PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: AB1781

Project Name	Rampur Hydropower Project
Region	SOUTH ASIA
Sector	Renewable energy (50%); Power (50%)
Project ID	P095114
Borrower(s)	SATLUJ JAL VIDYUT NIGAM LTD (SJVN)
Implementing Agency	
Environment Category	[X] A [ ] B [ ] C [ ] FI [ ] TBD (to be determined)
Date PID Prepared	August 16, 2005
Estimated Date of Appraisal Authorization	November 1, 2006
Estimated Date of Board Approval	March 15, 2007

1. Key development issues and rationale for Bank involvement

The Government of India is targeting high levels of economic expansion, with 8% projected growth in the current five-year plan period (FY 2002-07), in order to achieve its goals of poverty alleviation and the advancement of the relatively less developed regions. Infrastructure development, leading to improved access to reliable electricity supplies, is a strong prerequisite for achieving these goals. Thus, the Government has adopted universal access to electricity as one of its most important goals, and is committed to encouraging the construction of additional electricity generation capacity to meet the ever-growing demand for power.

However, India has for many years faced severe power shortages. Currently, , at the time of peak demand, power shortages are estimated to be about 12%, while annual energy shortages are nearly 7% of demand[1/]. These shortages are likely to continue and increase into the foreseeable future, even with the planned additions in generation capacity. Analysis shows that the gap in supply (after considering the impact of price elasticity on demand) can be only marginally reduced by loss reduction and efficiency gains. The Government estimates that India will require an additional 100,000 MW by 2012, if the country is to reach its year-on-year growth target of 8% and provide power to all households.

Besides these problems in overall generating capacity, the share of hydropower in the overall generation mix has been declining in recent years; with the result that now hydropower constitutes only 25% of India's total generating capacity. This deficiency has contributed to India's inability to meet the demands for peaking power, and has also resulted in technical and economic problems related to the operation of the grid[2/]. Given the availability of abundant indigenous coal resources, relatively cheap coal-fired power stations are likely to continue to be the preferred generation alternative for years to come. However, coal-fired plants are a significant source of carbon-dioxide (CO_2) emissions; and since Indian coal has high ash content, these plants also add to suspended particulate matter (SPM) in the

---

1/ Source: Ministry of Power Annual Report 2004-2005.

2/ Hydropower has the capacity to be both started and shut down in relatively little time, and hence can be used economically to meet peak demand. Coal-fired and nuclear thermal generation is less flexible and can only be used economically for base-load operations. Hydropower thus provides a means of ensuring efficient, economic grid operations and helps to maintain system stability.

environment. Hydropower, on the other hand, when developed according to good environmental and social practices, represents a relatively clean and cheap renewable source of power supply, which can be utilised to meet India's substantial peaking load and to address grid management issues. Hydro-generation also obviates greenhouse gas (GHG) emissions from thermal generating plant. Thus, India plans to increase the power generation mix more in favour of hydro; to 28% by FY 2007, and to 40% over the longer term. There is a broad consensus on this strategy, which both recent national governments have affirmed.

Existing hydropower projects have made and are making a large contribution to economic development and poverty reduction in India. However, during their construction, insufficient attention was often paid to environmental and social factors. But, in the past decade, India has started to correct these deficiencies. It has ensured that there have been improvements in the methodology used to select sites by central power sector agencies; it has insisted upon increased public consultation, better monitoring of environmental and social aspects, improvements in resettlement policy and practice, and improved institutional capacity related to project identification, engineering and design. There is now broad consensus in government and the hydropower industry in India that further progress is required so that all future hydroelectric projects will be implemented on time and to budget, and respecting national environmental and social standards.

