



## 1. Project Data

<b>Project ID</b> P115566	<b>Project Name</b> IN: POWERGRID V	
<b>Country</b> India	<b>Practice Area(Lead)</b> Energy & Extractives	
<b>L/C/TF Number(s)</b> IBRD-77870	<b>Closing Date (Original)</b> 30-Jun-2015	<b>Total Project Cost (USD)</b> 1,000,000,000.00
<b>Bank Approval Date</b> 22-Sep-2009	<b>Closing Date (Actual)</b> 31-May-2019	
	<b>IBRD/IDA (USD)</b>	<b>Grants (USD)</b>
Original Commitment	1,000,000,000.00	0.00
Revised Commitment	1,000,000,000.00	0.00
Actual	1,000,000,000.00	0.00

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## 2. Project Objectives and Components

### a. Objectives

According to both the Loan Agreement (p.5) dated October 13, 2009, and the Project Appraisal Document (PAD, p.4) dated August 25, 2009, the project objective was “to strengthen the transmission system in order to increase reliable power exchange between the regions and States of India.”



The formulation of the project objective in Annex 3: Results Framework and Monitoring of the PAD (p.29) was slightly different: “To strengthen India’s electricity transmission system in order to increase reliable power exchange between regions and states.”

**Note 1:** The World Bank (the Bank) has supported the Power Grid Corporation of India Limited’s (POWERGRID—the central transmission utility) emergence as one of the world’s largest transmission utilities through the Power System Development Projects (PSDP) series, of which this project is the fifth. The Bank financing for the PSDP series has amounted to US\$3.2 billion since 1993 and included intensive capacity-building support during POWERGRID’s formative years. The Bank has financed following POWERGRID projects, with the loan amounts indicated:

- First PSDP for US\$350 million (closed in December 2000)
- Second PSDP for US\$450 million (closed in June 2006)
- Third PSDP for US\$400 million (closed in July 2011)
- Fourth PSDP for US\$1,000 million (closed in July 2014)
- Fifth PSDP for US\$1,000 million (closed in May 2019)

**Note 2:** In this review, a split rating has not been carried out because, according to the Bank guidance, if the scope of a project expands, which was the case in this project at the first restructuring (see section 2.e Comments on Project Cost, Financing, Borrower Contribution, and Dates below), this supports a decision not to apply a split rating and instead to assess the entire project based on the revised outcomes and outcome targets.

**b. Were the project objectives/key associated outcome targets revised during implementation?**  
Yes

**Did the Board approve the revised objectives/key associated outcome targets?**  
Yes

**Date of Board Approval**  
23-May-2014

**c. Will a split evaluation be undertaken?**  
No

**d. Components**  
The project consisted of one component:

**A. Transmission Component.** (*Appraisal cost: US\$1,562 million including US\$200 million for physical and price contingencies; actual cost: US\$2,158 million*)

The component consisted of the construction of five transmission schemes—765 kilovolt (kV) and 400 kV transmission lines and large substations:

- a. System strengthening in the Western Region (WR) for Sasan Ultra Mega Power Plant\*



- b. System strengthening in the Northern Region (NR) for Sasan and Mundra Ultra Mega Power Plants
- c. System strengthening in the WR for Mundra Ultra Mega Power Plant
- d. System strengthening in the Southern Region (SR) and WR for Krishnapatnam Ultra Mega Power Plant
- e. Transmission system for the South-West Interconnection.

\* An ultra mega power plant is a large coal-fired thermal power plant that employs super critical technology to achieve high fuel efficiency with a capacity of approximately 4,000 megawatt (MW) (PAD, footnote 9, p.5).

### Revised Components

At the first restructuring in May 2013, the first transmission scheme—system strengthening in the Western region for Sasan Ultra Mega Power Plant—was moved to the Fourth PSDP to utilize the funds available in that project under an additional financing. The fifth transmission scheme—transmission system for the South-West Interconnection—was cancelled because the system was found to be redundant. In place of these two schemes, two schemes were moved from the Fourth PSDP and four new schemes were added resulting in an increase in the number of schemes from five to nine. The nine schemes, after the restructuring, were follows:

System strengthening in the NR for Sasan and Mundra Ultra Mega Power Plants (original)

- a. System strengthening in the WR for Mundra Ultra Mega Power Plant (original)
- b. System strengthening in the SR and WR for Krishnapatnam Ultra Mega Power Plant (original)
- c. Southern Region System Strengthening XVII (SRSS 17) (from the Fourth PSDP)
- d. Northern Region System Strengthening Scheme XXIV (NRSS 24) (from the Fourth PSDP)
- e. Northern Region System Strengthening Scheme XXV (NRSS 25) (new)
- f. Northern Region System Strengthening Scheme XXVI (NRSS 26) (new)
- g. Eastern Region System Strengthening V (ERSS V) (new)
- h. Upgradation of  $\pm 800\text{kV}$  3,000 MW High Voltage Direct Current (HVDC) Bipole\* between Champa and Kurukshetra to 6,000 MW (called “Champa-Kurukshetra Bipole”)

\* A bipolar link consists of two conductors with opposite charges of negative and positive, respectively, compared to the earth. Such bipolar links are commonly used in HVDC systems.

### e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

**Project Cost:** The total project cost was originally estimated at US\$1,562 million including US\$200 million for physical and price contingencies. In May 2019, the project closed with a total cost of US\$2,158 million. The Implementation Completion and Results Report (ICR, p.41) gives three reasons for the significant increase in project costs: (i) the dropping of one scheme; (ii) the swapping of another scheme with two from the Fourth PSDP Additional Financing; and (iii) the addition of five new schemes (See Revised Components above).



**Financing:** At appraisal, the International Bank for Reconstruction and Development (IBRD) loan was estimated at US\$1,000 million. By project closing in May 2019, the project had disbursed all of the IBRD loan.

**Borrower contribution:** At appraisal, the POWERGRID's contribution was estimated at US\$562 million. At project closing, the POWERGRID's actual contribution was US\$1,158 million because of the increase in project scope.

