), subsidies from GoSL.

The projects undertook several initiatives to popularise and promote RETs as viable alternatives. They focused on the installation of:

1. Grid-connected projects

ESD and RERED assisted grid-connected power generation subprojects by providing long credit through Participating Credit Institutions (PCIs). PCIs conducted their own subproject appraisals, which included technical, financial and promoter evaluation – 80% of the PCI project loan was refinanced at the prevailing average commercial bank deposit rate. The rate to the beneficiary was market driven and not specified. The ESD Project funded small hydro projects, while the RERED Project also funded wind and sustainable bio-mass projects.

2. Off-grid community-based projects

Off-grid community based projects assisted were mainly micro-hydro projects implemented and owned by village Electricity Consumer Societies (ECS). The ECS calculated and collected flat monthly subscription fees from members for electricity use. Construction was financed through a combination of a loan from a PCI (or non-PCI financial institution), grant support from ESD/RERED and equity from household and other sources (e.g. provincial councils, state agencies and NGOs). The ECS negotiated loans with the lender and agreed on terms. Lending institutions evaluated household income and cohesiveness, and ECS managerial and technical capability when extending loans. The ECS was assisted in the process by a Registered Project Developer, who prepared the feasibility study and provided technical assistance for design and construction. Each successfully completed sub-project received a co-financing grant based on installed capacity. Project Developers received a ‘Project Preparation Grant’ for their efforts. The ESD/RERED Administrative Unit (AU) sent technical consultants to verify design and installations of sub-project as per ESD/RERED technical specifications.



3. Solar Home Systems (SHS)

SHS were marketed by registered SHS vendors. The vendors technician visited the households of interested customers and evaluated their electricity needs. If the customer required a credit facility, the vendor performed a preliminary credit assessment and directed the customer to a microfinance institution (MFI). When the loan was approved, the vendor collected a typical 15% downpayment from the customer and installed the SHS. The MFI thereafter collected the instalments from the customer as agreed, either monthly or seasonally.

ESD/RERED provided a co-finance grant based on SHS capacity to the vendor which could be used to reduce the cost to the end-user or for marketing/working capital purposes. In order to reduce dependency on grants, the co-financing grants were progressively reduced in terms of amounts and system size over the life of the projects.

Following a successful SHS subsidy initiative from a provincial council, GoSL started providing a subsidy to SHS buyers in the form of upfront discounts on SHS selling prices. The vendors claimed this subsidy from the GoSL through the AU.

The performance of ESD and RERED at completion was as follows:

TABLE 1

	Project Duration	Objectives	Technology promoted	Targets	Achievements
ESD	1997-2002	<ul style="list-style-type: none"> Assisting the private sector, NGOs and cooperatives in their delivery of grid-connected and off-grid RETs to provide electrification to rural households Strengthening the enabling environment for implementing demand-side management Reducing carbon emissions 	As of June 2002		
			Grid connected small hydro	21 MW	31 MW, 15 subprojects
			SHSs	15,000 households	20,953 households
			Community-based projects (hydro)	252 kW, 20 schemes	350 kW, 35 schemes, 1,732 households
RERED	2002-2011 (Initially was set to conclude in 2008)	<ul style="list-style-type: none"> Providing off-grid electricity services to stimulate the rural economy, empower the poor and improve their standard of living Establishing grid-connected projects to encourage competition in the electricity sector, provide additional capacity, and achieve greater efficiency and transparency 	As of December 2011		
			Grid connected small hydro, wind, bio-mass and solar	135 MW (85 MW)	184 MW, 70 subprojects (68 hydro and 2 wind)
			SHSs	160,000 households (revised target -113,500 households)	110,575 households
			Community-based (hydro, wind, bio-mass and solar)		6,220 households; 1,770 kW; 175 schemes (includes two community-based biomass projects)



Existing Climate Finance Gaps

The first independent power project Sri Lanka was a 0.96 MW small hydro plant commissioned in 1996. This project was financed by DFCC Bank, a DFI. The gaps in finance that existed at the time for such grid connected projects were due to a lack of domestic sources of long capital from development banks, lack of project financing capability from commercial banks and hesitancy by commercial banks to finance RETs new to Sri Lanka. The legal and regulatory framework (state agency approvals, feed in tariffs, power purchase agreements etc) was also evolving at the time.

For off-grid initiative such as SHS and village micro-hydro, the field was new and an entire sector had to be built practically from scratch – encouraging solar vendors, training technicians, ensuring technical and service standards, creating customer awareness and acceptance, and arranging financing for vendors and more importantly consumer financing for poor rural customers. Lending to villages on a communal basis for micro-projects was also a new concept for many financial institutions.

