Document of
The World Bank

Report No: ICR1140

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IBRD-72940)

ON A

LOAN

IN THE AMOUNT OF US$48 MILLION

TO AZERENERJI OJSC

WITH THE GUARANTEE OF THE REPUBLIC OF AZERBAIJAN

FOR A

POWER TRANSMISSION PROJECT

June 26, 2012

Sustainable Development Department
South Caucasus Country Unit
Europe and Central Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective May 2, 2012)

Currency Unit = Manat (AZM)
1.00 Manat = US$ 1.55
US$ 1.00 = 0.79 Manat

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

BCC	Backup Control Center (for dispatch of electricity)
CAS	Country Assistance Strategy
CIS	Commonwealth of Independent States
CPS	Country Partnership Strategy
EA	Environmental Assessment
EBRD	European Bank for Reconstruction and Development
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
EMS	Energy Management System
EU	European Union
FIRR	Financial Internal Rate of Return
FM	Financial Management
FSU	Former Soviet Union
GIC	Guaranteed Investment Certificate
GDP	Gross Domestic Product
HV	High Voltage
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IDP	Internally Displaced Person
IDR	Issuer Default Rating
IFIs	International Financial Institutions
IFRS	International Financial Reporting Standards
ISDS	Integrated Safeguards Data Sheet
ISR	Implementation Supervision Report
JBIC	Japan Bank for International Cooperation
KfW	Kreditanstalt fur Wiederaufbau
kV	Kilovolts
kWh	Kilowatt hour
LDP	Letter of Development Policy
MDG	Millennium Development Goal
MED	Ministry of Economic Development
MIE	Ministry of Industry and Energy
MIS	Management Information System
MVA	Market Value Added
NDC	National Dispatch Center
NPV	Net Present Value
PAD	Project Appraisal Document
PCB	Polychlorinated Biphenyls
PCN	Project Concept Note
PDO	Project Development Objectives
PID	Project Information Document
PIU	Project Implementation Unit
PLC	Power Line Carrier
PPIAF	Public Private Infrastructure Advisory Facility
PRSC	Poverty Reduction Strategy Credit
PRSP	Poverty Reduction Strategy Paper
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
SPPRED	State Program on Poverty Reduction and Economic Development
TA	Technical Assistance
USAID	United States Agency for International Development

Vice President:	Philippe H. Le Houerou
Country Director:	Asad Alam
Sector Manager/ Director:	Ranjit Lamech/ Laszlo Lovei
Project Team Leader:	Salvador Rivera
ICR Team Leader:	Yadviga Semikolenova

AZERBAIJAN
POWER TRANSMISSION PROJECT

CONTENTS

A. Basic Information			
Country:	Azerbaijan	Project Name:	Power Transmission Project
Project ID:	P083341	L/C/TF Number(s):	IBRD-72940
ICR Date:	05/20/2012	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	AZERENERJI OJSC
Original Total Commitment:	USD 48.00M	Disbursed Amount:	USD 46.3M
Revised Amount:	USD 46.3M		
Environmental Category: B			
Implementing Agencies: Azerenerji			
Cofinanciers and Other External Partners: n/a			

B. Key Dates				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	09/03/2003	Effectiveness:	02/07/2006	03/24/2006
Appraisal:	02/11/2005	Restructuring(s):		12/22/2010
Approval:	05/17/2005	Mid-term Review:	06/30/2008	04/14/2008
		Closing:	12/31/2010	12/31/2011

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes:	Satisfactory
Risk to Development Outcome:	Moderate
Bank Performance:	Satisfactory
Borrower Performance:	Moderately Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)			
Bank	**Ratings**	**Borrower**	**Ratings**
Quality at Entry:	Satisfactory	Government:	Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
Overall Bank Performance:	Satisfactory	**Overall Borrower Performance:**	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating**
Potential Problem Project at any time (Yes/No):	Yes	Quality at Entry (QEA):	None

Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA):	None
DO rating before Closing/Inactive status:	Moderately Satisfactory		

D. Sector and Theme Codes

	Original	Actual
Sector Code (as % of total Bank financing)		
Power	100	100
Theme Code (as % of total Bank financing)		
Infrastructure services for private sector development	100	100

E. Bank Staff

Positions	At ICR	At Approval
Vice President:	Philippe H. Le Houerou	Shigeo Katsu
Country Director:	Asad Alam	D-M. Dowsett-Coirolo
Sector Manager:	Ranjit Lamech	Peter D. Thomson
Project Team Leader:	Arturo S. Rivera	Bjorn Hamso
ICR Team Leader:	Yadviga Semikolenova	
ICR Primary Author:	Yadviga Semikolenova	

F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)

The primary objective of the Project was to improve the efficiency of the power transmission operation in Azerbaijan through technical and institutional strengthening of the generation/ transmission utility. The project has as a secondary objective to contribute to strengthening Azerenerji's financial position.

Revised Project Development Objectives (as approved by original approving authority)

Not Applicable

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Improved efficiency of fuel use per kWh of electricity generated through Economic Dispatch and reduced transmission losses.			
Value (quantitative or Qualitative)	353 grams of fuel per kWh generated electricity (2007).	0.5% fuel reduction per kWh produced in 2009 and 1.5%		314 grams of equivalent fuel (with heat rate

	Transmission losses: 3.63% (2007); 4.05% (2008).	reduction in 2010 because of the Economic Dispatch feature in the SCADA system. Transmission losses to be reduced by 0.5 % because of the Optimal Power Flow feature.		7kcal/g) per kWh generated electricity (11% reduction). Transmission losses: 3.6%.
Date achieved	12/31/2007	12/31/2010		12/31/2011
Comments (incl. % achievement).	Fuel reduction target achieved over 700%. This target was achieved in part due to the rehabilitation of generating plants. Greater efficiencies will be achieved once the new SCADA is in operation. Transmission losses in 2011 cannot be compared to transmission losses in 2007 since other (old) transmission lines were added to Azerenerji system in 2005-2008, hence transmission system operated by Azerenerji in 2007 is different from transmission system operated in 2011.			
Indicator 2 :	Improved quality of electricity supply with respect to frequency and voltage levels.			
Value quantitative or Qualitative)	Frequency fluctuations outside 50 Hz +/-0.5 Hz. Voltage fluctuations outside band +5%/-10% of target.	Frequency 50 Hz+/-0.5 Hz. Voltage within band +5%/-10% of target		Frequency 50 Hz+/-0.5 Hz. Voltage within band +5%/-10% of target
Date achieved	09/13/2006	12/31/2010		12/ 31/2011
Comments (incl. % achievement)	Achieved 100%			
Indicator 3 :	Azerenerji's financial position strengthened (i.e. need for Govt. financial support reduced/eliminated).			
Value quantitative or Qualitative)	US$400 million subsidy from the state (2004).	No state subsidies to Azerenerji.		No state subsidies for operational expenditures
Date achieved	12/31/2004	12/31/2010		12/31/2011
Comments (incl. % achievement)	Partially achieved. While Azerenerji stopped receiving state subsidies for the operational expenditures since 2008, it is still receiving government subsidies for the investment expenditures. In accordance with a Government decision, Azerenerji buys gas at about a half of its market price.			

(b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Wholesale payment collections in full.			
Value (quantitative	Payment collections (wholesale level) 50%	100% wholesale payment		100% wholesale receipts considered

or Qualitative)	(2004)	collections in 2010.		collected for 2010 and 2011. However, wholesale bills are systematically underpaid; Azerenerji classifies most of this debt as impaired and subsequently written off
Date achieved	09/13/2006	12/31/2010		12/31/2011
Comments (incl. % achievement)	The baseline value and the actual value achieved by the end of the Project are not comparable because institutional arrangements between distribution companies and Azerenerji changed since appraisal. During Project appraisal, the power distribution networks were organized into four regional companies that were managed by private operators. To attract operators and investors, the Government allowed the distribution companies to defer payments for a portion of the electricity they purchase from Azerenerji while they were building up their end-user payment collections. Payments from the distribution companies to Azerenerji were scheduled to reach 100% in 2010. In 2006, private distribution operators were ousted and since then Azerenerji controls all distribution networks excluding Baku (with suburbs) and Nakhchivan; BakiElektrikShebeke is in charge of Baku distribution. Wholesale collections improved dramatically compared to 47% in 2006. However, systematic underpayment by wholesale customers remains an issue. According to 2010 Auditor's Letter, the largest wholesale customer systematically underpays about 18% of its monthly bills. Azerenerji classifies most of this debt as impaired, which is periodically written off. For example, in 2010-2011, accounts receivables of about AZN 1.5 billion (US$1.9 billion) from wholesale customers were written off (Decrees # 148 and 133).			
Indicator 2 :	Tariffs to increase to cover full costs.			
Value (quantitative or Qualitative)	Tariffs covering 64% of costs (2004).	Tariffs covering 100% of costs by 2010.		In general, tariff level is adequate to cover operating costs, assuming full collections. However, in 2010 and 2011, revenue after collections was inadequate to recover costs.
Date achieved	09/13/2006	12/31/2010		12/31/2011
Comments (incl. % achievement)	Achieved, but not sustained. The electricity tariffs were tripled in 2007. In 2009, revenues were adequate to cover operating costs, including depreciation. In 2010, revenue after collections was about 6 percent below cost of supply.			
Indicator 3 :	Transmission grid forced outages reduced.			
Value (quantitative or Qualitative)	Total outages: 1424.5 hrs (2003) Lost load/yr: 81,062	Half of 2003		158 hrs 13,017 MWh

	MWh (2003)			
Date achieved	12/31/2003	12/31/2011		12/31/2011
Comments (incl. % achievement)	The target was achieved 170% for total outages and lost load. Between 2003-2011, total outages were reduced by about 9 times and lost load reduced by about 6 times			

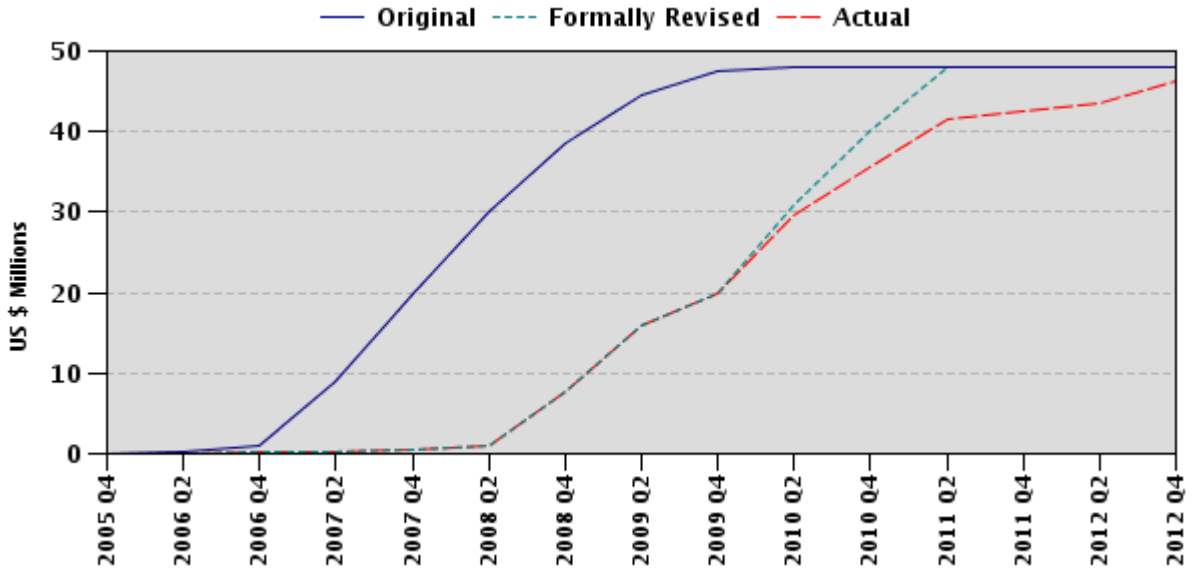
G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
1	08/23/2005	Satisfactory	Satisfactory	0.00
2	04/05/2006	Satisfactory	Satisfactory	0.24
3	09/28/2006	Satisfactory	Moderately Satisfactory	0.33
4	01/14/2007	Satisfactory	Moderately Satisfactory	0.35
5	03/11/2008	Satisfactory	Unsatisfactory	7.08
6	06/19/2008	Satisfactory	Moderately Unsatisfactory	7.69
7	01/30/2009	Satisfactory	Moderately Satisfactory	16.00
8	09/21/2009	Satisfactory	Satisfactory	25.46
9	05/01/2010	Satisfactory	Satisfactory	34.59
10	04/14/2011	Satisfactory	Satisfactory	41.64
11	12/24/2011	Moderately Satisfactory	Satisfactory	43.42

H. Restructuring (if any)

Restructuring Date(s)	Board Approved PDO Change	IST Ratings at Restructuring		Amount Disbursed at Restructuring in USD million	Reason for Restructuring & Key Changes Made
		DO	IP		
12/22/2010	N	S	S	40.1	The closing date was extended by one year to December 31, 2011. While significant progress had been made, with implementation of the SCADA system, additional time was required for completion of the remaining tasks to enable the system to become fully operational.

I. Disbursement Profile



1. Project Context, Development Objectives and Design

1.1 Context at Appraisal

Since gaining independence from the Soviet Union, Azerbaijan experienced many of the same challenges as other CIS transition states. The country's problems were exacerbated, however, by an armed conflict and a large population of refugees and Internally Displaced Persons (IDPs). As a result, at the time of the Project's appraisal in 2005 Azerbaijan was one of the seven lowest income countries of the Europe and Central Asia Region.

By 2005, Azerbaijan had succeeded in achieving economic stabilization as a result of a consistent program of fiscal restraint and prudent monetary policy. However, poverty remained a serious concern, in part owing to the large numbers of IDPs (nearly a million people) and in part to insufficient investment in labor-intensive sectors and supporting infrastructure. Azerbaijan's Poverty Reduction Strategy Paper (PRSP) for 2003-2005 identified six strategic pillars, which included infrastructure improvements (roads, utility services, and irrigation); social protection reforms to serve the vulnerable more effectively; and better conditions for refugees and IDPs.

The power sector performed poorly in the years since independence. Effective generation capacity shrank due to insufficient funds for rehabilitation and capacity addition. In 2005, existing capacity was inadequate to meet the domestic electricity demand. Many areas of the country received only a few hours of electricity per day. System reliability was poor, with frequent localized outages and occasional widespread system failures. In addition, the sector was far from financially viable. Azerenerji (the state power generation and transmission company and beneficiary under the Project) depended heavily on the State to provide financial support through payment for power plant fuel (natural gas and mazut) and electricity imports.