**Restructurings:** There were two project restructurings:

- **First Restructuring (Level 2 – May 23, 2014):** Loans in the amount of US\$433 million were saved because of the depreciation of the Indian rupee against the US dollar, the cancellation of one of the five original schemes, lower prices than those estimated at the appraisal as a result of competitive bidding, and the regulatory requirements binding POWERGRID to maintain a debt-equity ratio of 70:30 for all the schemes financed by the utility (ICR, p.11). To utilize these savings, the project was structured to shift schemes between the Fourth and Fifth PSDPs and add new schemes (see Revised Components above). The project closing date was extended by 23 months from June 30, 2015 to May 31, 2017 to allow time for the completion of the new schemes added in this restructuring. At the time of the restructuring, it was expected that the original three components would have been completed by the original closing date (Restructuring Paper, Report No: RES13840, p.6). Because of the project closing date extension, the end target values of the indicators, which monitored the system-wide increase in transmission capacity and power exchange across regions, were increased.
- **Second Restructuring (Level 2 – May 23, 2017):** The project closing date was extended by another 24 months from May 31, 2017 to May 31, 2019 to allow time for the completion of the four schemes that were delayed because of right-of-way (ROW) issues. The four schemes were the following: (a) System strengthening in WR for Mundra UMPP (original scheme); (b) NRSS 24; (c) ERSS V; and (d) Champa-Kurukshetra Bipole. As was the case in the first restructuring, the end target values of indicators were also increased in this restructuring.

**Dates:** The project was approved on September 22, 2009. The Loan Agreement was signed on October 13, 2009, and the loan became effective on January 8, 2010. The Mid-Term Review was conducted in October 2013. The original closing date was June 30, 2015. In the first and second restructurings, the closing date was extended by a total of 47 months, for the reasons cited above, and the project closed on May 31, 2019.

### 3. Relevance of Objectives

#### Rationale

The project objective was highly relevant to the country context. Given that the project activities consisted of the construction of major high-voltage transmission lines to strengthen the national transmission system, the project objective to increase reliable power exchange among the regions and states of India was outcome-oriented. It was appropriately pitched for the development status of India where demand for electricity had been growing rapidly in parallel to economic growth. The capacity in the country, which was strengthened by the earlier projects in the Power Sector Development Projects (PSDP) series that resulted in the emergence of POWERGRID as an effective transmission company, was sufficient to expect the



achievement of the objectives. The project objective was also aligned with the priorities set in the government’s National Electricity Plan for Transmission—the continued development of the national grid for providing adequate infrastructure for inter-state transmission of power and facilitation of the underutilized generation capacity to generate electricity for transmission from surplus regions to deficit regions (Official Gazette, January 15, 2019, p.245).

The project objective is assessed as highly aligned with the Bank’s current strategy as defined in the Country Partnership Framework (CPF) for India, FY18-FY22. Although the current CPF does not directly refer to the Fifth PSDP’s specific objectives, the achievement of the long-term objectives of the PSDP series, which was implemented over an almost three-decade period, is already embedded in the Bank’s strategy as it shifted over time to address new issues in the power sector. The Bank supported POWERGRID in transforming the utility into a well-functioning major transmission company and establishing an interconnected national transmission grid operating on a single frequency (CPF, p.84). By 2017, the target set in the previous Country Partnership Strategy (CPS) for India, FY13-FY17, i.e., 75,000 gigawatt hours (GWh) of power exchange under the Fourth and Fifth PSDPs, was exceeded by more than 14,000 GWh at 89,052 GWh (CPF, p.112). Therefore, the focus of the Bank’s current strategy in energy, under “Objective 1.4: Increase access to sustainable energy”, expanded from strengthening the transmission network to also supporting the distribution companies to increase access to reliable power, scaling up renewable energy generation, and promoting energy efficiency (CPF, pp.52-53).

The Bank has been a development partner for India in the establishment of its transmission network since early 1990s. The Bank has in-depth knowledge of the sector in India and extensive expertise in such projects. The last three PSDP projects had the same objective, with some difference in formulation. These successive projects were designed to support the POWERGRID’s investment program. The objective was sufficiently challenging.

Overall, the relevance of the objectives is rated High as the Bank’s strategy expanded from its focus on strengthening the transmission network, which was achieved under the PSDP series, toward more broadly increasing access to reliable energy.

## **Rating**

High

## **4. Achievement of Objectives (Efficacy)**

### **OBJECTIVE 1**

#### **Objective**

To strengthen the transmission system in order to increase reliable power exchange between the regions and States of India.

#### **Rationale**



## Theory of Change

The project inputs—IBRD loans and counterpart funds—were sufficient to implement the project activities consisting of the construction of high-voltage transmission lines and related large substations. The project activities were expected to result in four major transmission schemes in the Western, Southern and Northern Regions and one scheme connecting the Southern and Western Regions. (The project did not include any scheme in the Northeastern Region.) The expected intermediate outcomes were increased transmission capacity both in terms of achieving targeted mega volt amperes (MVA) and circuit kilometers (ckm) to enable the evacuation of power from three privately owned ultra mega power plants (UMPPs), thus strengthening the national grid system. The project's expected outcomes were an increase in reliable power exchange between the regions and a decrease in the power deficit in the northern load centers through the facilitation of power flow from the generation plants in the eastern part of the country to these load centers. However, the indicators were designed to measure these outputs and outcomes at the system level. According to the information provided by the project team (email dated December 18, 2020), due to the nature of such transmission systems with multiple connection points and the flow of electricity through the least resistance path, it was not possible to measure the impact of the project's outputs on transmission capacity and power exchange increases at the scheme level. The results framework did not originally include any indicator to measure the improvement in the reliability of power exchange, because, as the project team commented, the initial focus of the PSDP series was to connect five separate electricity regions with each other to allow flow of surplus energy to deficit regions, and the results framework and the indicators were kept consistent for the comparison of projects. (The project team also commented that as regional grids were integrated, reliability was measured by the availability of the transmission system and number of trippings per line attributable to POWERGRID. These were measured as additional indicators.) The project's theory of change was built on the critical assumption that there would be sufficient power supply from power producers. Overall, the causal pathways from inputs to outcomes were valid and direct, but the outcomes achieved could not be isolated and directly attributed to the project's intervention due to the difficulty in separately measuring the project's impact on a highly interconnected transmission system. The first project restructuring in May 2014 resulted in an increase in the project's scope without any material effect on the theory of change.

