

**2006 Ex-Post Monitoring of Completed ODA Loan Projects**

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Project: Pakistan: "Second 220kV Guddu-Sibbi-Quetta Transmission Project" (PK-P27)

**Loan Outline**

Loan Amount/Disbursement Amount : 4,915 million yen / 3,705 million yen  
 Loan Agreement : March 1989  
 Loan Completion : August 1998  
 Ex-Post Evaluation : Fiscal Year 2001  
 Executing Agency : Water and Power Development Authority (WAPDA)

Note: The agency currently in charge of operation and maintenance for this project is the National Transmission and Dispatch Company (NTDC), which was separated from WAPDA.

**Project Objective:**

The objective of the project was to construct transmission lines in Balochistan in order to meet the demand for electric power which has been rapidly increasing and to enhance the reliability of power supply facilities, thus contributing to the development of the local economy and the stabilization of people's livelihoods.

Consultant: N/A

Contractor: Local companies, etc.

**Overview of Results**

Item	At time of ex-post evaluation	At time of monitoring
<p><b>Effectiveness &amp; Impact</b></p> <p>Effectiveness</p>	<p>(1) Electric Supply Reliability between Guddu-Sibbi-Industrial II</p> <ul style="list-style-type: none"> <li>• The amount of electric power increased in 1999, the year following completion of the project.</li> <li>• Annual load shedding increased in 1998 and 2000, but there were no cases in which the two lines were out concurrently, and since completion of the project, there has not been a substantial stop in electric supply.</li> <li>• Planned outages and sharp changes in voltage decreased significantly.</li> </ul> <p style="text-align: center;">Table 1: Electric Supply Reliability between Guddu-Sibbi-Industrial II</p>	<div style="border: 2px solid black; padding: 5px; margin-bottom: 10px;"> <p><b>As a result of the addition of new power generation and distribution facilities in the target region of this project, the amount of electric power transmitted and the power consumption per person in the target region has continued to increase since the time of the ex-post evaluation. The effectiveness of the project has thus been high. The slight increase in the number of power outages is not at a problematic level.</b></p> </div> <p>(1) Electric Supply Reliability between Guddu-Sibbi-Industrial II</p> <ul style="list-style-type: none"> <li>• The amount of electric power transmitted since the ex-post evaluation has continued to grow. This appears to be as a result of latent power demand being covered by this project and the construction of new power generation facilities and transmission lines in this section*.</li> <li>• The number of power outages lasting more than 20 minutes has increased, but it is natural for the number of outages to increase over time following the construction of facilities as a result of operation and maintenance activities. The latest number of outages (for 2005) fell to between 10 and 20, a level which is not particularly</li> </ul>

Year	1994	1995	1996	1997	1998	1999	2000
Transmitted power** (GWh)	Unkno wn	Unkno wn	953.0	874.3	856.9	1,884.0	1,036.0*
Number of outages lasting more than 20 minutes	0	3	2	1	4	1	9
Number of outages lasting up to 20 minutes	1	3	0	0	0	0	6
Annual load shedding (hours)	0	Unkno wn	81	1	276	2	199*

\*Note: Total for January-June, 2000

\*\*Note: Including the amount transmitted along the existing 220kV line.

The Sibbi-Industrial II line was completed in December 1994 and the Guddu-Sibbi line in June 1998.

problematic.

- It appears that the annual load shedding has increased since the ex-post evaluation, but these are the total figures for three lines, including the new transmission line, and there are very few cases of all three lines being out concurrently.

Table 1: Electric Supply Reliability between Guddu-Sibbi-Industrial II

Year	2001	2002	2003	2004	2005
Transmitted power** (GWh)	1,352	2,472	2,912	3,323	3,251
Number of outages lasting more than 20 minutes (planned)	38	63	45	46	18
Number of outages lasting more than 20 minutes (unplanned)	14	12	14	24	17
Number of outages lasting up to 20 minutes (planned)	0	0	0	0	0
Number of outages lasting up to 20 minutes (unplanned)	Unknown	Unknown	Unknown	2	3
Annual load shedding (hours)	992.1	418.7	2479.8	1327.0	962.3

Source: WAPDA

\*Note: A 580mW power station was constructed in Guddu-Sibbi-Industrial II and has been in operation since 2000. A transmission line was also added, and this section has three lines.

\*\*Note: Including the amount transmitted along the existing 220kV line and the new transmission line mentioned in the note above.

