



1. Project Data:		Date Posted : 08/18/2000	
PROJ ID: P010392		Appraisal	Actual
Project Name: Power Efficiency Improvement Project	Project Costs (US\$M)	88.6	62.8
Country: Nepal	Loan/Credit (US\$M)	65.0	56.5
Sector(s): Hydro	Cofinancing (US\$M)	14.7	
L/C Number: C2347			
	Board Approval (FY)		92
Partners involved : GTZ, Nordic Development Fund	Closing Date	12/31/1997	06/30/1999

Prepared by :	Reviewed by :	Group Manager :	Group:

2. Project Objectives and Components

a. Objectives

The project's primary objectives were to :

1. Increase the supply capacity of the Nepal Electricity Authority (NEA) by improving technical and operational efficiency, upgrading existing generation capacity and improving the system load factor;
2. Restore NEA's financial viability and strengthen its institutional performance;
3. Enhance energy conservation measures, implemented by the Ministry of Industry (MOI) and NEA; and
4. Address the remaining environmental concerns arising from the Marsyangdi Hydroelectric Project (Cr. 1478-NEP) by supporting an innovative approach to catchment management on a pilot basis, implemented by the Ministry of Local Development, Department of Roads (DOR) and NEA.
5. Develop a high quality pipeline of hydropower projects to be offered for private development (added, August 1995)

b. Components

The project included the following components :

A. Components Implemented by NEA:

- Upgrading of the civil works of the Trishuli and Devighat hydroelectric plants and the retrofitting of the Trishuli electro-mechanical equipment.
- Reinforcement of High Voltage Transmission Network: (i) Increase the 66 kV circuit capacity to improve voltage regulation and reliability; (ii) Upgrade the 66/11 kV transformer capacity at existing substations and construct two substations near the load centers in Kathmandu (Teku and Bhaktapur); (iii) Construct a 5 km 132 kV intertie between the Marsyangdi and Kulekhani system and a 12 km 132 kV line from Bhaktapur to New Chabel (initially operated at 66 kV); and (iv) Construct a 4 km, 4-circuit 132 kV line between Teku and Suichatar; (v) Provide equipment, spare parts and tools for the Western, Eastern and Bagmati transmission sections; (vi) Construct a 132 kV interconnection line between Duhabi and Kataiya (Bihar, India) to upgrade power exchange capability with India; and (vii) Install the second circuit on the existing 132 kV Kusaha-Dhalkebar line and expand the associated substations.
- Improvement of NEA Infrastructure/Buildings;
- Electrification of the Besisahar area and vicinity under the Marsyangdi Catchment Management Plan;
- Provision of technical assistance to NEA in the form of consultant services to assist NEA in: (i) Implementation of the generation rehabilitation and high voltage (HV) network reinforcements; (ii) Design of NEA infrastructure and buildings; (iii) Preparation of feasibility and/or detailed engineering studies for priority hydroelectric projects; (iv) Continuation of the "twinning" support to NEA; (v) Preparation of a Training Master Plan and detailed project for a new central training facility in Kathmandu; and (vi) Efforts to improve the system load factor by providing services and equipment to upgrade NEA's load dispatch center and install low frequency relays, load monitoring equipment, time of day metering and communications equipment to be used for the load management program.

B. Components Implemented by Other Agencies:

- Marsyangdi Catchment Management Plan. The component included financing of consultant services, materials and equipment necessary to implement the pilot project which covered: (i) A soil conservation and sediment

reduction program, implemented by the Ministry of Local Development; (ii) Institutional support to the Local Development Office (Lamjung District) of the Ministry of Local Development and to the Department of Soil Conservation and Watershed Management of the Ministry of Forests and Environment; (iii) Upgrading of the Dumre-Besisahar road, implemented by DOR; and (iv) Electrification of the Besisahar area and vicinity, implemented by NEA.

- Industrial Energy Audits. The component implemented by MOI, included: (i) Financing of consultant services and equipment needed for the establishment of an Energy Audit Unit within MOI which would provide technical advisory services to assist local industries in implementing energy conservation measures .
- Technical Assistance to DOR. This component included consultant services to assist DOR in upgrading of the Dumre-Besisahar road.