In the early 1990s, GOI decided to encourage the private sector to invest in power generating capacity. Such private investments have been inadequate, mainly because the principle off-takers, the State Electricity Boards and utilities, make financial losses and are traditionally poor payers to generators, which has led to difficulties in reaching financial closure on private power generation. To a significant extent, this problem will continue to persist, in the short to medium term, because domestic and agriculture tariffs are still far below the cost of supply, and system losses are high – leading to financial losses. While tariff increases continue to be politically sensitive, there are positive developments in other areas; and these are helping, to some extent, to mitigate the risks inherent in the power sector. In this respect, signs of progress include the passage of the Electricity Act of 2003; the creation of the state and central independent regulatory commissions; securitization of past dues of state utilities to central power utilities; and increased electricity trading, together with action by the state agencies to reduce losses. In particular, securitization of dues to central power utilities has led to significant improvements in payment discipline.

Lessons learnt from similar activities

The Bank has been engaged in hydropower in India since the late 1950s, when it helped finance the Second Koyna Power Project in 1959. Hydro engagement has often been problematic, with Bank support for, a number of potential hydropower projects, being cancelled before they were commissioned[3/]. However, the two most recent Bank engagements, Nathpa Jhakri and Koyna IV (both approved in 1989) were successfully completed with the help of Bank financing. Other projects, where engagement was dissolved, were afflicted with many of the problems, which pervaded the sector through the 1980s and 90s. Several of these projects had problems at the design stage; most of them suffered (or looked likely to suffer) from implementation problems due to inadequate management capacity and poor decision-making; and some of them also saw significant problems related to resettlement. Experience has shown that several elements are essential for the successful implementation of these large projects. These include: a) the careful selection of the site and appropriate engineering design; b) solid initial investigations, especially regarding geological conditions; c) strong and competent implementing agencies with the capacity to take quick decisions; d) continued and substantive consultations with

---

[3/] Projects in which Bank engagement was cancelled include the Upper Indravati, Upper Krishna, Srinagar (Uttar Pradesh), and Sardar Sarovar (Narmada) projects.

stakeholders; e) early attention to social and environmental aspects of projects; and f) appropriate financing and tariff design which are critical to the financial sustainability of projects with long gestation periods. There has been progress on each of these issues by the Indian hydropower developing agencies, and it is on the basis of supporting this progress that the Bank is now considering re-engagement in the sector. However, there will need to be continued close attention to these during the course of the preparation of the proposed project.

Issues relating to the Nathpa Jhakri Hydropower Project.

During the construction of the Nathpa Jhakri Hydropower Project (NJHP), which was the most recent Bank-funded operation in hydropower in India, the Bank had two major concerns; the speed of decision making within the Nathpa Jhakri organisation, and the time taken for environmental protection and remediation work to be arranged with the Himachal Pradesh Department of Forests. Although the organisation has improved and developed over the intervening time, the issue of the institutional strength of the organisation (now SJVN) continues to be a concern; for example, there are still frequent periods when the organisation has less then its full complement of Directors. The relationship with Department of Forests also shows signs of improvement. The following issues relating to the NJHP remain. These are of significance to the Rampur project, and will be monitored during project preparation.

a) There remain some disputed payments on the major civil works contracts as some claims have been referred to arbitration or court. This is not unusual for large civil works contracts. At present this does not seem likely to have a major impact on the contractors' appetite for the Rampur project, but this will be monitored. SJVN have taken action to revise the scheme of delegation of authority and the procedures for issuing variation orders to reduce the number of disputes on future contracts;

b) Implementation of the catchment area treatment plan is still proceeding as planned with Ministry of Environment and Forests (Government of Himachal Pradesh). The Bank team will continue to monitor this implementation;

c) Implementation of all agreed resettlement actions were completed before the project was commissioned, apart from the allocation of seven shops which was held up due to court cases. However, since the project was commissioned, the Government of Himachal Pradesh has retrospectively changed the definition of a project- affected family and thus additional families have become eligible for resettlement and rehabilitation benefits[4]. SJVN is actively processing these new requirements;

d) NJHP has suffered from a higher than expected silt content in the river water, and consequently there has been increased wear on the turbines, which has increased maintenance costs. In August 2005 the project was closed for nearly three weeks due to excess silt in the water, which was beyond the capacity of the desilting chambers. Closures due to silt were predicted in the design of NJHP but were expected to be in the region of 5 days per year. The project authorities are now in the process of determining the probability that such high silt loads as happened in 2005 are likely to recur. This has implications for the Rampur project because Rampur can only generate when NJHP is operating, and Rampur will be utilising the same water. These factors are being taken into account in the technical design and financial and economic analysis of the project.

