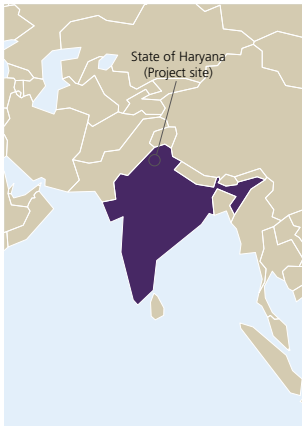


Overall Rating **D** A Foundation for Sustained Growth



**26 India**  
**Western Yamuna Canal Hydroelectric Project**

Considerable increases in the project period and costs despite the contribution to the expansion of electric generation capacity in response to industrial structure change.

<b>Loan Amount / Disbursed Amount</b>	4 billion yen / 3,244 billion yen
<b>Loan Agreement</b>	March 1981
<b>Terms &amp; Conditions</b>	2.75% interest rate, 30 year repayment period (10 year grace period), partially untied
<b>Final Disbursement Date</b>	March 1992
<b>Executing Agency</b>	Haryana Power Generation Corporation Limited (HPGCL) ( <a href="http://www.hpgcl.org">http://www.hpgcl.org</a> )



**Project Objectives**

The project objective was to increase the power generation capacity through the construction of additional power plants as well as a channel in parallel with the existing Western Yamuna Canal in the Tajewala district of the state of Haryana, and thereby contribute to the development of the state economy and improvement of people's living conditions.

**Effectiveness and Impact**

Rating **a**

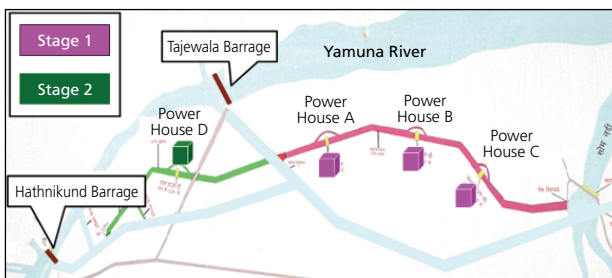
Power Houses A, B, and C (maximum output: 48MW) were constructed during Stage 1 and Power House D (maximum output: 14MW) during Stage 2. Under the initial plan, the net electric energy production value of 275GWh and a plant load factor of 54% (drought discharge year) to 68% (average discharge year) were targeted during Stage 1. During Stage 2, the net electric energy production value of 64GWh and a plant load factor of 51% were targeted. Due to the recent reduction in the discharge of the Yamuna Canal and the forced outage hours due to the breakdown of the front gate during Stage 1, there have been very few years when the above targets were achieved, (but 80% of the targets were mostly achieved). However, in recent years government policies have given priority to revitalizing the manufacturing and service industries and there has been approximately 36% increase in electricity consumption in the state since 2000. Although the entire electricity supply capacity of the executing agency is only 4%, it is clear that it is making a contribution to some extent to easing tight supply-demand in the state. Therefore, this project has largely achieved its objectives, and effectiveness is highly satisfactory.

**Relevance**

Rating **b**

Although some problem is observed regarding the technical

Location of Each Power House Established through the Project



Source: HPGCL

relevance of the construction of the plant, the project's relevance with India's national policies both at the time of the appraisal and the ex-post evaluation is recognized.

**Efficiency**

Rating **c**

Both the project period and project costs significantly exceeded their targets (542% and 136% of planned respectively), therefore the efficiency of the project is low. The main reasons for the delay were additional civil works and a review of the draining and drilling plans during Stage 1, and the significant delay of the construction work for Stage 2 due to the dispute over the water use rights with adjacent states and commencement of works of the Hathnikund Barrage, which were conditions for securing water volume for operation of the power house. The main reason for additional costs was additions to the construction scope and time.

**Sustainability**

Rating **b**

Though some problems have been observed in terms of operation and maintenance (lack of proper overhauls and annual inspection of the power houses) and allocation of personnel (the excess workload on the Chief Engineer), sustainability of this project is moderate.

**Conclusion, Lessons Learned, Recommendation**

In light of the above, the project is evaluated to be unsatisfactory. Lessons learned from this project include the need to give adequate consideration to water rights issues and the technical specifications of the hydroelectric plants. Immediate overhauling of the Stage 1 power house, appropriate allocation of personnel at all power houses and thorough annual inspection are recommended.

**Third-Party Opinion**

This project ranks high in effectiveness but there are problems in the operation and maintenance capacity of the executing agency as reflected in the delay in overhauls and other problems. In the future, discretion and efficiency regarding technical specifications and project planning are desired.

Name of specialist: Mr. Sankaran Kartha Narayanan Nair (private sector)  
 After obtaining Master's degree from University of Madras, served as a consultant in India's Ministry of Power. Currently active as a private consultant specializing in infrastructure development, policy and institutional reforms in electricity, railways and telecommunications, and urban infrastructure.