Considering these challenges, ESD and RERED went a long way in mainstreaming RE financing in Sri Lanka. Long after the projects ended, the RE sector is still vibrant.

While the domestic capital market has developed over the years, adequate domestic sources of long term capital are still inadequate to fund the growing infrastructure requirements of a lower middle income economy.

Financial Framework of the Project's Implementation

The Ministry of Finance and Planning (MoFP) oversaw the projects while the Project Management Department of DFCC Bank, functioned as the project Administrative Unit (AU). The AU administered the IDA credit program to re-finance sub-loans made by Participating Credit Institutions (PCIs) to Investment Projects (sub-projects), developed and implemented by the private sector companies, village communities or NGOs. It also administered the Global Environment Facility (GEF) grant program to co-finance the development of off-grid investment projects to provide support to develop new renewable energy applications and technical assistance for a selection of activities. On request of the AU, the Treasury Operations Department (ToD) of the MoFP disbursed the re-finance credit funds to the PCIs (development banks, commercial banks, leasing companies, finance companies and micro-finance institutions) from a Central Bank of Sri Lanka (CBSL) account. The PCIs took the credit risk of the beneficiaries and the government took the credit risk of the PCIs. PCIs had to conform to stipulated eligibility criteria. GEF grants funds were also disbursed on the request of the AU by the ToD from another CBSL account.

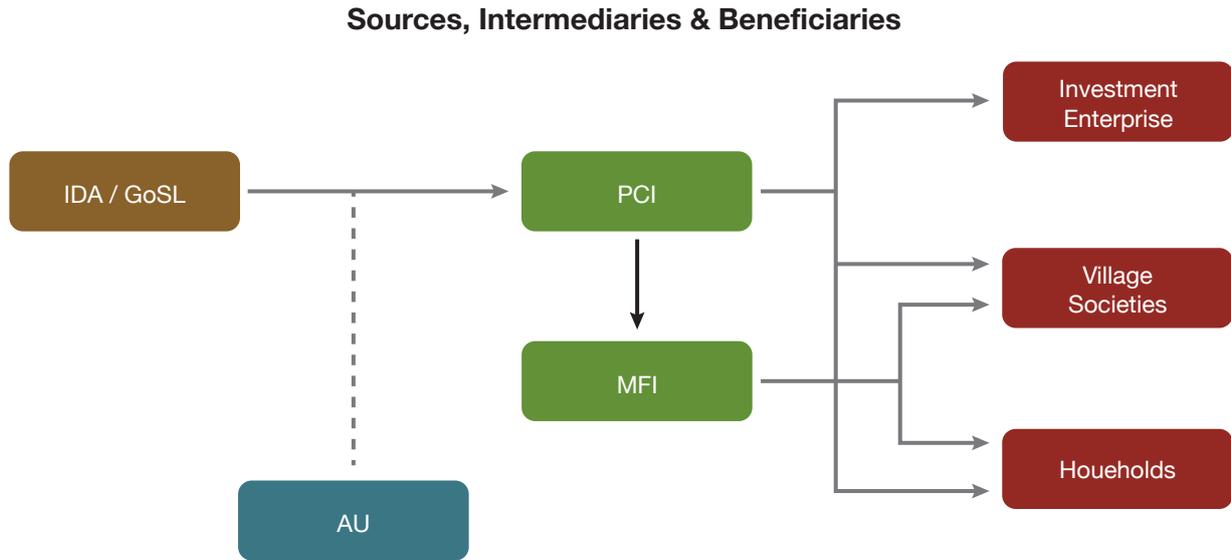
TABLE 2

Funding Agencies	GoSL
	IDA
	GEF
Implementation and Administration	MOF&P
	AU (DFCC Bank)
	ToD/CBSL
Financial Intermediaries	Participating Banks
	Participating MFIs, Leasing Companies and Finance Companies
	Non-PCI Financial Institutions (used own resources or obtained loans from PCIs)
Partners	Project Developers, SHS Vendors, Equipment Suppliers, Consultants, Industry Associations
Beneficiaries	Investment Enterprises, Households, Households borrowing collectively as Village Electricity Consumer Societies



Figure 1 below illustrates a simplified flow of funds for the project.