Activities of other partners. ADB and JBIC have ongoing initiatives in hydropower in India. ADB has been working with Government on the production of initial preparation studies for bankable hydropower projects. JBIC is financing the Dhauliganga hydropower project located in the state of Uttaranchal. IFC is also actively supporting a private hydropower project in Himachal Pradesh.

[4] As a result of this change in definition 70 additional families are eligible for land for land and 72 additional families are eligible for employment in the project. In addition, 4 families also eligible for alternative houses because of change in definition of a family and court rulings.

Rationale for Bank involvement

As documented in the Bank's global review of the private sector in energy generation[5], "New, large, and complex hydropower projects that have strong economic justification will usually require significant public investment. Compared to thermal generation, hydro projects have very different risk and benefit profiles and, accordingly, a much greater public financing role. These include the geological and hydrological risks, the long-lived nature of the assets, and the fact that many hydropower projects are multipurpose projects providing public goods such as flood control and drought protection. The Bank should support dams that are economically well justified, and should ensure that all such projects meet the good environmental and social practices which have been developed by the industry in recent decades."

There is insufficient private interest in hydropower to finance the required expansion, and the Government's capacity to commit public resources falls well short of investment needs. Private investors see hydropower as a high risk sector. There has been a recent improvement in private sector interest with such projects as Baspa II (300MW) and Vishnu Prayag (400MW) being developed privately. However, in comparison to the amount of funds required, relatively little private finance is available. The Government has requested that, in addition to facilitating a rapid increase in installed capacity through provision of longer tenure finance, the Bank's resources assist in strengthening the capacity of the agencies involved in the sector and in consolidating the major gains made over the last decade by the present agencies involved in the sector.

Objectives for Bank involvement. Thus the over all objectives for Bank involvement in the hydropower sector are to provide assistance to the long term sustainable development of hydro-power as a renewable resource in India; to assist the sector in consolidating recent improvements and moving towards international good practices; to strengthen the capacity of agencies involved, and thus to contribute to the development of a power sector in India which is well managed, financially and economically viable, technically sound, and which follows good environmental and social practices. In the context of these objectives the Rampur project is considered a suitable first step.

Borrowers interest and preparedness. The proposed operation responds to a Government of India request for World Bank engagement in the energy sector. Given the Bank's previous experience of financing the Nathpa Jhakri Hydro-electric Power Plant (NJHP), there is some advantage in making the Bank's first step in its re-engagement in the sector the financing of the next station (Rampur hydroelectric power project) on the Sutlej, which is a downstream cascade station to NJHP. The developer, Satluj Jal Vidyut Nigam, (SJVN - previously the Nathpa Jhakri Power Corporation – NJPC) is a joint venture between the Government of India and Government of Himachal Pradesh. In accordance with the Government of India's objectives described above, SJVN is planning to develop a range of other projects in Himachal Pradesh and Uttaranchal.

Although SJVN has only implemented one project; the 1500MW NJHP project was one of the largest hydro schemes in South Asia, and the largest to have been built in India. The NJHP project was IBRD funded, and thus SJVN followed Bank procurement procedures and safeguards. While the standards and procedures used in the 1990's are not exactly the same as those used now, the fact remains that SJVN are well used to working with the Bank. They have also taken action to address the Bank's previous concerns about the speed of decision-making and relationship with the Department of Forests. However, given the concern regarding the organisation's institutional weaknesses, which were noted in

[5] Public and Private Sector Roles in the Supply of Electricity Services Operational Guidance for Bank Group Staff – January 2004

the NJHP implementation completion report, these issues will continue to be monitored closely as the Bank proceeds with the supervision of the preparation and implementation of the proposed project.

