

Pakistan: Tarbela 5 Hydropower Extension Project (T5HEP)
(Co-financed with the World Bank)

Project Summary

Report No: 0005-PAK

Project Name	Tarbela 5 Hydropower Extension Project
Country	Islamic Republic of Pakistan
Sector	Hydropower, Energy
Project No	000005
Borrower	Islamic Republic of Pakistan
Implementation Agencies	Water and Power Development Authority (WAPDA) National Transmission and Dispatch Company (NTDC)
Environmental and Social Category	A
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I. Introduction

1. The Project, to be co-financed with the World Bank (WB), comprises the installation of a power house at the fifth tunnel (Tunnel 5) of the Tarbela Dam, and construction of a transmission line to connect the power to the national grid. The WB's co-financing will be in the form of an Additional Financing (AF) for the existing WB-financed Tarbela Fourth Extension Hydropower Project (T4HP). The Tarbela Dam was originally constructed in the 1970s.

2. The WB will be the lead co-financier for the Project and will supervise it in accordance with the WB's policies, including environmental and social safeguard policies, procurement and sanctions. The Bank's policies on these matters allow the Bank to apply another co-financier's policies to the projects it finances when the co-financier's policies meet certain requirements. The Bank is satisfied that the WB's policies meet these requirements.

II. Proposed Project Objectives and Expected Results

3. The Project's objective is to facilitate the sustainable expansion of Pakistan's electricity generation capacity.

4. The Project will provide a low cost, clean, renewable energy option in a relatively short period of time. This will help alleviate severe blackouts and expensive, unhealthy and polluting self-generation with small gasoline and diesel generators. The Project will add capacity of 2,820 Megawatt (MW), with annual electricity generation of over 4,800 Gigawatt-hours (GWh), primarily during the summer season when demand is highest.

III. Project Description

5. The proposed Project will develop the existing Tunnel 5 at Tarbela Dam into a power generation source. It is comprised of the following:

- (a) Construction of a power house and modification to the existing Tunnel 5; (b) Power equipment and transmission line:
 - (i) Supply and installation of power units and ancillary equipment for the power house on Tunnel 5 to generate power; and
 - (ii) Construction of a transmission line to evacuate power and connect it to the national grid;
- (c) Safeguard measures, dam monitoring and surveillance;
- (d) Supervision, implementation, monitoring and evaluation support; and
- (e) Project management support, including audits, capacity building, solar power pilot and studies.

The Bank Loan will be used to jointly co-finance components (a) and (b) (i) with the WB. WAPDA will implement all components except for the transmission line (component (b) (ii)), which will be implemented by NTDC.

IV. Environmental and Social

6. ***Project Categorization.*** The Project involves large scale construction at the existing Tarbela Dam on the Indus River and is located directly upstream of the multi-financier funded Ghazi Barotha Hydropower Project (1990s), which had issues related to resettlement and land acquisition. In addition, there are social legacy issues related to resettlement and land acquisition from the original WB-funded Tarbela Dam project in the 1970s, which are being addressed under T4HP and will continue to be under the Project. As the Project is a large undertaking by WAPDA, in conjunction with the ongoing construction of the WB-funded T4HP, it has also been placed by the WB in Environmental Category "A." This categorization requires a full environmental and social assessment, including consultations with stakeholders. The environmental and social assessment (ESA) of the Project, prepared jointly by WAPDA and NTDC, considers adverse environmental and social issues likely to arise during the complete project cycle, including the preconstruction, construction, and operation phases. In addition, WAPDA and NTDC have prepared a land acquisition and resettlement framework (LARF) for component (b) (ii), which covers preparation of resettlement action plans (RAPs) for the transmission line and a new grid station to which the transmission line will be connected. This grid station will be constructed and financed by the WB under another project (National Transmission Modernization I Project (NTMIP)) currently under preparation.

