



1. Project Data:		Date Posted : 11/06/2000	
PROJ ID: P035757		Appraisal	Actual
Project Name: Power Maintenance	Project Costs (US\$M)	14.50	15.78
Country: Armenia	Loan/Credit (US\$M)	13.70	13.24
Sector(s): Thermal	Cofinancing (US\$M)	0	1.36
L/C Number: C2666			
	Board Approval (FY)		95
Partners involved : USAID	Closing Date	07/31/1998	06/30/1999

Prepared by :	Reviewed by :	Group Manager :	Group:

2. Project Objectives and Components

a. Objectives

The objectives of the project were :

1. to reverse the deterioration of three thermal generation units and three hydropower generation plants, and improve their availability (reduce unscheduled down-time); and
2. to strengthen the electricity load management and dispatch capability of the national dispatch center and stop the further deterioration of the electricity distribution system .

b. Components

The project consisted of the following major components :

1. maintenance of selected existing generation units and ancillary facilities at : (i) the Hrazdan Thermal power plant, mainly focused on two thermal units (2x200 MW); and (ii) the Sevan-Hrazdan hydropower cascade, mainly focused on the Kanaker (100 MW) and Yerevan (44 MW) plants;
2. rehabilitation of two of the four units at Gyumush (Arghel) Hydropower Plant;
3. strengthening and maintenance of the electricity dispatch communications and distribution systems;
4. technical assistance for project implementation, and upgrading the electricity dispatch system .

c. Comments on Project Cost, Financing and Dates

Total project cost was US\$ 15.78 million, which was US\$1.28 million higher than the appraisal estimate. IDA provided a credit in the amount of US\$ 13.24 million, of which US\$0.46 million was canceled. USAID provided a grant of US\$1.36 million. The Government also provided financing in the amount of US\$ 1.18 million, which was US\$0.38 million more than the appraisal estimate. The project closed 11 months late, largely due to a combination of the Borrower's inexperience with Bank procedures, entrenched procurement procedures of the former Soviet system, the "maintenance" nature of the project and the constantly changing priorities of the power infrastructure, given the crisis period in Armenia, and the additional time required to overcome transportation obstacles created by the blockade .

3. Achievement of Relevant Objectives:

1. Reverse the deterioration of three thermal generation units and three hydropower generation plants, and improve their availability (reduce unscheduled down-time): This objective was achieved . The generation units were rehabilitated, fuel efficiency was improved, available capacity was increased, and unscheduled down time was reduced. Moreover, reliable electricity supply has been restored to 24 hours per day (as opposed to about 2-4 hours per day previously) at a frequency of 50 Hz.
2. Strengthen the electricity load management and dispatch capability of the national dispatch center and stop the further deterioration of the electricity distribution system .: This objective was achieved .
 - Power supply to consumers became more reliable .
 - The annual losses in the transmission lines and in the transformers were reduced .
 - Transformer oil losses and rehabilitation expenses were reduced .
 - Power losses in transmission and distribution were reduced by 163.5 million kWh in 1998, (or 2.5 percent of net generation) compared to 1997.
 - New and more reliable communication channels were created using radio -relay and long-distance communications equipment.
 - 4 new electronic digital communication channels with multipliers now connect the Central Communication

Unit with most important substations .

- The 20 most important substations can now be reached by telephone, whereas previously urgent messages had to be delivered by car (if a car and/ or fuel were available).
- Reliable back-up power for communications equipment was provided by replacing old batteries with new ones.
- 5.7 km of damaged cables were replaced .
- Maintenance crews work more effectively as a result of hand -held radios.
- Fault recorders, tape recorders and other measuring equipment increased control, metering and quality of records.
- The number of unscheduled breakdowns decreased by 15 times compared with 1993-1996.

4. Significant Outcomes/Impacts:

This project was one of the first Bank projects in Armenia and the Bank's first project in the energy sector . The project made a significant contribution to stabilizing power supply in Armenia . This was done at relatively low cost and electricity has become the only reliable source of energy supply in the country . This has improved consumer welfare and contributed to a stable environment for investment . Restoration of reliable electricity supply has been a major achievement of the Armenian authorities, and the Power Maintenance Project has played an important role in this achievement. The Bank's timely intervention showed that the Bank can deliver tangible benefits at the project level while using other instruments to advance policy reforms .

It is also worth noting that the energy sector in Armenia has matured significantly, thanks to a combination of IDA financing, other donor support, and key pieces of economic and sector work . Most notably, since the electricity crisis in Armenia from 1992 to 1994, when electricity was supplied for 2-4 hours per day and its poor quality (46-48 Hz) caused serious damage to commercial and residential electrical equipment, Armenia has :

- Restored reliable electricity supply - 24 hours per day at a frequency of 50 Hz (plus or minus 0.2 Hz);
- Restored the reliable supply of gas for power generation and commercial consumers;
- Improved payment discipline from < 40% of supply to 65-70% of supply and 80% of billings;
- Increased average electricity tariffs from 1.4 USc/kWh in end-1994 to 4.6 USc/kWh (on 1/1/99); the tariff increases have strengthened the financial condition of the power subsector, although much remains to be done. Tariffs now cover operating and maintenance costs .
- Adopted an Energy Law (June 1997), which in the power sector, separated generation, transmission, dispatch and distribution into separate companies, established an independent Energy Commission responsible for issuing licenses, establishing market rules and setting regulated tariffs, and separated the policy -making and ownership role of the state;
- Unbundled Armenergo, the vertically -integrated power company, into separate generation, transmission, dispatch and distribution companies; and
- Consolidated electricity distribution companies in preparation for strategic investor privatization (from more than 60 in 1996 to 11 in 1997 to 4 in 1998).

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

None.

6. Ratings :	ICR	OED Review	Reason for Disagreement /Comments
Outcome :	Satisfactory	Satisfactory	
Institutional Dev .:	Substantial	Substantial	
Sustainability :	Highly Likely	Highly Likely	Because of the significant improvements in the sector.
Bank Performance :	Satisfactory	Satisfactory	
Borrower Perf .:	Satisfactory	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 lessons learned as a result of the disbursement and implementation delays are (i) to use less optimistic disbursement forecasts for projects with borrowers and implementing agencies that are new to the Bank; and (ii) to provide adequate hands-on training in procurement and disbursements (not just once, but as many times as necessary). Additionally, the Region noted that in the last year of the project, virtually all of the delays in the USAID grant implementation were due to the different computer systems used by the Bank's accounting and disbursement departments.
- In the face of unexpected and catastrophic accidents, as happened in May 1995 at the Gyumush Hydropower Plant, Bank flexibility in amending a project's legal agreements in a timely manner can significantly contribute to a project's satisfactory outcome, while allowing Bank funds to be redirected to meet the greatest needs .

8. Assessment Recommended? Yes No

9. Comments on Quality of ICR:

The quality of the ICR is satisfactory . It is clearly written and is comprehensive in its scope .