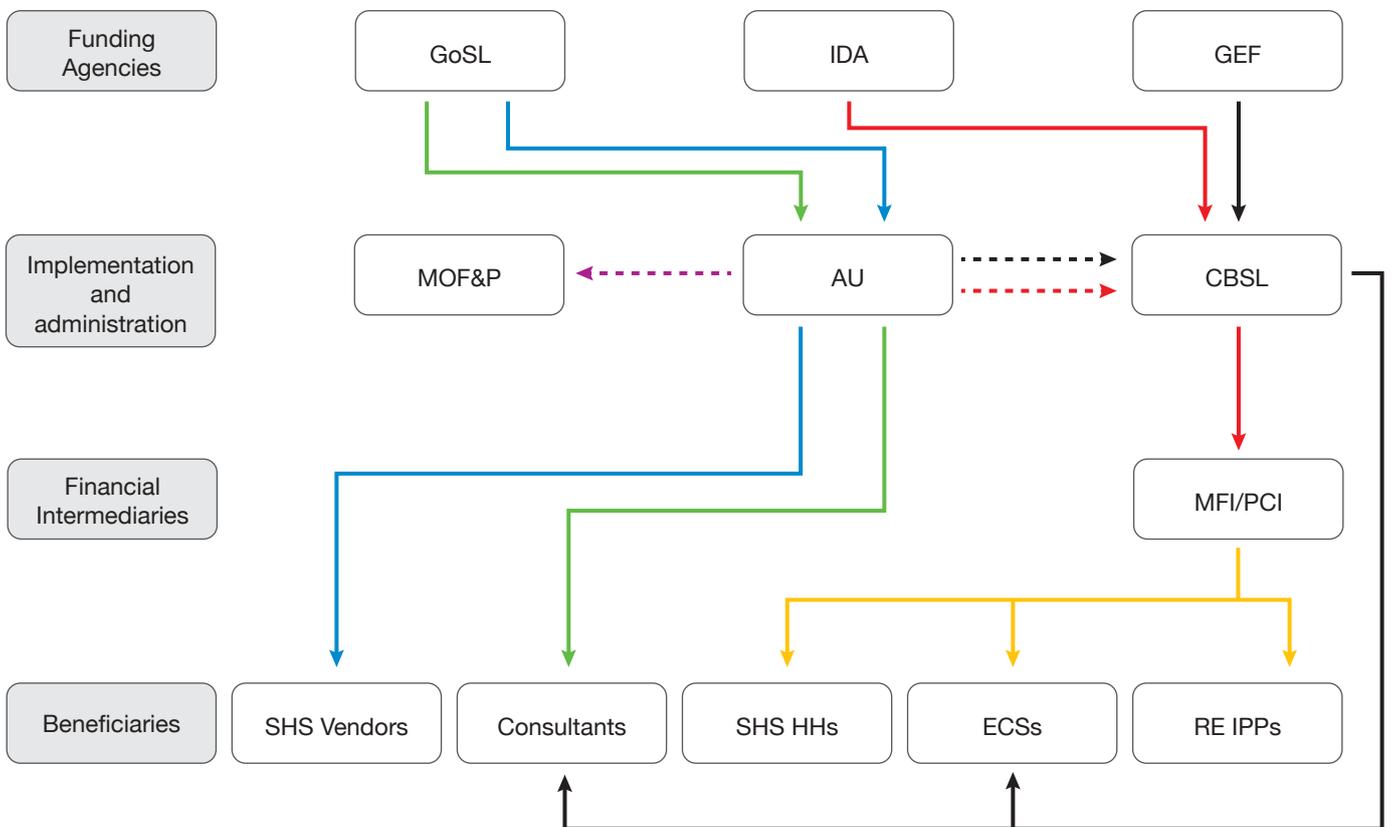
FIGURE 1



Note, an MFI could be a PCI if it could satisfy the eligibility criteria. Otherwise, it had to use its own resources or obtain a re-finance loan from a PCI. In this case, the PCI took the credit risk of the MFI.

A more detailed depiction of the funds flow and the reporting flow is depicted below in Figure 2.

