**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 Mutabera in the Birbhum District in WB, thereby contributing to the promotion of industries and the improvement of residents’ lives by electrification.

**Effectiveness and Impact**

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 socioeconomic 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 educational and medical infrastructures have also been observed.

**Surpassed Expectations**

The project has surpassed expectations, effectiveness is highly satisfactory.

**Relevance**

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**

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**

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.

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**Appendix**

**Actual Operation Results for Bakreswar Thermal Power Station**

<table>
<thead>
<tr>
<th>At the Time of Appraisal</th>
<th>Plant Availability Factor (%)</th>
<th>Excess Output Factor (%)</th>
<th>Excess Power Ratio (%)</th>
<th>Excess Power Generation (GWh)</th>
<th>Actual Power Generation (GWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000/01</td>
<td>89.9%</td>
<td>128%</td>
<td>99.3%</td>
<td>3,421GWh</td>
<td>830GWh</td>
</tr>
<tr>
<td>2000/02</td>
<td>89.9%</td>
<td>128%</td>
<td>99.3%</td>
<td>3,421GWh</td>
<td>830GWh</td>
</tr>
<tr>
<td>2000/03</td>
<td>89.9%</td>
<td>128%</td>
<td>99.3%</td>
<td>3,421GWh</td>
<td>830GWh</td>
</tr>
<tr>
<td>2000/04</td>
<td>89.9%</td>
<td>128%</td>
<td>99.3%</td>
<td>3,421GWh</td>
<td>830GWh</td>
</tr>
<tr>
<td>2000/05</td>
<td>89.9%</td>
<td>128%</td>
<td>99.3%</td>
<td>3,421GWh</td>
<td>830GWh</td>
</tr>
<tr>
<td>2000/06</td>
<td>89.9%</td>
<td>128%</td>
<td>99.3%</td>
<td>3,421GWh</td>
<td>830GWh</td>
</tr>
</tbody>
</table>

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
Excess power generation (GWh) = annual power generation – annual auxiliary power consumption
Source: WBPDCL