



1. Project Data:		Date Posted : 08/15/2002	
PROJ ID: P010410		Appraisal	Actual
Project Name: Renewable Resources	Project Costs (US\$M)	US\$280 million	US\$284 million
Country: India	Loan/Credit (US\$M)	US\$190 million	
Sector(s): Board: EMT - Renewable energy (100%)	Cofinancing (US\$M)	US\$26 million GEF US\$4 million Swiss Development Corporation (SDC) \$US50 million DANIDA	US\$26 million GEF US\$2.3 million SDC US\$3.9 million DANIDA \$0.4 million GON
L/C Number: C2449; L3544			
	Board Approval (FY)		93
Partners involved : GEF, SDC, DANIDA, GON	Closing Date	12/31/1999	12/31/2001
Prepared by :	Reviewed by :	Group Manager :	Group:
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2. Project Objectives and Components			
a. Objectives			
(a) Promote commercialization of renewable resources technologies by strengthening the Indian Renewable Energy Development Agency's (IREDA) capacity to promote and finance entrepreneurial investments in alternate energy; (b) create marketing and financing mechanisms for the sale and delivery of alternate energy systems based on cost-recovery principles; (c) strengthen the institutional framework for encouraging entry of private sector investments in non-conventional power generation; and (d) promote environmentally sound investments to reduce the energy sector's dependence on fossil fuels . GEF's objectives were to demonstrate commercialization and catalyze wind energy and solar photovoltaic (PV) investments by strengthening IREDA's capacity to promote private investments in the sector. The GEF grant was used to help reduce the project cost to a level comparable to that of conventional alternatives.			
b. Components			
Investments financed through IREDA: (i) irrigation-based small hydro projects with an aggregate capacity of 100 MW; (ii) aggregate capacity of 85 MW of wind farms; and (iii) a marketing and financing program to support the solar PV market and installation of 2.5 to 3.0 Megawatt Peak (MWp) of PV systems. Technical assistance to strengthen IREDA's capacity to promote renewable energy technologies and attract private sector interest; provide technical support and training for IREDA staff, investors and other stakeholders engaged in renewable energy market development and investment.			
c. Comments on Project Cost, Financing and Dates			
The original project cost (SAR) was estimated at US\$450 million. However, the Tamil Nadu Newprint and Papers Limited (TNPL) Papermill component was completed and a separate ICR was issued for it . In the absence of the papermill component, the ICR reports appraisal estimates as US\$ 280 million. Actual project costs were US\$284 million. The IDA Credit (US\$115 million, equivalent) and GEF Grant (US\$26 million, equivalent) were both fully utilized. Financing from DANIDA was reduced from US\$50 million to US\$3.9 million, SDC funding was reduced from US\$4 to US\$2.3 million equivalent. These shortfalls were made up by additional funding of US\$ 0.4 million from the Government of the Netherlands (GON), and IREDA (US\$40.7 million vs. US\$17 million at appraisal), promoter/consumer contributions (US\$87.7 million vs. US\$68 million) and other loans (US\$12.5 million).			
3. Achievement of Relevant Objectives:			
The objectives were fully achieved . Although the project appraisal costs were exceeded, this resulted in 207 MW of additional capacity (compared to 188 MW expected at appraisal).			
4. Significant Outcomes/Impacts:			
<ul style="list-style-type: none"> Commercialization has been fully achieved in the small hydro sector with installed capacity rising to over 1,423 MW over the past 10 years with the vast majority of new installations being owned and operated by private 			

sector companies for sales of power to the grid, captive generation or third party sale .

- Over 90% of installed capacity in the wind power sector is private (1,507 MW) compared to 40 MW of state-owned facilities in 1992. Commercial market development in solar PV is evidenced by: (i) the large private sector-led manufacturing base; (ii) a competitive market place where product costs are now among the lowest in the world; (iii) established retail sales and service networks; and (iv) emerging participation of financial intermediaries. Installed PV capacity in 2000 was 82 MWp.
- About half of the 3400 MW in renewable power systems built since 1992 were funded by loans from IREDA.
- IREDA is now a mature financing institution specializing in lending for renewable energy and energy efficiency .
- IREDA's role has encouraged other lenders to support renewable energy projects, including a range of bank and non-bank institutions -- in 1993, there was no funding for this type of project .
- The project has identified innovative ways to address rural credit risks .
- The government has changed its approach to renewable energy development from state -administered to market-driven.
- India is now exporting wind and PV technology .
- Carbon emissions avoided as a direct result of the project are 6.6 million tons.
- International joint ventures have been fostered by the project requirement for competition in procurement .

5. Significant Shortcomings (including non-compliance with safeguard policies):

- Staff retention has been difficult for IREDA due to its below market rate salary structure (specified by the government).
- Regulatory and policy risks with respect to wind and small hydro were underestimated .

6. Ratings:	ICR	OED Review	Reason for Disagreement /Comments
Outcome:	Satisfactory	Satisfactory	The significant increase in the use of renewable energy technologies is largely due to the catalytic influence of IREDA, which was assisted by this program . Given that financial returns on renewable energy investments are rather modest, this is a significant achievement.
Institutional Dev .:	Substantial	Substantial	
Sustainability:	Likely	Likely	
Bank Performance:	Satisfactory	Satisfactory	
Borrower Perf .:	Highly Satisfactory	Highly Satisfactory	
Quality of ICR:		Satisfactory	

NOTE: ICR rating values flagged with '*' don't comply with OP/BP 13.55, but are listed for completeness.

7. Lessons of Broad Applicability:

The ICR identifies some useful lessons. Ten lessons from the ICR are reproduced below .

- Adequate time must be allowed to develop innovative projects and the market for renewable energy .
- A specialized financial institution such as IREDA was essential at the beginning as new technologies were commercialized, but if market growth is to expand, broader participation by the financial sector is essential .
- Similar to rural electrification the world over, affordable financing accessible to rural consumers is essential for selling PV products in rural areas.
- Delivering rural PV services needs a partnership between key actors : rural financing institutions, product/service suppliers and preferably organized consumer groups .
- Assessment of land acquisition as well as payment of compensation should be completed prior to commencement of civil works to avoid delays in project implementation .
- The renewable energy program should be consistent with and embedded into the plan for power sector reform and restructuring.
- Supportive and predictable policies and regulatory framework are essential for market development .
- Tariffs and power sales rules should be fair to all parties for sustainable development of the sector .
- Careful attention should be paid to maximizing energy output rather than installed capacity .
- Regular review and rationalization of subsidy policy is necessary .

8. Assessment Recommended? ☒ Yes ☐ No

Why? Significant lessons can be learned through this pioneering renewable energy projects financed by the Bank, GEF and other donors.

9. Comments on Quality of ICR:

The ICR was clearly written and well-organized. It provided detailed annexes, including performance ratings

throughout the supervision process . A separate ICR was issued earlier on May 1996 for the TNPL Papermill component, which confirmed that commercialization prospects for bagasse -based newsprint technology are favorable and suitable for IFC financing, rather than the Bank .