Document of
The World Bank

Report No.: 29532

PROJECT PERFORMANCE ASSESSMENT REPORT

SRI LANKA

ENERGY SERVICES DELIVERY PROJECT
(CREDIT 2938-CE; GETF 28955)

SECOND POWER DISTRIBUTION AND TRANSMISSION PROJECT
(CREDIT 2297-CE)

,June 25, 2004

Sector and Thematic Evaluation Group
Operations Evaluation Department

Currency Equivalents (annual averages)

Currency Unit = Sri Lankan Rupees (Rs.)

1991	US$1.00	Rs40.23
1992	US$1.00	Rs42.51
1993	US$1.00	Rs46.15
1994	US$1.00	Rs49.50
1995	US$1.00	Rs49.99
1996	US$1.00	Rs54.04
1997	US$1.00	Rs56.69
1998	US$1.00	Rs61.21
1999	US$1.00	Rs68.36
2000	US$1.00	Rs72.02
2001	US$1.00	Rs82.55
2002	US$1.00	Rs93.05
2003	US$1.00	Rs96.71

Abbreviations and Acronyms

AU	Administrative Unit based at DFCC Bank
CAS	Country Assistance Strategy
CEB	Ceylon Electricity Board
DSM	demand-side management
EBRS	Energy Business Renewal Strategy
ECS	electricity consumers societies
ESDP	Energy Services Delivery Project
GCMH	grid-connected minihydro
GEF	Global Environment Facility
GoSL	Government of Sri Lanka
ICR	Implementation Completion Report
IDA	International Development Association
ITDG	Intermediate Technology Development Group
LOI	Letter of Intent
MFI	microfinance institutions
NGO	nongovernmental organization
OED	Operations Evaluation Department
OGVH	off-grid village hydro
PCI	participating credit institutions
PPAR	Project Performance Assessment Report
RERED	Renewable Energy and Rural Economic Development Project
SHS	solar home systems
SEEDS	Sarvodaya Economic Enterprises Development Services
SPPA	small power purchase agreement

Fiscal Year

Government: January 1 – December 31

Director-General, Operations Evaluation	:	Mr. Gregory K. Ingram
Director, Operations Evaluation Department	:	Mr. Ajay Chhibber
Manager, Sector and Thematic Evaluation	:	Mr. Alain Barbu
Task Manager	:	Mr. Fernando Manibog

OED Mission: Enhancing development effectiveness through excellence and independence in evaluation.

About this Report

The Operations Evaluation Department assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the Bank's self-evaluation process and to verify that the Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, OED annually assesses about 25 percent of the Bank's lending operations. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or Bank management have requested assessments; and those that are likely to generate important lessons. The projects, topics, and analytical approaches selected for assessment support larger evaluation studies.

A Project Performance Assessment Report (PPAR) is based on a review of the Implementation Completion Report (a self-evaluation by the responsible Bank department) and fieldwork conducted by OED. To prepare PPARs, OED staff examine project files and other documents, interview operational staff, and in most cases visit the borrowing country for onsite discussions with project staff and beneficiaries. The PPAR thereby seeks to validate and augment the information provided in the ICR, as well as examine issues of special interest to broader OED studies.

Each PPAR is subject to a peer review process and OED management approval. Once cleared internally, the PPAR is reviewed by the responsible Bank department and amended as necessary. The completed PPAR is then sent to the borrower for review; the borrowers' comments are attached to the document that is sent to the Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

About the OED Rating System

The time-tested evaluation methods used by OED are suited to the broad range of the World Bank's work. The methods offer both rigor and a necessary level of flexibility to adapt to lending instrument, project design, or sectoral approach. OED evaluators all apply the same basic method to arrive at their project ratings. Following is the definition and rating scale used for each evaluation criterion (more information is available on the **OED** website: http://worldbank.org/oed/eta-mainpage.html).

Relevance *of* Objectives: The extent to which the project's objectives are consistent with the country's current development priorities and with current Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, Operational Policies). Possible ratings: High, Substantial, Modest, Negligible.

Efficacy: The extent to which the project's objectives were achieved, or expected to be achieved, taking into account their relative importance. Possible ratings: High, Substantial, Modest, Negligible.

Efficiency: The extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. Possible ratings: High, Substantial, Modest, Negligible. This rating is not generally applied to adjustment operations.

Sustainability: The resilience to risk of net benefits flows over time. Possible ratings: Highly Likely, Likely, Unlikely, Highly Unlikely, Not Evaluable.

***Institutional* Development Impact:** The extent to which a project improves the ability of a country or region to make more efficient, equitable and sustainable use of its human, financial, and natural resources through: (a) better definition, stability, transparency, enforceability, and predictability of institutional arrangements and/or (b) better alignment of the mission and capacity of an organization with its mandate, which derives from these institutional arrangements. Institutional Development Impact includes both intended and unintended effects of a project. Possible ratings: High, Substantial, Modest, Negligible.

Outcome: The extent to which the project's major relevant objectives were achieved, or are expected to be achieved, efficiently. Possible ratings: Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Bank Performance: The extent to which services provided by the Bank ensured quality at entry and supported implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of the project). Possible ratings: Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

Borrower Performance: The extent to which the borrower assumed ownership and responsibility to ensure quality of preparation and implementation, and complied with covenants and agreements, towards the achievement of development objectives and sustainability. Possible ratings: Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

Contents

This report was prepared by Fernando Manibog. who assessed the project in October 2003. The report was edited by William Hurlbut, and Rose Gachina provided administrative support.

Principal Ratings

Second Power Distribution and Transmission Project (Credit 2297-CE)

	*ICR**	*ICR Review**	*PPAR*
Outcome	Satisfactory	Marginally Satisfactory	Moderately Satisfactory
Sustainability	Likely	Likely	Likely
Institutional Development Impact	Substantial	Modest	Modest
Bank Performance	Satisfactory	Satisfactory	Satisfactory
Borrower Performance	Satisfactory	Satisfactory	Unsatisfactory

Energy Services Delivery Project (Credit 2938-CE; GETF-28955)

	*ICR**	*ICR Review**	*PPAR*
Outcome	Satisfactory	Satisfactory	Highly Satisfactory
Sustainability	Likely	Likely	Likely
Institutional Development Impact	High	High	High
Bank Performance	Satisfactory	Satisfactory	Highly Satisfactory
Borrower Performance	Highly Satisfactory	Highly Satisfactory	Highly Satisfactory

* The Implementation Completion Report (ICR) is a self-evaluation by the responsible operational division of the Bank. The ICR Review is an intermediate OED product that seeks to independently verify the findings of the ICR.

Key Staff Responsible

Second Power Distribution and Transmission Project (Credit 2297-CE)

Project	*Task Manager/Leader*	*Division Chief/ Sector Director*	*Country Director*
Appraisal	Heping Wu and Mohinder Manrai	Frederick T. Temple	Shinji Asanuma
Completion	Marc Heitner	Alastair J. McKechnie	Mariana Todorova

Energy Services Delivery Project (Credit 2938-CE; GETF-28955)

Project	*Task Manager/Leader*	*Division Chief/ Sector Director*	*Country Director*
Appraisal	Loreta Schaeffer	Per Ljung	Roberto Bentjerodt
Completion	Chandrasekar Govindarajalu	Penelope Brook	Peter Harrold

Preface

This is a Project Performance Assessment Report (PPAR) prepared by the Operations Evaluation Department (OED) on two energy projects in Sri Lanka: the Second Power Distribution and Transmission Project and Energy Services Delivery Project (ESDP). The Second Power Distribution and Transmission Project was approved in 1992 for an IDA credit of US$50 million equivalent and closed on June 30, 1998, after a 27-month delay and US$7.61 million equivalent was cancelled. The ESDP was approved on March 18, 1997, for a Bank credit of US$22.1 million equivalent (Cr. 2938-CE), and a Global Environment Facility (GEF) grant of US$5.7 million equivalent (GETF No. 028955). The project closed as scheduled on December 31,2002, and was fully disbursed.

The Second Power Distribution and Transmission Project was assessed because it was IDA's last project with the Ceylon Electricity Board (CEB). There has been no new lending to CEB since 1998, and no new operations are planned. The ESDP was selected for an OED assessment because it is one of the first major renewable energy projects financed by IDA and GEF, and it features a unique financing mechanism and implementation framework from which important lessons can be derived.

The Second Power Distribution and Transmission Project is based on the ICR (Report No. 19396) issued on June 30,1999, and the IDA credit documents and interviews. The ESDP assessment is based on the Implementation Completion Report (ICR Report No. 25907) prepared by the South Asia Region and issued on June 5,2003, as well as the IDA credit and GEF grant documents, project files, and discussions with Bank staff. An OED mission visited Sri Lanka in October 2003 to discuss the effectiveness of the Bank's assistance with the government, project implementing agencies at the national and state levels, commercial banks, private investors and business associations for renewable energy technologies, academic and research institutes, nongovernmental organizations, and other stakeholders. Their cooperation in granting interviews and providing data is gratefully acknowledged. The substantial assistance provided by the project's Administrative Unit in the DFCC Bank during the mission and report preparation is especially appreciated.

In the main report, the ESDP is discussed first because of its greater learning interest, given its more innovative design and components compared to the Second Power Project.

Following standard OED procedures, the draft PPAR was sent to the borrower for comments. No comments were received.

Summary

The Second Power Distribution and Transmission Project, approved in 1992, was IDA's last project with the Ceylon Electricity Board (CEB), Sri Lanka's state-owned utility. Since 1981, IDA has supported two other power projects in Sri Lanka. The objectives of the Second Power project were to: (a) support the rationalization of power distribution, reduce system losses in the distribution system operated by local licensees, and improve service quality; (b) expand the transmission system to meet demand growth; (c) strengthen CEB's institutional capacity; and (d) assist in the preparation of a selected hydroelectric complex.