By constructing Rampur, India will delay the necessity of the construction of either coal or oil-fired thermal plant of the same capacity, and will thus reduce the country's greenhouses gas emissions, and positively impact on India's global warming effect. By displacing an equivalent sized coal-fired thermal plant; Rampur will obviate the need for India to emit about 12,000 tons of SO_x emissions and about 6,000 tons of NO_x emissions and about 2 million tons of carbon dioxide into the atmosphere each year. The Government plans to apply for carbon finance for this project.

2. Proposed objective(s)

The development objective of the project is for SJVN to develop the Rampur hydropower project and, after commissioning, to provide 1,800 million units[6] of electricity per year in an economically, environmentally and socially sustainable manner.

3. Preliminary description

The Rampur hydroelectric power project (RHPP) is situated on the Sutlej River in the Indian State of Himachal Pradesh. It is planned as a 412MW power plant consisting of a 15km transfer tunnel bringing water from the point where it leaves the Nathpa Jhakri hydroelectric power plant (NJHP) to a new surface powerhouse some 15km from Rampur town. Thus RHPP will in effect be operated as a cascade station to the NJHP run-of-the-river power plant. NJHP was constructed with the help of IBRD financing and has been in operation for about two years. The first unit was commissioned in October, 2003 and the last or sixth unit commissioned in May, 2004. Since Rampur hydro project will take water from the NJHP, it will require neither a dam nor any new reservoir capacity or land inundation. No additional desilting chambers will be required, as the water will already have been desilted within the NJHP plant[7]. The Rampur intake arrangement was excavated and built during the construction of the NJHP scheme. Rampur will be developed by SJVN, a joint venture between Government of Himachal Pradesh and Government of India. The project will generate some 1,900 million units (in a 90% dependable year as regards hydrology); and this power will be used in the states of the Northern Region of India. The project will also contribute to the development of the state of Himachal Pradesh which will receive a royalty of 12% of the power generated (approx $10 million per annum) in return for the use of the state's indigenous hydroelectric resource, in addition to its share of the power station dividends, (which it will receive as an equity partner).

According to SJVN estimates, the project will require 81 hectares of land for the powerhouse, permanent camps, access roads, quarries etc. This includes 32 hectares of private land and the balance is government forest-land. It is provisionally estimated that about 215 title-holders will be affected as a result of private land acquisition and about 20 families will be physically displaced. The land acquisition process has been initiated. To mitigate the impacts associated with the land acquisition and the consequent resettlement, a resettlement policy framework outlining the entitlements and assistance for different type of impacts has been executed by SJVN with the state government. The Bank will review the R&R policy provisions for consistency with the Bank's Operational Policy on Involuntary Resettlement and propose modifications,

[6] This is a conservative estimate, currently pitched 5% below the expected production in a 90% dependable year. As the project preparation advances, this number will be fine-tuned as more precise information becomes available.

[7] Note that NJHP has experienced higher silt loads than were anticipated at the time of design. This will be considered in the design and operation parameters of Rampur.

if required, for updating the policy provisions to bring to the level of Bank's Operational Policy provisions.

Possible Project Components	Indicative Cost US$m – Bank financing
Capital investments for finance of hydropower investment.	390
Technical Assistance for Institutional Reform and Capacity Building, towards preparation for future projects.	10
TOTAL	400