FIGURE 2



- Loan Facilities
- Counterpart Funding
- - - Reporting
- SHS Subsidy
- GEF Grant
- IDA Credit
- - - - - Withdrawal Applications (Grant)
- - - - - Withdrawal Applications (Credit)



Legal and Regulatory Framework

Two principal actors in the Sri Lanka electricity sector were the Ministry of Power and Energy - which oversaw the import, generation, distribution and consumption of energy resources and implemented policies regarding the energy sector – and the Ceylon Electricity Board (CEB), accountable for electricity generation, transmission, purchases from independent power producers (IPPS) and distribution to consumers. The legal status of off-grid community-based power generation was a matter of concern at the inception of ESD in 1997, since the **Electricity Act** prevailing at the time did not allow the distribution and sale of electricity by any other entity besides the CEB. The Electricity Act was subsequently replaced, and also two new agencies came into being – the Public Utilities Commission of Sri Lanka (PUCSL) as the regulator (2003) and the Sri Lanka Sustainable Energy Authority (SLSEA) (2007) with a mandate to develop the RE sector.

Grid Connected Projects

ESD and RERED influenced a new legal framework enabling the rapid development of power generation through RETs in Sri Lanka. In particular, ESD played a key role in establishing a **Standardised Power Purchase Agreement (SPPA)** and the non-negotiable **Small Power Purchase Tariff (SPPT)**, which greatly enabled independent grid-connected power generation in the country and allowed local entrepreneurs to enter the market and invest in numerous projects. Under the SPPA, IPPs entered into a 15-year agreement with the CEB, with clearly specified conditions of power delivery and purchase. This framework, which reduced financial uncertainties for subprojects, together with the support of ESD/RERED, served as a catalyst in attracting more investors and financiers to the industry.

Later, SPPAs were for 20 year periods and SPPTs became technology specific. Investments in technologies newer to Sri Lanka such as wind, bio-mass and solar were incentivised with higher purchase tariffs.

Community Based Projects

Under the then Electricity Act, Electricity Consumer Societies (ECSs) operating community owned off-grid village (micro)hydro projects (VHPs) were allowed to generate power, but only for use by ECS members for self-generation rather than commercial production and sale of power. ECS members paid a flat monthly subscription fee rather than a tariff, which was used to pay loan instalments and interest, to meet routine operation and maintenance (O&M) expenses, and to create a small pool of funds for major break downs and emergencies. ECSs were also responsible for ensuring there was no overloading of the system and that members were using only the agreed amount of electricity, disconnecting defaulters and providing new connections. To ensure legality of VHP subprojects, ECS had to register with the provincial authorities and they had to obtain permissions from relevant state agencies before beginning construction.

SHS

At the initial stage of ESD, financing SHSs posed a challenge for the then existing PCIs (large development banks and commercial banks), as they were not equipped to economically provide very small consumer loans to households in remote geographically disbursed locations. Therefore, SHS vendors provided consumer credit (e.g. financial appraisal of potential customers, provision of credit facilities and collection of loan instalments) after obtaining working capital loans from PCIs. However, this consumer credit delivery mechanism was unsuitable since SHS vendors were not competent in credit evaluation and collection and also their borrowing capacity was limited.

The involvement of MFIs by ESD had an immense impact on SHS sales since they had the required rural outreach. The success of such rural microcredit was principally dependent on the MFIs rural presence, local connections and its understanding of local needs. MFIs initially accessed term loans from PCIs and provided SHS loans to consumers. However this model introduced another layer in the credit delivery process and pushed up interest rates. To solve this issue, a new set of eligibility criteria for MFIs was introduced such that they could become PCIs and thus access the credit line directly.

Success Factors

A key method ESD/RERED used to achieve its objectives was a multi-stakeholder partnership approach and an innovative financial mechanism. It created a national financial services subsector for RE funding, by opening the project credit facility to multiple participating credit institutions (PCIs), which as a result encouraged many commercial banks to fund RE projects thereby increasing competition among lenders. Seven banks and four non-bank financial institutions provided credit facilities for RE projects. Commercial banks were a large deposit



base they could tap to lend long term as opposed to the development banks who were more dependent on higher cost borrowings.

The project helped latent Sri Lankan entrepreneurs to develop and expand new business models for the provision of a variety of energy services. In particular, the AU created and maintained an enabling environment of capacity building, technical assistance and financial products for each renewable energy industry category. The AU aided the mobilisation of industry associations, professional services accreditation and quality assurance standards. Quarterly stakeholder meetings, served as a platform for the various stakeholders to come together. Furthermore, by training local youth in various aspects of the renewable energy industry, the project created a skilled workforce that could be readily tapped by the various companies and entrepreneurs.

The financing mechanism and stakeholder approach used in this project created a substantive change in investments in low-carbon climate resilient development, expanding and promoting the use of renewable energy technologies above all in rural and poor areas. It created an advantageous environment for businesses, NGOs, Community Based Organisations (CBOs) cooperatives, commercial and development banks, leasing companies and microfinance institutions to provide renewable energy services on a business as usual basis.