The project's outcome is rated *moderately satisfactory*, as its objectives were only partially achieved or implemented with significant delays, some after Credit closing. Its *sustainability* is likely, since CEB is now properly operating and maintaining the project's facilities. The institutional development impact is rated *modest*, given CEB's continuing lack of financial and operational autonomy, lack of commercial orientation, and poor financial results. IDA performance is rated *satisfactory*, as project documents and interviews indicated that IDA was diligent and provided potentially useful (but unheeded) advice during project design, appraisal and supervision. The Borrower performance is rated *unsatisfactory*, particularly by causing long procurement delays and maintaining inadequate power tariffs, which did not enable CEB to implement the project efficiently and fully achieve its objectives.

The main lessons from the Second Power project concern the importance, prior to Board approval, of addressing procurement policies and procedures that could create problems and delays later; the necessity for a truly independent regulatory regime to govern tariff determination in order to help safeguard the sector's financial viability; and the importance of rigorously assessing risk and identifying exit mechanisms for project components located in areas with civil unrest.

The Energy Service Delivery Project (ESDP), approved in 1997, was a necessary response of the Government of Sri Lanka (GoSL) to the serious constraints in power grid expansion that the country was encountering during the 1990s. At that time, GoSL recognized the inefficiencies of a purely public sector approach that relied entirely on the financially and institutionally weak CEB. GoSL wished to facilitate a transition from the public sector's monopoly in power generation to a market-based system that gave an important role for private investors and renewable energy. The objectives of the ESDP were to: (a) promote the provision of grid-connected and off-grid energy services by the private sector, NGOs and cooperatives, using environmentally sustainable renewable energy technologies; (b) strengthen the environment for implementing demand side management (DSM); and (c) improve public and private sector performance to deliver energy services through renewable energy and DSM.

Overall, the ESDP's outcome is rated *highly satisfactory*. The ESDP achieved (and in some cases, exceeded) its objectives by addressing technical, financial, policy and information barriers to wider-scale renewable energy commercialization in Sri Lanka, including rural and low-income markets. The project is innovative and applied lessons from other projects in its design; some of its components are cross-sectoral (financial

sector/micro-finance); and it featured a high degree of stakeholder participation. As a result of ESDP, there is now a vibrant renewable energy industry in Sri Lanka offering wide customer choice and competition both in range of products, services and financing sources. The project led to improvements in the institutional and policy framework that will have positive effects on future private participation in power, possibly going beyond renewable energy. The ESDP also strengthened the foundations for adopting demand-side management measures to reduce electricity consumption.

The ESDP's sustainability is *likely*, judging from the continued growth in private involvement in the renewables market and the robust returns from investments. The project's institutional development impact is *high*, having contributed significantly to the mainstreaming of stable and transparent institutions for commercializing renewable energy. The maturity of institutional processes is evident from the ESDP's overall project management, private and micro-financing innovations, end-user participation, and stakeholder consultations. The Bank's performance is rated *highly satisfactory*. The quality of the Bank's advice and inputs was consistently high during the design, implementation, supervision and project closing stages, and was widely appreciated by country clients and project stakeholders. The Borrower's performance is rated *highly satisfactory*. The government's commitment helped ensure that national and sectoral objectives were consistent, thus leveling the playing field between conventional and renewable energy technologies.

The ESDP yielded many important lessons of broad applicability as the Bank expands its assistance for renewable energy, as part of its 2001 Energy Business Renewable Strategy and 2003 Infrastructure Plan. These numerous lessons can be clustered around three important areas: (a) building-up the business and policy environment, addressing in particular the key barrier of access to capital; (b) scaling-up the market, including a reliable after-sales service system and end-user training; and (c) establishing strong project and financial management systems, including monitoring and evaluation.

Gregory K. Ingram
Director-General
Operations Evaluation

Energy Services Delivery Project

INTRODUCTION

1. The Energy Services Delivery Project (ESDP) was conceived at a time when public sector investments in power generation in Sri Lanka lagged seriously behind growing demand. While investments in new capacity for electricity generation had been increasing by about 4.5 percent of GDP since 1990, they could not keep pace with power demand, which was growing by at least 8 percent annually. Almost half of the population (48 percent) was without access to the power grid, and prospects for being served through by the system were nearly non-existent. Painful daily power cuts in 1996 highlighted the urgency of building new generating capacity and improving end-use efficiency. The Ceylon Electricity Board (CEB), however, was financially very weak mainly because power tariffs were set artificially too low, and a purely public sector approach to generation expansion proved to be highly inefficient. To address the situation, the Government of Sri Lanka (GoSL) decided to: (i) create a regulatory and policy environment that would encourage private investments to supplement public resources; and (2) improve the efficiency both in delivering energy services and final energy consumption. The ESDP was designed to address deficient capacity and sector inefficiency by fostering private provision of energy services.

PROJECT OBJECTIVES, COMPONENTS AND FINANCING MECHANISMS

2. *Objectives.* The ESDP's main objectives were to: (a) promote the provision of grid-connected and off-grid energy services by the private sector, NGOs, and cooperatives, using environmentally sustainable renewable energy technologies; (b) strengthen the environment for implementing demand side management; and (c) improve public and private sector performance to deliver energy services through renewable energy and demand side management.

3. *Components.* The ESDP had three principal components:

(a) The *ESD Credit Component* (US$48.9 million) was designed to provide private sector firms, nongovernmental organizations, and cooperatives with medium- and long-term financing for off-grid solar home systems and village hydro projects, and grid-connected mini-hydro, wind, and other renewable energy investments. In addition to the IDA credit, the Global Environment Facility (GEF) provided grant cofinancing to dealers and developers of solar home systems and off-grid village hydro schemes.

(b) The *Pilot, 3-MW Grid-Connected Wind Farm Component* (US$3.8 million), to demonstrate the technical and commercial viability and long-run economic potential of wind power in Sri Lanka, and to catalyze future private sector wind farm development. The component was implemented by the Ceylon Electricity Board (CEB).

(c) The *Capacity-Building Component* (US$2.6 million), to provide training and technical support for renewable energy and energy efficiency initiatives by both the public and private sector, that is, CEB and energy service entrepreneurs.

4. *Project Implementation Arrangements.* An Administrative Unit was established in the DFCC Bank, one of the participating credit institutions, to provide overall project management, that is, process loans and grant disbursement requests, maintain records, compile program statistics, submit quarterly reports and catalyze as well as chair quarterly meetings of the project stakeholders. This implementation arrangement has been maintained under the ongoing, follow-on Renewable Energy and Rural Economic Development (RERED) Project.

5. *Costs and Financing.* The ESDP's total costs were estimated during appraisal at US$55.3 million. Actual project costs amounted to US$44.3 million, and were financed as shown in Table 1. The Ministry of Finance and Planning lent the IDA proceeds to eligible participating credit institutions[1] (PCIs) at the Average Weighted Deposit Rate (AWDR); those institutions in turn onlent these proceeds, along with their own complementary financing, to eligible sub-borrowers at market rates and terms. The GEF grant covered business development costs and a one-time capital cost buy-down. The grant also financed the off-grid promotional efforts, verification, and consumer protection activities carried out by the Administrative Unit under DFCC. GEF's participation was necessary in order to catalyze private developers, financiers, retailers and end-users into creating market conditions and eventually a full-scale and self-sustaining commercialization process.

Table 1: Project Costs and Sources of Financing

Source	*Appraisal estimate (US$ million)*	*Actual (US$ million)*
International Development Association	24.2	22.3
Global Environment Facility	5.9	5.7
Participating credit institutions	13.7	4.8
Renewable energy project developers, entrepreneurs, and end-users	9.6	10.7
Ceylon Electricity Board/Government of Sri Lanka	1.9	1.3
TOTAL	**55.3**	**44.8**

6. All physical targets were met or exceeded at about 20 percent lower cost in U.S. dollar terms. The lower IDA and GEF disbursement figures are due to the appreciation of the dollar against the SDR (Special Drawing Rights). The sharp decrease in the contribution of participating credit institutions resulted from the increase in IDA refinance from 60 percent to 80 percent, the lower-than-expected investment costs (in dollars per kilowatt terms) for the minihydro and village hydro components, and the conservative gearing ratios adopted by the participating credit institutions to minimize financial risk.

7. *Financing Mechanisms.* Of the three ESDP components, the DFCC Bank participated only in the credit component and performed two independent roles: (i) as the Administrative Unit (AU), but not the apex agency; and (ii) as a participating credit

1. These comprised the DFCC Bank, National Development Bank, Hatton National Bank, Sampath Bank, Commercial Bank, and a microfinance institution, SEEDS.

institution (PCI). GoSL assumed the credit risk of each individual PCI, and the PCIs repay GoSL directly. The World Bank and GoSL drafted the eligibility criteria for PCIs. The PCI-GoSL Participation Agreements were drafted by the AU and approved by the Bank and GoSL. The AU facilitated the admission of PCIs, each of which were approved by the Bank before the PCI-GoSL Participation Agreement is executed. Subsequently, the AU monitored compliance annually and ensured that the PCIs submitted their compliance certificates to the Bank.

8. The active on-lenders were: DFCC Bank and National Development Bank (for grid-connected minihydro); Hatton National Bank and DFCC Bank (for off-grid village hydro); and SEEDS (for consumer financing of solar home systems). Disbursement statistics on each of these PCIs are available in the ICR. The typical lending terms – which were not materially different from the terms and conditions offered for other long-term loans and microcredit – are as follows:

(a) Grid-Connected Mini Hydro
Interest rate equal to AWDR plus 4 percent; maturity of 6 to 8 years including a grace period of 1 to **2** years; secured on project assets

(b) Off-Grid Village Hydro
Interest rate equal to AWDR plus 4 to 6 percent; maturity of 6 to 8 years including a grace period of 6 to 12 months; secured on project assets

(c) Solar Home Systems
Fixed interest rates equal to AWDR plus 10 percent or more; maturity of 2 to 4 years with no grace period; secured on project assets plus two guarantors from the village.