## Outputs

Eight of the nine transmission schemes were commissioned before project closing. The list of transmission lines, loop-in loop-outs (LILO) and substations financed by the project are given below:

### a. System strengthening in the Northern Region for Sasan and Mundra UMPPs

- Agra – Sikar 400 kV line
- Sikar – Jaipur 400 kV line
- Sikar – Ratangarh 400 kV line
- Nathpa Jhakri – Abdullapur 400 kV LILO at Panchkula
- Sikar – Ratangarh 220 kV line LILO at Sikar Substation
- Sikar Substation 400/220 kV 2x315 MVA (new)
- Panchkula Substation 400/220 kV 2x315 MVA (new)
- Agra Substation 765/400 kV (extension)
- Ratangarh Substation 400/220 kV (extension)
- Jaipur Substation 400/220 kV (extension)



b. System strengthening in the Southern and Western Regions for Krishnapatnam UMPP

- Raichur – Sholapur 765 kV line
- Scholapur – Pune 765 kV line
- Parli – Pune 400 kV line LILO at Pune Substation
- Pune – Aurangabad 400 kV line LILIO at Pune Substation
- Raichur – Gooty 400 kV line LILO at Raichur Substation
- Raichur Substation 765/400 kV 7x500 MVA (new)
- Sholapur Substation 765/400 kV 7x500 MVA (new)
- Kurnool Substation 765/400 kV 7x500 MVA (extension)
- Gooty Substation 400/2200 kV 2x63 MVA reactive (extension)

c. Southern Region System Strengthening XVII (SRSS 17) (from Fourth PSDP)

- Kudgi – Kolhapur 765 kV line
- Kudgi – Narendra 400 kV line
- Kolhapur – Mapusa 400 kV line LILO at Kolhapur Substation.
- Kolhapur Substation 765/400 kV(new)
- Narendra Substation 765/400 kV 1xMVW reactive (extension)
- Kolhapur Substations 400/220 kV 1x125 MVA reactive (extension)

d. Northern Region System Strengthening Scheme XXIV (NRSS 24) (from Fourth PSDP)

- Dehradun – Abdullapur 400 kV line

e. Northern Region System Strengthening Scheme XXV (NRSS 25) (new)

- Jaipur – Bhiwani 765 kV line
- Bhiwani – Hissar 400 kV line
- Moga – Bhiwadi 400 kV line LILO at Hissar

f. Northern Region System Strengthening Scheme XXVI (NRSS 26) (new)

- Meerut – Moga 765 kV line

g. Eastern Region System Strengthening V (ERSS V) (new)

- Rajarhat – Purnea 400 kV line
- Rajarhat – Purnea 400 kV line LILO at Gokarna
- Rajarhat – Purnea 400 kV line LILO at Farakka
- Subhasgram – Jeerat 400 kV line LILO at Rajarhat

h. Champa-Kurukshetra Bipole

- Champa – Kurukshetra Bipole  $\pm$ 800 kV upgrading from 3000 MW to 6000 MW.



- Champa Pooling Station 765/400 MVA (new)

One scheme, i.e., System Strengthening in Western Region for Mundra UMPP, could not be commissioned before project closure. The original target commissioning date of this scheme was September 2012. The construction of the Wardha – Aurangabad 400 kV line under this scheme was delayed because of right-of-way (ROW) issues. The design of the line was later upgraded to 1,200 kV. The lack of skilled workers to install a transmission line at 1,200 kV, the highest voltage in the world, was another reason for delay. The COVID-19 outbreak further slowed the construction activities. According to the information provided by the project team, the commissioning of this scheme is expected in March 2021.

By March 2019, POWERGRID had increased the length of the transmission lines to 153,218 ckm against the revised target of 150,000 ckm. The baseline value at appraisal was 79,552 ckm. This indicator was designed to measure the achievement at the system level. The total length of the 765 kV and 400 kV transmission lines financed under this project was 4,100 ckm. There was no target set to compare the project's contribution to the increase in the length of transmission lines, because project activities were designed as schemes rather than construction of certain length of transmission lines.

Similarly, the construction or upgrading of substations increased the POWERGRID's system-wide transmission capacity to 366,097 MVA against the target of 320,000 MVA. The baseline at appraisal was 79,522 MVA. The project's contribution was 8,000 MVA, for which there was no target set at appraisal.

### **Outcomes**

The increase in the transmission capacity resulted in an increase in the amount of electricity exchanged among the regions. At project closing 181,744 GWh of electricity was exchanged between the regions against the revised target value of 150,000 GWh. The baseline value at appraisal was 46,027 GWh. As mentioned in the theory of change section above, due to the nature of interconnected transmission systems and the flow of electricity, the achievements were measured at the system level.

The project team followed two additional indicators to measure the availability and the reliability of the transmission system. The availability of the system fluctuated between 99.7 percent and 99.92 percent between 2011 and 2019, which is a very high availability rate. The number of trippings per line attributable to POWERGRID dropped from 1.27 in 2011 to 0.46 in 2019 (Aide Memoire of the Implementation Support Mission held in August-September 2018, p.20 and additional information provided by the project team in their email dated December 18, 2020). Both achievements show that POWERGRID's operational performance improved as a result of the transmission scheme investments, which were supported by the Bank under the PSDP series. All these achievements resulted in a sharp decrease in average peak deficit from 11.9 percent in 2008/09 to 0.8 percent in 2018/19 and average energy deficit from 11 percent to 0.6 percent in the same period (ICR, footnote 2, p.2).

With the Bank's almost three-decade long support, POWERGRID extended and connected the intra-region transmission network in the country and increased reliable power exchange between regions resulting in a sharp decrease in the average peak deficit and energy deficit. This project contributed to further strengthening of the transmission system in the country and achieved all its outcome targets. Therefore, the efficacy of the achievement of the project objective is rated high.





**Rating**

High

**OVERALL EFFICACY**

**Rationale**

Eight of nine schemes have been commissioned and the ninth scheme is expected to be commissioned in early 2021. The project achieved all the outcome targets measured at the system level. Overall, the efficacy of the achievement of the project objective is rated High.

**Overall Efficacy Rating**

High

**5. Efficiency**

**Economic Analysis**

At appraisal, a cost-benefit analysis was conducted separately for each five original schemes. The economic benefit of the schemes was estimated by calculating the reduction in system losses to be achieved after the completion of the schemes. A better proxy to calculate the economic benefit could have been the measurement of incremental power supply through the strengthened system, but, as explained in the PAD (p.65), since other factors, other than transmission, such as sub-transmission lines and distribution networks, affect the increase in incremental power supply, the economic benefits from this increase could not be attributed to the project's intervention in transmission network. Therefore, estimated reduction in system losses was an appropriate proxy for calculating the economic benefits of the project. It was estimated that the project would reduce system losses by 526 MW that was equivalent to an energy saving of 8,699 GWh per year (PAD, p.66) To quantify the economic benefits of the estimated system loss reductions, the economic price of electricity was derived using the opportunity cost of thermal energy saved. In the base case scenario, it was assumed that the schemes would be completed as scheduled without any cost escalation and the foreign exchange rate would vary in accordance with the Bank's projections. Based on these assumptions, an economic rate of return (ERR) was calculated for each scheme that varied between 16.3 percent and 24.4 percent. These ERRs were higher than the hurdle rate of 12 percent that was specified in the official memorandum of the India Country Director on the Exchange Rates and Price Contingencies for Project Analysis dated June 29, 2007 (PAD, p.65). In the sensitivity analysis, when cost escalation of 10 percent, foreign exchange variation of 10 percent and implementation delay of two years were considered together, the ERRs were still above the hurdle rate ranging from 12.1 percent to 17.7 percent. Net present values were not calculated at appraisal.