The following components were added: (i) Rehabilitation of NEA's Gandak Hydropower Plant through provision of electro-mechanical equipment and spares (funded from NEA's own resources); (ii) Medium Hydropower Study (Screening and Ranking exercise); (iii) Establishment of an Early Warning System against Glacier Lake Outburst Flood (GLOF) dangers at the Tsho Rolpa Glacier Lake .

c. Comments on Project Cost, Financing and Dates

The total cost of the project was US\$62.8 million, which was US\$25.8 million less than the appraisal estimate. The cost under-run was a result of the depreciation of the Nepali Rupee against the US Dollar . The Bank provided funding in the amount of US\$65.0 million, US\$56.5 million of which was disbursed. The remainder was canceled in February, 2000. The Nordic Development Fund provided funding in the amount of US\$ 5.4 million. GTZ also provided funding, but the ICR does not provide the amount . The Government of France committed US\$5.1 million to the project, but financing never materialized . The project closed 1.5 years later than expected .

3. Achievement of Relevant Objectives:

- 1. Increase the supply capacity of the Nepal Electricity Authority (NEA) by improving technical and operational efficiency, upgrading existing generation capacity, and improving the system load factor** : This objective was achieved. System losses were reduced to less than 25 percent by FY93 (appraisal target of 24 percent) and to less than 22 percent by FY98 (appraisal target of 21 percent by FY97). Financial losses were reduced as evidenced by a rapid turn-around in NEA's operating accounts from a negative income position in FY 91 and FY92, to progressively increasing profit margins from FY 93 onwards, with the exception of FY 98 where profit levels fell, but still remained positive . Accounts receivable were reduced from the equivalent of 5.6 months average billings in FY90 to the current 3 to 4 months. The rehabilitation of power stations and the expansion of the HV network were satisfactorily completed and their operational efficiency substantially improved as a result of the project. During the implementation of the project, power exports to India increased, and Nepal is expected to become a net exporter of energy over the next few years .
- 2. Restore NEA's financial viability and strengthen its institutional performance** : This objective was partially achieved. NEA's overall financial position showed improvement with four successive tariff increases during FY91/92 - FY96/97. Total electricity sales increased from 737.4 GWh in FY91/92 to 1124.8 GWh in FY98/99. The average retail tariff increased steadily from NR 1.99/kWh in FY91/92 to NR 4.96/kWh (about 8.1 cents/kWh) in FY96/97, and the rate of return on revalued assets (ROR) increased from -0.5 percent in FY91/92 to 4.2 percent in FY96/97. NEA's self-financing ratio (SFR) increased to about 40.4 percent in FY96/97 and its debt service coverage ratio was 2.0. Thereafter, NEA's financial performance started to deteriorate and NEA was unable to comply with the main financial covenants under the project, mainly because the Government did not allow further tariff increases . However, in November 1999, tariffs were increased with another 25 percent to about Rs. 6.2/kWh or about US cents 9.9/kWh, making it one of the highest in the region. Efficiency improvements were not sufficient to compensate for the lack of tariff increases, and NEA resorted to using its cash reserves built up in the early nineties to help fund its investment program. The level of accounts receivable, excluding sales to India, remains about 3 to 4 months of sales equivalent, mainly because of difficulties in collecting from government departments and municipalities . In terms of NEA's institutional performance, the agency has taken several performance -improving steps, yet it still lacks the autonomy and ability to function as a modern utility .
- 3. Enhance energy conservation measures, implemented by the Ministry of Industry (MOI) and NEA: This objective was achieved**. All three phases of the industrial energy audits program implemented by MOI were satisfactorily completed. NEA's load dispatch center is being upgraded through a credit by KfW . A Non-Technical Loss Reduction Project was undertaken by an ADB Technical Assistance Grant . A separate ADB-funded pilot project for computerized billing demonstrated the advantages of such systems for loss reduction.
- 4. Address the remaining environmental concerns arising from the Marsyangdi Hydroelectric Project** : Achievement not known. The ICR does not provide adequate, concrete evidence whether this objective was implemented satisfactorily.
- 5. Develop a high quality pipeline of hydropower projects to be offered for private development (added, August 1995): This objective was achieved**. A Medium Hydropower Study was launched to define potential hydropower projects for private development. Seven of 24 potential projects were selected and formed the high quality project pipeline. Feasibility studies and preliminary environmental impact assessments (EIAs) for these projects were carried out by international and local consulting companies in 1997/98. During the fine

Screening and Ranking (S&R) process, seven additional sites for which licenses (survey or production licenses) had already been granted to private developers and NEA were also reviewed. They were all confirmed as fitting the S&R criteria and were among those projects chosen for implementation. (Some of them are in the process of construction).