Issues Faced

In the second half of the 2000s, GoSL embarked on a rapid rural electrification programme, such that by the end of RERED in 2011, around 97% of Sri Lanka's 20 million population had access to the grid. The SHS market virtually ceased leading to the vendors curtailing operations or closing down and SHS loan defaults increased. Micro-hydro became stranded assets when all or some of the households accessed the grid.

A 2008 policy initiative of GoSL provided encouragement to grid-tied solar systems in urban areas (i.e. Net Metering). This initiative was supported by RERED technical assistance, and currently there are over 200 vendors installing grid-tied systems for both household and commercial applications. As of 2016, a cumulative capacity of 52MW across 7,570 customers was connected to the grid on net-metering basis¹. In a new initiative, GOSL is targeting 1 million roof-top solar connections by 2025.

As a pilot project, RERED together with USAID provided technical assistance to two micro-hydro projects to sell electricity to the grid, thus becoming Independent Power Producers (IPP) receiving the same feed-in tariff as larger small hydro IPPs.

Lessons Learned/Estimated and/or Achieved Impact

The project indirectly contributed to the achievement of Sri Lanka's Millennium Development Goals (MDGs). The expansion of electric power in rural areas enhanced incomes and standards of living in different ways such as keeping houses and workplaces cleaner and healthier since they were no longer blackened by smoke from kerosene lamps and keeping businesses open for longer hours to increase revenues. Electricity also had a social impact such as on education, health and gender equality. It gave the opportunity to expand technology, education and communication facilities to rural communities, and provided more time to children to study and to women a sense of security due to longer electric lighting.

Furthermore, it also helped generate employment at community and household levels through installations and O&M of grid-connected MHPs, VHPs and SHS. For example the construction of a single MHP employs 8-11 members of the surrounding community for 18 months, therefore the completion of 68 MHPs under RERED have generated between 244,800 and 336,600 person-days of employment.

Unfortunately, even though the projects provided a project preparation (PPC) grant of up to USD 1000 to set up income generating activities within subprojects, households in villages demonstrated little interest in establishing formal economic activities. Limited production capacity and limited size of markets in the immediate vicinity, difficulty in transporting produce from remote locations to markets and the more remunerative income at the time from agricultural pursuits like tea growing are the likely causes. However, some cottage industries that served the community rather than external markets thrived.

¹ <https://www.adb.org/sites/default/files/linked-documents/50373-002-ssa.pdf>



In terms of greenhouse gas emissions, RERED project is estimated to have saved 2.15² million tons of carbon emissions during 2002-2011. The 70 grid-connected RE projects with a capacity of 184MW continue to generate power, thereby avoiding carbon emissions.

Regarding the impact of the project in the legal sector, GoSL started to give non-conventional renewable energy (NCRE) a larger role in the electricity sector as a technique to reduce dependence on imported oil. In 2008, it introduced 'net metering' for electricity generated from renewable sources so that electricity consumers are able to feed it into the national grid in exchange for credit to their electricity bill in units generated. This opened a new avenue for users of RE generators to expand their operations. Furthermore, the establishment of SEA in 2007 gave the opportunity to RE stakeholders to discuss their views and to lobby for their interest in a state-recognised forum. SEA also evolved the SPPA into a more transparent, longer term agreement with technology-specific tariffs, to facilitate the entry of new technologies in the market. Also, the amendment of the Electricity Act in 2009 has vested wide-ranging powers in the PUCSL.

The rapid expansion of the national grid, while being beneficial to consumers on a macro viewpoint (as the quality of electricity and the unlimited quantity available) caused problems to solar vendors, lenders, equipment supplier who had to rapidly change their business models. While some SHS vendors went out of business (and left customers in the lurch) others transitioned to providing grid-tied systems in urban areas. A leasing company that got in to rural finance for the first time through SHS consumer financing is now operates very successful micro-finance operation in Sri Lanka and overseas. Some village hydro developers are working as consultant in Africa.

From a policy making point of view, there are lessons to be learnt in terms of dealing with transition from off-grid to on-grid and dealing with stranded assets.

In the meantime, the grid-connected RE generation sector has developed greatly. As the untapped hydro power potential in Sri Lanka was getting exhausted developers pursued other RE technologies such as wind, solar and bio-mass. Some are developing small hydro projects in East Africa, notably in Uganda.

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² World Bank: Implementation Completion and Result Report (ICR00002296) on the RERED Project (June 2012)