When the number of transmission schemes increased from five to nine at the first restructuring, ERRs were calculated, using the same methodology, for the six schemes added to the project (one original scheme was cancelled and one original scheme was moved to the Fourth PSDP; hence, the number of schemes increased to nine after the restructuring - see Revised Components in section 2.d Components). The ERRs for the new schemes ranged from 13.2 percent to 25.7 percent in the base scenario, higher than the hurdle rate of 12



percent. In the worst-case scenario, which was defined as cost escalation by 20 percent, delay of two years, foreign exchange rate lower by 10 percent, the ERRs varied between 9.53 percent and 17.8 percent.

At project closing, the economic analysis, using the same methodology at appraisal and project restructuring, resulted in lower ERRs. The range for the ERRs was from 8.09 percent to 15.06 percent. Of the nine schemes, only two had ERRs higher than the hurdle rate of 12 percent. The main reason for lower ERRs are listed as substantial delays in the commissioning of the schemes—five schemes were delayed by between three and eight years—and cost escalations ranging from 9 percent to 58 percent (ICR, pp.43-44).

### **Economic Rates of Return (ERRs) for Each Scheme (ERR at appraisal or at restructuring; ERR at closing)**

1. WR for Sasan UMPP: ERR at appraisal was 21.10 percent; ERR was not available at closing because this scheme was moved to Fourth PSDP at the restructuring.
2. WR for Mundra UMPP: ERR decreased from 19.50 percent to 8.09 percent due to delays totaling eight years and 34 percent cost escalation. Commissioning in March 2021.
3. NR for Sasan and Mundra UMPPs: ERR decreased from 16.30 percent to 9.36 percent due to delays of four years and six months and 15 percent cost escalation.
4. SR and WR for Krishnapatnam UMPP: ERR decreased slightly from 16.40 percent to 15.06 percent. These ERRs are comparable. There was a delay of one year and six months, but actual cost was 20 percent lower than the estimated cost.
5. South-West Interconnector: ERR at appraisal was 21.10 percent; ERR was not available at closing because this scheme was found to be redundant and cancelled at the restructuring.
6. SRSS 17: ERR decreased from 18.85 percent to 13.86 percent. There was a delay of seven months, but actual cost was 11 percent lower than the estimated cost.
7. NRSS 24: ERR decreased from 25.67 percent to 8.84 percent due to delays of three years and four months and 58 percent cost escalation.
8. NRSS 25: ERR decreased from 13.20 percent to 8.38 percent due to delays of seven months and 24 percent cost escalation.
9. NRSS 26: ERR decreased from 13.33 percent to 9.86 percent. There was a delay of two months and cost escalation was nine percent.
10. ERSS V: ERR decreased from 14.66 percent to 8.82 percent due to delays of four years and 35 percent cost escalation.
11. Champa-Kurukshetra Bipole: ERR decreased from 20.97 percent to 11.26 percent due to delays of two years and ten months despite a cost reduction of 19 percent.

The ERRs calculated at project closure for the schemes financed under this project were also lower than the ERRs calculated for the schemes financed under the Third and Fourth PSDPs. In the Third PSDP, the ERRs ranged from 12.09 percent to 23.85, all being higher than the hurdle rate of 12 percent (ICR of Third PSDP, p.37). In the Fourth PSDP, only one scheme, i.e., the Eastern Region System Strengthening 1, had an ERR of 10.86 percent that was under the hurdle rate of 12 percent. The ERRs calculated for other schemes financed under the Fourth PSDP were above 12 percent and the highest was 24 percent (ICR of Fourth PSDP, p.64). Compared to the previous two PSDPs, the Fifth PSDP had significantly lower ERRs.

### **Financial Analysis**

At appraisal, two alternative indices, i.e., Financial Internal Rate of Return (FIRR) and Internal Rate of Return on Equity (RoE), were considered for financial analysis of the schemes. Since the cost of POWERGRID's debt was



a pass through in tariff, the financial performance of the schemes would be unaffected by the cost of debt. Therefore, RoE, which is benchmarked against the cost of equity for POWERGRID, was used as a proxy for the financial appraisal of the schemes (PAD, p.68).

The financial analysis was conducted based on the additional revenue that would be earned by POWERGRID as a result of the strengthening of the system by the schemes to be financed under the project. The tariff structure at the time of appraisal was based on the cost-plus basis and the tariff determined in April 2009 that was to be valid for the following five years was used in the RoE calculations. The calculations for the original five schemes resulted in RoEs ranging from 20.1 percent to 22.5 percent at the base case scenarios. These RoEs were higher than the cost of equity of 15.50 percent for POWERGRID.

At the first restructuring, same methodology was used to calculate the RoEs for the additional six schemes. The RoEs ranged from 15.68 percent to 20.90 percent, which were also higher than the hurdle rate of 15.50 percent.

At project closure, the RoEs were mostly lower than the RoEs calculated at appraisal or the project restructuring because of significant delays in commissioning of the schemes and cost escalations. The RoEs at project closure varied between 10.16 percent and 21.22 percent. Of the nine schemes, five had RoEs lower than the hurdle rate of 15.5 percent.

#### **Returns on Equity (RoEs) for Each Scheme (RoE at appraisal or at restructuring; RoE at closing)**

1. WR for Sasan UMPP: RoE at appraisal was 20.80 percent; RoE was not available at closing because this scheme was moved to Fourth PSDP at the restructuring.
2. WR for Mundra UMPP: RoE decreased from 21.50 percent to 10.16 percent due to delays totaling eight years and 34 percent cost escalation. Commissioning in March 2021.
3. NR for Sasan and Mundra UMPPs: RoE decreased from 22.50 percent to 11.16 percent due to delays of four years and six months and 15 percent cost escalation.
4. SR and WR for Krishnapatnam UMPP: RoE decreased slightly from 20.20 percent to 17.94 percent. These RoEs are comparable. There was a delay of one year and six months, but actual cost was 20 percent lower than the estimated cost.
5. South-West Interconnector: RoE at appraisal was 21.90 percent; RoE was not available at closing because this scheme was found to be redundant and cancelled at the restructuring.
6. SRSS 17: RoE slightly increased from 19.53 percent to 21.22 percent. There was a delay of seven months, but actual cost was 11 percent lower than the estimated cost.
7. NRSS 24: RoE decreased from 15.68 percent to 14.58 percent. These RoEs are comparable despite a delay of three years and four months and 58 percent cost escalation.
8. NRSS 25: RoE decreased from 20.90 percent to 15.40 percent due to delays of seven months and 24 percent cost escalation.
9. NRSS 26: RoE decreased from 19.25 percent to 16.73 percent. There was a delay of two months and cost escalation was nine percent.
10. ERSS V: RoE decreased from 18.36 percent to 10.72 percent due to delays of four years and 35 percent cost escalation.
11. Champa-Kurukshetra Bipole: RoE slightly decreased from 16.46 percent to 15.49 percent. These are comparable RoEs. There was a delay of two years and ten months, but actual cost was 19 percent lower than the estimated cost.