However, the power sector benefited from significant investments from international financial institutions (IFIs), and Azerenerji's financial dependence on the State was primarily a matter of political choices relating to the Government's tariff policy and its privatization strategy for power distribution. In 2002, the Government reorganized the power distribution networks into four regional companies and entered into long-term management contracts with private companies[1]. To attract operators and investors, the Government allowed the distribution companies to defer payments for a portion of the electricity they purchased from Azerenerji while they were building up their end-user payment collections. Payments from the distribution companies to Azerenerji were scheduled to reach 100 percent in 2010.

[1] In 2002-2006, Barmek Holding AS managed the Baku and Sumgait distribution networks; power distribution networks on the remaining mainland territory of Azerbaijan (i.e. excluding Nakhchivan Autonomic Republic) were managed by private company "Baiva". In 2006, private distribution operators were ousted, and since then Azerenerji controls all of distribution network excluding Baku (with suburbs) and Nakhchivan; BakiElektrikShebeke is in charge of the Baku distribution network.

The delivery of affordable electricity and other utility services of acceptable quality was seen as an essential requirement in enhancing the living standards of the population. The Government established a strategy to address this need and outlined it in the Letter of Development Policy for the Poverty Reduction Support Credit (PRSC-I, approved in April, 2005). This strategy included promoting increased private participation in the provision of utility services and establishing a medium-term tariff policy for Azerbaijan, which incorporated a transition to full cost recovery for utility service providers.

The Government was also fully cognizant of the need to ensure that utility services provided to consumers within Azerbaijan were affordable. The development and implementation of a targeted social safety net was underway to ensure that the most vulnerable continued to be able to afford essential utility services as prices rose to reach full cost recovery levels. Taking into account these considerations, the Government took the initial step of increasing prices of gas and water supply in January 2005, but chose to defer increases in electricity tariffs.

Rationale for Bank involvement

At the time of the Project's appraisal, private sector funding was not available to Azerbaijan on the scale needed for full rehabilitation of the power system. IFIs/donors (EBRD, KfW, Islamic Development Bank, and JBIC) had been providing significant funding to the sector for building new generation capacity and rehabilitating generation and transmission, thereby remedying some of the neglect of the system over two decades. Still, some of the equipment in use was more than 50 years old, and represented a risk to system reliability. With the Project, the Bank could not only help to fill the funding gap, but could also work with the Government to achieve the structural, legal and regulatory framework needed to attract private funding to the sector.

The Project was to complement sector reforms that had been supported by the Bank's adjustment operations by providing needed investment in power dispatch and transmission network rehabilitation. As transmission is the backbone of the power system, the lack of an adequate dispatch system was both a risk to security of supply and a cause of inefficient operations. The Bank could offer extensive experience in the design and implementation of transmission rehabilitation projects in FSU countries, with lessons that were directly applicable to Azerbaijan.

Higher level objectives to which the Project was to contribute

The Project to rehabilitate the power transmission system was to contribute to the PRSP by improving the conditions for economic growth through more reliable electricity supply; reducing the cost of electricity through improved technical and financial management of the transmission system; and improving the basis for private participation in energy infrastructure development by upgrading the power transmission system to enable dispatch and transmission of electricity consistent with contractual arrangements.

The Project was included in the FY2003-2005 Country Assistance Strategy (CAS) for investment program in the context of improving access to services by reversing the decline in social services and infrastructure, which was one of the four strategic goals of the CAS.

1.2 Original Project Development Objectives (PDO) and Key Indicators

The primary objective of the Project was to improve the efficiency of the power transmission operation in Azerbaijan through technical and institutional strengthening of the generation/ transmission utility. The project had as a secondary objective to contribute to strengthening Azerenerji's financial position.

The key performance indicators that were used to assess the fulfillment of the project's development objectives are: (i) improved efficiency of fuel use per kWh of electricity generated through Economic Dispatch and reduced transmission losses; (ii) improved reliability and quality of electricity supply with respect to frequency and duration of forced outages; and (iii) strengthened financial position (i.e. need for government financial support reduced/ eliminated) as a consequence of (a) tariffs that increase over time to cover full costs, and (b) increased payment collections.

1.3 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

N/A

1.4 Main Beneficiaries

The main beneficiaries of the Project were consumers of electricity: they were expected to benefit from improved efficiency, reliability and quality of electricity supply resulting from successful Project implementation. Azereneji was another beneficiary of the Project: they were expected to benefit from successful implementation of the Project components that targeted institutional, operational and financial strengthening of the national utility.

1.5 Original Components

The Project had four components. These components were selected on the basis of urgent needs of the power system and a division of focus among IFIs, with EBRD at the time preparing a power generation project, and KfW financing transmission components complementary to those to be financed by the Project. The four Project components were as follows:

Component A: Power System Management

To improve the efficiency of the power transmission operations in Azerbaijan and increase reliability and quality of electricity supply, this Project component included investments to upgrade the electricity dispatch system in the country. There were three main subcomponents:

- **SCADA/EMS[2] system:** installation of hardware and software to enable real time acquisition of operational information from generating stations and HV transmission system substations, construction and equipping of Backup Control Center with proper hardware and software, analysis and monitoring of the network status at the National Dispatch Center or Backup Control Center, and control and dispatch of the generating plants and the HV transmission system;

[2] SCADA/ EMS: Supervisory Control and Data Acquisition/ Energy Management System.

- **Telecommunications network upgrade:** installation of communications equipment to meet the requirements of dispatch, metering, and HV network operations and maintenance. It was also expected to provide broadband communications facilities between major Azerenerji offices and generating plants to support improvements in Azerenerji financial management and administration;
- **Station adaptation and metering:** adaptation of generating plant and substation control and metering circuits and equipment to provide alarm, status, and metering inputs to the Remote Terminal Units (RTUs)[3] and accept control outputs from the RTUs.

Component B: Transmission Network Rehabilitation

To enhance system reliability and help protect valuable system assets from costly damage, the second component was to cover priority investments in rehabilitation of high voltage transmission lines and selected high-voltage substations. Subprojects were selected based on priority and economic returns, and included increasing transformer capacity at four HV substations, rehabilitation of 12 transmission line segments, and some low-cost rehabilitation work on four additional substations. The original subprojects are listed in Annex 2

Component C: Management Assistance

In order to support strengthening of Azerenerji's financial position and contribute to its institutional development, the third component was designed to provide technical assistance (TA) to improve the management systems of Azerenerji and prepare the company for a future restructured energy sector. The TA included: (1) assistance in the company's transition to International Financial Reporting Standards (IFRS); (2) related development of an integrated management information system; (3) related revaluation o f Azerenerji's assets; (4) company and project audits; (5) development of an updated Grid Code; (6) transmission costing (as basis for separate transmission tariff); and (7) a transmission network stability study.

This component was expected to also provide TA to help Azerenerji ensure efficient implementation of the project; it included: (8) dispatch system procurement support; (9) project management and technical support; and (10) dispatch system training.

Component D: Project Implementation

The fourth component was to finance Incremental Operating Costs for the Project Implementation Unit (PIU). This subcomponent was modest in size given that the PIU was a part of the Azerenerji organization, with funding reserved for translation and interpretation work, incremental office equipment, international travel relevant to the Project, and incremental office operating expenditures.

During Project preparation, it was expected that some of the subprojects/ subcomponents under Components B and C might change during Project implementation subject to additional studies and changing system environment (e.g., deterioration of existing equipment, emergence of system bottlenecks or weaknesses, etc).

[3] SCADA equipment installed at substations and generating plants.

1.6 Revised Components

There was no revision to the components of the Project.

1.7 Other significant changes

During Project implementation, the Ministry of Industry and Energy (MIE) developed the following documents within the framework of a TA program funded by the EU: (i) updated Grid Code; and (ii) transmission costing. As a result, there was no need for Azerenerji to undertake those studies under Component C. The completion of these tasks by the Ministry, and not Azerenerji, was justified since usually Grid Code and transmission costing are done at the national level since these documents establish power market rules.

Additionally, Azerenerji decided that it was of critical and strategic importance to finance the following items, originally also included under Component C, with their own funds: (i) dispatch system training; (ii) assistance in the company's transition to International Financial Reporting Standards (IFRS); and (iii) related development of an integrated management information system. As a result, over the life of the Project, Azerenerji's contribution to the Project was higher than envisioned at appraisal: not US$7.4 million, but US$8 million.

The Closing Date of the Project was extended by one year, from December 31, 2010, to December 31, 2011. The undisbursed balance US$1.77 million was cancelled on April 30, 2012.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

The Project's quality at entry was high and the Project was based on a sound background analysis; all major risks were identified and appropriate mitigation measures were proposed. By the time the Project was being conceptualized, the Bank had accumulated substantial experience in implementation of similar projects in the countries in the region. Moreover, the Bank had a deep understanding of the problems in the energy sector of Azerbaijan and had been engaged in high-level dialogue to address those.

The Government was committed to the successful achievement of the Project's development objectives. The Government's strategy to address sector governance issues and financial performance of the energy companies was outlined in the Letter of Development Policy for the PRSC-I. This strategy included, among other things, establishing a medium-term tariff policy for Azerbaijan to enable a transition to full cost recovery for utility service providers; and implementing international financial reporting standards. The Government also committed to provide necessary financial and/ or in-kind support to Azerenerji to enable it to meet its obligations under the Legal Agreement.

The most important lesson incorporated in the Project's design was that the priority problems included two closely inter-related issues: sector governance and financial performance of the energy companies. At the time of Project preparation, Azerbaijan had only recently embarked on energy sector reform. The process of restructuring, legal and

regulatory reform, as well as enhancement of utility financial performance was a progression which was supported by an IDA adjustment operation (PRSC-I (P074938, 2005)). The Project was to complement those efforts with needed investment in power system dispatch and transmission network rehabilitation. This integration of policy and investment support was designed to maximize their combined effect on the sector's financial position and sustainability of sector reforms.

The investment and technical assistance components of the Project were based on a feasibility study prepared in November, 2004, by Azerenerji's consultant engineer. This report provided a good basis to select the Project components, and estimate costs and benefits. Based on the feasibility study, the procurement of the SCADA system (with prequalification) started early, in the summer of 2004, during Project preparation, using a PHRD Grant (TF052680-PHRD-Azerbaijan: Energy Project).

Procurement design and management, bid evaluation, project management and implementation coordination had been difficult challenges for borrowers in similar projects. In general, at the time Azerenerji was an inexperienced client, working with the Bank for the first time. To minimize procurement challenges for Azerenerji and its PIU, the procurement strategy was based on two-stage bidding and a turnkey contract for the integrated dispatch system. Technical assistance by international consultants was also included to assist the PIU during project implementation and for capacity building in operation of the new dispatch system and to enhance project sustainability.

Finally, until the financial performance of sector enterprises improved (which would in turn require improvements in collections, tariffs, and social protection systems), the ability of Azerenerji to co-finance projects, was recognized as limited. Acknowledging that the improvements in financial performance would develop only in parallel with the implementation of the reform program, the local financing contribution was kept relatively low in order to reduce the risk of implementation delays.

During the preparation stage, the team identified all the major implementation risks and recommended mitigation measures. The overall risk rating was assessed as substantial. The main identified risks included: (i) loss of Government commitment to the principles of cost-recovery tariffs; (ii) failure to establish adequate social protection systems; and (iii) Project implementation delays due to lack of local financing and poor Project management. The first two risks were addressed through adjustment lending (PRSC-I) and Pension and Social Assistance Project (P049892, 2004). The last risk was mitigated through TA for Project management during implementation (Component C); also, the local financing requirement was minimized.

2.2 Implementation

The key factors that contributed to the success of implementation were:

- **Commitment of the Government to improving financial viability of power sector**. Electricity tariffs were tripled in January 2007 which boosted revenues of Azerenerij. Equally important for improving collections was a Government-championed roll-out of new end-user metering equipment which was completed by 2008. The Government fulfilled its commitment, agreed during Project preparation, to financially support Azerenerji and compensate them for operational losses. After

the tariff increase in 2007, government support to Azerenerji has been consistently decreasing, because the utility's financial position has improved. In 2009, Azerenerji received no direct government transfers. Currently, Azerenerji receives investment support as well as fuel subsidies from the Government.

- **The quality of the technical specifications and of the tendering and procurement process**. Technical specifications for SCADA and transmission rehabilitation components were prepared at a very high professional level with the assistance of owner's consultant engineer, which contributed to an efficient procurement process and hence implementation of the project.

- **The quality of the actual implementation and technical management of the SCADA/EMS and transmission rehabilitation subprojects.** The PIU provided quality technical management of the works. The PIU developed a good working relationship with the owner's consultant engineer and closely cooperated with the Bank team. The PIU's decision to hire an international Project Management consultant significantly improved the implementation of the SCADA/EMS component. Transmission rehabilitation subprojects were implemented by Azerenerji under supervision of the contractors' representatives; this arrangement had a highly positive impact on quality and timely implementation of subprojects.

- **Proactive supervision by the Bank's team.** Because Project implementation experienced delays, a mid-term review of the Project was conducted in April 2008, two months earlier than originally planned. At the time of the review, the mission rated the Project's implementation progress as Unsatisfactory. The review highlighted the following issues: (i) delays in effectiveness of the contract with SCADA supplier; (ii) inadequate FM and procurement staffing of the PIU; and (iii) non-compliance with financial reporting requirements. The Bank team, together with Azerenerji, put together a 19-point action plan to address the issues above and closely followed its implementation. Taking this action at the mid-term review contributed to the Project's success. Most of the actions on the list were completed within six months after the mid-term review. As a result, disbursements increased for all Project components and there was dramatic improvement in the PIU performance (the PIU received its own space; a financial specialist and a Project Management Advisor came on board in 2008).