7. ***Environmental and Social.*** The power generation element of the Project (component (a)) will be implemented on the left bank of the Indus River, in a limited area concentrated around the inlet and outlet of Tunnel 5 of the Tarbela Dam. The proposed transmission line for power evacuation (component (b) (ii)) will be about 50 km long. It will be connected to a new Islamabad West Grid Station, which will be financed under the NTMIP and will require land acquisition and very limited resettlement (see below). Direct and indirect impacts of the Project will mainly occur in the immediate surroundings (a few km) of the power generation facility, along the transmission line corridor and at the Islamabad West Grid Station, as well as at some borrow areas and quarries for construction materials that are situated at a further distance. The ESA shows that major adverse environmental impacts are primarily limited to the design and construction stage, are likely to be temporary and reversible in nature, and will be managed locally. The positive impacts of the Project will be very substantial due to production of clean, low-carbon hydropower. Net greenhouse gas emissions from implementation of the Project are negative, with a reduction, as compared to fossil fuel generation, of 20 million tons of CO_{2e} over the 30-year life of the Project. The Environmental and Social Management Plan (ESMP), which is an element of the ESA, provides a framework to ensure transparent and effective monitoring, prevention, minimization, mitigation, off-setting and enhancement measures to address environmental and social impacts associated with the Project.

8. ***Environmental Impacts.*** The Project, including the transmission line (component (b) (ii)), does not have impacts on any natural habitat or forest. Similarly, the Project will not use and does not promote use of pesticides as a result of any activity. In the Project design, a number of project alternatives were analyzed in terms of location and layout of the power house, intake options, routing of transmission line and location of grid station. For each of the proposed alternatives, technical, environmental and social considerations were weighed before deciding on a preferred option. The ESA report presents analyses of cumulative impacts, induced impacts, and risks for the Project against natural disasters like earthquakes, extreme flooding and those associated with climate change. The Project is also not expected to contribute to any cumulative impacts since it will not change the Tarbela Dam's operational regime.

9. ***Social Impacts of Tunnel 5.*** No direct social impacts are expected from construction of the hydropower generation component of the Project (component (a)). The Project will utilize the existing Tunnel 5 and the Tarbela Dam's reservoir for generation of hydropower. The power plant construction works will be entirely within a WAPDA controlled zone, cordoned off from the public with a fence and covered by security arrangements. None of the physical works, whether new or existing ones being upgraded, will require new land acquisition for the power generation aspects. Key benefits include employment opportunities during construction that will mostly use local labor. Other social issues will include labor employment conditions and safety measures.

10. ***Social Impacts of Transmission Line.*** The transmission line will span over 52 km and will have about 160 towers. The exact siting of the towers will be finalized during the construction phase. Hence, exact land compensation and resettlement impacts are not known at this stage. However, socioeconomic surveys were carried out to understand the livelihood sources and landholdings near the tentative tower locations. Nearly 80 percent of the people who own the tower locations are farmers. The impacts associated with the towers include disturbance to crops at the

time of construction, and clearing of vegetation under the alignment. Consistent with the provisions of the ESMP and LARF, a RAP specific to the transmission line will be prepared during the detailed design stage, prior to the start of construction.

11. ***Social Impacts of the Islamabad West Grid Station.*** The Islamabad West Grid Station will require about 200 acres of land, affecting a total of 150 households. The social impacts largely include loss of agricultural land with associated loss of income and livelihoods. To address and mitigate these relocation and resettlement impacts, a draft RAP has been prepared and is being updated. The RAP is being based on the findings of the inventory and census surveys as well as meetings and consultations with various Project-affected persons. It is being designed as a “development” plan, with the overall objective to restore and/or improve the living standards of the affected persons from the pre-Project level.

12. ***Social Action Plan.*** Local communities will obtain benefits through an outreach social assistance program that will support social infrastructure needs in the Project’s immediate vicinity. A Social Action Plan (SAP) has been included in the Project along with resources, based on experience gained in T4HP. The SAP under T4HP included a number of community schemes identified through a collaborative process with local settlements. It was implemented successfully and provided benefits to local communities such as water supply and sanitation schemes, road construction, assistance to health facilities and construction of schools.

13. ***Resolution of Legacy Land Cases.*** Several legacy resettlement and land acquisition cases under both the 1970s Tarbela Dam project and the 1990s Ghazi Barotha Hydropower project have been addressed through a Resettlement Commission financed under the T4HP. This Commission will be reconstituted and financed under the WB’s Additional Financing to continue to work on remaining legacy cases under the Project.