4. Significant Outcomes/Impacts:

- The Screening and Ranking (S&R) exercise for future private sector involvement in hydropower projects was a significant outcome of the project. During the S&R process, a stakeholder analysis for identification of the legitimate stakeholders was also conducted, and systematic public consultations with those stakeholders were held. The S&R exercise had three key outcomes: (i) It developed Nepal's hydroelectric potential by building up a high quality pipeline of projects which had been selected through a participatory S&R process that recognized technical, economic, financial as well as environmental and social impacts and ensured an appropriate balance between investments in generation, transmission and distribution; (ii) It improved the regulatory environment for private investment in the power sector and established procedures for competition between private power developers; and (iii) It improved the efficiency of operations and creditworthiness of NEA. Before projects are approved by the Government for implementation, detailed environmental and social assessments will be carried out in accordance with Nepalese guidelines. In the case of projects funded under possible, subsequent IDA Credits, these detailed environmental and social assessments would also be carried out in accordance with IDA guidelines. The process includes an interagency review and full public stakeholder consultation and participation, in particular, for the preparation of the environmental management and resettlement and rehabilitation action plans.

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

- The changes to the NEA Act enhanced NEA's autonomy on paper, but in practice, the Government appears to be unwilling to provide NEA with the degree of autonomy that is a necessary (but not sufficient) condition for the utility to operate on a commercial basis. There were frequent changes in managing directors and interference into day-to-day matters including recruitment of staff. Also, the Government's reluctance to adjust tariffs harmed the relations with the principal donors.
- NEA's managerial weaknesses; difficulties in recruiting qualified accounting staff; and a lack of attention to financial management continued to be main factors (closely tied to the previously mentioned factors) impeding a satisfactory institutional development of the utility.
- The design of the institutional development measures was not effective. Effective training and recruitment of qualified staff should have been given more priority to ensure that institutional development actions are sustainable. Under the project, technical staff benefited much more from on the job training and coaching from consultants. Training of financial staff received much less attention. Weaknesses in available skilled human resources (particularly in the financial and administrative areas); lack of appropriately designed training programs; and practical problems of donor coordination all contributed to the difficulties in meeting institutional development targets. The project team would have benefited from specialist staff to ensure that such project components were realistic and well designed.
- In terms of the project's physical components, compliance with OD 4.30 (Involuntary Resettlement) and OP 4.01 (Environmental Assessment) is not clear. The Medium Hydropower Study, however, did include Environmental Impact Assessments for the recommended potential projects.

6. Ratings:	ICR	OED Review	Reason for Disagreement /Comments
Outcome:	Satisfactory	Moderately Satisfactory	Three objectives were fully achieved, another was partially achieved, but one did not provide evidence of satisfactory implementation.
Institutional Dev.:	Modest	Modest	
Sustainability:	Likely	Unlikely	Financial resilience: The Government's involvement with NEA and the prospect that it will continue to remain involved in NEA's day-to-day business calls into question the ability of the utility to remain financially sound over the long run.
Bank Performance:	Satisfactory	Satisfactory	
Borrower Perf.:	Satisfactory	Satisfactory	OED concurs with the ICR's rating of Borrower Performance as Marginally 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:

Public consultations based on sound technical, economic, financial criteria and taking into account social and environmental concerns, as used in the screening and ranking exercise of the Medium Hydropower Study, should be made an integral part of the preparatory process to create a political consensus on proposed hydropower investments. It is an essential tool for mitigating social and environmental impacts as well as implementation risks .

8. Assessment Recommended? Yes No

9. Comments on Quality of ICR:

The overall quality of the ICR is satisfactory. However, details on the implementation of the Medium Hydropower Study, which is an important (albeit additional) objective of the project, should not have been relegated to "Additional Information." It should have been included in "Achievement of Objectives." Also, the ICR should have provided sufficient measurable evidence on the implementation of the objective to address the remaining environmental concerns arising from the Marsyangdi Hydroelectric Project. The figures in Annex 2, "Project Cost by Component," do not add up (the figures in the table add up to US\$62.8 million, not US\$115.40 million, as the table states). Finally, the table, "Project Financing by Component" does not take into account the funding from the Nordic Development Fund (US\$5.4 million) and from GTZ.