9. The GEF's grant funding was used only for technical assistance and cofinancing off-grid subprojects, and amounted to about 20 to *25* percent of the investment costs of solar home systems and off-grid village hydro, as explained below:

(a) Off-grid Village Hydro (OGVH)
The Electricity Consumer Societies comprised of villagers received a cofinancing grant of US$400/kW, as well as project preparation assistance through an independent consultant.

(b) Solar Home Systems (SHS)
Solar companies received the output-based GEF cofinancing grant and a one-time business plan preparation assistance through an independent consultant. The solar companies had the freedom to decide whether to defray their costs in developing rural outreach schemes, reduce selling prices, seek or expand market shares, and so forth. Originally, the intention was for the solar companies to provide a complete package including consumer credit, thus qualifying them for refinance for each system sold on credit terms. Midway through implementation, SEEDS qualified for such refinance when consumer financing was assigned to a microfinance institution. However, the solar companies also needed loans to meet incremental permanent working capital. Each solar company received a

maximum of one or two loans, as the amount financed had to be the incremental part of its permanent working capital requirements. These subloans were provided by the larger PCIs and not SEEDS.

It is important not to confuse equipment financing (for the consumer) with working capital financing. IDA funds did not finance the 'producer'. IDA funded the retailer (i.e., the solar company) to meet only the incremental permanent working capital, which resulted in just one or two subloans being granted during the whole life of ESDP. Such subloans supported a different economic activity, and should not be confused with subloans for consumer financing where each SHS sold on credit qualifies for refinance.[2]

(c) Technical Assistance

Technical assistance activities included: conducting an off-grid promotion and awareness creation program; surveys; upgrading of technical specifications for OGVH; consultant panels for verification activities; stakeholder workshops; numerous capacity-building activities for SHS technicians, village hydro developers and induction generator controller manufacturers; support for the implementation of innovative ideas, and the like.

10. All PCIs (including SEEDS) are repaying their loans and interest to GOSL without any default. External auditors certify compliance with eligibility criteria. These certifications are maintained in the World Bank's country office in Colombo. For solar home systems, the collection ratio of SEEDS is 94%. For grid-connected mini-hydro, 8 out of 10 projects by the National Development Bank have 100% collection ratios. Two were rescheduled and are now performing well. The DFCC Bank and Sampath Bank report a similar situation. For off-grid village hydro, some projects were affected by the floods of 2003, but these problems have now been overcome. It must be noted that the subloans provided by the commercial and development banks under ESDP are a relatively small fraction of their respective total portfolios.

---

2. In consumer equipment financing for SHS, the asset financed is clearly identified by make, model, serial number, etc. Funds are disbursed for a physically verifiable SHS, which includes a solar panel, battery, lights, controller, wiring, switches, mounting charges, free services and warranty. It is a complete package of hardware and service obligations reflected in a composite selling price to an identified customer. By way of distinction, working capital financing (a financial concept) is not equipment financing (a physical concept), given the fungible nature of working capital: the underlying assets, comprising a **mix** of inventory, receivables and cash, less payables, would be continuously replaced by others belonging to the same classification. Individual specimens of such current assets and current liabilities are not identified specifically at the time of loan granting. Working capital is fluid, with a typical operating cycle of about four months for the solar industry. The way that equipment financing and working capital financing are secured also differ: SHS consumer loans were secured on specifically identified assets and personal guarantees of one or two outsiders, whereas the incremental permanent working capital loans to solar companies were secured on a floating mortgage of inventory, parent company guarantee, other company assets, etc. The ESDP funded only the incremental and not the cyclical part of working capital, as evidenced by sustained business growth based on a business development plan.

RELEVANCE

11. **The relevance of the project's objectives is rated as high.** The ESDP's objectives are consistent with and support the Country Assistance Strategy (CAS) objectives of (i) fostering environmentally sustainable energy development; (ii) promoting private sector delivery of energy services; and (iii) enhancing energy sector efficiency.[3] The project's objectives are also consistent with the GEF's focus on removing market barriers to large-scale application of energy efficient services, products, and technologies. The project's push for commercialization of renewables is also relevant to Goal 7 of the Millennium Development Goals ("ensure environmental sustainability") and its accompanying Target 9 ("integrate sustainable development into country policies and reverse loss of environmental resources"). The ESDP addresses three of the four core goals of the Bank's 2001 Energy Business Renewal Strategy (EBRS): help the poor directly, through improved access; promote private sector development; and protect the environment. Arguably, the ESDP also responds to the fourth EBRS objective, that is, macro-fiscal balancing, since in 2002 grid-connected minihydro alone has generated Rs400 million of avoided costs (for diesel-based power) for CEB. In that year, minihydro facilities fed about 100 Gigawatt hours of power to the grid, and could double this by 2005.

EFFICACY

12. **The project's efficacy is rated as high: its physical and capacity-building objectives were achieved and in most cases its original targets were exceeded,** as shown in Table 2.

Table 2: Achievement of Objective Targets

Project Component	*Target at Appraisal*	*Achieved by Project Closing in December 2002*
Grid-connected minihydro by the private sector	21 MW	31 MW (involving about 10 private minihydro developers and 15 subprojects, with more capacity planned)
Pilot Wind Farm	3 MW	3 MW wind farm commissioned in February 1999 and certified in May 2000. Wind projects as high as 30 MW being proposed by several private companies.
Solar Home Systems	15,000 (revised at midterm review)[4]	21,000 installed in rural homes as of end-2002. Four major vendors have invested in extensive sales and distribution networks. About 1,000 systems were being installed per month by end-2002.
Village Hydro Systems	250 kW through 20 systems serving 2,000 households	350 kW through 35 village hydro systems serving 1,732 households completed and certified by Chartered Engineers

3. CAS Report No. 15633-CE, with a Board date of May 21, 1996.

4. The ESDP initially targeted a market of 30,000 rural households for solar home systems, but fewer than 1,000 systems were installed by the project's midterm review in February 2000. After the problems related to the financing terms and mechanisms were identified, the SHS target was cut in half to 15,000 and alternative financing approaches were developed.

13. *Minihydro,* in particular, has been very successful. Development costs have decreased from US$1,030 per kilowatt estimated at appraisal to an average of US$963.5 per kilowatt actually achieved. CEB has had to expand its staff from one engineer to three engineers to cope with the high demand from private developers. In October 2003 there were more than 100 outstanding applications, and CEB had already issued Letters of Intent (LOIs) for about 200 megawatts of capacity. CEB told the OED mission that there is a guideline for minihydro to be 10 to 15 percent of total capacity, and this 200 megawatts of LOIs already exceeds this ceiling. This raises potential issues related to system control and dispatch because as "embedded generation" (i.e., not originally designed to be technically or formally part of, but connected to the main grid) minihydro supplies are fed directly into the distribution system. CEB indicates that this technical issue would effectively put a brake on issuance of LOIs and place a cap on further minihydro development.

14. *Solar home systems* (SHS) expanded from two or three small operators to four accredited companies selling a total of about 1,000 systems per month by project close in end-2002. One year later, there were nine accredited companies, of which eight were members of the Solar Industries Association.' Compared to the target of 15,000 units set at the midterm review, more than 20,000 units were installed by end-2002. Actual average costs are US$10 per peak Watt[6] today, compared to appraisal estimates of US$11 per peak Watt (total installed system costs).

15. *Off-grid village hydro* (OGVH) was serving 1,732 households through charter engineer-certified projects by December 2002, compared to 2,000 households estimated at appraisal. However, installed capacity was 350 kilowatts against an appraisal estimate of 250 kilowatts since per-household demand proved to be much greater at 200 watts per household or more compared to the appraisal estimate of 100 watts per household. A total of 35 systems were implemented, far more than the original target of 20 systems. Another 50 projects were nearing completion or were in the process of being certified in October 2003, demonstrating the lag effect of capacity-building and promotional efforts put in earlier to scale-up the market. These projects were implemented under the follow-on RERED project.

16. The *pilot windfarm* component (five 46-meter towers with 600 kilowatt turbines designed to supply a total annual capacity of around 4.5 gigawatt-hours) has catalyzed significant private investor interest, thus leading CEB to issue an open tender for a 22-megawatt wind farm in 2003. Total economic costs of US$1,175 per kilowatt compare acceptably with expectations at appraisal. CEB continues to monitor and record operational data to learn what issues must be addressed in integrating non-dispatchable and intermittent wind power into the rest of the system.

17. The ESDP also launched *demand side management* (DSM) programs at the CEB, including: (a) a code of practice for energy-efficient commercial buildings; (b) increased

---

5. The market leaders include Shell Solar, Access Solar, Selco Solar, and Alpha Thermal, all of which had participated in ESDP.

6. A peak watt (Wp) measures the 'ideal'output of a PV system, when the panel is at 25° C and receiving 1000 Watts per square meter of solar insolation.

technical capacity to carry out energy audits and provide advice on energy efficiency measures for commercial and industrial clients; (c) a load research study; and (d) an appliance energy labeling program. The CEB continues to promote energy efficiency and DSM, with target savings of approximately 82 gigawatt-hours per year of energy and 32.5 megawatts of demand capacity by the year 2006. The first energy service company in Sri Lanka, LTL Energy, continues to operate successfully and three more companies have begun operations. LTL Energy has about 20 clients, more than 100 energy efficiency installations, and an annual turnover of Rs 20 million.

18. Today, as a result of ESDP, there is a strong industry of renewable energy developers, suppliers, consultants, and trainers in Sri Lanka. Whereas there were only a handful of suppliers or developers before the project, there are now 11 minihydro developers, 9 accredited solar companies, and about 20 active village hydro developers. Sri Lankan minihydro developers have started exploring Asian and African markets and local renewables consultants have begun taking on regional assignments.