The main issues that gave rise to problems were:

- **Complexity of SCADA component**. Procuring (and implementing) SCADA for Azerbaijan has been among the most complex technical undertakings in the sector to date. The scale of this endeavor was the primary reason for the implementation delays, mostly because of:

  i. *The complexity of work that went into preparation of technical specifications and evaluation of bidding documents (bidding documents plus technical specifications were about 1,700 pages).* The technical complexity of SCADA/ EMS component led to delays in preparation of the technical specifications. Due to the magnitude of the task to obtain compliance with detailed specifications, it took Azerenerji and their consultant engineer 9 months from having received the bids to prepare a Bid Evaluation Report;

ii. *Difficulties of SCADA design.* At the stage of signing the contract's Statement of Work with the SCADA supplier it was discovered that the bidder had not taken into account all necessary technical modifications; it made significant technical changes in the Stage 2 financial offer and did not provide adequate explanation of those changes. As a result, the proposed technical changes became the subject of long disputes, disagreements, change orders, and delays in Project implementation;

iii. *Necessity for sufficient resources and expertise to carry out the station/substation adaptation task*. The control and metering circuits at existing substations and generation plants needed to be modified for connection to SCADA system's RTUs. Azerenerji assessed that station/substation adaptation could be performed using its own Construction Department resources. However, it turned out during the Project implementation that the Construction Department was split off from Azerenerji into a new construction company that was also a subsidiary of Azerenerji. Azerenerji had also underestimated its capacity to carry out both the detailed design and the installation of the station adaptation work. After long delays and negotiations, Azerenerji was able to have the SCADA supplier prepare the station adaptation designs and the construction company to perform the installation work. The insufficient quality and progress rate of the adaptation works resulted in project delays and many errors and deficiencies that required corrections and adjustments.

- **Limited experience of Azerenerji to deal with international contract administration**. During contract negotiations with the SCADA supplier, Azerenerji agreed to pay the supplier's subcontractor directly, which is not a good practice from a contract administration point of view. This decision resulted in additional requirements for contract effectiveness (i.e., issuing advance payment and letter for credit to supplier's subcontractor). As a result, the effectiveness of the contract with the SCADA supplier was delayed.

- **Limited experience of the PIU**. Azerenerji at first underestimated the administrative and procurement challenges of the Project implementation. The PIU at the outset lacked a fully-developed plan for its staffing, and initial procurement plans were lagging in most areas; record keeping of procurement activity and contract management were inadequate; the PIU members did not work in the same office, but were located in different parts of Azerenerji.

The delays in Component A (SCADA/ EMS) implementation caused the extension of the Project. However, despite difficulties and complexity of SCADA/ EMS implementation, the Project was extended only once and the Project outcomes were satisfactory.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

Monitoring and evaluation of the Project was adequately designed. The appropriate monitoring indicators were selected that were directly relevant to the achievement of the Project development objective. The indicators were quantifiable, relevant and measurable. During Project preparation the Bank team and the PIU designed a data collection format and developed a plan for data collection to establish baseline indicators. Monitoring and data collection was the responsibility of Azerenerji.

Azerenerji initially did not have the capacity to collect and provide data that met the requirements set by the Bank team, particularly on grid outages statistics and hydro generation performance. The Bank team worked closely with Azerenerji to improve cooperation and coordination within its departments in order to build up Azerenerji's capacity to collect and provide all of the necessary results monitoring data. Still, after the data collection format was finalized, the baseline indicators were established and the Bank was satisfied with the quality of the data received, coordination between different departments of Azerenerji remained an issue. As a result, Azerenerji did not consistently report operations data needed to assess Project performance. The necessary monitoring information was sent after it was requested by the Bank.

The quality of data provided by Azerenerji met the Bank requirements. The values of the indicators were integrated in Aide Memoires, PSRs and ISRs.

2.4 Safeguard and Fiduciary Compliance

The Project triggered OP/ BP 4.01 Environmental Assessment (EA) as the high voltage transformers and switchgear contained potentially hazardous material. The proposed investments under the Project were to be confined to existing facilities and as such were unlikely to trigger major environmental impacts or other safeguard policies. An EA was carried out and an Environmental Management Plan (EMP) was prepared to define procedures for mitigation of local impacts of the project during construction (e.g. repair of lines, replacement of transformer equipment) and disposal of waste materials and procedures for mitigation during operation (e.g. maintenance activities). Satisfactory consultations about and disclosure of the EMP took place. There was no presence of polychlorinated biphenyls (PCB) in the transformer oil used in Azerbaijan. There were no subprojects in disputed areas/conflict zones. Implementation of EMP was closely followed by Azerenerji, and the Bank supervision team received regular reports of the contracts for orderly removal of old equipment, transformer oils and scrap metal, and the status of measurements of electric and magnetic fields.

An FM reporting process was established at the start of implementation with the assistance of the Bank's FM specialist. A Project accounting system was established to produce regular quarterly reports. These were later integrated into the company's Management Information System (MIS). The quarterly reports were consistently submitted in a timely manner and were acceptable to the Bank. FM arrangements established by Azerenerji were found to be fully satisfactory and Azerenerji's performance to be fully compliant with Bank standards. 2006 audit of Azerenerji accounts was submitted with a significant delay in 2009 as a result of poor delivery performance of the auditors. Significant progress was observed regarding FM governance of Azerenerji particularly during the last two years of the Project implementation (2010 and 2011). Azerenerji transitioned to IFRS in 2010.

All procurement was carried out consistent with Bank Guidelines and in accordance with the methods and thresholds specified in the Legal Agreement. Procurement plans were reviewed and updated during each mission. Azerenerji's owner's consultant engineer assisted with preparation of all bidding documents for SCADA/EMS at an early stage; in 2007 a local Procurement Specialist was engaged to deliver 2 other big procurement packages for the transmission rehabilitation component. The technical complexity of the

SCADA/ EMS component led to delays in preparation of the technical specifications, and the procurement process took longer than originally anticipated. However, by the end of the Project, all contracts for equipment had been completed satisfactorily, due to an improvement in procurement capacity of the PIU.

2.5 Covenant Compliance[4]

Azerenerji did not comply with the current ratio covenant in 2009-2011, and the debt service ratio covenant in 2009-2010. The main reason for low current and debt service ratios was Government's decision to launch a massive rehabilitation and construction investment plan in generation and transmission in particular. After reviewing Azerenerji's 2009 audit, the Bank team, together with Azerenerji, developed an action plan that would allow Azerenerji to address the issue of non-compliance with the covenants. The agreed action plan included: (a) improvements on collection of receivables through loss reductions and improved revenue collection; (b) gradual tariff adjustments; (c) reclassification of IFIs loans from current liabilities to long term liabilities; (d) further steps in the corporatization process, particularly the establishment of a risk management and budgeting unit by December 2012.

Based on the action plan, Azerenerji launched an ambitious commercial restructuring and financing plan, which is expected to positively affect Azerenerji's finances starting 2015-2017. In March, 2011, Azerenerji requested a waiver for the 2010 fiscal year in terms of the current ratio and debt service covenants. After due consideration the Bank accepted to waive compliance by Azerenerji with the current ratio and the debt service ratio covenants. Similar waiver for the fiscal year 2011 was granted in February, 2012.

2.6 Post-completion Operation/Next Phase

A significant portion of the investment financed by the Project was the installation of a state of the art SCADA/ EMS which is now largely operational. For the system to become fully operational, system tests need to be completed. The tests are expected to be completed in June 2012.

Extensive training has been provided to Azerenerji by the SCADA supplier, but more hands-on training is needed to improve project sustainability. Azerenerji has negotiated with the supplier that it will provide additional training to Azerenerji staff on operation of SCADA/ EMS and telecommunication systems. These trainings are scheduled for mid-2012. After the system is fully operational, a supplier specialist will be embedded into the Azerenerji SCADA/EMS technical support team for one year, until spring 2013, to continue hands-on operational training of Azerenerji staff.

Azerenerji's Dispatch Manual needs to be updated. Azerenerji stated that they were in negotiations with a European power utility to assist in developing an updated Manual that would cover the use of the EMS functions and cross-border energy transactions.

[4] The legal covenants included: (i) current ratio not less than 1.2; (ii) debt service ratio not less than 1.5; (iii) the Government to provide financial and/or in-kind contribution to enable Azerenerji to meet obligations under the Legal Agreement.

Azerenerji has taken a number of steps to ensure that established FM governance is sustained. To address auditors' recommendations in 2010 audit, Azerenerji established a separate department for automatic billing in 2011. Furthermore, Azerenerji launched an ambitious commercial restructuring and financing plan including measures to improve collections on the distribution side of the business and write-offs of its payables and receivables. It is expected that the results on Azerenerji's finances will start showing up in 2015-2017.

The monitoring and evaluation system, including the set of indicators used for the Project, remains relevant. Once the SCADA system becomes fully operational, it will provide all the necessary information for the Project indicators thus eliminating the problem of inter-departmental coordination. The Bank will continue dialogue with Azerenerji to ensure that SCADA system becomes fully operational and that Project indicators continue to be used and utilized to monitor system performance.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

The Project development objective (PDO) and design still remain highly relevant to the current development priorities of the Azeri Government. The 2009 financial crisis heightened the Government's resolve to transform itself into a diversified, globally-integrated competitive economy. Improving and expanding infrastructure in power supply is seen as a critical input. The need to ensure uninterrupted power supply remains a priority, and SCADA/EMS is a key element of power sector reform and modernization. The necessity to enhance the business environment, including commercialization and financial sustainability of state-owned enterprises, is equally an important goal. In addition, regional power trade is one of the Government's strategic focuses. By improving effectiveness of the electricity market operations and reducing losses through utilization of SCADA/ EMS, the Project contributes to the Government's overall long-term goals.

Thus, the PDO and design were and still are fully aligned with the Government's objectives. The Bank provided adequate, timely and proactive implementation support to ensure successful achievement of the PDO.

The PDO is also consistent with the current Country Partnership Strategy (CPS) for FY11-14. One of the two pillars in the CPS is building a competitive non-oil economy. Reliable and efficient power supply is fundamental to developing a competitive business environment. An efficient, financially-viable generation/transmission utility is essential for a properly-operated, regionally integrated electricity market.

3.2 Achievement of Project Development Objectives

The project has been successful in achieving its PDO. By the Project's closing date, the SCADA system was substantially completed and transmission rehabilitation subprojects were fully completed. As intended, technical and institutional strengthening of Azerenerji has brought about improvements in the efficiency of power transmission. The efficiency of power transmission operation has improved, as reflected in the respective monitoring

indicators. The corporate and financial management of Azerenerj has shown impressive progress.

During the Project, the efficiency of fuel use per kWh of electricity generated improved and is expected to improve further, when the SCADA system becomes fully operational. Much of the improvement was due to the additional generation built by Azerenerji during the lifetime of the Project, but further improvements are likely once the SCADA/EMS system is in full operation. The quality of electricity supply was increased with respect to frequency and voltage levels. Despite tripling of tariffs in 2007, collection rates have been consistently improving: from 61 percent in 2006 to about 90 percent in 2011.

The Project has also significantly contributed to strengthening of Azerenerji's financial management system and internal controls, including preparation of IFRS-based accounts. Azerenerji has completed financial audits since 2006. In 2008, it received unqualified (clean) audit; it has addressed auditors' recommendations of 2009 and 2010 audits.

A positive impact of the Project on the economy has taken place through more efficient electricity supply to households and enterprises. Electricity supply has improved along the entire grid, supporting economic activity in the process. There has been a significant turnaround in billings and collections. SCADA/EMS has provided the technical means to enable efficient provision of quality power supply by accurate measurement of power, respectively accurate billing and improved system stability through efficient power dispatch.

3.3 Efficiency

Economic

A cost-benefit analysis was carried out using similar assumptions as those at Project appraisal, except where the data were available in a different form. Quantifiable benefits of the Project include: (1) improvements in power plant scheduling resulting in lower overall fuel costs; (2) lower transmission losses; (3) lower operational costs in administration, data logging and reporting; (4) reduced faults on the line leading to improved outage times; and (5) avoided load shedding due to increased capacity of transformers. The economic benefits were measured using the average regional electricity price. Since 2007, Azerbaijan is a net electricity exporter, so the opportunity cost of power losses is foregone export revenues.

The overall net present value is estimated to be US$80 million, compared to US$145.1 million at appraisal. The internal economic rate of return (EIRR) was estimated to be 28%, compared to 39% at appraisal. The estimated EIRR is lower than at appraisal, because the expected benefits of SCADA will be utilized later than assumed initially.

Financial

A financial analysis was carried out for the same components. The only difference from the economic analysis is that the benefits were valued at the domestic electricity and fuel prices, US$0.075 /kWh and US$0.01-0.03/ kWh (depending on a year) respectively. The financial internal rate of return was estimated to be 19%.

Table 2 below summarizes Project's rates of return.

Table 2: Summary of Project Rates of Return

	EIRR	NPV US$ mln	FIRR	NPV US$ mln
SCADA/ EMS	22.1%	39.5	11.7%	4.0
Transmission System Rehab	41%	43.8	32%	26.7
Transmission Line Component	69%	33.6	56%	22.0
Transformer Replacement Component	21%	10.3	16%	4.7
Total Project	**28%**	**80.0**	**19%**	**30.3**

3.4 Justification of Overall Outcome Rating
Rating: Satisfactory

The Project is considered to be satisfactory in terms of the overall outcome. By the time the Project closed, the SCADA component was substantially completed (by 95%), the transmission system rehabilitation component was fully completed, and management assistance component was completed. The reason the outcome is rated satisfactory, and not highly satisfactory, is due to the fact that the SCADA system tests are still ongoing[5]. As discussed above, the PDO remains highly relevant to the current priorities of the Government and the Bank (as stated in current CPS). The PDO has been achieved as measured by targets established at appraisal. As a result of the investment, the transmission and distribution systems, as well as institutional structure of Azerenerji, have undergone significant improvements that fulfill the key goal of providing reliable power supply to consumers.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development
Not applicable to this project.

(b) Institutional Change/Strengthening
During Project implementation, Azerenerji has gone through significant transformation. Some of the highlights of the long-term improvements are:

- Reporting and planning has improved with regular monthly, quarterly and annual reports, which combine financial, corporate and operational information;
- Financial audits are conducted based on IFRS;
- Azerenerji received unqualified (clean) audit in 2008;
- Operation and maintenance of the transmission system is improving;
- Capacity of Azerenerji to manage complex investment projects has increased.

The above outcomes (except for unqualified audit) have been sustained for two years.

(c) Other Unintended Outcomes and Impacts (positive or negative)
N/a

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops
N/a

[5] For SCADA/EMS system to be fully operational, it has to run without any issues for three consecutive months. The tests of the system are still ongoing.

