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Bakreswar Thermal Power Station Construction Project (1) (2)
Bakreswar Thermal Power Station Unit No. 3 Construction Project (1) (2)

Contributing to the stable supply of electricity and socioeconomic development in the state of West Bengal through high operating capacity of power stations

Loan Amount / Disbursed Amount 81.416 billion yen / 77.314 billion yen
Loan Agreement January 1994 to March 1999
Terms & Conditions 1.8-2.6% interest rate, 30 year repayment period (10 year grace period), General untied
Final Disbursement Date March 1993 – April 1999
Executing Agency West Bengal Power Development Corporation Ltd. (WBPDCL) (<http://wbpdcl.co.in/>)

*This evaluation was conducted jointly by the WBPDCL with the support of the Energy and Resources Institute, India.



Project Objectives

The objective of this project was to meet the increasing demand for electric power and to assure stable electricity supply in West Bengal State (hereafter WB) by constructing thermal power stations using domestic coal produced at a nearby coal field and also related transmission facilities in the village of Mutaberia in the Birbhum District in WB, thereby contributing to the promotion of industries and the improvement of residents' lives by electrification

Effectiveness and Impact

Rating **a**

Thermal electric power stations with a rated output of 630MW (210MW x 3 units) and transmission facilities were constructed during this project. In 2006, the plants significantly outperformed initial targets of annual power generation (3,780GWh), plant load factor (68.5%), and maximum output (630MW). Unit No. 3 recorded continual operation for 452 days, achieving the national record. In addition, all the indicators for the generating efficiency, such as station heat rate, coal consumption, oil consumption and DM water consumption have achieved respective targets, and the Bakreswar Thermal Power Station received a Meritorious Award for Lower Oil Consumption and a Silver Shield for Overall Performance for the overall operational performance from the Government of India in 2003. The power plant has been supplying up to 18% of peak period power demand in WB, playing an important role to ensure a stable power supply for the state in recent years. There have also been positive impacts in the areas surrounding the power station as a result of the executing agency's active support in socio-economic development and welfare improvement. An increase in economic activities, generation of employment, and improvement in educational and medical infrastructures have also been observed. The beneficiary survey also confirmed improvement in dietary and an increase in enrollment rates. Therefore, as this project has by far

surpassed expectations, effectiveness is highly satisfactory.

Relevance

Rating **a**

This project has been highly relevant with national policies both at the time of the appraisal and at the time of the ex-post evaluation. The power shortage in WB has substantially improved, and it has become even possible to sell surplus electricity during off-peak hours to other states. Meanwhile, as the power demand and the peak demand are expected to increase at an annual rate of 7.1% and 5.2% respectively in the next 10 years, continual enhancement of the generating capacity is required to maintain a stable power supply.

Efficiency

Rating **a**

Although the project period slightly exceeded plan (113% of planned period), project costs were below plan (82% of planned costs) as a result of competitive tendering, therefore, efficiency of the project is regarded as high. This delay was caused by extensive damage to the railway tracks and roads used for the transportation of the equipment and materials by major flooding of the area in 2000. On the other hand, Unit No. 1 was completed six months earlier than the original schedule, which was a national record.

Sustainability

Rating **a**

No major problem has been observed for capacity of the executing agency nor the operation and maintenance system nor the financial capacity, therefore sustainability of this project is high.

Conclusion, Lessons Learned, Recommendation

In light of the above, this project is evaluated to be highly satisfactory. It is desirable for the executing agency to share its outstanding results of this project with other electric power companies, particularly those of excellent socioeconomic welfare activities to support local communities as best practices of the electric power sector.

Actual Operation Results for Bakreswar Thermal Power Station

At the Time of Appraisal	Plant Availability Factor	Maximum Output	Plant Load Factor	Annual Power Generation	Auxiliary Power Ratio	Ex-bus Power Generation
	80.0%	630 MW	68.5%	3,780 GWh	9.5%	3,421 GWh
2000/01	50.2%	—	63.9%	1,274 GWh	12.4%	1,117 GWh
2001/02	73.7%	—	69.2%	3,147 GWh	10.6%	2,814 GWh
2002/03	83.0%	670 MW	72.9%	4,023 GWh	10.0%	3,619 GWh
2003/04	91.8%	647 MW	78.2%	4,325 GWh	9.7%	3,905 GWh
2004/05	83.0%	645 MW	75.7%	4,175 GWh	9.8%	3,764 GWh
2005/06	87.6%	636 MW	79.3%	4,374 GWh	9.5%	3,953 GWh
2006/07	93.2%	640 MW	89.0%	4,913 GWh	9.3%	4,454 GWh

Note: Plant availability factor (%) = (annual operating hours/annual hours) x 100 (80% is the standard set by the Government of India.)
 Plant load factor (%) = annual power generation / (rated output x annual hours) x 100
 Auxiliary power ratio (%) = annual auxiliary power consumption / annual power generation) x 100
 Ex-bus power generation (GWh) = annual power generation – annual auxiliary power consumption
 Source: WBPDCL

Third-Party Opinion

This project has not only contributed significantly to the stable supply of electricity in WB, but has also had a broad impact on promoting industry and employment. Successful relocation of the residents and welfare activities in the surrounding areas can also be highly evaluated.

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