19. More important than the above statistics, however, are the institutional and broader developmental impacts of the project, of which major examples are as follows:

(a) *Pioneering the Small Power Purchase Agreement (SPPA).* A key achievement of the ESDP was the successful resolution of the tariff determination issue between the CEB and the developers, through the standardized SPPA that was developed under the ESDP. The result has been growth in the number of both minihydro and wind power developers, who are also exploring access to financial support from the Clean Development Mechanism as a way of enhancing the financial viability of their projects.

(b) *Working Through a Microfinance Institution.* Midway through implementation, the ESDP adapted flexibly to the initial difficulty of promoting consumer financing of solar home systems through solar companies, by designing a microfinance model in partnership with a key nongovernmental organization (NGO), the Sarvodaya Economic Enterprise Development Services (SEEDS). This resulted in the expansion of the ESDP's reach to a much larger number of rural solar home system consumers. Toward the latter part of ESDP, SEEDS also helped bridge the financing needs of a few small electricity cooperative societies that were formed to build, own, and operate the village hydro projects. SEEDS reported good collection rates exceeding 90 percent, although the highly decentralized, door-to-door, manual system makes it difficult to have a full financial picture specifically for their solar home system operations.

(c) *Brokering Village-level Partnerships.* Throughout project implementation, the ESDP actively brokered partnerships with NGOs and community-based organizations including through regular stakeholder meetings. This extensive effort was most evident in identifying, organizing, and developing village hydro projects. Most participating credit institutions, however, did not pursue these OGVH projects actively, with the exception of Hatton National Bank (15 projects) and DFCC Bank (14 projects), who between them financed 83 percent of OGVH projects.

(d) *Promoting Local Business and Increasing Lender Confidence*. The ESDP enabled existing vendors of solar home systems to expand their current market, and new ones to be established to respond to growing demand. Local hydro consultants have also

increased in response to the growth in demand for their technical services. The ESDP has made hydro project development more attractive to private investors, especially with the resolution of the tariff issue through the SPPA. The project also gave Sri Lanka's financial community a new exposure to renewable energy and rural electrification projects, fostered their market responsiveness through innovative financing mechanisms, and gave them increased confidence that not all renewable energy projects fall under the high-risk category. As a result, a higher number of PCIs are participating in the follow-on RERED project, including leasing companies for the first time. All PCIs continue to meet eligibility criteria based on measures of profitability, liquidity, solvency, and collection performance, as confirmed annually by external auditors. **A** new development apparent in the RERED project is that financing of off-grid renewable energy projects has been embraced by non-PCIs as well, bringing *greater customer choice and competition* in the financial sector. For example, credit facilities for solar home systems are now being offered by a well-established finance company, a state-owned commercial bank, and a new "bank" in the North East province. Similarly, credit facilities for OGVH projects are being provided by a provincial rural development bank. Being ineligible to become PCIs, none of these institutions receive refinance from the RERED project. These developments, catalyzed by ESDP, demonstrate a shift in the mindset of lending institutions in financing renewable energy projects in Sri Lanka.

EFFICIENCY

20. **The ESDP's efficiency is rated substantial.** With the exception of the wind farm component, the project's recalculated economic internal rates of return (EIRR) are significantly above those estimated at appraisal, as shown in Table 3.

Table 3: Project Rate of Return

Component	EIRR at Appraisal (%)	EIRR at Closing (%)
Grid-connected minihydro	18	26 (announced tariff basis)
Off-grid village hydro	12	18 (avoided cost basis)
Solar home systems	12	42.6
Wind farm	14	3.9

The minihydro EIRR may have been underestimated, since it is based on CEB's announced tariff, which is likely to be lower than actual avoided cost. The village hydro EIRR would be 54 percent if consumer surplus is considered in addition to avoided costs, and 61 percent if the GEF grant is factored in. These high EIRRs were achieved because capacity factors were significantly greater in practice than was assumed at appraisal, and willingness-to-pay for electric service has become much higher as a result of greater expenditures on kerosene and batteries (before electric service) as a result of large real income gains since 1996. The EIRR for solar home systems reflects the observed willingness-to-pay that far exceeds replacement costs of kerosene and battery-charging equipment. The low EIRR for the wind component is a result of capacity factors that were substantially lower than were estimated at appraisal. Actual wind speeds were much lower than the bid estimates of wind turbine suppliers. Moreover, site selection proved problematic, as environmental NGOs opposed the best site (which was close to a wildlife reserve) and the Sri Lankan Air Force objected to the second-best site. Finally, the

turbine power curve assumptions in the feasibility study could not be matched by the equipment actually offered at the time of tender.

21. Financial internal rates of return were difficult to recalculate due to unavailability of information, as private investors are unwilling to divulge their margins and returns. For the grid-connected minihydro component, the final FIRR is estimated at 24 percent, compared to 13 percent at appraisal, based on a representative project reflecting average costs (US$1,025 per kilowatt and 43 percent plant factor) and technical performance. The FIRRs for the village hydro and solar home system components are not available, but for the solar component, equity returns are likely to be greater that 20 percent for solar home systems based on strong private investor interest, compared to 19 percent at appraisal. Overall, based on interviews with financial intermediaries, equipment suppliers and end-users, the renewable energy business in Sri Lanka has yielded sound financial returns and expects further expansion.

OUTCOME

22. **The project outcome is rated highly satisfactory** (the ICR rating is satisfactory), as indicated above by the relevance rating of "high", efficacy rating of "high", and efficiency rating of "substantial". Analysis of the project documents and extensive field interviews indicate that the ESDP successfully achieved its objectives, and exceeded them in some cases. The project promoted the provision of renewable energy services by the private sector, NGOs, and cooperatives -- including rural and low-income markets -- and improved public and private sector performance. The project is innovative and applied lessons from other projects in its design; some of its components are cross-sectoral (financial sector/micro-finance); and it featured a high degree of stakeholder participation. By effectively addressing technical, financial, policy, and information barriers, the project was able to lay the foundations in Sri Lanka for a wider-scale renewable energy commercialization and energy efficiency program.

23. Average power demand is around 800 megawatts, of which 5 percent is now minihydro-based. According to the Ministry of Power, 200 megawatts more are needed by 2004, wherein minihydro can contribute up to 40 megawatts more in addition to the 40 megawatts already installed, of which 31 megawatts were completed with ESDP assistance (see table below). The GEF grants of about US$100 per solar home system and US$400 per kilowatt of installed village microhydro were directly instrumental in supporting market development for solar home system and village hydro industries, respectively (although there are reported complaints that the GEF grant is disbursed too late, sometimes as late as 18 months after the final disbursement of the sub-loan from the participating credit institution).[7] The ESDP's implementation framework was well designed, leading to significant gains in (i) commercializing grid-connected minihydro and wind power, as well as off-grid village or microhydro power, and (ii) promoting the use of solar home systems on a wide scale. The ESDP also helped strengthen the basis for

7. This GEF cofinancing grant is released only after the release of the project completion certificate issued by an independent chartered engineer, who may recommend remedial work to ensure compliance with ESDP technical specifications for OGVH.

adopting demand side management (DSM) measures to help reduce consumption of grid-based electricity.

24. An important measure of outcome is the project's impact on the final energy end-users. Detailed interviews of 100 solar home system customers and 50 off-grid village hydro consumers analyzed the social and economic impacts of receiving off-grid electric services. The solar home system and OGVH customers all acknowledged the improvement in their quality of life as a result of having a cleaner, more reliable source of electricity. The benefits included: (i) the ability of women to continue their household work at night; (ii) longer studying hours for school-age children and perceived improvements in the educational performance; (iii) extended entertainment hours and improved family interaction; (iv) increased feeling of safety; and (v) better health conditions with the elimination of the fumes from kerosene lamps. Interestingly, the survey yielded little evidence that access to electricity from solar home systems or OGVH has significantly increased economic or income-generating activities, although data indicates that typically around 30 to 60 people per OGVH are employed seasonally during construction. Solar home systems provide power that is barely sufficient to meet basic household lighting and entertainment needs. OGVH should have greater potential for income-generating activities and deserves further field studies.

SUSTAINABILITY

25. The ESDP's sustainability is rated likely, judging from the continuing, private sector-driven expansion of the renewables market and the robust returns from investments. While starting out as a pilot initiative, the ESDP succeeded in establishing the financial and institutional framework for a sustainable renewable energy industry in Sri Lanka. This expansion is being supported further by the follow-on Rural and Renewable Energy Development (RERED) project, as well as the opening up of the northern and eastern parts of the country following the cessation of hostilities through a ceasefire agreement.

26. More important to sustainability are the economic fundamentals of the Sri Lankan renewable energy industry. The introduction of new technology was founded on market principles: for grid-connected minihydro, the systems had to be the least-cost option compared to their competitor products; and for solar home systems and village hydro, the incremental cost of the systems need to be in line with the global incremental costs and demonstrate a clear declining path due to economies of scale. Participating credit institutions expect to remain interested in financing renewables because of the existence of a floor price and a reliable SPPA, which CEB has honored, and the "escrow account" procedure* wherein CEB payments to the hydro developer are put in escrow in order to finance plant operation and maintenance, and to service debt. These underlying principles bring down the risk profile, generate private sector interest, and lead the investors to expect reasonable returns and continued renewable industry growth even after the external GEF grant support is withdrawn. RERED incorporates declining grant mechanisms, such that grants for solar home systems will be phased out completely and

8. Applied by most PCIs, which enter into an Escrow Agreement with the project sponsor once the project is in operation. The Agreement is negotiated during the hydro project appraisal.

those for community-driven projects will be reduced to levels that can be sustained by the government's own programs. Three provinces have now started providing grants in the range of Rs 100,000 to Rs 600,000 per village hydro project, depending on capacity and the number of beneficiaries. The Intermediate Technology Development Group-Sri Lanka played an important role in mobilizing the Provincial Councils to provide this assistance.