4. Assessment of Risk to Development Outcome

Rating: Moderate

The risk to development outcome has been evaluated with respect to a number of criteria as summarized below:

- **Technical risk** is assessed as low and manageable. Most of the technologies introduced are well-established and Azerenerji has received training in applications that were new to the company.
- **Financial risk** is assessed as moderate. Azerenerji's financial position has improved since 2007. The company has also launched a commercial restructuring and financing plan, which is expected to have positive results on its finances in 2015-2017. Still, cost-recovery tariffs and systematic underpayment of large wholesale customers remain an issue. In 2010 and 2011, the tariff was inadequate to recover costs, once collections were taken into account. BakiElektrikShebeke, which is in charge of the Baku distribution network and is the largest wholesale customer of Azerenerji, systematically underpays about 18 percent of its monthly bills. No tariff increases happened since 2007 and none are expected. With the domestic inflation rate as high as 8.3 percent, zero tariff increase in nominal terms over a period of a decade is equivalent to more than 50 percent decrease in real terms. As Azerenerji's cost structure evolves over time, the infrequency of tariff adjustments could lead to divergence in the company's operating margin.
- **Economic risk** is assessed as moderate. The recent economic crisis had limited impact on sector operations.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: Satisfactory

Bank performance in ensuring quality at entry is rated as satisfactory. Objectives of the Project and its components were well defined and consistent with country priorities and CPS objectives. Bank team was instrumental in obtaining the PHRD grant, which enabled project preparation experience for the PIU and preparation of bidding documents before effectiveness.

(b) Quality of Supervision

Rating: Satisfactory

Supervision of the Project was carried out on a regular basis with numerous formal missions over the Project life, including a detailed mid-term review. The Bank team's recommendations during the mid-term review were instrumental in turning the project around and ensuring its successful completion. An average of three missions per year over the lifetime of the project, plus field office continuous engagement, helped secure close cooperation with the government and to supervise the technical aspects of the Project. All aspects of the Project implementation were proactively addressed during the missions, including action plan to improve compliance with the legal covenants; potential problem areas were highlighted and steps to resolve issues were agreed with Azerenerji.

The subsequent missions followed up on the implementation of the agreed steps and resulting outcomes. Critical Project and sector-related issues were addressed via Aid Memoires and follow-up letters. The Bank team had appropriate skills mix and adequate budget to effectively monitor Project implementation. The Bank team closely monitored implementation of the SCADA contract and recommended to contract the supplier for an additional year of training on SCADA.

(c) Justification of Rating for Overall Bank Performance

Rating: Satisfactory

Based on satisfactory quality at entry and supervision, the overall Bank performance is rated satisfactory.

5.2 Borrower Performance

(a) Government Performance

Rating: Satisfactory

The Government was highly supportive in all aspects of Project implementation. The Government took the necessary steps to improve financial viability of the sector: it provided direct financial support to Azerenerji as agreed during Project preparation, increased electricity tariffs and started decreasing direct support to Azerenerji as the utility's financial position improved. Without full commitment of the Government to a properly sequenced reform process and its willingness to partner closely with the Bank, the Project could not have been implemented successfully and the Project development objectives would not have been achieved.

(b) Implementing Agency or Agencies Performance

Rating: Moderately Satisfactory

The Implementing Agency's performance is rated moderately satisfactory because Azerenerji did not comply with all legal covenants. Also there is no evidence that Azerenerji will continue using established Project indicators to monitor system performance. The financial management and procurement functions were performed in a satisfactory manner by the PIU. Despite initial staffing shortcomings, the PIU went on to provide quality technical management of the Project implementation, was prepared for missions and complied with requests for supplementary information. Field trips to observe implementation progress were efficiently organized and missions received attention of the top management. There was close cooperation between the PIU and the Bank team.

(c) Justification of Rating for Overall Borrower Performance

Rating: Moderately Satisfactory

Based on satisfactory Government performance and moderately satisfactory performance of the Implementing Agency, the overall Borrower performance is rated moderately satisfactory.

6. Lessons Learned

1. **Government commitment to reform is essential and needs to be maintained to ensure sustainability of the Project outcomes.** The Government's stance on financial

reforms was crucial to achieving PDOs. The Government followed through on its commitment to increase tariffs, which improved financial position of the power sector and moved Azerenerji towards becoming a financially sustainable utility. Government-promoted installation of new end-user metering equipment played an important role in improving collections. However, for sustainability of the Project's achievements, the Government needs to maintain its commitment to ensure cost-recovery tariffs: tariffs need to be systematically adjusted to reflect the full cost of service.

2. **The difficulty of introducing modern SCADA/ EMS must not be underestimated with respect to complexity, unexpected developments during installation and implementation time**. Design of a project of installation of SCADA/EMS for a power sector which faces operational, structural and technical problems should allocate ample time for the project's timely completion. Under such conditions, it is critical not to misjudge the complexity of developing technical specifications and checking for compliance with those during the procurement process. It is also essential to ensure that necessary resources and qualifications are allocated to adaptation of substations and generating plants for connection to the SCADA/ EMS system. Knowledge transfer is also important for proper SCADA/ EMS system operation. Hands-on dispatch staff training by a SCADA vendor is essential for the efficient use of the system to its full capacity.

3. **Commitment and strong Project ownership by an implementing agency is critical.** During the life of the Project, Azerenerji went through a process of a dramatic transformation: from a Soviet-type state-owned utility to a corporatized public entity. Increasing efficiency of electricity market operations through installing SCADA/ EMS and improving internal governance through introducing proper financial management system and internal controls have been among main priorities of Azerenerji. Despite the fact that at the beginning of the Project Azerenerji had limited experience of dealing with international investments, by the end of the Project the utility has transformed into a reliable player ready to enter the regional electricity market.

4. **Close bank supervision and continuity of staff is essential for a successful project implementation**. Introduction of SCADA/ EMS, in parallel with energy sector reforms, is a complex, multifaceted undertaking and requires more than normal Bank supervision. An average of three missions per year over the lifetime of the project, plus field office continuous engagement, helped secure close cooperation with the government and to supervise the technical aspects of the Project. When working with a PIU with limited experience of implementing complex projects implementation, it is important to ensure adequate capacity building. It is also important to assist the PIU in developing its monitoring and evaluation capacity.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

Comments on the draft ICR were received from the Borrower and were taken into account.

(b) Cofinanciers

N/a

(c) Other partners and stakeholders

N/a

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
SCADA system	45.8[6]	35.7	110
Transmission system rehab.		14.7	
Management Assistance	3.3	2.2	67
Project Implementation	0.7	1.5	214
Unallocated	0.2		
Total Baseline Cost	50.0	54.1	108
Physical Contingencies	2.6	0.00	0.00
Price Contingencies	2.6	0.00	0.00
Total Project Costs	55.2	54.1	98
Front-end fee PPF	0.00	0.00	0.00
Front-end fee IBRD	0.2	0.2	100
Total Financing Required	55.4	54.3	98

(b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Borrower		7.4	8.0	108
International Bank for Reconstruction and Development		48.0	46.3	96

[6] At appraisal, the cost of these two components was combined.

Annex 2. Outputs by Component

Component A: Power System Management

Component A included investments to upgrade the electricity dispatch system in the country, which in turn was to support the reliable, secure and economic operation of the electricity sector, and facilitate financial settlements in a future wholesale electricity market. There were three main subcomponents:

Subcomponent 1

This subcomponent included installation of hardware and software to enable real time acquisition of operational information from generating stations and HV transmission system substations, analysis and monitoring of the network status at the National Dispatch Center, and control and dispatch of the generating plants and the HV transmission system.

Activities Planned at Appraisal[7]	Actual Activities	Outputs
- Installation of Supervisory Control and Data Acquisition (SCADA) system and the Energy Management System (EMS) at the National Dispatch Center (NDC); - Construction of Backup Control Center (BCC) in Baku; - Installation of Remote Terminal Units (RTUs) at the generating plants and HV substations.	- National Dispatch Center was properly upgraded and equipped with new computer equipment, proper servers, panels, recorders, printers, workstations, UPS and etc; - New Backup Control Center (BCC) was constructed and also equipped with all necessary computer equipment, wall video-display, instruments; - Equipment for forty seven (47) most important power system sites (power plants, HV substations) was purchased and installed, including Remote Terminal Units (RTU), transducers and others; - Adaptation works were implemented at each project site in order to make existing equipment at all sites compatible with the new equipment purchased as a part of the Project.	Dispatchers have all operational data needed in order: - To monitor and control the load flows on transmission lines in real time mode; - To estimate the power system state and make flexible solutions for localization of faults in transmission network, if any; - To plan outages of the substations and lines; - To refer to archive for analyzing of all events in the power system, and etc. Calculating Team of Dispatch Department has possibility: - To calculate forecast loads at substations and transmission lines; - To develop different models of the power system depend on various configurations; - To estimate the dynamic and static stability of the power system, and etc.

Subcomponent 2

This subcomponent included installation of communications equipment to meet the requirements of dispatch, metering and HV network operations and maintenance.

[7] As specified in the Project Appraisal Document

Activities Planned at Appraisal	Actual Activities	Outputs
- Installation of the necessary communications equipment (fiber optic cable systems, power line carrier systems (PLC), telephone systems) - Providing broadband communications facilities between major Azerenerji offices and generating plants	- About 850 km of Fiber Optic Communication Lines were installed to connect NDC and BCC with node substations and power plants; - Power Line Carrier Systems were purchased and installed including two digital systems; - For NDC, BCC and all project sites modern private digital telephone system was purchased and installed; - New communication network management system (NMS) purchased and installed	Private Communication System became more reliable, faster, more secure and manageable

Subcomponent 3

This subcomponent included adaptation of generating plant and substation control and metering circuits and equipment to provide alarm, status, and metering inputs to the Remote Terminal Units (RTUs) and accept control outputs from the RTUs; and installation of fuel meters on each major thermal generating unit.

Activities Planned at Appraisal	Actual Activities	Outputs
- Design and installation modifications to the station control circuits and equipment; - Installation of remote access facilities to existing and new energy meters at all interconnecting points to the bulk power transmission grid from the generating plants	- Adaptation works were implemented at each project site in order to make existing equipment at all sites compatible with the new equipment purchased as a part of the Project; - Automatic Generation Control (AGC), purchased as a part of SCADA System, includes now one power plant only; - The Central Metering System (CMS) purchased and installed in the scope of the Project includes 150 modern intellectual meters of ION type properly configured and equipped with proper servers, other equipment and software	- AGC System allows remote controlling of generation at the power plants involved in the System depend on specific situation in the power system e.g. on the frequency level; - CMS provides monitoring of load flows on all border points with the electricity consumers in real time mode and taking measures depend on specific situation.

Component B: Transmission Network Rehabilitation

Component B included priority investments in rehabilitation of high voltage transmission lines and selected high-voltage substations.

As planned during preparation and appraisal, flexibility was included in the Project to cover the changing system environment. In May-June 2005, a planned detailed assessment of Azerenerji's substations, related to SCADA/EMS system, was carried out.

During the assessment it was identified that replacement of measuring transformers at some additional substations would be needed, because accuracy rate of them was not in accordance with the Standard requirements. It was also found that purchasing of additional 330-35 kV Circuit Breakers and Disconnecting Switches would be required to guarantee more successful rehabilitation of substations included in the subproject list under Component B. As a result, after the Loan Agreement was signed, Azerenerji requested to change the substations to be rehabilitated.

Moreover, in autumn of 2005 Azerenerji received the information that Japan Government decided to allocate a grant for financing of rehabilitation of one of the substations included under Component B (Mushfiq 220 kV Substation); this grant had been discussed since 2003. The sum of the grant was rather more than it was foreseen in the framework of the Project. Therefore Azerenerji proposed to exclude the rehabilitation of Mushfiq 220 kV Substation from the subproject list for Component B and add the newly identified investments. The Bank provided its' No Objection. As agreed with the Bank, substation equipment was purchased from two suppliers

Activities Planned at Appraisal	Actual Activities	Outputs
- **Mushvig 220 kV substation**: Purchase and replace two 200 MVA transformers with two 250 MVA transformers; - **Imishli 330 kV substation**: Purchase and replace two 125 MVA transformers with two 200 MVA transformers; - **Ganja 330 kV substation**: Purchase and add one 125 MVA transformer; - **Gala 110 kV substation**: Purchase and replace two 40 MVA transformers with two 63 MVA transformers; - **2nd Apsheron 500 kV line**: Stabilize transmission line towers; - **1st Apsheron 330 kV line**: Stabilize transmission line towers; - **4th Ali-Bayramli 330 kV line**: Stabilize transmission line towers; - **1st Ali-Bayramli 220 kV line**: Replace conductors and insulators and reinforce towers; - **Sangchal 220 kV line**: Replace conductors and insulators and reinforce towers; - **3rd Apsheron 220 kV line**: Replace conductors; - **4th Apsheron 220 kV line**: Replace conductors; - **1st Mingechevir 220 kV line**: Replace insulators and reinforce towers; - **2nd Mingechevir 220 kV line**: Replace insulators and reinforce towers; - **2nd Ali-Beyramli 220 kV line**: Replace conductors and insulators; - **Agsu 220 kV line**: Replace insulators and	- **Imishli 330 kV substation**: Purchase and replace two 200 MVA 330/110 kV autotransformers with two ones each of 240 MVA capacity, 110 kV Current Transformers, DC battery, 10 kV Switchgear bays, add one 40 MVA 110 kV transformer; then it was decided to install this transformer at Agdjabedi 110 kV substation because of unexpected load increasing; - **Gala 110 kV substation**: Purchase and replace two 40 MVA 110 kV transformers with two 63 MVA transformers, 110 kV CTs, 6 kV Switchgear bays; - **Gandja 330 kV substation**: Purchase and replace 110 kV Circuit Breakers, Disconnecting Switches - **Yashma 330 kV substation**: Purchase and replace 330 kV Circuit Breakers, Disconnecting Switches, 110 kV Current Transformers, 220 kV Voltage Transformers; - **Sumgait CHPP-2 (S/S)**: Purchase and replace 110 kV Current Transformers; - **Sabirabad 110 kV substation**: Purchase and replace 110 kV Current Transformers; - **Janub 110 kV substation**: Purchase and replace 110 kV Current Transformers; - **110 kVSubstation #135**: Purchase and replace 110 kV Current Transformers; - **Sumgait 110 kV substation**: Purchase and replace 110 kV Current Transformers - **Agdjabedi 110kV substation:** Purchase and replace 110 kV Current Transformers,	- Obsolete HV circuit-breakers, insulators, current transformers and others were replaced with new ones at most critical substations; this brought improvement in reliability and functional capability of those substations; -Main transformers at Imishli, Gala and Agdjabedi Substations were replaced with new ones having more capacities. A 330/110 kV transformer withdrawn from Imishli Substation was installed at Gandja Substation. All these measures brought improvement in grid reliability.