The RoEs calculated at project closure for the schemes financed-under this project were also lower than the RoEs calculated for the schemes financed under the Third and Fourth PSDPs. In the Third PSDP, the RoEs



varied between 15.76 percent to 25.96, all being higher than the hurdle rate of 15.5 percent (ICR of Third PSDP, p.45). In the Fourth PSDP, two schemes, i.e., the Eastern Region System Strengthening 1 and Western Region System Strengthening 2, had RoEs of 14.02 percent and 15.38 percent, respectively, that were under the hurdle rate of 15.5 percent. The RoEs calculated for other four schemes financed under the Fourth PSDP were above 15.5 percent and the highest was 29.08 percent (ICR of Fourth PSDP, p.72). Compared to the previous two PSDPs, the Fifth PSDP had significantly lower RoEs.

**Operational and Administrative Efficiency**

The project implementation was adversely impacted by the right-of-way and forest clearance issues. According to the information provided by the project team, landowners were compensated by 85 percent of the land value under the transmission towers and 15 percent under the transmission lines starting from 2015 following the issuance of the guidelines by the Ministry of Power to address ROW issues. Despite these compensations, ROW issues continued to delay the construction works. Some landowners were completely against the installation of transmission lines over their lands believing that those lines were harmful to childbirth and caused radioactive harm on humans (ICR, p.32). Some other landowners were not satisfied with the compensation amount. Such ROW issues delayed the commissioning of most of the schemes by more than couple of years (see Table 1 or Table 2 for the duration of delays in commissioning of the transmission lines). Delays in forest clearance also adversely affected project implementation. For example, for the NRSS 25 scheme the forest clearance was approved 15 months after the submission of the proposal (ICR, p.45). The adverse impact of these issues on project efficiency were adequately captured under economic and financial analyses that resulted in lower ERRs and RoEs.

Overall, because of the major delays and the significant decrease in the ERRs and RoEs of the schemes compared to both the estimates at appraisal and project restructuring and those of the Third and Fourth PSDPs, the efficiency of this project is rated Modest.

**Note:** The highest ERR at project closing, in a range of ERRs for the schemes, is entered below with its corresponding ERR at appraisal.

**Efficiency Rating**

Modest

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	25.67	0 <input checked="" type="checkbox"/> Not Applicable
ICR Estimate	✓	8.84	0 <input checked="" type="checkbox"/> Not Applicable

\* Refers to percent of total project cost for which ERR/FRR was calculated.



## 6. Outcome

The relevance of the project objectives is rated high. The project achieved all the outcome targets measured at the system level. The efficacy of the achievement of the project objective is rated high. The efficiency of the project is rated modest because of the major implementation delays and the economic rates of return (ERRs) and returns on equity (ROEs) that were calculated for economic analysis and financial analysis, respectively, were substantially lower than the estimates at appraisal and the project restructuring, and most of them were lower than their respective hurdle rates of 12 percent and 15.5 percent. The ERRs and RoEs were also lower than those calculated for the Third and Fourth PSDPs at their closure. Overall, the outcome is rated Moderately Satisfactory, in line with the OPCS and IEG guidelines for deriving outcome ratings [Bank Guidance, Appendix H. Deriving the Overall Outcome Rating, p.38).

### a. Outcome Rating

Moderately Satisfactory

## 7. Risk to Development Outcome

**The technical and operational risk is low.** POWERGRID is an operationally well-established global scale utility. It has highly sufficient technical capacity to operate and maintain high voltage transmission lines. POWERGRID also leads the transmission sector with 800 kV transmission lines and is about to complete the first 1,200 kV transmission line under this project. POWERGRID has been able to maintain a system availability rate of at least 99.7 percent since 2011. The operational structure has been strengthened through Integrated Project Management and Control Systems. If the transmission network investments do not continue to match the increase in electricity demand, this might result in an overloading of the transmission system, but given the past performance of POWERGRID in expanding the transmission network and entry of the private companies in the transmission sector, this is unlikely to happen.

**The institutional risk is negligible.** POWERGRID has continuously improved its corporate management system. Its institutional structure has been strengthened through Integrated Project Management and Control Systems, and Enterprise Resource Planning to improve corporate governance and financial accountability (ICR, p.20). POWERGRID has been listed on the Indian Stock Exchange since 2007; therefore, it is subject to certain reporting obligations ensuring transparency in its management. The utility has a high institutional capacity and shares its expertise through international consulting and construction service for transmission projects in other countries (ICR, p.6).

**The financial risk is low, but the utility may face some short-term cash flow problems because of the COVID pandemic.** The current cost-plus tariff regime ensures sufficient revenue generation for POWERGRID. The tariff regime is designed based on the availability of the transmission system; therefore, POWERGRID's revenues are not affected by any decrease in the electricity consumption. However, the utility may face some cash flow problems because of non-payment by off-taking state utilities that face a decrease in their revenues because of a drop in electricity demand during the pandemic. Overall, the utility is financially highly viable: its debt-equity ratio has been always less than 80:20, and the self-financing ratio has been greater than 20 percent (ICR, p.18).



## 8. Assessment of Bank Performance

### a. Quality-at-Entry

At project entry, the goal of developing India's national transmission system to transfer power more reliably from generation centers to high load centers was of high strategic priority. The project's approach was straightforward, i.e., construction of power transmission schemes consisting of high voltage transmission lines and substations. The technical aspects of the project were sound. Project implementation plans were prepared in advance with detailed description of the investment subprojects (ICR, p.27). As a repeater project under the programmatic engagement to develop the power system in the country, the project benefited from the already existing implementation arrangements and fiduciary arrangements. As a well-established transmission utility, POWERGRID had sufficient institutional capacity to implement the project. The monitoring and evaluation (M&E) arrangements of the previous projects were continued in this project, too, supported by additional indicators, such as trippings and system availability, to measure the reliability of the system. The overall risk assessment was satisfactory, but the risk of implementation delays stemming from the right-of-way (ROW) issues was not identified at appraisal, although ROW issues had been reported in the project appraisal documents and ICRs of the Third and Fourth PSDPs. Additionally, the social and environmental safeguards risk was not adequately identified. This risk was rated low at appraisal because it was noted in the project appraisal document that POWERGRID had been satisfactorily applying its Environmental and Social Policy and Procedures (ESPP) in all its investment projects (PAD, p.11).