27. Toward the latter years of ESDP, the Uva Provincial Council – with the assistance of the Administrative Unit – piggybacked on ESDP to set up an independent solar home system subsidy scheme for beneficiaries of the Uva Province, using its own decentralized budget for rural electrification. This subsidy scheme, which proved to be successful, has been expanded under RERED to cover three provinces that have the lower electrification rates in the country, namely, North East, Uva, and Sabaragamuwa. The solar home systems subsidy scheme under RERED uses counterpart funds from the central government and is managed by the Administrative Unit. This scheme is intended to be a precursor to a technology-neutral rural electrification subsidy program to be implemented nationally following a RERED-funded consultancy study to be completed in 2004.

28. While some continuation of subsidies are still required, cofinancing grants per SHS are lower under RERED than the level provided under ESDP, and are being phased out entirely. Similarly, the project preparation grant for OGVH is also lower.

INSTITUTIONAL DEVELOPMENT IMPACT

29. **The ESDP's institutional development impact is rated high.** The project has contributed significantly to the creation of stable and transparent institutions for renewable energy commercialization in Sri Lanka, as evidenced by the evolution of project management, private financing and microfinancing, and end-user participation, as discussed below. Project records show that while capacity building initially was conducted project-by-project, these efforts were bundled as market uptake accelerated (for example, technical training for hundreds of solar home system installers; integration of formal training in renewables in standard school curricula; a process of "innovation solicitation" from among industry players to stimulate further market growth).

30. An Administrative Unit was established in the DFCC Bank to be responsible for processing loan and grant disbursement requests, maintaining records, compiling program statistics, and submitting quarterly reports. The Administrative Unit and PCI functions of the DFCC Bank were kept separate and independent to avoid conflicts of interest. Initially, the project archives show that, although the Administrative Unit was highly adept in banking rules and administrative procedures, especially with respect to application and disbursement of the IDA credit and the GEF grant, it was not familiar or fully effective with the promotion of the ESD components themselves. The highly capable management and staff of the unit were able to address this issue by stepping up its outreach to all ESDP stakeholders, which also required ESDP to recognize the need to expand the original scope of work for the Administrative Unit to include numerous project support activities. The unit provided extensive technical support to subproject developers, and training on ESDP operations to participating credit institutions (PCIs). The unit still meets quarterly with stakeholders to identify implementation issues and

resolve problems. Understanding the lag effect in a market development exercise of this nature, DFCC Bank itself was willing to sustain losses for the first three years of ESDP, until disbursements picked up and the Administrative Unit became financially self-sustaining.

31. The PCIs, which were commercial and licensed specialized banks, also proved early on to be ill suited for the financing needs of small, off-grid solar home system and village hydro systems. At the same time, the solar home system vendors, who were expected to provide consumer financing (with recourse to refinance from the ESDP credit line) were unwilling or unable to lend to consumers, thus leaving a financing vacuum. It was clear that a microfinance institution with an established rural network and community-based approach was required, which led to the eventual accreditation of SEEDS as a PCI. With the involvement of SEEDS, the solar component took off dramatically: home system vendors were relieved of the consumer financing burden, for which they quickly proved ineffective early in the project, thus allowing them to concentrate on marketing, installation and servicing of solar systems. The off-grid village hydro (OGVH) developers also had initial difficulties in setting up Electricity Consumer Societies and convincing PCIs to lend to this sector. OGVH projects eventually scaled-up during the second half of ESDP, supported by a few successful OGVH projects that provided a demonstration effect and an ESDP-funded capacity-building program for project developers.

32. Finally, stakeholder participation and consultation was high. The project's hydro components (grid-connected minihydro and off-grid village hydro) provide two examples. The local small power developers association played a key role in the success of the grid-connected minihydro component, by effectively voicing the concerns of minihydro project developers regarding the transparency of the tariff computation methodology adopted and the data inputs used by CEB for small power purchases. In the absence of an independent regulator, a strong industry voice was necessary to keep a monopolistic state-owned utility in check. It was a consensus among evaluation informants that the Small Power Purchase Agreement (SPPA), which was prepared through the ESDP, was highly instrumental in enabling private investments in renewable energy services through the application of a transparent, standardized, and predictable agreement, as well as a non-negotiable tariff, the lack of which impeded the development of small grid-connected power projects. The ESDP also improved the capabilities of local off-grid hydro developers and users to organize themselves and to collectively manage and monitor projects, as residents had to form rural electricity cooperatives or societies, and then assume responsibility for the day-to-day operation of the installation. Regarding the solar photovoltaic component, ESDP supported the formation of an industry association and channeled technical assistance for technician training. The association also provided useful inputs in modifying the ESDP Operating Guidelines and solar home system technical specifications based on circumstances and experience gained.

33. The assessment mission attended the October 2003 quarterly stakeholders' meeting convened and chaired by the Administrative Unit, during which the effective consultation processes among stakeholders were evident. Suppliers of village hydro equipment were proposing standardized warranties and seeking agreement on service standards, such as less than one week for responses to complaints, repair or replacement

within two weeks, and three weeks maximum from the time of the complaint to full functioning of the system. The expansion of accredited solar companies to nine (two more joined in the preceding two months) also attested to the continued expansion of the solar industry. Auditors were also hired recently to do on-site verifications, and it was reported that they found some blank warranty cards, there was a mismatch between copies given to the Administrative Unit and those kept by the consumers (and that these had different languages), and other issues. Overall, the mission observed a high degree of willingness to discuss problems, suggest solutions, and share information among the ESDP stakeholders, which has been maintained in the ongoing RERED project.

BANK PERFORMANCE

34. The assessment agrees with the recommendation made by the GoSL in its Borrower's Evaluation (Annex B of the Implementation Completion Report) that **Bank performance should be rated highly satisfactory** (the ICR's rating is satisfactory). The quality of the Bank's advice was high during the project design, implementation, and closing stages (the ICR process, which benefited from an "Impact Assessments and Lessons Learned" study and a stakeholder survey, is exemplary). Quality at entry was high. ESDP's conception was marked by extensive multi-stakeholder consultations, and benefited from a number of studies financed by the Bank's Asia Alternative Energy Unit (ASTAE) and Project Preparation Facility, and the GEF. A key study is the development of the Small Power Purchase Agreement, although the risks in its implementation were underestimated. Such institutional capacity issues were well researched and addressed through GEF funds.

35. Project records also indicate that the design of ESDP's credit program took into account the lessons learned from the successful Private Finance Development Project (Credit 2484-CE). This design benefited from internal consultations with the Bank's financial sector advisory team. It featured the selection of an Administrative Unit arrangement rather than on-lending through an apex financial institution, project administration by the Administrative Unit within a private entity (the DFCC Bank) on contract to the government, and on-lending terms based on market conditions. The Bank also took anticipatory care by creating a wall between the Administrative Unit and DFCC's own lending operations as a PCI. The initial subproject pipeline was robust; US$58 million of hydro and solar projects had already been identified for financing, and more than 30 villages made use of the GEF Project Preparation Advance to prepare village hydro projects ranging from 1.5 to 60 kilowatts. Moreover, during project preparation, the Operating Guidelines for the credit program were already in place, PCI eligibility criteria had been established, and GoSL was already in advanced discussions with several PCIs.

36. The records also show consistent, high quality supervision, which benefited from strong GEF budgetary support. The supervision missions included field visits and coincided with quarterly stakeholder consultation meetings. The missions included technical, financial, economic, environmental, procurement, and disbursement specialists, as required. Supervisory inputs from the Bank's Colombo office were also high, particularly in the areas of financial management and procurement advice. There was a high degree of continuity in the task team, and the supervision documents show the

Bank's strong attention to identifying and devising solutions, including workshops to (i) identify barriers to market uptake of solar home systems and (ii) solicit innovative ways to improve the pipeline of village hydro projects. At the mid-term review, the Bank correctly diagnosed key constraints to solar market development among rural consumers, and showed flexibility as well as innovativeness in resolving the issues. The Bank team identified these constraints as: (i) the unwillingness of the vendors of solar home systems to borrow from the ESDP's approved PCIs and provide consumer financing themselves; and (ii) the constraint faced by most of the PCIs in extending microfinance directly to solar system consumers. The solar home systems target was revised to 15,000. The Bank also recommended close partnership with an NGO with a proven and effective record in rural microfinance (SEEDS), as an alternative approach to consumer finance, which resulted in successfully reversing the failure to implement that component until that point.

37. Finally, the Bank piloted output-based grant financing by providing GEF grants to cover some of the private incremental costs of introducing renewable energy technologies. The grants were disbursed only after pre-defined results were achieved – an approach that was replicated in the Uva province when it became clear that its budget for grid-based rural electrification could support at least three times more households through an off-grid solar program that worked in tandem with ESDP.

BORROWER PERFORMANCE

38. **The borrower's performance is rated highly satisfactory.** Government commitment is very important to ensure that national and sectoral objectives are consistent, thus enabling renewable energy to compete with other technologies on a level playing field. The GoSL played a critical role from the inception to the closing of the ESDP. Project records show the strong support of the Director-General of External Resources in the Ministry of Finance, which continued throughout the project and was tested and demonstrated through: (i) the rationalization of import duties on photovoltaic modules, which removed a major barrier to their widespread use; (ii) upgrading the status of microfinance institutions to PCIs subject to their meeting pre-defined eligibility criteria; and (iii) timely actions to resolve the minihydro tariff issue. The Ministry of Finance also was an effective liaison between various financial institutions, provincial governments, and private investors.

