



1. Project Data:		Date Posted : 05/09/2003	
PROJ ID: P038820		Appraisal	Actual
Project Name: Hydropower Rehabilitation and System Control	Project Costs (US\$M)	215.10	141.55
Country: Ukraine	Loan/Credit (US\$M)	114.0	82.50
Sector(s): Board: EMT - Power (100%)	Cofinancing (US\$M)	12.90	11.30
L/C Number: L3865			
	Board Approval (FY)		95
Partners involved :	Closing Date	12/31/2000	06/30/2002
Prepared by :	Reviewed by :	Group Manager :	Group:
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2. Project Objectives and Components

a. Objectives

The objectives of the project (as stated in the PAD) were to: (i) improve the efficiency, reliability, safety and environmental performance of hydropower plants (ii) increase hydropower generation capacity; (iii) improve the quality of electricity supply by upgrading load and frequency control, which also improve the safety of nuclear plants; and (iv) reduce fuel cost by facilitating the economic dispatch of generating units . Although no mentioned explicitly in the ICR, a power sector financial discipline objective was agreed at loan negotiations and cast in the loan beneficiaries' legal documents as financial covenants on self-financing ratio, reduction of accounts receivable and payable, and auditing. The objectives were not revised.

b. Components

The project had four components (as stated in the PAD): (a) The initial 5 years of the hydropower rehabilitation program outlined in the feasibility study, including the implementation of the complete rehabilitation program for the Dnieper I and Dnieper II hydropower plants and the Kiev Pumped Storage Plant (PSP); near-complete implementation of the rehabilitation program for the Kakhovka Hydro Power Station (HPS); and partial implementation and rehabilitation program for the Kiev, Kakhovka, Kremenchug, and Dniprodzerzhinsk hydropower plants; (b) Installation of dam safety monitoring systems at the main water reservoirs on the Dnieper river (Kiev, Kanev, Kremenchug, Dnieper, Dniprodzerzhinsk, Kakhovka); (c) upgrade of communications, dispatch, and system control and protection, and generating unit control; and (d) technical assistance for project implementation, and optimization of the use of the reservoirs on the Dnieper river . These components were not revised.

c. Comments on Project Cost, Financing and Dates

The project was completed with a delay of 18 months at a cost equivalent to US\$ 141.55 million or 34 percent below the US\$215.1 million estimated at appraisal. The cost savings were caused by a reduction of the number of rehabilitated turbine/generator units, the cancellation of the Thermal Power Plants governor sub-component, the lower than estimated local costs of the system control component, and the lower than estimated interest during construction derived from the cancellation of unused Bank funds . These cost savings largely exceeded the increase in the cost of dam safety devices, the higher volume of local works, the additional quantities of system control and monitoring equipment, and the extended technical assistance . The delays were caused by deep financial crises of both Dnirohydroenergo (DHE) and Ukrenergo (UE) that paralyzed project implementation for 6 months and delayed works for more than 20 months. The Bank loan financed the equivalent of US\$ 82.50 million broken down in works, equipment and installation for the hydropower rehabilitation, dam safety and system control and communications (US\$45.05 million), technical assistance (US\$1.4 million) and contingencies and interest during construction (US\$11.45 million). A total of US\$31.5 million were cancelled from the loan, which was closed on June 30, 2002 after extension of the loan closing date by 18 months. Grants from the co-financiers financed high voltage equipment for hydropower rehabilitation (US\$8.4 million) and technical assistance services in engineering, procurement and project management (US\$2.9 million). Government funds equivalent to US\$ 47.75 million financed the cost of local works and equipment of the hydropower rehabilitation and dam safety (US\$ 45.05 million) and technical assistance (US\$2.7 million). The overall ERR of the project is estimated at 13.6 percent (18.1 percent at appraisal). The ex-post calculation of the ERR for the Hydropower Rehabilitation component is 13 percent (17 percent at appraisal) and for

the System Control and Communications Upgrade component is 17.7 percent (22.7 at appraisal).