4. Safeguard policies that might apply

Applicable?	**Safeguard Policy** If Applicable, How Might It Apply?
[X]	**Environmental Assessment (OP/BP 4.01)** The major environmental issues in the project would include (a) disturbance to the forest cover and biodiversity in the project influence area; (b) impacts on the potential water use downstream, such as at the Rampur town; (c) induced erosion and landslides in the project area and its vicinity; (d) impacts from the project's associated facilities; and (e) the construction-related impacts. These issues would be addressed by the environment assessment for the project, and all required measures will be identified in an environmental management plan, and implemented. Further the environmental impacts of the associated transmission line will also be assessed.
[X]	**Natural Habitats (OP/BP 4.04)** The legally protected natural habitat, the Rupi-Bhava Wildlife Sanctuary is about 13km away from the project. However, the project area and the immediate vicinity of the project include patches of good secondary forests, which would be directly and indirectly impacted. These losses would be compensated or mitigated through the catchment area treatment plan, which would be prepared as part of the environmental management plan.
[X]	**Involuntary Resettlement (OP/BP 4.12)** The resettlement impacts are very moderate, but it will be necessary to devise an appropriate resettlement package in consultation with the affected persons. The project requires about 81 hectares of land, out of which, 32 hectares is private land and the balance is government owned forest-land. It is provisionally estimated that about 215 title-holders will be affected as a result of private land acquisition, and about 20 families will be physically displaced. The approach to resettlement will be based on meaningful consultations and informed participation of the affected people in the design and implementation interventions. The Resettlement Action Plan (RAP) is being prepared taking into consideration the choices and preferences expressed by the project affected people [PAPs] as agreed with Government of Himachal Pradesh. As a part of a memorandum of understanding [MOU], a resettlement policy for this project was agreed by SJVN with Government of Himachal Pradesh. The policy incorporates several provisions for taking up community development works, including the operation of a mobile health unit. The arrangements may require some modifications consequent to Bank review of how well the R&R policy complies with the Bank's Operational Policy [OP] on Involuntary Resettlement.
[TBD]	**Indigenous Peoples (OP 4.10)**

	The Social Assessment will study the characteristics of any the tribal families living in the project area to ensure that they are correctly treated and also to confirm whether the strictures terms of this OP will need to be applied for the Rampur project.
[X]	**Forests (OP/BP 4.36)** Of the 86.5 ha of land required for the project, about 54ha (62%) is forest-land, part of which have only degraded forest cover. These forests will be lost. In addition, there are patches of good quality secondary forests in the surroundings of the project, which would potentially be impacted directly (by the power evacuation facilities, quarrying, etc.) and indirectly (by increased pressure on the forest resources). The direct losses of forests will be compensated through implementation of a compensatory afforestation plan. The indirect losses will be compensated through the catchment area treatment plan, and the additional afforestation work to be undertaken using the additional amounts paid by the project to reflect the loss in net present value of forests. The forest issues of the transmission line will be identified and mitigated separately and this will be monitored by the Bank team.
[X]	**Safety of Dams (OP/BP 4.37)** This project does not construct any dam, but uses tailrace water diverted by the dam earlier constructed by the Nathpa-Jhakri Power project. The 60m high Nathpa-Jhakri Dam was constructed in accordance with the Bank's policy on safety of dams. In this project, the aspects related to the safety of the dam will be re-confirmed.
[X]	**Cultural Property (draft OP 4.11 - OPN 11.03)** The project area does not have any known archaeological or historical sites or remains. There is only a marginal possibility of impacts on cultural properties (such as community religious properties, sacred groves, and chance-finds). These would be identified as part of the environmental assessment, and mitigated through the environmental management plan, which will also include a "chance-find" procedures for cultural properties.
[X]	**Projects on International Waterways (OP/BP/GP 7.50)** The River Sutlej (a tributary of the Indus) is an international river (lies in China, India and Pakistan). Neither the upstream or downstream impacts are expected to be significant. There is an existing dams upstream and downstream, particularly the major downstream reservoir at Bhakra. In addition, the Sutlej is one of the 3 eastern rivers defined by the Indus Water Treaty; and is earmarked for sole use by India. Therefore, the project (which does not include a storage reservoir) should be of minor interest to upstream and downstream riparian countries. This policy has been complied with.

5. Tentative financing

Source:	($m.)
BORROWER	125
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT	400
Total	525

6. Contact point

Contact: Judith K. Plummer
Title: Sr Financial Analyst
Tel: (202) 473-2307 Fax (202) 522 2418
Email: Jplummer@worldbank.org