39. GoSL played an active role in addressing NGO concerns during the construction of the wind farm facility. It also helped resolve the minihydro tariff issue with CEB and in establishing a predictable framework for small power purchases, which facilitated the implementation of small hydro projects. The Small Power Purchase Agreement served as a standardized, legally binding agreement between small producers and CEB, thus replacing the costly and cumbersome process of individually negotiating each small project. While costing ESDP only $200,000 to prepare, these regulations facilitated more than 30 megawatts of private power within five years, with several more projects in the pipeline. Toward project closing, GoSL also introduced its Rural Electrification Policy, which promoted environmentally sustainable, market-based provision of rural energy services.

40. The performance of the management and staff of the ESDP's implementing agency, the Administrative Unit at the DFCC Bank, was also **highly satisfactory.**

LESSONS LEARNED

41. The ESDP's unique design for implementation can serve as a model for other rural electrification initiatives with renewable energy and energy efficiency components. The ESDP lesson with potentially the broadest applicability is its demand-driven and commercially focused approach of enabling multiple stakeholders to overcome financial, institutional, and market barriers associated with small-scale renewable energy and the promotion of energy efficiency. Throughout implementation, this required a strong and consistent emphasis on establishing strategic and working partnerships between the central government, Provincial Councils, the Ceylon Electricity Board, commercial and development banks, a microfinancing institution, private developers, contractors and consultants, industry associations, equipment vendors, rural electricity cooperatives, and consumers. It also required a stable, competent, and highly proactive Administrative Unit with multi-disciplinary capabilities to manage project coordination and implementation, which proved to be a key element in successfully broad-scaling private investments to commercialize renewable energy technologies.

42. The ICR provides an excellent and detailed section on lessons learned, which benefited from a stakeholders' survey and a full-scale, independent report.[9] The lessons can be clustered around three main actions:

(i) Build the business and policy environment

43. The key barrier of access to capital must be addressed as a priority, be it for longer-term loans (sought by project developers), for credit assistance to improve affordability (required for village hydro and solar electricity consumers), or for working capital (needed by entrepreneurs). Sri Lanka has the advantage of having a long experience with minihydro dating back from the establishment of the tea estates (that is, good maps, existing roads, and good rainfall data), as well as financial institutions (such as DFCC Bank and National Development Bank [NDB] that were already lending to small and medium enterprises, as well as to a variety of large infrastructure projects, before ESDP. Even before ESDP and the SPPA became realities, DFCC Bank had pioneered the financing (with debt and equity) of the country's first-ever private sector minihydro project that was set up to sell power exclusively to the CEB grid. Under ESDP, the two development banks DFCC and NDB, by virtue of their in-house engineering capabilities, spearheaded the financing of grid-connected minihydro, often syndicating their loans with other commercial banks that were PCIs. Today, commercial banks have gained sufficient confidence to lend to this sector by themselves. While prior experience is important, microfinance institutions can play a significant role in providing consumer financing for solar home systems and term loans to community-based organizations for developing small and medium off-grid renewable energy projects. Although microfinance institutions and rural development banks are in general more

9. International Resources Group. World Bank/Sri Lanka Energy Services Delivery Project: Impact Assessment and Lessons Learned. Washington DC, March 2003.

suited for financing rural energy services rather than larger commercial banks and main vendors of solar home systems, exceptions do exist, such as the continuing role played by Hatton National Bank and DFCC Bank as leaders in financing off-grid village hydro projects.

44. Unfavorable aspects of the overall investment environment must be addressed: for small hydro developers, a transparent and standardized contracting and tariff arrangement (the SPPA) is essential; for dealers of solar home systems, high import costs and the lack of consumer financing needed to be resolved; and for village hydro developers, access to favorable credit terms and reliable manufacturers of turbines and induction generator controllers were required before they could enter rural areas and stimulate demand for a mini-grid among small communities.

*(ii) **Scale-up** the Market*

45. In addition to the adoption of market-based principles, several measures need to be taken to foster continued growth in the renewables industry. First, a reliable after-sales service system needs to be established. In Sri Lanka, the solar industry responded very well and now has more than 100 sales and service outlets throughout the country, developed through foreign and local private investment. Second, information technology should be introduced in the operations of participating microfinance institutions, which in the case of ESDP reduced turnaround time of loan approvals for solar systems from more than 3 months to less than 30 days. Third, consumers should be trained properly in the operation, maintenance, and limitations of their systems, particularly to self-diagnose technical problems (such as loose wiring connections, shading over photovoltaic modules, tripping of village hydro distribution circuits, keeping distribution poles free of rot and termite attack) and avoid over-usage. This is especially important as systems grow older and components start failing. Solar systems need special watching and improvements, as complaints have increased (in absolute numbers, but not per capita) about system malfunctions. Some consumers indicate a preference and willingness-to-pay for grid connection if ever feasible for their remote area, since the 200 watts per household provided by microhydro or the subsistence-level electrification provided by solar home systems are limited and do not permit the addition of more appliances or leisure uses.

46. The stakeholders' survey indicated that rural consumers are willing to pay more for their energy use, as long as the supply is reliable, safe, and of a high quality – as is demonstrated by hydro and solar energy compared to the use of kerosene, which poses health risks in addition to inconvenience of use. Community contributions (in cash and kind) to the implementation and management of off-grid village hydro is crucial to project success. In Sri Lanka, families contributed their time to civil works and construction of distribution lines, as well as the supply of poles, sand, and other materials in kind, which were assigned equivalent cash amounts and deducted from their actual required payments. These contributions brought a sense of project ownership and a desire to ensure successful implementation."

(iii) Establish Robust Project and Financial Management Systems

47. Competent project management proved essential to ESDP's successful implementation, as were accounting, record-keeping and financial reporting systems that were timely and comprehensive. Particularly noteworthy is the performance of the Administrative Unit in: (i) brokering partnerships among multiple stakeholders; (ii) quickly assimilating the underlying technologies; and (iii) setting up a financial management system for monitoring and disbursing against loan refinancing applications from PCIs, as well as verifying and releasing grant disbursements, including the tracking of over 20,000 solar home systems. In practice, these enabled the Bank and the borrower to be flexible in project design (for example, the certification of a microfinance institution to reverse the slow uptake of solar home systems in rural areas, and the relative ease in revising the Operating Guidelines to improve systems and procedures) and to introduce output-based aid approaches (such as the tying of project development consulting contracts to concrete deliverables).

REMAINING CHALLENGES

48. At the overall power sector level, the weaknesses in regulations and the slowness in reforms was not detrimental to the ESDP because the renewables market has developed mainly among communities that do not have grid access or expect any in the near future. Whereas in India," the post-reform backtracking and arbitrariness of some state regulatory agencies have affected the financial viability of small power producers (particularly small hydro), power reform legislation and regulation is at its initial stages in Sri Lanka. Many important issues have arisen, as discussed below.

49. Micro-grid service providers should not be left out of the reform process. Will 10- to 50-kilowatt microhydro units have to jump through complex regulatory hoops to provide service to a small community? This issue is ignored by current laws, which only allows CEB as the monopoly distributor of electricity. Consequently, Electricity

---

10. In Sri Lanka, "shramadana," (voluntary work), is a popular mechanism used to galvanize community participation to achieve a common goal. Based on an ESDP survey of two hydro districts (Ratnapura and Kegalle) in June and July 2002, 43 percent of households contributed between 20 to 39 days to hydro projects, and 33 percent contributed more than 60 days.

11. See OED's Project Performance Assessment Report for the India-Renewable Resources Development Project, dated October 21,2003 (Report No. 27076).

Consumer Societies, although producing electricity, are not legally recognized and have to join "backdoor" by being officially classified as consumers and not as power producers or distributors. Some minihydro investors have indicated CEB's resistance to negotiating with a large number of small producers, compared to dealing with only one or two large private developers. Open market transmission of "green power' is also not permitted currently, and would raise important tariff issues if considered.

50. On the issue of stranded costs, what will happen if the CEB grid reaches a village while the community is still paying off its microhydro plant and minigrid loan? Will CEB or the planned private power distribution companies agree to connect the microhydro plant to the grid and buy power, or will it be disregarded as too small to bother about? If systems less than 25 kilowatts are exempted from regulations, how will safety and compliance with technical standards be ensured, and by whom? While the contribution of non-grid-connected hydro is small, it is directly related to the Bank's strategy of helping the poor directly through improved energy access. Therefore, these issues of potential "disconnect" between the 2002 Electricity Reform Act, the policy directions taken by the new Public Utilities Commission, and the future of decentralized energy systems, need to be addressed as the Sri Lankan power sector reforms are being designed, and not afterward when regulations are already in place.[12]

51. Under the follow-on RERED project, where solar and village hydro programs are being scaled up, there is a need to strengthen the participation of the new micro credit providers if solar home systems and other small-scale isolated grid/cooperatives are to develop further. The high dependence on SEEDS for solar consumer financing under ESDP has been mitigated through the entry of four other PCIs — two leasing companies (LOLC and Ceylinco Leasing), a development bank (Sanasa), and a commercial bank (Seylan) — while a few non-PCIs too have also entered the financing market for solar home systems. Following a strong interest shown by finance companies, a study has been commissioned by the Administrative Unit to consider the admission of registered finance companies as a new category of PCIs for providing micro credit to solar consumers and OGVH electricity consumer societies. Moreover, in designing rural electrification subprojects, RERED needs to give added emphasis to income-generation components and the integration of productive uses from electricity access. This aspect has been addressed in the RERED design, both in the Operating Guidelines and through periodic 'innovation solicitation' exercises initiated by the Administrative Unit. The first round of 'innovation solicitation' resulted in four contracts being awarded by the Administration Unit to stimulate rural income-generation activities using OGVH and solar technologies. An invitation for expressions of interest for the second round of proposals was advertised by the Administrative Unit in February 2004 and will be kept open throughout the year. Health and education organizations providing rural services should also integrate energy provision in their programs. This has been addressed through a separate Cross-sectoral Energy Applications component in the RERED design, on which work is already underway. RERED's financing terms are also under greater scrutiny: as was found in India, some hydro developers (through their Small Hydro Associations) have found that commercial banks can sometimes have better terms.