Activities Planned at Appraisal	Actual Activities	Outputs
reinforce towers; - **1st Barda 110 kV line**: Replace conductors, insulators and towers; - **Yashma 330 kV substation**: Purchase and add three 330 kV GIC circuit breakers; - **Alat 110 kV substation**: Purchase and replace the station control battery; - **1st Alat 110 kV line**: Replace conductors, insulators and towers; - **1st Kurdemir 110 kV line**: Replace conductors, insulators and towers; - **Kurdemir 110 kV substation**: Replace one 15 MVA transformer with one 25 MVA transformer; - **Yevlakh 110 kV substation**: Replace 10 kV switchgear.	and installation of 40 MVA Transformer initially intended for Imishli substation	

Component C: Management Assistance

Component C included technical assistance (TA) to improve the management systems of Azerenerji and prepare the company for a future restructured energy sector.

Activities Planned at Appraisal	Actual Activities	Outputs
- Support to Azerenerji's transition to International Financial reporting Standards (IFRS); - Assistance with Integrated Management Information System (IMIS); - Asset revaluation; - Development of the revised Grid Code; - Transmission costing study; - Transmission network study; - Company and project audits; - Assistance with Dispatch system procurement; - Project Management and Technical Support: a. Project management; b. Procurement assistance; c. Technical Specialist assistance; d. Environmental management; - Dispatch Training	The most important technical assistance for improving of the management systems was actually provided per the following directions: - Project Management; - Transmission Network Study; - Project Finance Management; - Project Procurement; - Assets Evaluation; - Project and Company Audits; - Assistance in the company's transition to International Financial Reporting Standards (IFRS); - Related development of an integrated management information system; - Dispatch system training.	The following studies were completed: - related development of an integrated management information system; - transmission network stability study; - company and project audits. Azerenerji received very highly qualified assistance on: - Projects management practice, - Project procurement practice; - Adoption of modern approaches for modeling and planning of the power system development; - Finance management practice.

Component D: Project Implementation

Component D financed Incremental Operating Costs for the Project Implementation Unit (PIU).

Activities Planned at Appraisal	Actual Activities	Outputs
- Financing of incremental office furnishings and equipment; - Financing of incremental office operating expenses; - Financing of accounting and office software; - Interpretation and translations; - Overseas travel expenses for PIU team members for project-related meetings, training, and to witness in-plant tests.	In order to arrange the PIU was created. PIU contained the persons having proper specialty and qualification. There are the best specialists on: - Transmission System; - Generation System; - Telemetry and Measurement Systems; - Communication System; - Relay Protection System; - Environment; and etc. The PIU was entirely financed by Azerenerji.	Azerenerji's PIU members were in daily contact with the contractors involved to Power Transmission Project implementation; reviewed and commented on all project documentation (configurations of equipment to be supplied and installed, connection schemes, drawings and etc.), participated in factory tests of the equipment to be supplied and on site tests of the equipment delivered. They also monitored Project progress. Weekly meetings were held in order to solve problems, to correct schedules, etc.

Annex 3. Economic and Financial Analysis

A cost-benefit analysis was carried out using the same assumptions as at Project appraisal except where the data were available in a different form. Table A3.1 below summarizes Project rates of return; sections below explain the calculations by component.

Table A3.1 Summary of Project Rates of Return

	EIRR	NPV US$ mln	FIRR	NPV US$ mln
SCADA/ EMS	22.1%	39.5	11.7%	4.0
Transmission System Rehab	41%	43.8	32%	26.7
Transmission Line Component	69%	33.6	56%	22.0
Transformer replacement Component	21%	10.3	16%	4.7
Total Project	**28%**	**80.0**	**19%**	**30.3**

1. Component A: Power System Management (SACADA/EMS System)

Capital cost: The overall capital cost of the SCADA/EMS system was US$35.7 million. The system is expected to deliver full benefits by the end of 2012. Expenditures began in the first quarter of 2008.

Benefits: The installation of a modern SCADA/EMS system will fundamentally improve the operational work of Azerenerji in almost all its aspects. In some instances, the degree of improvement is difficult to quantify or to value (for example, the effects of better maintenance scheduling, extension of asset life and improved billing resulting in lower commercial losses). Other benefits, however, can more readily be quantified and valued. Specifically, the types of benefits considered in the IRR analysis were as follows:

1) improvements in power plant scheduling resulting in lower overall fuel costs;
2) lower transmission losses;
3) lower operational costs in administration, data logging and reporting; and
4) deferred expenditure on new generation.

1) Improved Scheduling: The Azerenerji system is relatively complex for its demand load. It used to be controlled by a central dispatch center in Baku that was of obsolete design and suffered from poor maintenance and lack of spare parts. As a consequence, station dispatch operated at below optimal levels which resulted in losses due to lower overall system efficiency. With the SCADA and communications system, scheduling of thermal plants will be improved so as to make better use of those with higher efficiency. At the margin, the variable costs saved as a result of improved scheduling of generating plants are primarily fuel, either in the form of fuel saved or in the form of scheduling lower-cost plants at higher loads. The average cost of fuel per kWh was US$0.0217/kWh in 2005 and rose to US$0.0326/kWh in 2006. Since then, the price Azerenerji has been paying for gas is subsidized: since 2009 it pays about US$0.015/kWh, about 1/2 of full

economic price. Using these estimates, the projected financial fuel bill for Azerenerji in 2012 would be US$291 million (based on average fuel costs per kWh). The economic cost would be approximately 100 percent higher (US$579 million).

SCADA/EMS system is expected to become fully operational in 2012. Given current data limitations, it is impossible to forecast with any accuracy the improvements that can be achieved by a modern SCADA/EMS system installed on the current Azerenerji network. A conservative estimate based upon international experience is that overall fuel use will be reduced by 1.5%. The resultant savings associated with the installation of the SCADA system in 2013 (the first year of full operation of the system) is estimated at US$4.3 million for the financial analysis, and US$8.9 million for the economic analysis. These savings would increase on an annual basis in proportion to demand growth (conservatively about 5% per year, as regional trade grows).

2) *Lower Transmission Losses:* The electricity system in Azerbaijan was reported to have technical losses in 2005 of 3.45%. In 2006-2008, reported transmission losses were increasing, because other (old) transmission lines were added to Azerenerji system. The transmission system reported to have technical losses of about 4.05% in 2008. Since 2008, transmission losses have been reduced to 3.6% in 2011. The introduction of SCADA will allow more efficient use of the national transmission system and, consequently, lower overall transmission losses. As with improvements in scheduling, such improvement is difficult to quantify although experience with other systems suggests that it will occur. An improvement of 0.5% was assumed for this analysis; that is transmission losses were assumed to decline from the current 3.6% to 3.1% after 2012 (assuming that the transmission system operated by Azerenerji stays unchanged). The resultant benefits were measured as the value of avoided fuel consumption expressed in both financial and economic terms. In 2013, the financial benefits to Azerenerji are projected at $1.4 million while the economic benefits are projected to be $3 million.

3) *Lower Operating Costs:* Logging and transmitting data presently consumes a significant amount of resources within the Azerenerji organization. During appraisal, the company prepared an estimate of the operational savings likely to arise as a result of SCADA installation, which totaled US$315,400 annually. This estimate remains valid. The areas of savings included accounting and financial reporting, preparation of techno-economic data, computerized preparation of financial data, human resources management, computerization of O&M data, reduction in communications expenses, and investment planning. At the same time, there will be additional O&M costs for the new SCADA/ EMS system. Based on international experience with such systems, the incremental O&M costs are estimated at 1.5% of the capital cost per annum - approximately US$500,000.

4) *Deferred Generation Expenditure:* Reduction in transmission losses and improvements in generation scheduling including power import will enable the

current generating system to operate for a longer period without additional capacity. The benefit would be equivalent to the capital cost savings of such deferral measured in equivalent interest charges (financial and economic). Given the relatively small value of the benefit, as well as the uncertainty with respect to its timing (a number of other factors, including tariff increases, end-user efficiency improvements, and access to less-costly fuels for heating and cooling could substantially defer the need for new generation capacity), it was decided to omit this from the IRR calculations.

Overall Rate of Return to SCADA/EMS System: The quantifiable costs and benefits of the SCADA/ EMS system over a 20-year period are shown in financial and economic terms in Tables A3.2 and A3.3 below. Because full benefits of SCADA/ EMS are expected by the end of 2012, 75% of the expected full benefits were assumed to accrue in 2012.

Financial internal rate of return (FIRR): The benefits of improved scheduling and lower transmission losses are calculated as a percentage of forecast average fuel cost. The FIRR of the SCADA/ EMS system over a period of 20 years is estimated to be 11.7%. The NPV of at 10% is $4 million.

Economic internal rate-of-return (EIRR): The estimate of the economic rate of return (EIRR) of the Project is estimated assuming that the gas subsidy to Azereneji is eliminated. Under the above assumptions, the EIRR of the project is 22.1%, and the NPV at 10% discount rate is $39.5 million.

Table A3.2: Financial Cash Flow: SACAD/ EMS System

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2021	2026
Total Transmission (GWh)	21,256	22,519	20,109	19,869	17,436	17,278	18,583	19,305	19,889	20,736	21,918	23,014	29,372	38,204
Fuel Cost//kWh(average) – US$/kWh	0.02	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Forecast fuel cost (USD million)	465	769	366	355	278	241	278	291	296	305	318	320	409	531
COSTS														
Investment costs (IBRD portion, US$ mln)				8.30	8.90	9.75	1.50	2.70						
Investment costs (Local portion, US$, mln)						0.90	3.70							
Additional O&M costs									0.5	0.5	0.5	0.5	0.5	0.5
BENEFITS														
a. Reduced operating costs														
Saving in Operating Costs (USD million)								0.24	0.32	0.32	0.32	0.32	0.32	0.32
b. Improved transmission losses														
Transmission losses (%)	3.45%	3.59%	3.63%	4.05%	3.90%	3.70%	3.6%	3.6%*	3.1%*	3.1%*	3.1%*	3.1%*	3.1%*	3.1%*
Improved transmission efficiency		-0.1%	0.0%	-0.4%	0.2%	0.2%	0.1%	0.0%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Loss Reduction Fuel cost savings (GWh)		-32	-8	-83	26	35	19	0	99	104	110	115	147	191
Fuel cost savings (US$ mln)		-1	0	-1	0	1	0	0	1	1	2	2	2	3
c. Higher dispatch efficiency														
Overall system efficiency gain ***1.50%***														
Overall system efficiency gain (GWh)								193	298	311	329	345	441	573
Fuel cost savings (US$ mln)								3	4	4	5	5	6	8
Net Cash Flow		***-1.03***	***-0.14***	***-9.74***	***-8.49***	***-10.14***	***-4.92***	***0.39***	***5.58***	***5.71***	***5.92***	***6.22***	***7.99***	***10.45***
IRR	***11.7%***													
NPV@ 10%	***4.00***													

Notes:

75% of annual benefits assumed for 2012

Decrease in electricity demand after 2007 was due to tariff increase in 2007

* This assumes that the transmission system operated by Azerenerji stays unchanged after 2011

Table A3.3: Economic Cash Flow: SACAD/ EMS System

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2021	2026
Total Transmission (GWh)	21,256	22,519	20,109	19,869	17,436	17,278	18,583	19,305	19,889	20,736	21,918	23,014	29,372	38,204
Fuel Cost//kWh(average) – US$/kWh	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Forecast fuel cost (US$ mln)	465	769	714	686	545	514	557	579	596	621	657	690	880	1,145
COSTS														
Investment costs (IBRD portion, US$ mln)				8.30	8.90	9.75	1.50	2.70						
Investment costs (Local portion, US$ mln)						0.90	3.70							
Additional O&M costs									0.500	0.500	0.500	0.500	0.500	0.500
BENEFITS														
a. Reduced operating costs														
Saving in Operating Costs (US$ mln)								0.24	0.32	0.32	0.32	0.32	0.32	0.32
b. Improved transmission losses														
Transmission losses (%)	3.45%	3.59%	3.63%	4.05%	3.90%	3.70%	3.6%	3.6%*	3.1%*	3.1%*	3.1%*	3.1%*	3.1%*	3.1%*
Improved transmission efficiency		-0.1%	0.0%	-0.4%	0.2%	0.2%	0.1%	0.0%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Loss Reduction Fuel cost savings (GWh)		-32	-8	-83	26	35	19	0	99	104	110	115	147	191
Fuel cost savings (US$ mln)		-1	0	-1	0	1	0	0	3	3	3	3	4	6
c. Higher dispatch efficiency														
Overall system efficiency gain ***1.50%***														
Overall system efficiency gain (GWh)								193	298	311	329	345	441	573
Fuel cost savings (US$ mln)								6	9	9	10	10	13	17
Net Cash Flow		***-1.03***	***-0.29***	***-11.18***	***-8.08***	***-9.63***	***-4.64***	***3.33***	***11.74***	***12.25***	***12.96***	***13.61***	***17.42***	***22.72***
IRR	***22.1%***													
NPV@ 10%	***39.5***													

Notes:

75% of annual benefits assumed for 2012

Decrease in electricity demand after 2007 was due to tariff increase in 2007

* This assumes that the transmission system operated by Azerenerji stays unchanged after 2011

2. Component B: Transmission Network Rehabilitation

Under the Project, a number of relatively small subprojects were implemented to improve the reliability of transmission lines and substations, all of which were considered high priority during Project appraisal. The total cost of these subprojects was US$14.7 million.

Rehabilitation of Transmission Lines: Improvements to the existing high-voltage transmission system can be justified in two ways:

- the lines have reached capacity, and capacity increase will result in increased power supply as demand grows;
- faults on the line can be reduced leading to improved outage times.

The first of these does not apply to any of the implemented subprojects. Data supplied on peak currents in these lines during appraisal confirmed that none approached design maximum. In addition, it can be noted that the kind of improvement achieved, e.g. replacement of towers, is not such as to increase capacity.

The benefits of the implemented subprojects accrue primarily from reduction in outage times as a result of recurring faults in the equipment; power which is not lost during outages could be sold to final customers, including exports. It is known that the rehabilitated lines had faults resulting in outages in 2002-2005. Table A3.4 shows data on outages in 2003, as evaluated during appraisal, and demonstrates that outages on the project lines were frequent and of considerable duration.