Overall, because of the shortcomings in the identification of ROW risk and the environmental safeguard risk, the quality at entry is rated satisfactory rather than highly satisfactory.

### Quality-at-Entry Rating

Satisfactory

### b. Quality of supervision

There were 14 supervision missions, some including site visits, during the ten-year project implementation period. The Bank's local office staff had regular contacts with POWERGRID and other relevant governmental entities, such as the Ministry of Power and the Ministry of Finance. The performance reporting in the Implementation Status and Results Reports (ISRs) and Aide Memoirs prepared after each supervision mission was candid and of high quality. However, some ISRs were prepared based on desk reviews. Such ISRs provided updated information about investments' progress, but other sections of the reports were mostly repetition of the previous ISRs. The project team's supervision of the fiduciary aspects of the project was adequate. Some project-financed materials were diverted to non-Bank project sites, but these diversions were not reported in the financial statements. The project team took necessary measures to ensure POWERGRID's compliance with the Bank's fiduciary requirements (for details see section 10. Other Issues, b. Fiduciary Compliance, Financial Management below). The project team was also proactive in facilitating project implementation by resolving technical design and procurement related issues. Such delays were mostly because of the use of advanced technologies, such as 765 kV transmission lines, that



required lengthy but necessary talks with potential international vendors (for details see section 10. Other Issues, b. Fiduciary Compliance, Procurement below).

The right-of-way issues adversely affected project implementation. This was a complex issue, the solution of which required the involvement of the federal government and state governments. According to the additional information provided by the project team in their note dated March 3, 2021, the project team followed up these issues at multiple administrative levels, and these efforts resulted in the issuance of an opinion by the Attorney General of India (the primary lawyer in the federal government) that allowed POWERGRID to process the ROW compensations. The project team's involvement in the ROW issues was also instrumental in the adoption of the compensation guidelines but implementation of those guidelines was not uniform across states, which was beyond the control of the project team. Investments were delayed for multiple years because of these ROW issues (for details see 10. Other Issues, a. Safeguards, Involuntary Resettlements below). Additionally, the project was not compliant with the Bank's requirements in ensuring adequate accommodation for workers at labor camps during project implementation (for details see 10. Other Issues, a. Safeguards, Environmental Assessment below). According to the additional information provided by the project team, beginning with the supervision mission in September 2013, some shortcomings were observed in selected project sites, and the project team supported POWERGRID to bring the conditions at the labor camps in accordance with the Bank's safeguard policy requirements. The support was through ensuring regular inspection of the implementation of contractual obligations at project sites, preparation of an action plan to improve the conditions in the labor camps and holding sanitization and health related workshops at camps. However, it needs to be noted that despite almost a decade of Bank supervision, POWERGRID submitted the action plan in January 2018, about one year before project closing, after which the conditions in labor camps started to improve (Aide Memoire, September 2018 p.5).

### **Quality of Supervision Rating**

Satisfactory

### **Overall Bank Performance Rating**

Satisfactory

## **9. M&E Design, Implementation, & Utilization**

### **a. M&E Design**

The theory of change of the project was sound; the causal pathways from inputs to outcomes were valid and direct based on the critical assumption that there would be sufficient power supply. The formulation of the project objective to increase reliable power exchange between the regions and states of India was straightforward, but the meaning of "reliable" was not clear, nor was it captured by the results framework. Because of the nature of transmission systems with multiple connection points and the flow of electricity through the least resistance path, indicators were designed to measure the achievements at the system level as had been the case in previous PSDPs. The indicators were specific, measurable, achievable, and time bound. Baselines and targets were available for all indicators. POWERGRID had sufficient technical capacity and expertise to implement M&E.



## **b. M&E Implementation**

The project benefited from the M&E arrangements of previous PSDPs. POWERGRID implemented M&E satisfactorily. The indicators were adequately measured, and the achievements were reported as planned. POWERGRID utilized its integrated project control and management system to collect real-time data on implementation progress and increases in transmission and transformation capacities. The National Load Dispatch Center measured the growth in power exchanges among regions and states. Progress in investment activities was reported in quarterly financial monitoring reports. Intermediate-outcome and outcome indicators were reported annually. Following the Mid-Term Review in September 2013, POWERGRID started to measure the availability of the transmission system and the number of trippings per line attributable to POWERGRID to capture the improvements in the reliability aspect of the project objective. POWERGRID has a well-established M&E system and these functions and processes are highly likely to be sustained in the future.

## **c. M&E Utilization**

M&E findings were communicated to various stakeholders regularly, such as the Ministry of Power and Ministry of Finance. M&E findings were used to adjust project implementation through two restructurings and to increase the scope of work. The M&E data supported the outcomes achieved at the system level. The discussion was not restricted to the application of inputs or achievement of outputs. The M&E data showed that POWERGRID was successful in establishing an interconnected transmission network facilitating the flow of power from generation centers to load centers that resulted in a sharp decrease in power deficits. This achievement supported the shift in the focus of the Bank's strategy in the power sector from transmission to distribution, renewable energy, and energy efficiency (see section 3. Relevance of Objectives).

## **M&E Quality Rating**

High

## **10. Other Issues**

### **a. Safeguards**

The project was assigned an environment Category A under Environmental Assessment (OP/BP 4.01) because of its large geographical spread including forest areas. Additionally, the project triggered five safeguard policies: Natural Habitats (OP/BP 4.04), Indigenous Peoples (OP/BP 4.10), Physical Cultural Resources (OP/BP 4.11), Involuntary Settlement (OP/BP 4.12), and Forests (OP/BP 4.36).

At appraisal, the Bank established the equivalence and acceptability of the POWERGRID's Environment and Social Policy and Procedures (ESPP) revised according to the findings of the Bank's Safeguard Diagnostic Review (SDR) for use as a country borrower system with reference to five out of six applicable safeguard policies of the Bank (for equivalence analysis see PAD, pp.75-76). The Indigenous Peoples (OP/BP 4.10) safeguard policy was excluded because it was not covered by the ESPP. The five safeguard





policies were piloted under the Use of Borrower Systems (OP 4.00) policy of the Bank (PAD, p. 73). Both the SDR and the revised ESPP were disclosed at the Bank's Infoshop and POWERGRID's website in June 2009 (PAD, p.18).