12. These important issues are discussed with case studies in: Navroz Dubash (ed.). Power Politics: Equity and Environment in Electricity Reform. Washington, DC: World Resources Institute, 2002.

52. Some SHS vendors have argued that the "poverty focus" of the Bank and the GEF grant RERED is harming the expansion of the solar industry because it limits the grants to systems of 60 peak Watts or less, with the maximum size for grant eligibility being gradually reduced to 40 peak Watts and finally 20 peak Watts. The most popular system size presently is around 40 peak Watts, which supports about four lights and a black-and-white television. The SHS vendors' claim that there is no market for the smaller systems has to be balanced with their own short-term profit maximization strategy of focusing on larger systems that command better margins and entail lower service costs per unit of sales revenue. Nevertheless, the Bank should assess whether the grant phase-out formula is introducing any distortions in the sizing and design of SHS.

53. Private developers also see RERED as more administratively labor-intensive and cumbersome compared to ESDP. Procurement and environmental safeguard aspects under RERED have been tightened across the board, and while they may comply with Bank requirements, their relevance and benefits are not fully apparent or convincing to the project stakeholders who are required to apply them. RERED now effectively requires competitive bidding ('established commercial practice') for all procurements that are less than the threshold for international competitive bidding, whereas some developers consider their 1- to 2-megawatt systems too small to be able to bid competitively.[13] This requirement also applies to tiny procurements involving off-grid village hydros. The tighter documentation of environmental safeguards, which entail another independent review over and above the national Central Environmental Authority clearance, appears to developers as overkill for off-grid village hydro (OGVH) systems. Given the clean environmental record of OGVH under ESDP, the industry strongly believes that this Bank-imposed additional environmental certification for OGVH is another unwarranted bureaucratic barrier that only increases loan processing time.

54. Finally, the welfare impacts of improved energy access and the achievement of DSM targets should be monitored and evaluated under the ongoing RERED project, to help maintain the sustainability of the ESDP's achievements. This is being addressed through a consultancy assignment for the design and implementation of a comprehensive monitoring and evaluation system. Under the ESDP design, OGVH projects were to be supervised by PCIs during the tenure of their loans, which typically ranged from 5 to 8 years. PCIs have tended to treat OGVH projects like any other loan client, with the primary focus being on loan and interest recovery in the succeeding years, with little technical follow-up after the Installation Verification Report had been issued by a chartered engineer upon project completion. Grid-connected mini hydro (GCMH) installations, by contrast, appear to be better supervised, which would seem counter-intuitive since micro hydro village installations have lower profitability and need more technical support. However, from a PCI point of view, it could be argued that it is much 'easier' to supervise a professionally managed GCMH and show good results, and that supervision expenses incurred should justify the value of investment at risk.

13. Some developers argue that each small hydro development must have its own specifications, and that their required equipment is not available off-the-shelf from several manufacturers. This renders the requirement for three independent quotations meaningless, since in the end only the manufacturer who can meet specifications qualifies, and the others who cannot come in at higher costs.

55. While hindsight provides good insights, it should be remembered that a heavily structured approach at ESDP inception could well have stifled a nascent OGVH industry that had only seen ad hoc donor-funded projects until then. To address the remaining problems of OGVH, including those stemming from projects executed outside ESDP, the Administrative Unit set up a Village Hydro Working Group in 2003 to facilitate closer consultations and is introducing several progressive measures, including: post-installation verification of problem projects, registration of suppliers and developers, dissemination of key facts to electricity consumer societies and all other stakeholders through a freely distributed booklet prepared by the Administrative Unit, capacity building of electricity consumer societies through a series of training programs, introduction of performance standards for suppliers, and working with the National Engineering Research and Development Centre (NERDC) to commission a micro hydro turbine test facility at NERDC. The RERED project recently assisted NERDC to obtain ISO 17025 accreditation for its solar photovoltaic test facility, which will be a boon to the domestic solar industry.

Second Power Distribution and Transmission Project

56. The Ceylon Electricity Board (CEB) has been an important beneficiary of IDA assistance in Sri Lanka's power sector. IDA's involvement in the sector started in 1954 with the expansion of the Aberdeen-Laksapana hydroelectric scheme. Since then, IDA has made 11 credits for power sector development intended to help meet power demand at least cost, improve the quality and reliability of supply, and promote institutional reforms. The Second Power Distribution and Transmission Project (henceforth, Second Power) was probably the last IDA-supported project; there has been no power lending relationship since 1998, and no further energy infrastructure lending is planned in the 2003 Country Assistance Strategy. Consequently, it was very difficult for the OED assessment mission to obtain current data from CEB (or from the Asian Development Bank, which was in the midst of an operational and financial review and could not provide up-to-date information). In the absence of a continuous operational relationship since 1998 when this project was closed, CEB was also reluctant to discuss and share information other than technical and implementation aspects directly related to the Second Power Project.

57. Historically, GoSL has given hydropower development a high priority, and has initiated reforms since the early-1990s, of which one main target was to address the fragmentation of distribution and the resulting technical inefficiencies, inability to meet demand, and high cost structure. Traditionally, in addition to CEB, the Lanka Electric Company Limited (LECO) and 212 other local licensees distributed and sold electricity. A Distribution Master Plan (DMP) for development of the distribution system was prepared under the Ninth Power Project (Cr. 1736) closed in 1994, which led to GoSL's decision to implement a phased takeover of all licensees by CEB and LECO. Much of this takeover program (156 licensees) and a first round of reforms were implemented under subsequent IDA and Asian Development Bank projects. The Second Power project was intended to implement the second phase of institutional reforms, the takeover of the final remaining 56 licensees, and DMP measures to strengthen CEB's financial, operational, and technical management capabilities.

PROJECT OBJECTIVES AND COMPONENTS

58. The objectives of the Second Power Distribution and Transmission Project were to: (a) support the rationalization of power distribution, reduce system losses in the distribution system operated by local licensees, and improve service quality; (b) expand the transmission system to meet demand growth; (c) strengthen CEB's institutional capacity; and (d) assist in the preparation of a selected hydroelectric complex.

59. The project's components included: (a) the rehabilitation and expansion of the licensees' distribution system that were to be taken over by CEB during 1992-1995; (b) capacity expansion of the 220-kilovolt and 132-kilovolt systems; (c) technical assistance for implementing both the physical and institutional development components (including a training component to improve utility management); and (d) preparation of the design and bidding documents for the Upper Kotmale hydroelectric plant.

60. The project, which was approved in FY92, was supported by an IDA credit of SDR 37.5 million (US$50 million equivalent). The project was completed in December 1998 with a delay of 27 months[14]. A total of SDR 5.66 million (US$7.61 million equivalent) was canceled. Over 92 percent of project financing was allocated to the purchase of equipment and materials for distribution, transmission lines, and transformer and switching substations; the rest was used to contract consultant services for the technical assistance and training components.

OUTCOME

61. **The project's outcome is rated moderately satisfactory** (the ICR rating is satisfactory), as explained below.

62. The project's *relevance* is rated substantial. The project was consistent with IDA's lending strategy in the early 1990s, which combined institution-building with partial financing of CEB's investment program to promote a balanced and cost-effective development of Sri Lanka's power supply infrastructure.

63. The project's *efficacy* is rated modest. Objective (a) was only partially achieved. CEB had taken over 22 licensees' distribution systems by end-1997, but suspended the program due to the delicate security situation in the north. CEB was able to take over 10 more as the situation improved, leading to 32 taken over out of 56 total licensees. The distribution expansion was also partially achieved: 240 kilometers (compared to the target of 495 kilometers) of medium-voltage and low-voltage overhead lines and 124 (compared to a target of 233) distribution transformer substations were added. Service connections, however, exceeded targets, at 46,000 connections compared to the 25,000 targeted. Distribution rehabilitation also exceeded the targets with 519 kilometers rehabilitated compared to the initial goal of 300 kilometers. Finally, 20,000 electricity meters were also replaced.

15. The project closed on June 30, 1998 (FY98) but the date of final disbursement was December 14, 1998 (FY99).

64. Objective (b) was achieved in 1999 with 189 kilometers of high-voltage lines and related substations, but with delays ranging from three to five years resulting from the cumbersome procurement procedures that the government imposed upon CEB.

65. Objective (c) was almost fully implemented, but the training program did not have any significant impact on CEB's capabilities. By credit closing, the ratio of customers per employee had increased, accounts receivable had decreased, and the self-financing ratio was satisfactory. But the rate of return on CEB's assets remained well below covenanted levels because of distorted electricity tariffs that did not fully recover the cost of service.

66. The project's efficiency is rated modest. Its recalculated economic internal rate of return (EIRR), using the same methods and assumptions as in the Staff Appraisal Report (SAR), is 12.2 percent, but is slightly above the SAR's 10.7 percent estimate. Adjusted to capture willingness-to-pay, the recalculated E R R rises to 14.8 percent, but is slightly below the SAR estimate. This is likely an underestimate, however, since the calculations reflect low tariff levels and do not fully capture the consumer surplus.

SUSTAINABILITY

67. **The project's sustainability is rated likely.** CEB is properly operating and maintaining the project's facilities. CEB needs to continue investing in new generation, transmission and distribution assets, estimated at US$300 annually through this decade. Investments had a declining trend during the 1990s, however, while internal resources and donor financing taken together are not expected to reach this level annually. Thus, there continues to be a compelling case for promoting private participation in the electricity sector, which is being pursued by the ongoing reforms and restructuring.