Table A3.4: Transmission Line Performance: Outages and Duration

	Number of outages in 2003	Total Outage Duration
	#	(Hrs)
2nd Apsheron 500 kV	12	47
1st Apsheron 330 kV	16	138
lst Ali-Bayramli 220 kV	15	83
Sangachal220 kV	13	71
3rd Apsheron 220 kV	9	45.5
4th Apsheron 220 kV	8	45.5
1st Mingachevir 220 kV	17	131.5
2nd Mingachevir 220 kV	10	93
2nd Ali-Bayramli 220 kV	6	60
Agsu 220 kV	8	54
4th Ali-Bayramli 330 kV	6	32
lst Barda 110 kV	5	624

At appraisal, the available data did not specify (i) whether the outages resulted in load-shedding equal to the power that would have been transmitted by the line; (ii) what this power level was; or (iii) how many of the faults occurred in equipment that would be replaced/ rehabilitated. However, inspection of the dates of outages suggested that they occurred throughout the year and at various times of day. It was assumed, therefore, that the outages occurred on average when the lines were carrying base load power, that it is 62% of the peak current carried and that 50% of this power was actually lost to consumers, that is that 50% was transmitted via an alternate route. If outages occurred during higher load periods then losses would be greater. The resultant estimates of total GWh lost, calculated during appraisal, are shown in Table A3.5. The Table also shows how performance of the rehabilitated lines was improved by the end of 2011.

Table A3.5: Estimates of Outages and Loss of Power

	At appraisal (2003 data)				Actual (2011)			
	Peak Current	Base Load Current	Total Outage	Power Lost	Peak Current	Base Load Current	Total Outage	Power Lost
	(A)	(B)	(Hrs)	(GWh)	(A)	(B)	(Hrs)	(GWh)
2nd Apsheron 500 kV	925	573.5	47	10.492	910	564	12	2.634
1st Apsheron 330 kV	700	434	138	15.387	670	415	25	2.668
1st Ali-Bayramli 220 kV	950	589	83	8.373	650	403	17	1.176
Sangachal220 kV	800	496	71	6.031	650	403	0	0.000
3rd Apsheron 220 kV	600	372	45.5	2.899	600	372	13	0.830
4th Apsheron 220 kV	600	372	45.5	2.899	600	372	3	0.214
1st Mingachevir 220 kV	550	341	131.5	7.680	400	248	4	0.170
2nd Mingachevir 220 kV	600	372	93	5.925	400	248	49	2.085
2nd Ali-Bayramli 220 kV	800	496	60	5.097	650	403	21	1.452
Agsu 220 kV	550	341	54	3.154	400	248	0	0.000
4th Ali-Bayramli 330 kV	950	589	32	4.842	800	496	14	1.787
1st Barda 110 kV	250	155	624	8.283	The transmission line was dismantled in 2008			
Total			**1424.5**	**81.1**			**158**	**13.0**

Base load current = 62% of peak current
Power lost = 50% of base current multiplied by voltage times 1.73 times power factor assumed at 0.9 times duration of outages

As it is seen from the Table A3.5, after lines were rehabilitated, losses from outages were reduced by over 80%. Table A3.6 shows the FIRR and EIRR (over 20 years) of the transmission lines rehabilitation subcomponent. For FIRR, it is assumed that the power saved is valued at current domestic tariffs (US$0.075/kWh); for EIRR, the saved power is valued at regional prices (Turkish retail price of US$0.11/kWh) since reduced electricity

exports are the opportunity cost of lost power (since 2007, Azerbaijan is a net electricity exporter).

Table A3.6: Financial and Economic Returns on Transmission Line Component

	Cost, US$ mln	Financial Annual Benefits, US$ mln	FIRR (20 years)	NPV@10%, US$ mln	Economic Annual Benefits, US$ mln	EIRR (20 years)	NPV@10%, US$ mln
Transmission Line Component	3.8	5.1	56%	22.0	7.5	69%	33.6

***Transformer Replacement*:** Five transformer replacement subprojects were completed under this component at the following substations: Imishli 330 kV (two transformers), Agdjabedi 110 kV (one transformer) and Gala 110 kV (two ones), whose transformers were at or close to capacity shortage (Imishli 330 kV, Agdjabedi 110 kV and Gala 110 kV).

The sub-station transformers effectively act as a bottleneck through which power supply to consumption districts must pass. When the transformers reach capacity, downstream supply is necessarily restricted at first to a limited number of consumers at peak load times, then increasingly to larger number of consumers for longer times. When the capacity of the transformer is only about 62% of peak demand, which is the national base load level, there will effectively be a state of permanent load-shedding downstream of the substation which will gradually increase as potential demand increases.

The result of this is that until capacity is reached, the benefits of increased transformer capacity are small, amounting to no more than improved efficiency in the transformer itself. However, once capacity is reached and incremental load must be shed, benefits will accrue which will increase annually as load increases. A precise calculation of the rate of return for each of the proposed projects requires data on the load-demand curve for the district served by the particular sub-station and also a demand forecast for that district. In the absence of these, the national load-demand curve was assumed to apply as well as the national base-case demand forecast. Examination of this national load demand curve suggested that there is a reasonable approximation to a linear change in load between the base load level (62% o f peak demand) and the peak load. The demand forecast of 5% per annum growth rate after 2012 means that full load-shedding of incremental demand (the point at which base loads on the transformers are equivalent to the present-day peak loads) would not have been reached in the absence of new transformer capacity for about 20 years.

In order to make estimate of the economic rate-of-return of each proposed project, the following assumptions were made (similar to the assumption at appraisal):

- Gala, Agdjabedi and Imishli (one transformer) were installed in 2010 and Imishli (second transformer) was installed in 2011;
- demand increases at 5% per annum;
- before 2015, load shedding because of insufficient capacity is zero, with existing transformers on full capacity;

- after 2015, 5% of this incremental load will be shed, increasing thereafter by 1% each year;
- for FIRR, the saved power is valued at domestic tariffs; for EIRR, the saved power is valued at regional electricity prices;
- a ten-year evaluation period is used; .

Table A3.7 shows the results of this evaluation for transformer replacement component.

Table A3.7: Financial and Economic Returns on Transformer Replacement Component

	Cost, US$ mln	Average Financial Annual Benefits, US$ mln	FIRR (10 years)	NPV@10%, US$ mln	Average Economic Annual Benefits, US$ mln	EIRR (10 years)	NPV@10%, US$ mln
Transformer Replacement Component	10.0	7.5	16%	4.7	11.0	21%	10.3

3. Financial Viability of Azerenerji

The secondary objective of the project is to contribute to strengthening Azerenerji's financial position. Two specific outcome indicators were set under this object: 1) tariffs reach cost recovery by 2010 and 2) 100 percent on-time payment from wholesale distributors by 2010.

Accomplishments to date

Azerenerji's financial position has improved since the project inception primarily due to progresses made in the following areas:

i) *Tariffs reach cost recovery*. The weighted average retail tariff increased from AZN 0.02 to AZN 0.06 per kWh (US$0.075 c/kWh) in January 2007. Before then, Azerenerji had suffered large operating losses year on year. The Government had to provide subsidies to cover the costs of fuel and electricity import.

ii) *Improved collections.* Collections have improved across all customer segments. Household segment has seen the greatest improvement with collection rate up from 37 percent in 2006 to 85 percent in the first three quarters of 2011 largely due to the installation of 300,000 smart meters and the adoption of a pre-payment regime among metered customers. Planned addition of smart and prepay meters in households should lead to a further increase in the receivable collection rates. Wholesale achieved full collections in 2010 from merely 50 percent in 2004. However, wholesale arrear and impairment have been rising overtime due to systematic underpayment from the state-owned wholesale customer.

iii) *Efficiency improvements.* Azerenerji has made (a) gradual removal of high cost fuel oil from the fuel mix (Figure A3.1); (b) better fuel efficiency in generation in

part due to the rehabilitation of older plants; and (c) lower transmission loss from 4.05 percent in 2008 to 3.6 percent in 2011. Transmission loss will be further reduced once the SCADA system is in operation.

Figure A3.1.
Fuel mix (2000- 9M 2011)

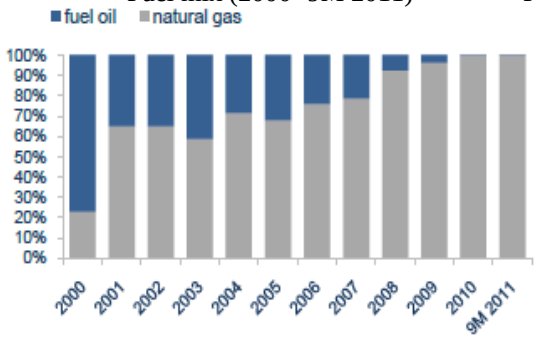
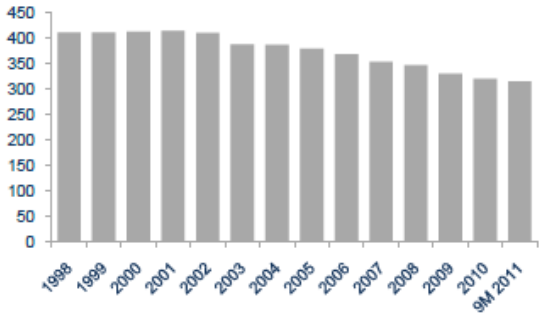


Figure A3.2.
Fuel consumption in conditional units (gr/kWh)



On May 3, 2012, Fitch Ratings assigned Azerbaijan's OJSC Azerenerji a Long-term foreign currency Issuer Default Rating (IDR) of 'BBB-' and Short-term foreign currency IDR of 'F3'. The Outlook on the Long-term IDR is Positive. The rating and outlook are aligned with the Republic of Azerbaijan ('BBB-'/Positive/'F3') reflecting strong legal, strategic and operational ties with the government of Azerbaijan. Positive characteristics recognized by the Rating Agency during the rating process include: i) the company's modern, primarily gas fired, generation fleet, ii) improvements in the household receivable collection rates, and iii) favorable prospects for energy consumption in Azerbaijan and certain markets in the region (such as Turkey and southern Russia).

Remaining issues and challenges

1) *Liquidity challenges remain and likely worsen in the near future* i) tariffs are still under cost recovery once collection is taken into consideration; ii) systematic underpayments and receivable impairments from the large state-own wholesale customer, iii) increasing debt service obligations to finance an ambitious investment program.

    a) *Tariff inadequate to recover costs once collections are taken into consideration*. At current tariff level, revenue collection is expected to be inadequate to recover costs of supply in the foreseeable future. In 2010, revenue after collection was about 6 percent below costs of supply. The issue is more serious if systematic wholesale underpayment of "collected" revenue is taken into account.

    b) *Systematic underpayment and impairment of receivables from the largest wholesale customer*. Upon analyzing the debt servicing history of Azerenerji's major counterparties, the auditor (Deloitte) noted in its letter to the management of Azerenerji that BakiElektrikShebeke OJSC, Azerenerji's largest wholesale customer, had been systematically underpaying on average 18 percent of its monthly bills. As a result, the amount due from BakiElektrikShebeke OJSC has been ever increasing; so has the allowance for

impairment of receivables. In 2009-10, BakiElektrikShebeke OJSC constituted 46% and 39% Azerenerji's revenue. As of December 31, 2011, the total receivables from BakiElektrikShebeke OJSC amounted to AZN 287 million, among which AZN 287 million, 98 percent of the total, was classified as impaired.

c) *Rising debt service obligations*. Azerenerji is the process of embarking on a large investment program on grid modernization with an estimated cost of 3.1 billion Euros. Its internal cash generation is far from being sufficient to meet the investment needs. With additional sources of funding yet to be identified, the company's liquidity position is bound to worsen if it were to proceed with the investments.[8]

2) *Declining operating margin in recent years.* Azerenerji's operating margin declined considerably from 45% in 2008, to 23% in 2009, and to merely 2% in 2010 (see Table A3.8).

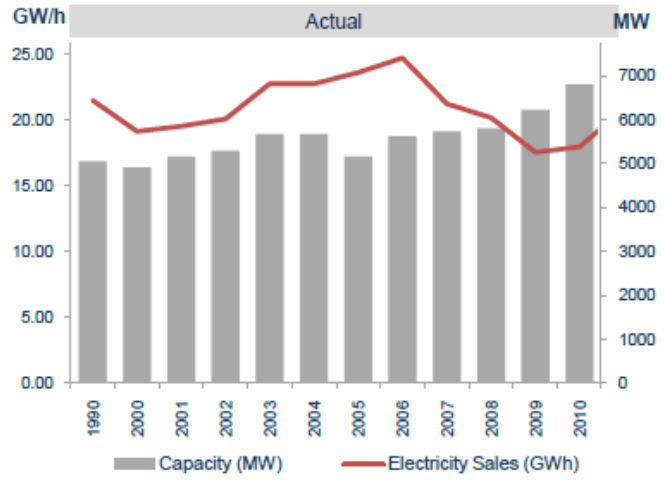
Table A3.8: Azerenerji's Operating Margin

	2007	2008	2009	2010	2011
Revenue (million AZN)	756	732	645	611	672
Operating income (million AZN)	251	333	147	14	76
Operating margin (%)	*33%*	*45%*	*23%*	*2%*	*11%*

Two factors have contributed to this sharp decline: (a) lower capacity utilization due to capacity expansion coupled with sluggish domestic demand (see figure below), and (b) higher SG&A resulted from large impairment losses. Azerenerji's installed capacity has grown more than 20 percent with about 1,100 MW capacity installed since 2008. Meanwhile, domestic demand has experienced a sharp decline due to (a) macroeconomic conditions; and (b) lower consumptions due to demand elasticity and higher collections. Moreover, the impairment loss amounted to AZN 60 million in 2010, accounting for more than 10 percent of electricity revenue that year. The operating margin rebound in 2011 was in part due to lower impairment losses (AZN 19 million) compared with 2010 (AZN 60 million).

[8] Fitch's statement upon assigning a 'BBB-'/Positive/'F3' rating on Azerenerji's foreign currency bond stated "a large part of the investment was viewed deferrable (around 60%) or has funding already arranged (30%) with the remaining part expected to have confirmed government funding in place before YE12."