At appraisal, it was assessed that POWERGRID had sufficient capacity to implement the ESPP. The Environment and Social Management Department (ESMD) was headed by an executive director and included a general manager and seven environment and social specialists. In its nine regional offices, POWERGRID had separate units for managing social and environmental activities in coordination with the ESMD at the utility's head office (PAD pp.16-17). However, there were serious shortcomings during project implementation in POWERGRID's enforcing of safeguards policies in the labor camps (see Environmental Assessment below).

**Environmental Assessment (OP/BP 4.01):** POWERGRID prepared Final Environment Assessment Reports (FEARs) for eight schemes out of nine. There were a few months of delay in the submission of the FEARs for NRSS 24, NRSS 26 and the Southern and Western Regions for Krishnapatnam UMPP scheme in 2015 because of the heavy workload of the ESMD. Initially, the Champa-Kurukshetra Bipole was exempted from the preparation of a FEAR since there was no Bank-financed transmission line in this scheme (Aide Memoire, May 2014, p.39). But a FEAR was prepared in 2017 after the completion of the transmission line financed by POWERGRID. All FEARs were disclosed on POWERGRID's website.

The poor labor camp conditions at project sites was a persistent issue during project implementation. Certain gaps were regularly observed in the accommodation and other facilities for workers against the environment management plan requirements defined in the FEARs. The issues related to camp sites consisted of insufficient lighting facilities, lack of beds and fans, lack of separate kitchen, inadequate number of toilets, absence of bath areas and insufficient drinking water facilities. The Bank's project team raised this issue at every supervision mission. POWERGRID agreed to prepare an action plan to improve the conditions at labor camps and submit it to the Bank before March 2017. Following the delayed submission of the Action Plan in January 2018, the conditions in the labor camps visited by the Bank's project team were observed to have improved, such as in the Kurukshetra Substation camp site (Aide Memoire, September 2018, p.5).

Contrary to the poor conditions at labor camps, the conditions at work sites were observed to have been better. Safety awareness programs were implemented. At the sites the Bank's project team visited workers were wearing safety equipment, such as helmets and other proper gear. In order to further improve the work site conditions, POWERGRID continued with its safety awareness activities and increased its supervision of the contractors by ESMD and regional offices. Despite these efforts, 14 workers lost their lives during project implementation (Aide Memoire, May 2019, p.6).

The project team confirmed that the project was in overall compliance with the Environmental Assessment safeguard policy at project closing, but the evidence is insufficient whether each of the construction sites had been in compliance with this safeguards policy during project implementation.

**Natural Habitats (OP/BP 4.04):** POWERGRID utilized tools such as remote sensing and global positioning system for the selection of the optimum routes for the transmission lines. As a result, protected areas, important wetlands, important bird and biodiversity areas, and elephant corridors were mostly avoided (ICR, p.25). For example, the lines for the Agra-Sikar line were re-aligned to avoid the Sariska Tiger reserve



(Project team's email dated December 18, 2020). The project team confirmed that the project was compliant with this safeguard policy.

**Indigenous Peoples (OP/BP 4.10):** The ICR did not provide information about this safeguards policy. The project team confirmed that the project avoided tribal land and did not have any impact on indigenous peoples.

**Physical Cultural Resources (OP/BP 4.11):** The ICR did not provide information about this safeguards policy. The project team confirmed that the project did not have any impact on physical cultural resources.

**Involuntary Settlement (OP/BP 4.12):** Resettlement Action Plans were prepared for substations that required acquisition of private land. The land acquisition for those substations were completed on a “willing-buyer, willing-seller” basis. There was no involuntary land acquisition for the project. To decrease the amount of land to be acquired, POWERGRID utilized new technologies such as gas-filled substations that required less land than the conventional air-filled substations (ICR, p.23). However, in some cases, there were significant delays in land acquisition; for example, the land acquisition for the Pune Substation took around 32 months (ICR, p.45). The lands of 444 households were acquired for the construction of substations. This had a temporary adverse impact on the households because of the period between the acquisition of the lands and the extension of compensation and rehabilitation assistance (ISR No:16, p.6). By 2017, all land acquisition had been completed, and compensations had been made to the landowners (ISR No:17, p.5).

On the other hand, the project faced serious right-of-way (ROW) issues that delayed the completion of some schemes by at least three years (ICR, Annex 7, pp.53-59). During the course of the PSDP series, ROW issues had gradually become a more serious issue for the implementation of project activities. On October 15, 2015, the Ministry of Power issued guidelines for states to compensate landowners for ROW amounting to 85 percent of the value of the land under the transmission line towers and 15 percent for land falling under the transmission lines. (Before the issuance of these guidelines compensation to landowners for ROW was not compulsory.) Yet, some states were slow in endorsing and issuing a government order for the implementation of the guidelines. In other states that endorsed the guidelines there were delays in payments to landowners (ISR No:16, p.6). ROW issues continued through to project closing and beyond. The 400 kV Wardha-Aurangabad line (upgradable to 1,200 kV) was still facing ROW issues at the time of the writing of the ICR; some lines, such as the 400 kV Sikar-Jaipur line, could only be constructed under police protection against obstruction by villagers (ICR, p.54). To reduce the ROW requirement per MW of power transfer, POWERGRID implemented measures such as “adoption of higher voltage levels (for instance, high-voltage direct current in place of high-voltage alternating current), specially designed towers, synchronization of high-voltage direct current bipoles, and new technologies” (ICR, pp.22-23). The Bank's project team commented that as land became more valuable, especially in the urban and peri-urban areas, ROW issues would likely continue to be a major issue for the implementation of transmission projects, for which underground lines, although more expensive, could be considered as a solution.

**Forests (OP/BP 4.36):** Since transmission lines were considered as linear projects, such as roads and optical fiber lines that require narrow, long strips of land, the requirement to obtain no-objection for forest clearance from every gram panchayats—the smallest administrative unit in India—was waived in 2013 under the Forest Rights Act. However, some project activities still faced forest clearance issues, such as the construction of 55 towers out of 247 for the Dehradun-Abdullapur transmission line that were delayed because of the involvement of three states (Uttar Pradesh, Uttarakhand, and Haryana) in the issuance of forest clearance permissions (Aide Memoire, May 2013, p.12). All schemes were issued necessary



permissions to clear forest if needed but in some cases, such as NRSS 24 and NRSS 25, significant delays adversely affected project implementation (ICR, p.45). The impact of the project on forests was minimized through avoidance of such areas when the routes of the transmission lines were designed. For example, 45 hectares of forest area was avoided when the Scholapur-Pune line was realigned (Aide Memoire, July 2015, p.11). No project activity that required forest clearance started before the issuance of the permission to clear the forest. The project was compliant with the Forests safeguard policy.