- The following shows the capacity utilization rate and transmission loss rate (technical low rate). The drop in the figure for 2003 is as a result of numerous acts of sabotage carried out against facilities (acts including the destruction of facilities by local anti-government groups) and damage to facilities from natural disasters during that year. The transmission loss rate is decreasing towards the desirable level of less than 1%.

Table 2: Capacity Utilization Rate and Transmission Loss Rate for Guddu-Sibbi-Industrial II

Year	2001	2002	2003	2004	2005
Capacity utilization rate (%)	84.0	89.7	66.7	80.8	88.2
Transmission loss rate (technical, %)	Unknown	Unknown	3.6	2.6	0.7

Source: WAPDA

- (2) Power consumption per person in Balochistan compared to the national average
- Power consumption in Balochistan is approaching the national average.

Table 2: Power Consumption per Person Unit: kWh

Year	(i) Balochistan	(ii) National average	(i)/(ii) (%)
1987	135	222	61
1988	160	250	64
1989	174	258	67
1990	180	275	65
1991	204	289	71
1992	230	311	74
1993	237	324	73
1994	238	324	73
1995	243	336	72
1996	256	346	74
1997	262	347	76
1998	262	343	76

- (3) Financial Internal Rate of Return (FIRR)
- 4.8% (12.6% at time of appraisal)
  - Causes included the overrun of project costs, delays in project implementation, a policy of keeping electricity prices at a lower level compared to increases in other prices, and the increase in losses due to power theft.  
(Costs) project costs and operation and maintenance costs  
(Benefits) increased portion of power sales generated by the project

Impact

- (1) Social Impact
- In Balochistan, electric power consumption in the agricultural sector accounts for 67.1% of total consumption in the province. As a steady supply of electric power is indispensable for agricultural development, the impact of implementing this project is expected to include increasing the production volume of agricultural products.
  - The direct cause of improvement in the rural electrification rate is distribution projects. The construction and improvement of transmission lines and substation facilities under the project are also essential factors, so the project is expected to make a contribution.
  - The displacement of residents was not necessary for site acquisition.

- (2) Power consumption per person in Balochistan compared to the national average
- The amount of power consumption in Balochistan reached the level of the national average in 2002, and following this has been increasing smoothly.

Table 3: Power Consumption per Person Unit: kWh

Year	(i) Balochistan	(ii) National average	(i)/(ii) (%)
1999	251	315	79
2000	265	325	81
2001	304	334	91
2002	353	341	103
2003	387	352	110
2004	430	375	114

Source: WAPDA

- (3) Financial Internal Rate of Return (FIRR)
- Around 5.0%
  - In order to factor out the effects of the addition of nearby power generation facilities and transmission lines from 2000 onward, this figure assumes a continuation of sales level in 1999. Taking the rise in prices into consideration would result in a downward revision to the figure, while calculating the figure with sales results for 2000 onward appears to result in an upward revision.

- (1) Social Impact
- The rural electrification rate for Balochistan has continued to increase steadily since the time of the ex-post evaluation.
  - The amount of electric power consumption in the agricultural sector in Balochistan in 2004 increased approximately 1.5-fold from 1998 to 154,240kWh, corresponding to 81.5% of total consumption. The contribution of electric power to agriculture in Balochistan remains high.

Table 4: Rural Electrification Rate in Balochistan

Year	Electrification rate (%)
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Table 5: Rural Electrification Rate in Balochistan

Year	Electrification rate (%)
1987	18
1996	20
1997	22
1998	24
1999	25

(2) Environmental Impact

- There has been no notable environmental impact.

1999	15.8
2000	15.8
2001	16.4
2002	16.9
2003	17.8
2004	21.1

Source: WAPDA

Note: The calculation method for data at the time of the ex-post evaluation is different, so a simple comparison is not possible.

(2) Environmental Impact

- Since after the ex-post evaluation, there continues to be no notable impact.

**Sustainability**

- Project sustainability
- Operation and maintenance

(1) Technology

- Grid System Operation (GSO) Quetta, which is in charge of operation and maintenance, has 199 employees engaged in this project, including 131 technicians. A total of 107 employees are stationed full time at Sibbi and Guddu substations. This organization is also in charge of operation and maintenance of the existing 220kV transmission line, so there are no issues regarding operation and maintenance.

(2) Organizational Structure

- Operation and maintenance is carried out by GSO Quetta of NTDC, which was separated from the transmission department of WAPDA, the executing agency for this project, and incorporated.