14. ***Consultation and Disclosure.*** Consultations were undertaken with local communities during Project preparation at Tunnel 5 (power generation), along the general transmission line route, and at Islamabad West Grid Station localities, and these views have been included in the development of mitigation measures under the ESA. Consultations with the local communities will continue through the SAP, during implementation of the RAPs and as communication initiatives under the Project. The ESA and LARF have been completed and disclosed by WAPDA and also posted on the WB’s website (<http://www.worldbank.org/projects/P157372/?lang=en&tab=documents&subTab=projectDocuments>). The RAP for the transmission line will be posted by WAPDA, WB and the Bank when it becomes available during the course of Project implementation. The RAP for the Islamabad West Grid Station will be disclosed prior to appraisal by the WB of the NTMIP.

15. ***Project-Specific Grievance Mechanisms.*** A Project-specific grievance redress mechanism will be used for the Project. A tripartite Grievance Redress Committee on labor issues has been operational during T4HP and will continue to address labor complaints and employment issues under the Project.

16. ***Health and Safety.*** Health hazards to labor will be managed through comprehensive training and provision of protective equipment. Further, labor camps required during the

construction phase will be carefully built, or existing sites will be upgraded, to ensure that living conditions are healthy and do not lead to any conflicts.

17. **Implementation of the ESMP.** The Project will be implemented by WAPDA and NTDC, both of which have extensive experience in implementing WB-funded projects. The ESA presents institutional responsibilities for environmental and social safeguards implementation at three levels, including the implementing agencies, supervision consultants and contractors. WAPDA is responsible for ensuring implementation of the ESMP. Within NTDC/Project Management Unit, an Environment and Social Impact Unit will oversee the preparation and implementation of the RAPs for the transmission line, and the Islamabad West Grid Station, in accordance with the LARF.

18. **Dam Safety.** The existing dam instrumentation and monitoring system at the Tarbela Dam is in remarkably good condition as compared to similar dams of the same age. However, some instruments are reaching the end of their useful life. Given the strategic importance of the Tarbela Dam, the Project will finance strengthening of the dam safety monitoring systems and other equipment required for the safe operation of the dam and its facilities. Dam monitoring instrumentation such as piezometers, extensometers, etc., will be upgraded where required and automatic data acquisition and logging systems will be installed. Dam safety inspections during the Project implementation period will also be financed by the Project.

19. **Monitoring of the Delta and Sediment Transport.** A monitoring system will be installed in the Tarbela reservoir to monitor the behavior of the delta and sediment transport. Support will also be provided for research on sediment management, in particular for the delta, sediment movements, composition and impact on the operation of the power house. Sedimentation modelling studies will be done to understand the pattern of movement of the delta toward the power house (Tunnels 1-4), spillways and Tunnel 5, and how this may affect operation of the power plants of Tarbela, the Ghazi-Barotha pond and operation of the Ghazi-Barotha canal.

20. **International Waterways.** Tarbela Dam is located on the Indus River, which is an international waterway, thus triggering the WB's operational policy on international waterways (OP 7.50). However, the Project activity at the Dam consists primarily of the installation of a power unit on the existing Tunnel 5. The WB has determined that riparian notification under OP 7.50 is not required because: (a) the Project does not involve works and activities that would exceed the original scheme, change its nature, or alter or expand its scope and extent to make it appear a new or different scheme; and (b) therefore, given the nature of works envisaged under the proposed Project: (i) the Project would not adversely affect the quality or quantity of water flows to other riparians; and (ii) it would not be adversely affected by other riparians' water use. The WB Project team has also reviewed the Indus Waters Treaty of 1960 between India and Pakistan and concluded that notification to the riparians is not required under the treaty, as the Project would not cause interference with the waters of any of the covered rivers and would not affect the other riparians materially.

V. Estimated Project Cost and Financing Source

21. The Project is estimated to cost US\$ 823.5 million including taxes, duties and financing charges during implementation. The financing sources are as follows:

WB	US\$ 390 million
AIIB	US\$ 300 million
Government	US\$ 133.5 million
Total:	US\$ 823.5 million

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