Figure A3.3: Azerenerji's Capacity and Electricity Sales



3) *Lack of financial autonomy and other institutional challenges:*

a) *Fully regulated electricity and natural gas tariffs.* The Presidential Decree #341 and the Cabinet of Ministers' Decision #247 stipulate that the Tariff Council of Azerbaijan Republic is the country's sole tariff setting and regulating entity. Electricity and gas adjustments are usually concurrent albeit at different pace. The government also regulates state employees' wage inflation. As a result, about 97 percent Azerenerji's revenue and 30 percent of its costs are directly controlled by the state whose considerations are highly influenced by social and political factors.

b) *Under the regulated framework, tariff adjustments have been very infrequent*. The last tariff adjustment was in 2007; and the prior adjustment to that was in the 1990's. Azerenerji's current financial projections for BAU conditions assume no tariff increase until 2015 by which time tariff rates would have remained flat for almost a decade. With the domestic inflation rate as high as 8.3 percent, zero tariff increase in nominal terms over a period of a decade is equivalent to more than 50 percent decrease in real terms. Moreover, as Azerenerji's cost structure evolving overtime, the infrequency of tariff adjustments can also *l*ead to divergence in the company's operating margin even though the general tariff setting principle remains *cost-plus*. This may lead to financial stress especially after a period of capital expansion before the benefits of the investments set in to take their full effects.

c) *Needs for government soft subsidies remain* i) highly subsidized fuel for generation at 55 percent discount; ii) large government equity infusion to help finance capital investments under liquidity constraint; and iii) government instituted massive write-off of accounts payables.

Table A3.9 Government Instituted Settlements among State-owned Entities (2010-11)

Decree	Date	Item	Related Entity	Amount
Decree #133	Aug. 2011	Loan to	MoF	AZN 92 million
		Receivable from	BakiElektrikShebeke	AZN 83 million
		Receivable from	Azersu	AZN 9 million
		Associated VAT to	GoA	AZN 14 million
Decree #148	Aug. 2010	Payable to	SOCAR	AZN 1,554 million
		Receivable from	Distribution companies	AZN 1,403 million
		VAT recoverable from	GoA	AZN 218 million
Decree #88	Jun. 2011	VAT payable to	GoA	AZN 124 million

d) *High uncertainties associated with the company's liquidity position due to a lack of control over the accounts receivables/payables process.* Azerenerji, its sole fuel supplier (SOCAR), and its largest customer (BakiElektrikShebeke OJSC) are all fully state-own enterprises. The government has the ultimate control over each company's bottom line through i) tariff setting, ii) exercising control over intra-enterprise payment transfers that are also highly influenced by social and political factors, and iii) equity injections.

The newly assigned ('BBB-'/Positive/'F3') rating also reflects the legal, strategic and operational ties between Azerenerji and the government of Azerbaijan. In a statement, Fitch Ratings recognized that Azerenerji's standalone profile is significantly weaker than the government-supported IDRs; and the

4) *Upcoming new generation capacities online coupled with sluggish domestic demand has led to lower operating margins and suboptimal return on investments.*

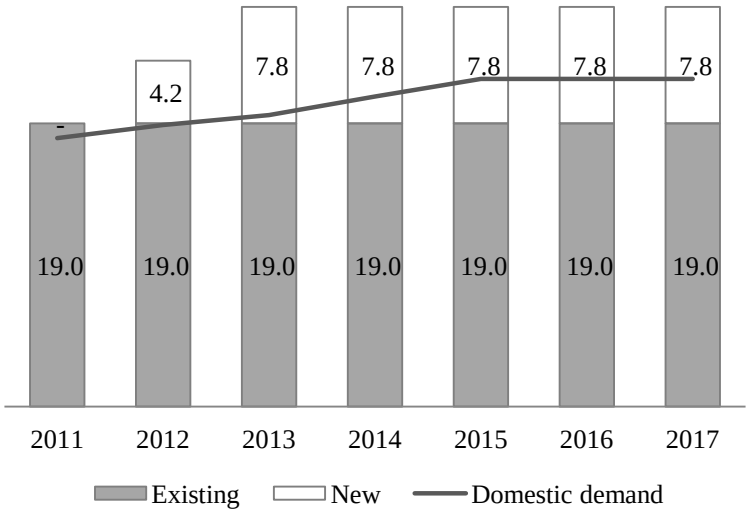
a) Tariff adjustments and improvements in collections may both have adverse effects on domestic demand. Azerenerji has already seen demand contractions in the past years in response to the installation of 300, 000 smart meters.

b) More generation capacity are coming online in the 2012-13 time frame, expanding supply potential by 41 percent while in the mean time, domestic demand is only expected to grow at a modest 4-6 percent. Depreciation is expected to grow at an annual rate of about 7 percent in the period of 2011-17 adding downward pressure to the company's operating margin if the extra capacity is left idle.

TableA3:10: Maximum Generation Output and Supply Surplus

In thousand kWh	2012	2013	2014	2015	2016	2017
Maximum production	21,100	22,900	22,900	22,900	22,900	22,900
Domestic demand	18,875	19,547	20,794	21,975	21,975	21,975
Supply surplus	4,325	7,253	6,006	4,825	4,825	4,825

Figure A3.4: Maximum Supply and Domestic Demand



Opportunities

1. *Participation in regional power trade* to help absorb excess capacity, increase operating revenue and maximize return on investments. Export will help substantially improve the company's liquidity position, especially in the near term when domestic tariff is expected to remain unchanged.

2. *Investments in grid modernization and billing* to further improve revenue collections. Azerenerji is about to embark on an ambitious investment program, with an estimated cost of Euro 3.5 billion, to modernize its grid, add new smart meters, distribution lines, transformers, etc. The program together with a prepayment regime would bring retail collections to 100 percent.

3. *Tariff roadmap*. The tariff trajectory in Azerenerji's business-as-usual (BAU) scenario assumes no tariff increase from 2012-14 followed by aggressive price hikes of 18%, 17% and 14% from 2015-17.[9] This tariff trajectory has two issues 1) it adds to the liquidity challenge in the near term; and 2) price hikes of such magnitude for three consecutive years are both unrealistic and unlikely to be approved by the government because of their adverse social consequences. An annual tariff adjustment of 3-5% would help greatly improve the company's liquidity position while remaining socially acceptable in an environment with 8.3% inflation (see table below).

[9] Tariff for domestic gas supply assumed to follow the same trajectory.

Table A3.11: Year End Cash Balance Projections (million AZN)

Scenario	2012	2013	2014	2015	2016	2017
Base Case						
- No tariff increase (2012-14)						
- 18% (2015), 17% (2016) and 14% (2017)	46	64	124	186	307	517
No tariff increase (2012-17)	46	64	124	106	56	(1)
3% annual increase	58	103	206	245	267	301
5% annual increase	66	129	262	343	418	518
Increase at the rate of inflation (8.3%)	80	174	359	512	683	910

Covenant compliance

Azerenerji was in breach of both the current ratio covenant (> 1.2) and the DSCR covenant (>1.5) associated with the IBRD loan in 2009-10 and again in breach with the current ratio covenant in 2011. On April 14, 2011, the Bank granted a temporary waiver of both ratios for FY2010; and subsequently, another temporary waiver for FY2011-12 to facility the company's effort in obtaining a bond rating. The financial projections for the period 2012-17[10] suggest Azerenerji is likely to continue having difficulties complying with both covenants in the medium term (2012-15).

[10] Per Azerenerji's request, financial projections are not included.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Supervision/ICR			
Salvador Rivera	Lead Energy Specialist	ECSS2	
Yadviga Semikolenova	Energy Economist	ECSS2	
Norpulat Daniyarov	Financial Management Specialis	ECSPS	
Majed El-Bayya	Lead Procurement Specialist	ECSPS	
Surekha Jaddoo	Operations Analyst	ECSSD	
Josephine A. Kida	Program Assistant	ECSSD	
Farid A. Mammadov	Operations Officer	ECSIE-HIS	
Ida N. Muhoho	Sr Financial Management Specia	ECSPS	
Neal Patterson	Consultant	ECSSD	
Gurcharan Singh	Senior Procurement Specialist	ECSPS	
Karl Skansing	Consultant	ECSPS	
Nijat Valiyev	Infrastructure Specialist	ECSSD	

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY03	0.00	13.98
FY04	41.71	201.09
FY05	43.98	211.40
FY06	0.00	-0.20
FY07	0.00	0.00
FY08	0.00	0.00
Total:	**85.69**	**426.27**
Supervision/ICR		
FY05	00.00	12.83
FY06	32.30	116.01
FY07	31.78	107.41
FY08	34.89	112.61
FY09	0.00	107.41
FY10	0.00	112.61
Total:	**98.97**	**348.86**

Annex 5. Beneficiary Survey Results
(if any)

N/A

Annex 6. Stakeholder Workshop Report and Results
(if any)

N/A

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

The full text of the Borrower's completion report is attached to the Project files. Below is the summary of the Borrower's assessment of the outcomes and lessons learned.

IMPLEMENTATION COMPLETION AND RESULTS REPORT

(P083341)

ON

LOAN #7294-AZ

IN THE AMOUNT OF US$ 48 MILLION EQUIVALENT

TO

JSC "AZERENERJI"

FOR

POWER TRANSMISSION PROJECT

May, 2012

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

The Project objectives and design remained highly relevant in the context of Azerbaijan's development priorities. Azerbaijan has maintained an ongoing commitment to developing an infrastructure which meets international standards and is capable of supporting economic growth and development. Establishment of an efficient and reliable power transmission network and the resultant improvements in the cost and reliability of power supply, have been key in facilitating the rapid economic growth that has occurred over much of the course of Project implementation. Although the Government has reduced its sovereign-guaranteed borrowings in recent years, it continues to provide support for Azerenerji's program of transmission system expansion and upgrade, thereby demonstrating the importance that it assigns to these initiatives. The PDOs therefore continue to be highly relevant to the country's development priorities.

The PDO and Project design also remained consistent with the objective of the current CPS, which is to support the development priorities of the Government. These include as one of the key pillars "investing in human capital and infrastructure" given that major segments of infrastructure (e.g., road and power transmission networks) do not fully meet the needs of a rapidly expanding economy. As noted above, improving the reliability and efficiency of electricity supply was a focal point of the Project objectives. Finally, the Project continues to be consistent with sector strategies for power sector reform, which advocate corporatization of sector entities where privatization is not a viable option and also the fostering of competition in the electricity industry to improve cost effectiveness.

3.2 Achievement of project Objectives

PDO	Indicators and Targets	Achievement
Improve the efficiency of the power transmission operation in Azerbaijan through technical and institutional strengthening of the generation/transmission utility.	Improved efficiency of fuel use per kWh of electricity generated through Economic Dispatch and reduced transmission losses. Improved reliability and quality of electricity supply with respect to frequency and duration of forced outages.	
Secondary objective: Contribute to strengthening Azerenerji's financial position.	In line with legal covenants, Azerenerji's financial position would be strengthened (i.e. need for Govt, financial support reduced/eliminated) as a consequence of (a) tariffs that increase over time to cover full costs, and (b) increased payment collections.	Since 2007 Azerenerji has not been getting subsidy from the Government. The tariffs were increased to cost recovery level.

3.3 Efficiency

At the time of Project appraisal, it was anticipated that the benefits of the Project would accrue primarily from savings in operating and maintenance (O&M) costs (including capital replacement) as a result of upgrading SS equipment and telecommunications networks, savings in reserve capacity requirements through the establishment of a capacity reserve pooling system, reductions in the average cost of wholesale power through more efficient, market-based dispatch of plants, reductions in customer losses due to outages, reduced transmission losses and savings accruing from more efficient management of inventories and plant maintenance schedules.

The economic and financial returns of the Project show a benefits stream relative to the costs incurred from both the national perspective (economic returns) and from the perspective of the Borrower (financial returns). The Project can be considered fully satisfactory in terms of efficient use of resources due to improvement of the system dispatching and management. But considering the fact that some projects were implemented simultaneously with the Project, it is impossible to identify its separate effect on the system operation indicators such as fuel saving and transmission losses.

3.4 Justification of Overall Outcome Rating

Rating: satisfactory

The Project is considered to have been Satisfactory in terms of overall outcome because all main subprojects have been completed satisfactory.

As considered above, the Project Aims remain highly relevant to the priorities of both the Government and the Bank's CPS. All of the Project Aims have been achieved relative to the criteria established in the Loan Agreement. As a result of the Project, an institutional framework established will support the financial sustainability of Azerenerji and provide a basis for further development of Azerbaijan power system. The audits of the Project and the Company indicate that financial management in Azerenerji is being improved from year to year.

On this basis, satisfactory rating is justified.

3.5 Overarching Themes, Other Outcomes and Impacts.

(a) Poverty Impacts, Gender Aspect, and Social Development

N/A

(b) Institutional Change/Strengthening

Long-term improvement in management practice through transfer of skills is one of the outcomes of the Project. Some of the highlights of long-term improvements are:

- Creation of new division in Central Dispatching Department, which maintains SCADA/EMS. Some of the Department staff has got good technology practice at ALSTOM (AREVA) entities.
- Azerenerji staff adopted the newest software for modeling and analyzing of different modes for the power system operation, and planning of technical measures for improvement of it.
- Creation of new department investigating strategic goals in power system development and managing achievement of those goals.
- KEMA consultants provided for Azerenerji staff a good practice per project management.
- Financial audits are conducted based on International Financing Reporting Standards.
- Operation and maintenance of the power system facilities are adequately planned and consistently implemented.

(c) Other Unintended Outcomes and Impacts (positive and negative)

N/A

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

N/A

4. Assessment of Risk to Development Outcome

Rating: Moderate

The risk development outcome has been evaluated with respect to a number of criteria. The findings are summarized below:

Technical risks: Manageable and moderate. Risk of delaying the Project was related to the capacity of the Contractor and Implementing Agency.
Financial risks: Moderate. Risks associated with fluctuating exchange rates because some contracts financed by the loan were in a currency different from the Loan currency.
Environmental risks: Lowest.

5. Assessment of Bank and Borrower Performance.

5.1 Bank Performance
(a) Bank Performance in Ensuring Quality at Entry
Rating: Satisfactory

Based on the above outlined in previous sections, the Bank performance in ensuring quality at entry is rated as satisfactory. Objectives of the Project and components were well defined and consistent with the country priorities. An Assessment of Quality at Entry was carried out and stated that PAD was developed well. The Assessment noted that the Project would be very important for the power sector in Azerbaijan.

(b) Quality of Supervision
Rating: Satisfactory

Supervision of the Project was carried out on a regular basis, with twice-yearly missions staffed by qualified specialists. All aspects of Project implementation were addressed during the missions, potential problem areas were highlighted, early warnings were issued when implementation problems surfaced, steps to resolve issues were agreed with the Borrower and subsequent missions followed up on the outcomes.