INSTITUTIONAL DEVELOPMENT IMPACT

68. **The project's institutional development impact is rated modest.** CEB was able to partially achieve the takeover of licensees (32 out of 56), but by the project's closing, CEB had no detailed information on the reduction in system losses of the systems that were taken over in order to enable measurement of improvements resulting from the takeover. Overall, CEB's own system losses declined only marginally from 18.8 percent in 1991 to 18.7 percent by the project closing date. Training and technical assistance to improve utility management and financial management were implemented satisfactorily. However, implementation of the physical components was delayed considerably (some with up to three-year delays) due to the lack of financial and operational autonomy, resulting in delayed procurement. CEB also showed a lack of commercial orientation, and the politically motivated low tariffs led to poor financial results for CEB.

BANK AND BORROWER PERFORMANCE

69. **The Bank's performance is rated satisfactory.** Project records show that IDA was diligent in designing, appraising, and supervising the project (about every six months), and provided the right skills mix. The documents contain much evidence that IDA (i) reviewed technical, financial, economic, institutional, and environmental aspects

carefully, and (ii) identified implementation problems and recommended remedial measures in a timely manner. Based on interviews, the assessment mission concludes that the ICR presented concisely and accurately the project implementation experience and results.

70. **The borrower's performance is rated unsatisfactory,** particularly in the areas of procurement and power tariff regulation. GoSL did not provide the enabling environment to let CEB implement the project and fully achieve its objectives. The project was plagued with procurement delays due to GoSL's protracted procedures. Combined with poor quality equipment and supplies in some of the physical components, this resulted in inordinate delays and the non-completion of construction works before credit closure.

71. CEB's financial performance during the project period was not fully satisfactory. Although there were some improvements in reduction of arrears, it failed to meet the covenanted rate of return target. Tariffs increased in nominal terms, but decreased marginally in inflation-adjusted terms. Project records indicate that despite repeated IDA reminders during project supervision, GoSL and CEB did not demonstrate the necessary commitment to meet fully the agreed revenue targets. More generally, records show that remedial measures recommended by IDA were not always implemented by CEB or were implemented with significant delay. CEB did not provide a dedicated project management unit for the distribution component, opting instead for *ad hoc* arrangements, which impeded the rehabilitation work under the project. CEB's inability to operate as a commercial entity and recover fully its costs through adequate tariffs has resulted in its weak financial performance. CEB's performance depends upon GoSL's willingness to enable the utility to exercise autonomy as provided for under the CEB Act, but CEB's autonomy has eroded during the 1990s.

72. On the positive side, it must be noted that the provision of counterpart funds from CEB was timely and adequate. Progress reports were also prepared regularly and were adequate for IDA's monitoring and supervision purposes. GoSL also provided a detailed contribution to the ICR, including a future operational plan for the project. These, however, are not sufficient to counter the overall poor performance on major project indicators. The Second Power Project was rated a "problem project" for four out of the six years of implementation because of procurement delays and non-compliance with covenants.

73. More recently, in the context of the ESDP, CEB's behavior was appreciated by independent power sellers. Strictly speaking, under the CEB Act, CEB has the monopoly for power generation and decentralized energy systems are not explicitly allowed (a lack of clarity which the ongoing reform process should take into account). But CEB generally did not interfere, and guaranteed power purchase if it met their voltage and other standard requirements. CEB has always paid power producers on time. According to evaluation informants, CEB's record in adhering to power production agreements has been good, and with a Public Utilities Commission in place, more regulatory transparency is expected. CEB's Pre-Electrification Unit helped increase awareness and build renewable energy project implementation capacity in CEB's area offices, as well as in the private sector and NGOs through regular training programs. Now, since OGVH is already well known and the unit has served its purpose, the unit was disbanded. Through ESDP, about

six CEB staff members, including a senior engineer, were fully trained to handle all operational and technical aspects of wind projects.

LESSONS LEARNED

74. The main lessons that can be derived from this project are: (a) policies and procedures with the potential to create procurement problems during implementation should be addressed and resolved before Board approval, in order to avoid inordinate implementation delays; (b) an independent regulatory regime is required to govern tariff determination, and it should be truly independent to adequately safeguard the sector's financial viability; and (c) the degree of risk in including project components in areas with civil unrest and/or difficult security should be rigorously assessed during project preparation and appraisal, and mechanisms for downscaling or pulling out should be properly identified before such components are included.

Annex A. Basic Data Sheets

ENERGY SERVICES DELIVERY PROJECT (CREDIT 2938-CE; GETF 28955)

Key Project Financing Data *(amounts in US$ million)*

	Appraisal estimate	*Actual or Current estimate*	*Actual as% of appraisal estimate*
International Development Association	24.2	22.3	92
Global Environmental Facility	5.9	5.7	97
Participating Credit institutions	13.7	4.8	35
Private Developers	9.6	10.7	111
Ceylon Electricity Board	1.9	1.3	68
Total	55.3	44.8	81

Cumulative Total Actual Disbursements

	FY98	*FY99*	*FYOO*	*FY01*	*FY02*	*FY03*
Actual (US$M)	0.956	4.180	10.465	15.807	20.897	22.398
Date of final disbursement:	May 6, 2003					

Project Dates

	Original	*Actual*
Project Concept Document	06/08/1994	06/08/1994
Appraisal	06/24/1996	06/24/1996
Board approval	03/18/1997	03/18/1997
Effectiveness	07/22/1997	07/22/1997
Mid-term Review	n.a.	04/03/2000
Closing date	12/31/2002	12/31/2002

Staff Inputs (staff weeks)

	Staff Weeks
Preappraisal	193.8
Appraisal/negotiations	243.3
Supervision	161.0
ICR	8.3
Total	606.4

Mission Data

	Date (month/year)	No. of persons	Specializations represented	Performance rating	
				Implementation progress	Development objective
Identification/ Preparation	10/1994	4	Task Manager, Renewable Energy Specialist Sr. Operations Officer, Industrial Economist		
Appraisal	6/1996	7	Task Manager, 3 Renewable Energy Specialists, Financial Analyst, Industrial Economist, Environmental Engineer		
Supervision	7/1997	3	Engineer, Renewable Energy Specialist, Industrial Economist	S	S
	2/1998	3	Renewable Energy Specialist, Industrial Economist, Energy Analyst	S	S
	8/1998	6	Solar/PV Engineer, Industrial Economist, Energy Analyst, Alternative Energy Engineer, Environmental Engineer, Consultant (SHS/Hydro)	S	S
	2/1999	7	Task Manager, Energy Analyst, 2 Alternative Energy Engineers, Environmental Engineer, Industrial Economist, Energy Specialist	S	S
	412000	5	Financial Analyst, Environmental Specialist, 2 Renewable Energy Specialists, Economist	S	S
Completion	4/2003	5	Renewable Energy Specialist, Economist, Procurement Specialist, Environmental Specialist. Financial Management	S	S

Performance Ratings: S=Satisfactory.

Other Project Data

Borrower/Executing Agency:

FOLLOW-ON OPERATIONS

Operation	Credit no.	Amount (US$ million)	Board date
Renewable Energy and Rural Economic Development (RERED) Project	IDA 36730	75.0	June 20,2002

SECOND POWER DISTRIBUTION AND TRANSMISSION PROJECT (CREDIT 2297-CE)

Key Project Financing Data *(amounts in US$ million)*

	Appraisal estimate	Actual or Current estimate	Actual as% of appraisal estimate
International Development Association	50.0	43.7	0.87
Ceylon Electricity Board	29.0	34.2	1.18
Total	79.0	77.9	0.99

	Appraisal estimate	Actual or Current estimate	Actual as% of appraisal estimate
International Development Association	50.0	43.7	0.87
Ceylon Electricity Board	29.0	34.2	1.18
Total	79.0	77.9	0.99

Cumulative Total Actual Disbursements

	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99
Actual (US$M)	2.3	2.3	5.3	7.9	10.9	15.0	29.8	43.7

Date of final Disbursement: December 14, 1998

Project Dates

	Original	Actual
Project Concept Document		February 1989
Appraisal		February 1991
Board approval		September 10, 1991
Effectiveness		December 16, 1991
Closing date		June 30, 1998

Staff Inputs *(staff weeks)*

	Actual Weeks	Actual US$000
Identification/Preparation	15.2	41.9
Appraisal/Negotiation	22.0	60.9
Supervision	128.4	364.7
ICR	7.5	13.3
Total	173.1	480.8

Mission Data

Stage *of* Project Cycle	Year	*No. of* persons	Specializations represented	Performance rating	
				Implementation progress	Development objective
Through Appraisal	1991	3	EGWFNNENIE	N/A	N/A
Appraisal through Board Approval	1992	3	EGWFNA	NIA	N/A
Supervision 1	5/92	2	EGWFNA	1	1
Supervision 2	7/92	1	EGR	Not rated	Not rated
Supervision 3	12/92	1	EGR	2	2
Supervision 4	10193	2	EGWFMA	3	2
Supervision 5	7/94	2	EGR/PR	U	S
Supervision 6	4/95	2	EGWFNA	U	S
Supervision 7	9/95	2	EGWFNA	U	S
Supervision 8	3/96	3	EGR/FNA/OPN	S	S
Supervision 9	12/96	2	EGWFNA	S	S
Supervision 10	3/97	1	EGR	Not rated	Not rated
Supervision 11	6/97	4	EGR/FNA/OPN/ENIE	S	S
Completion	5/98	4	EGR/FNA/ENIE/DA	U	U

Specializations Represented: EGR=Power Engineer; FNA=Financial Analyst; ECN=Economist; OPN=Operations Analyst; ENIE=Environmental & Infrastructure Engineer; PR=Procurement Specialist; DA=Disbursement Assistant

Performance Ratings: 1=Problem Free; 2=Moderate; 3=Major Problems; S=Satisfactory; U=Unsatisfactory.