3. Achievement of Relevant Objectives:

The principal objectives of the project were substantially achieved : (i) the efficiency, reliability, safety and environmental performance of hydropower plants were improved (efficiency of hydropower plants increased by 4.2 percent to 92.2 percent; safety monitoring equipment was installed along 150 km of dams and dykes of the Dnieper river; and the elimination of oil leakages from the rehabilitated turbines at Kiev and Kakhovka improved their environmental performance); (ii) the hydropower generation capacity was increased by 88.1 MW by rehabilitating 16 turbine-generators (the original target was an increase by 130 MW from 23 turbines and 37 generators) totaling 658.8 MW of hydro power (14 percent of the total 4,700 MW hydropower installed in the country); (iii) the quality of electricity supply was improved by upgrading load and frequency control - enabling interconnection of Ukraine and Former Soviet Union power systems- which has also contributed to improving the safety of nuclear power plants (frequency deviations now remain in the range +/- 0.05 Hz compared to + 0.3/- 0.8 Hz before the project); and (iv) fuel costs were reduced, but to a lesser extent than originally planned (0.4 percent compared to 0.9 percent) because of the cancellation of the sub-component of upgrading the regulation and management system of the thermal power plants that was intended to facilitate the economic dispatch of thermal generating units . A reduction of emissions to the atmosphere resulted from the reduction of fuel consumption and the increase in hydroelectric generation . The financial discipline objective was substantially achieved towards the end of the project .

4. Significant Outcomes/Impacts:

The project made significant impacts on some important aspects of institutional development . It helped the Government to improve management of the electricity sector through restructuring of the hydropower plants into a joint stock company and consolidating the regional dispatch centers into a National Dispatch Center, followed by sector unbundling, establishing of a National Electricity Regulatory Commission and a Wholesale Electricity Market and privatization of electricity distribution companies . It also helped to improve the quality and stability of electricity supply which in turn improved the safety of the nuclear power plants, thus moving Ukraine closer to European Union Standards. Also, since 2000, efficient Government measures to improve collections and restructure arrears in the power market, have further contributed to increase private sector interest in the sector and enhance the financial stability of the companies that benefited from the project . At the company level, the project improved their corporate governance by involving them in international project management, accounting, auditing and procurement practices and transferring advanced technologies and know-how. At country level, project implementation generated 10,000 new jobs and enhanced national key scientific and industrial capacity, and environmental policies to reduce environmental hazards along the Dnieper River .

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

The financial crisis of the implementation agencies (Dniprohydroenergo and Ukrenergo) led to a reduction in the scope of the Hydropower Rehabilitation component, paralyzed project implementation during 6 months, and delayed project completion by 20 months. However, completion of the remaining hydropower rehabilitation works will bring further benefits to the power system provided the Government's overall reform efforts remain on track and appropriate financial discipline is maintained in the power sector .

6. Ratings :	ICR	OED Review	Reason for Disagreement /Comments
Outcome :	Satisfactory	Satisfactory	
Institutional Dev .:	Modest	Modest	
Sustainability :	Likely	Likely	
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:

(1) A donors' working group can be a valuable instrument to assist the Government in project implementation by exploiting the comparative advantages of the donors . In this project the Bank's experience in power sector rehabilitation was successfully complemented with Canada's support with technical assistance in project management, Norway's support in water reservoir management, and Switzerland's supply and installation of switchgear equipment.

(2) Since financial discipline is a key factor in power sector reforms, the pressure on the Government generated by the project can be boosted by including specific financial targets in Bank's Program Adjustment Lending and IMF's Extended Fund Facility Program operations in the country . In this project, the inclusion of specific targets for cash collections in those lending operations helped the power sector to reach their highest level of cash collection ever .

8. Assessment Recommended? Yes No

Why? In a cluster with other power projects in Ukraine . The audit may follow up on the results of the

rehabilitation made in other hydropower plants in the Dnieper River and shed more light on the evolution of the Ukrainian power sector.

9. Comments on Quality of ICR:

The ICR generally complies with the Bank guidelines for ICRs . It presents a very detailed description, discussion and evaluation of the project objectives, components, results and implementation (25 pages) supported with contributions and comments received from the Borrower, the implementing agencies and the co-financiers, and thorough responses by the Bank (30 pages). Annex 3 of the ICR (50 pages) presents detailed analyses and recalculations of the ERR and NPV of the incremental project investment and that of its main components, comprising sensitivity analyses (with and without accounting for environmental benefits) and estimated switching values of the discount rate. Although the description of the project objectives and components presented in the ICR is not fully congruent with their description in the PAD, it retains the substantive meaning of project objectives and components . The ICR did not describe the findings and recommendations of the project mid-term review. The reader would have benefited from a more concise ICR.