(3) Financial Status

- The collection of fees is being overseen by power distribution company QESCO, but only 50% to 60% of the amount due is being collected. Reasons for this

**The operation and maintenance institution has continued to be stable technically and structurally following the organizational restructuring after the ex-post evaluation. With regard to financial challenges, profitability is increasing.**

(1) Technology

- The necessary maintenance operations are being carried out, and there are no particular issues.
- Staff training, including systematic training for new staff, is being developed and implemented.
- The number of technicians (GSO Guddu) engaged in this project is 211.

(2) Organizational Structure

- GSO Quetta was separated; a portion became GSO Quetta, which belongs to power distribution company QESCO, and the majority remained with NTDC and became GSO Guddu. The majority of facilities constructed in this project are operated and maintained by GSO Guddu.
- Operation and maintenance are overseen by GSO Guddu, which as mentioned above has been separated from GSO Quetta.
- Of the 405 total employees at GSO Guddu, 266 are engaged in a portion of this project. Of these, 211 are technicians.
- The Pakistani government intends to continue to support NTDC as a government-owned enterprise.

(3) Financial Status

- While NTDC has posted net deficits on a continual basis for the five-year period

include nonpayment by end users, rampant power theft, and delays in payment by public institutions.

- WAPDA is currently in the process of dividing and privatizing its organization with cooperation from the World Bank. The Pakistani government does not intend to privatize NTDC because of the public nature of its services and its disadvantage in terms of profitability, and will support it as a government-owned enterprise.

#### Operation and Maintenance

In constructing the transmission line, the substations were connected with the shortest possible routes in order to reduce construction costs. Therefore, portions of the transmission line are far from highways, and it is difficult to carry out day-to-day inspections and to access sites. Accordingly, NTDV and GSO Quetta are planning to construct paths for access to sites, along with maintenance stations.

from FY2001 through FY2005, the financial situation has been improving. The major reason for the losses is that while independent government agency the National Electric Power Regulatory Authority (NEPRA) has set fees to balance electric power procurement costs and sales prices, the rate of collection on the sales amounts for the eight distribution companies, including QESCO, is only around 95% (FY2005).

- In 2005, a loss of approximately 2,828 million rupees in bad loans was reported in the project cost, and this amount is clearly greater than the size of the final net loss for the relevant fiscal year. Nevertheless, operations related to the procurement and sale of electric power will be split from NTDC in 2007, and are set to be moved to another government agency (the Central Power Purchase Agency). Thus, in the future these issues will not have an effect on the financial status of NTDC.
- Electric power is sold from NTDC to end users through eight distribution companies, including QESCO, but the rate of fee collection for amounts due from the agricultural sector, which is among QESCO's major customers, is only 60%.

Table 5: status of revenue and expenditure for NTDC Unit: 1 million rupees

Fiscal year	2001	2002	2003	2004	2005
Sales	135,557.7	157,872.5	173,304.9	185,341.7	199,471.5
Electric power costs	130,807.0	160,448.5	171,064.8	168,894.2	191,960.3
Project costs	2,988.2	3,301.0	3,411.8	15,543.3	6,813.4
Operating profit	1,762.5	-5,877.0	-1,171.7	904.2	697.8
Other income	1,433.7	1,530.4	743.3	201.2	301.3
Interest expenditure	7,485.9	3,045.4	2,317.8	2,981.2	2,637.5
Net profit/loss for year	-5,855.4*	-7,392.0	-2,746.1	-1,875.8	-1,638.4

Source: Annual Report

\*Note: Aside from the items shown above, an extraordinary loss of 1,565.7 million rupees is included.

#### Operation and Maintenance

In terms of maintenance for the transmission line, the necessary standard operations are being carried out. With regard to transmission lines far from highways, as confirmed at the time of the ex-post evaluation, the construction of maintenance stations has been carried out.

- If paths for access to sites are constructed, the situation regarding access issues will likely improve.
- While the theft of parts and sabotage are occurring occasionally, countermeasures

		<p>are being taken for each case, and there are no particular issues with facility maintenance overall.</p>
<p><b>Lessons Learned, Recommendations, Information Resources and Monitoring Methods</b></p> <p>(1) Follow up on lessons learned and recommendations made in ex-post evaluation report or in later evaluations</p> <p>(2) Proposals for securing sustainability and instructions given at time of follow-up monitoring</p>	<p>(1) No lessons or recommendations are mentioned.</p>	<p><b>No notable items.</b></p> <p>(1) Follow-up on recommendations and lessons from the ex-post evaluation</p> <ul style="list-style-type: none"> <li>• Not applicable.</li> </ul> <p>(2) Lessons from the monitoring evaluation and recommendations for securing sustainability</p> <ul style="list-style-type: none"> <li>• Not applicable.</li> </ul>