## **b. Fiduciary Compliance**

### **Financial Management**

POWERGRID had sufficient institutional capacity for financial management. The project benefited from the financial management arrangements established in previous PSDP projects. Financial management was further strengthened by the use of enterprise resource planning (ERP) aimed at improving POWERGRID's corporate governance and financial accountability (ICR, p.20). Financial monitoring reports were submitted to the Bank quarterly. The utility complied with the financial covenant targets for debt-equity ratio (less than 80:20), the self-financing ratio (minimum 20 percent) and payment of arrears (three months of billing) throughout project implementation between 2009 and 2019 (ICR, p.18). The project team confirmed that there were no issues with counterpart funding or flow of funds. Independent audit reports were also submitted on time, but those reports were qualified between 2013 and 2015. Some materials purchased under the project were diverted to non-Bank financed sites and these diversions were not disclosed in the financial statements (Project team's email dated December 18, 2020). There were two reasons for this so-called "loaning of material between sites": (a) delays in project activities in the Bank-financed sites because of right-of-way issues; and (b) the POWERGRID's internal auditor's recommendation that the utility should reduce the US\$1.8 billion work in progress to avoid ordered material lying in stores not being utilized or left to corrode. POWERGRID provided written assurances to the Bank that diverted material would be replenished as soon as possible and if they were not replenished, the money used to purchase those materials would be refunded to the Bank. Additionally, new requirements were added to the external audit reports detailing the name of the scheme, and the description, quantity, value, and movement of the materials. The materials were returned to Bank-financed sites by 2015. Lastly, the project team confirmed that all project funds were accounted for at project closing.

### **Procurement**

POWERGRID has sufficient institutional capacity to implement procurement in accordance with the Bank's requirements. POWERGRID used standard bidding documents for various package categories prepared in consultation with the Bank under the PSDP series incorporating package-specific changes as needed (ICR, p.33). There were some minor delays in procurement. The contract for the new Kolhapur substation had to be rebid after the notice of award was issued because of a disagreement on the scope of work. The contract was awarded with one-year delay (ICR, p.44). Introduction of new technologies, such as the 765 kV transmission system that was new to the country, necessitated bid submission deadline extensions after factoring in the observations of the vendors that were established outside of the country. The procurement documents were revised to encourage such vendors to establish their operation and maintenance facilities in the country (Project team email dated December 18, 2020). Procurement was



completed by July 2015. The entire loan proceeds were committed and later disbursed in accordance with the Bank guidelines (Aide Memoire, July 2015, p.20).

**c. Unintended impacts (Positive or Negative)**

None.

**d. Other**

None.

**11. Ratings**

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Satisfactory	Moderately Satisfactory	Relevance of objectives is rated high. The efficacy of the achievement of the project objective is rated high. Because of the right-of-way and forest clearance issues, completion of schemes was significantly delayed that resulted in economic rates of returns for most of the schemes being lower than the hurdle rate of 12 percent. Therefore, the efficiency of the project is rated modest. Overall, the outcome rating is moderately satisfactory in line with OPCS guidelines for rating overall project outcome based on these three sub-ratings.
Bank Performance	Highly Satisfactory	Satisfactory	The ICR rated quality at entry highly satisfactory and quality of supervision satisfactory that should have resulted in a satisfactory rating for Bank performance according to the Bank guidance, but this rating was erroneously entered as highly satisfactory to the system.



This review rates quality at entry satisfactory, not highly satisfactory, because of shortcomings in identifying risks related to right-of-way issues and environmental safeguards, and the quality of supervision as satisfactory. Overall, the Bank performance is rated satisfactory.

Quality of M&E	High	High
Quality of ICR	---	Modest

## 12. Lessons

This review has drawn two lessons.

**Right-of-way (ROW) issues need to be identified and addressed significantly before implementation start-up in order to avoid delays that lower the project’s economic efficiency and create financial risks, both of which deter the achievement of the project objective.**

Almost all schemes financed under the project faced serious ROW issues causing lengthy implementation delays. ROW issues had already started during the implementation of Third PSDP. After the adoption of government guidelines in 2015 that made ROW payments compulsory to landlords, there were some improvements in project implementation, but ROW issues continued beyond project closing because of delays in states’ adoption of these guidelines in their respective jurisdictions or in processing payments. Delays caused by ROW issues resulted in economic rates of return that were lower than the hurdle rate of 12 percent for most of the schemes.

**When Borrower systems are used, Borrowers need to ensure adequate enforcement of its own safeguard policies and procedures in a manner that also achieves compliance with the requirements of the Bank’s safeguard policies.** In this project, the Bank piloted the Use of Borrower Systems for environmental and social policies. POWERGRID’s Environmental and Social Policy and Procedures were found to be acceptable by the Bank, but evidence shows that enforcement of these policies to ensure adequate accommodation facilities and labor practices for workers was not satisfactory. The camps did not have sufficient beds for workers, some camps lacked adequate water source or number of restrooms, some did not have separate kitchens and bath areas did not exist.

## 13. Assessment Recommended?

Yes



Please Explain

The Bank has supported POWERGRID through five projects under the PSDP series since 1993. An assessment of this programmatic engagement should provide invaluable information about the development impact of the Bank's long-term engagement in the power transmission sector that could be used in designing similar interventions in other countries or regions.

#### **14. Comments on Quality of ICR**

The ICR provides a comprehensive overview of the project. The narrative loosely supports the ratings and there are some gaps. For example, the narrative in the efficiency section does not support a substantial rating, and it is more descriptive rather than evaluative. The report covers a wide range of issues including POWERGRID's activities and achievement are not directly related to the project, such as the utility's corporate social responsibility activities or its first public offering of its shares in the local stock exchange. Such additional non-project related information made the assessment of the project difficult. The ICR does not adequately report how activities informed outcomes which in turn is linked to the impact of the project's intervention, except Annex 7 Detailed Description of the Schemes. This annex provides more information about the outputs and issues the project was faced with than does the main text. The ICR is internally consistent but there are shortcomings in following the Bank guidance. The relevance of objectives is not assessed based on the Bank strategy that was current at the time of project closure. The ICR does not report the revisions to the project component. Operational and administrative efficiency of the project is not adequately assessed. The ICR does not report the key issues that affected project implementation, such as right-of-way issues and delays in procurement because of the application of new technologies. The safeguards and fiduciary sections of the report are weak. The ICR does not report the issues at labor camps and diversion of project-financed material to non-Bank project sites although the supervision mission reports and aide memoires include detailed information about what these issues were and how they were solved. The financial management section does not provide information about the financial covenants; they are mentioned in the Efficiency section. The lessons do not respond to specific experiences and findings of the project but provides an overview of the PSDP series. Overall, the quality of the ICR is rated modest.

##### **a. Quality of ICR Rating**

Modest