The Task Team reviewed the implementation of the EMP during each supervision mission. Supervision reports and correspondence indicated that quarterly PMRs were received and reviewed in a timely manner, as were annual audited financial reports.

Critical issues in the Project were addressed via Aide Memoires and following letters. Basing on them action plans were timely developed. Those plans were effectively used by the Project PIU as guideline documents to arrange further progress.

(c) Justification of Rating for Overall Bank Performance
Rating: Satisfactory

Based on satisfactory quality at entry and supervision mentioned above the Bank's performance in whole is rated satisfactory.

5.2 Borrower Performance

(a) Government Performance
Rating: Satisfactory

Regular monthly and quarterly reports on the Project progress as well as clarifications if requested were submitted to the Cabinet of Ministers of Azerbaijan, Ministry of Economic Development and Ministry of Industry and Energy. Moreover, the progress of the Project was repeatedly discussed in the meetings taken place in the Ministries during the period 2005-2011. The comments stated on the meetings were strictly taken into consideration by Azerenerji and by the Project management for timely clearing.

(b) Implementing Agency or Agencies Performance
Rating: Satisfactory

Azerenerji complied with the covenants in the Loan Agreement on a consistent basis, including the timely submission of quarterly PMRs. PIU staff quickly learned to take over responsibility for procurement and project implementation scheduling. Staff was always well prepared for missions and complied promptly and fully with requests for supplementary information. Field trips to observe implementation progress were efficiently organized and missions received attention of the top management.

In terms of technical implementation, there was close cooperation between the PIU and the operations staff charged with supervising design and implementation. While initial response to consultant input was guarded in some instances, the staff ultimately developed a co-operative and supportive working relationship with the outside specialists. The primary shortfall in performance related to the planning and implementation of the Station Adaptation Works.

(c) Justification of Rating for Overall Borrower Performance
Rating: Satisfactory

6. Lessons Learned

Highlights of the lessons learned from the evaluation of the Project are listed below:

- Risks associated with fluctuating exchange rates should be hedged if a significant proportion of the expenditures financed by the loan are in a currency different from the Loan currency.
- Client and possible internal Bank pressures for an unrealistically short implementation timetable for unusually complex and large operations should be resisted by sector management and TTLs.

- Procurement and implementation arrangements for technically complex project components should be carefully aligned with the real capacity of the Contractor and the implementing agency.
- Borrower-financed components which are on the critical path for Project implementation (such as the cable work under the subject operation) require careful and timely monitoring to prevent their holding up the implementation of other Project components.
- Close involvement of the implementing agency in project design, together with attentiveness to their views, helps to build a cooperative relationship between the Bank and the Borrower.
- Continuity of Bank and Borrower personnel helps to create mutual respect and understanding which in turn facilitates resolution of problems that arise during the course of implementation.
- Transferring slow-moving components to other projects with the same Borrower should be considered in order to avoid prolonging Project closure, particularly in instances where PDOs are similar and additional financing is not a viable option.
- There is a need of professional development of dispatching staff.

Backup Control Center (BCC) Building

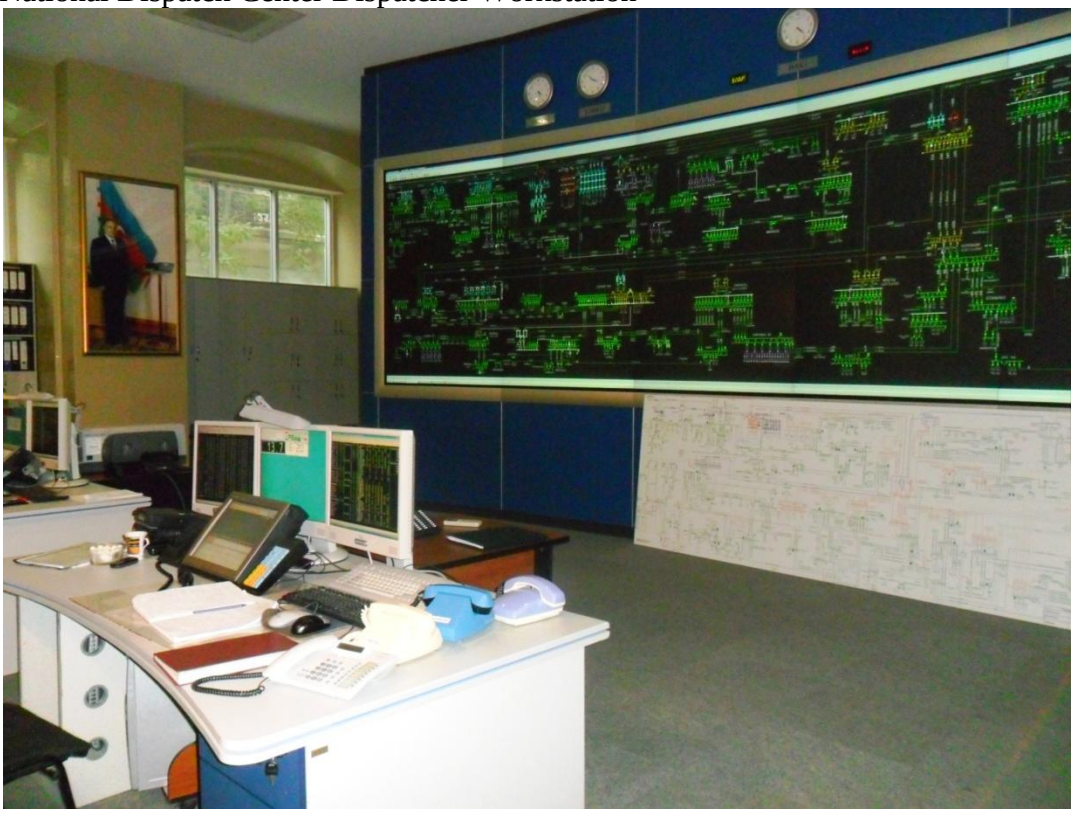
Backup Control Center (BCC) Dispatcher Workstation

BCC Equipment Room

Gala Substation 110kV Transformer

Imishli Substation 330kV Transformer

National Dispatch Center Dispatcher Workstation



Annex 7B. Borrower's Comments on Draft ICR

Azerenerji highly appreciates your efforts to prepare ICR as a comprehensive document. In order to make it more precise we allowed ourselves to do some small corrections. Please pay your attention on the following comments:

- **(a) PDO Indicators (page iii):** Please correct percentage of specific fuel consumption reduced (12% instead of 11%), and dates of indicators achievement (12/31/2011 instead of 11/07/2011);

- Comments (incl. % achievement) on Indicator 1 (page iv): Power tariff setting in Azerbaijan is regulated in due compliance with relevant legislation, including Law of Azerbaijan Republic on Natural Monopolies, Law of Azerbaijan Republic on Regulated Prices and Law of Azerbaijan Republic on Electrical Power. Accordingly, Article 10 of the Law of Azerbaijan Republic on Electrical Power Industry provides that tariffs of electric and thermal power must fully cover enterprise's expenditures for the output, transportation and distribution of power and ensure a profitable activity of the enterprise and development of power industry. That said, power tariff setting mechanism is on a "cost plus" basis since 2007 which ensures that Azerenerji covers its costs and make a profit at full collection rates, as well as eliminated a need for state subsidies to Azerenerji, made a power sector more attractive for investments, increased a strength of Azerenerji to repay attracted loans, played a role in elimination of non –payment issues among various subjects of power sector, contributed to material savings practices in power utilization process. However as two of privatized distribution companies (Ali Bayramli and Ganja) were returned to Azerenerji in 2006 and one was returned in 2009 (Sumgayitelektriksebeke) with material issues, including lack of required investment in power infrastructure, low collection levels and high technical losses, this affected a collection ratio in the distribution system of Azerenerji. Bakelektriksebeke JSC was transferred back into state ownership in 2006. Meanwhile, Azerenerji's management has implemented complex measures reforming the power distribution and billing systems in the ensuing period, resulting in significant growth in collection of receivables from 47% in 2006 to 85% in 2011. This will continue with a comprehensive power distribution system reform, including but not limited to replacement of post paid inefficient collection system with modern smart grid technology based on pre-paid methodology, reducing the technical and commercial thefts, enhancing the fiscal discipline and transparency in performance and cutting operating and administrative expenses. A pilot project on smart grid technology already started in Xirdalan Distribution Network with a funding from state budget, based on the experience of which a process will continue in other networks.

In addition to above said and in light of Azerenerji's central social and economic importance to the Government of Azerbaijan, Government of Azerbaijan regulates Azerenerji's payables and receivables to to provide a Azerenerji with a financial flexibility and to facilitate its cash management. For example, in 2010 under Cabinet Decree 148, accumulated payables of AZN1.56 billion ($1.95 billion) to SOCAR were written off and simultaneously the Government wrote off AZN1.56 billion of receivables to Azerenerji. Meanwhile, under Cabinet Decree 133 in 2011, Azerenerji's accumulated receivable from Azersu JSC (state-owned water utility) and Bakelektriksebeje JSC in the amount of 92,3 mln AZ were written off and simultaneously Azerenerji's payable to Ministry of Finance were written off for the same amount.;

- **Indicator 2, right column:** Please modify the text in the column in the following manner: Tariffs are adequate to cover operating costs. But in 2010 and 2011, underpayments by some customers brought to fund shortage to recover costs.

- **I. Disbursement Profile (page vi):** I could not find the profile mentioned; Please insert the profile we sent earlier;

- **1.1 Context at Appraisal (page 1):** Please modify the note to this page like below:

[1] Barmek Holding AS managed the Baku and Sumgait distribution networks; power distribution networks on the remaining mainland territory of Azerbaijan (i.e. excluding Nakhchivan Autonomic Republic) were managed by private company "BAIVA". Both BARMEK and BAIVA operated during 2002- 2006. In 2006, they were ousted due to their failure in performance of contract obligations. And since then Azerenerji controls all of distribution network excluding Baku with suburbs and Nakhchivan; BakiElektrikShebeke is in charge of the Baku distribution network.

- **1.5 Original Components** (**page 3**): After "system substations" please insert the following text: "construction and equipping of Backup Control Center with proper hardware and software" and after "Dispatch Center" insert "or Backup Control Center",

- **Station adaptation and metering (page 4):** Please withdraw the sentence: "Fuel meters on each major thermal generating unit were to be provided for economic dispatch." because the fuel meters was excluded from the scope of the Project.

- **Table in page 20, column "Actual Activities"**: Please add the first para with the following text: "; then it was decided to install this transformer at Agdjabedi 110 kV substation because of unexpected load increasing;"

- **The same table, same column, page 21**: please add last para with the following text: "and installation of 40 MVA Transformer initially intended for Imishli substation";

- **Transformers replacement (page31)**: Please modify the first para in the following manner: "Five transformer replacement subprojects were completed under this component at the following substations: Imishli 330 kV (two transformers), Agdjabedi 110 kV (one transformer) and Gala 110 kV (two ones), whose transformers were at or close to capacity shortage (Imishli 330 kV, Agdjabedi 110 kV and Gala 110 kV)"

- **Table A3.2: Financial Cash Flow: SACAD/ EMS System (page 27):** Please insert a note/clarification concerning the transmission losses planned on 2012 and next years, considering of SCADA functionality in whole e.g. "It is expected that the transmission losses will be decreased till 3.1% after 2012 due to SCADA/EMS full operation";

- **Table A3.3: Economic Cash Flow: SCADA/ EMS System (page 28):** like above;

- **Transformer Replacement (page 31):** Please withdraw from the first paragraph the substation name "Gandja 330" and insert "Agdjabedi 110" because the transformers purchased under the Project were installed at three substations: Gala 110 kV S/S, Imishli 330 kV S/S and Agdjabedi 110 kV S/S; Mushvig 220 kV Substation was rehabilitated under other project;

- **In the same clause in the same page:** Please correct the last paragraph in accordance with the previous comment.

DISCLOSURE:

- Due to inconsistency on 2009-2012 numbers and financial projections, we propose not to include the table on Azerenerji financial performance history (2009-11) and BAU Projections (2012-2017) under BAU Conditions in the ICR. For the same reason, please remove the figures of current ratio and debt-service ratio projections.

- We would like to withdraw the table on collection rates by customer segments from the ICR because of security reasons. Of course, the corresponding reference must be excluded from the text.

- Also, please, delete the figure of Year End Cash projections (and corresponding references in the text) because it is discussable, and we cannot do planning such export of electricity.

Attached please find the file with the ICR rev7 commented. The corrections and insertions suggested are tracked there.
Best regards,

Teyyar Ibrahimov
Project Director

JSC "Azerenerji"
Phone: +994 12 598 4184
Mobile: +994 50 225 3485
Fax: +994 12 598 4117
E-mail: tibrahimov@azerenerji.gov.az
Office address: 10, Acad. A.Alizadeh Str., AZ 1005 Baku - Azerbaijan

Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

Not Applicable

Annex 9. List of Supporting Documents

1. Monthly Project Progress reports and Quarterly Project Management reports
2. Azerenerji Audited Financial Statements
3. Supervision Aide Memoires and Project/ Implementation Status Reports
4. Power Transmission Project Appraisal Document, May 17 2005
5. CAS for Azerbaijan, 2003-2005
6. CPS for Azerbaijan 2011-2014
7. Implementation Completion report by Azerenerji

IBRD 33695R

AZERBAIJAN
POWER TRANSMISSION PROJECT

GEORGIA

RUSSIAN FEDERATION

ARMENIA

ISLAMIC REP. OF IRAN

Caspian Sea

Lake Sevan

Baku Bay

REHABILITATION
- PROJECT SUBSTATIONS (REHABILITATION)
- PROJECT NATIONAL DISPATCH CENTER (NDC)
- PROJECT BACKUP CONTROL CENTER (BCC)
- PROJECT TRANSMISSION LINES (REHABILITATION):
  - 500 kV
  - 330 kV
  - 220-230 kV
  - 154 kV
  - 110 kV

OTHER EXISTING
- THERMAL POWER PLANTS
- HYDRO POWER PLANTS
- SUBSTATIONS
- TRANSMISSION LINES:
  - 500 kV
  - 330 kV
  - 220-230 kV
  - 154 kV
  - 110 kV

PLANNED

- NATIONAL CAPITAL
- INTERNATIONAL BOUNDARIES

See inset for detail

0 10 20 30 40 50
KILOMETERS

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OCTOBER 2009