ASIAN INFRASTRUCTURE INVESTMENT BANK

Report Number 0005-PAK

Date: December 9, 2016

PROJECT DOCUMENT

OF

THE ASIAN INFRASTRUCTURE INVESTMENT BANK

Islamic Republic of Pakistan

Tarbela 5 Hydropower Extension Project

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 21, 2015)

Currency Unit	=	Pakistan Rupees (PKR)
PKR 105.00	=	US$1
US$	=	SDR 1

FISCAL YEAR

July 1 – June 30

ABBRREVIATIONS AND ACRONYMS

AF	Additional Financing
AIIB	Asian Infrastructure Investment Bank
BP	Bank Procedure (WB)
CSCs	Construction Supervision Consultants
ESA	Environmental and Social Assessment
ESP	Environmental and Social Policy
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
FDI	Foreign Direct Investment
FY	Fiscal Year
GAAP	Governance and Accountability Action Plan
GDP	Gross Domestic Product
GoP	Government of Pakistan
GWh	Gigawatt hour
kV	Kilovolt
kWh	Kilowatt hour
M&E	Monitoring & Evaluation
MW	Megawatt
NTDC	National Transmission and Dispatch Company, Ltd.
OP	Operational Policy (WB)
PM&ECs	Project Management Support and Monitoring & Evaluation Consultants
PMU	Project Management Unit
RAP	Resettlement Action Plan
SAP	Social Action Plan
T4HP	Tarbela Fourth Extension Hydropower Project
WAPDA	Water and Power Development Authority
WB	World Bank (International Bank for Reconstruction and Development)

Table of Contents

I. PROJECT SUMMARY SHEET

Republic of Pakistan

Tarbela 5 Hydropower Extension Project

President	Jin Liqun
Vice President	D.J. Pandian
Director General, Operations	Supee Teravaninthorn
Manager Operations	Fang Ke
Project Team Leader	Ian Nightingale
Project Team Members	Kishor Uprety, Senior Legal Counsel Anzheng Wei, Financial Analyst

Project No.	000005
Client Borrower Implementation Agency	 Islamic Republic of Pakistan Water and Power Development Authority (WAPDA)
Sector(s)	Hydropower, Energy
Project Objectives/Description	To facilitate the sustainable expansion of Pakistan's electricity generation capacity. The Project comprises the following 5 key activities: i) The construction of a power house and modification of the existing Tunnel 5 to house the power plant, a penstock connecting to the power units and the construction of raised intakes (Component A). ii) The installation of power units and ancillary equipment; this will include installation of turbines, generators, transformers, ancillary electro mechanical equipment for Tunnel 5, and a short transmission line to connect to the grid. Construction of a new transmission line to evacuate power (Component B). iii) The provision of technical assistance to support implementation of a social action plan, environmental and social management plan, and dam safety monitoring surveillance program (Component C). iv) The provision of technical assistance to carry out construction supervision, monitoring and evaluation of Project progress, quality, and impacts as well as independent supervision of the social action plan and environmental and social management plan (Component D). v) This component will support project management, and strengthen capacity to plan, develop and manage the hydropower infrastructure in the long term (Component E)

Project Implementation Period (Start Date and End Date)	Start Date: January 2017 End Date: March 2022
Expected Loan Closing Date	June 2022

<table>
<tr><td>Project Cost and Financing Plan</td><td>The Project is estimated to cost US$823.5 million. The financing sources are as follows (in US$ millions):

<table><tr><td></td><td>AIIB</td><td>WB</td><td>GoP</td><td>Total</td></tr><tr><td>Component A</td><td>133.2</td><td>109.0</td><td>60.5</td><td>302.7</td></tr><tr><td>Component B</td><td>140.7</td><td>156.0</td><td>72.9</td><td>369.7</td></tr><tr><td>Component C</td><td>0</td><td>13.0</td><td>0</td><td>13.0</td></tr><tr><td>Component D</td><td>0</td><td>32.0</td><td>0</td><td>32.0</td></tr><tr><td>Component E</td><td>0</td><td>42.6</td><td>0</td><td>42.6</td></tr><tr><td>Fees and IDC</td><td>26.1</td><td>37.4</td><td>0</td><td>63.5</td></tr><tr><td>Total</td><td>300.0</td><td>390.0</td><td>124.5</td><td>823.5</td></tr></table></td></tr>
<tr><td>AIIB Loan (Size and Terms)</td><td>A sovereign backed loan of US$300 million with a maturity of 20 years including a grace period of 6 years at the Bank’s standard interest rate for sovereign guaranteed loans. Repayment is on a non-level basis with a corresponding weighted average maturity of 14.9 years. The fixed rate is therefore determined as six month LIBOR plus 1.15%.</td></tr>
<tr><td>Co-Financing (Size and Terms)</td><td>World Bank (WB) Sovereign Backed Loan of US$390 million with a maturity of 20 years. Including a grace period of 6 years. The interest rate spread will be LIBOR with the WB variable spread.</td></tr>
<tr><td>Environmental and Social Category</td><td>A</td></tr>
<tr><td>Project Risk</td><td>High</td></tr>
<tr><td>Conditions for Effectiveness and Disbursement</td><td>Effectiveness conditions:
1. Cross effectiveness with the WB Loan Agreement.
2. Execution of Subsidiary Agreement between Pakistan and WAPDA.</td></tr>
<tr><td>Key Covenants</td><td>1. Implementation of the Project in accordance with WB policies, including those concerning anti-corruption, environmental and social safeguards, procurement of goods and services, financial management and disbursement, as described in the Loan Agreement and Project Agreement.
2. On-lending of the Loan by the Government of Pakistan to WAPDA under terms and conditions acceptable to the Bank.
3. Connection of the transmission line to the national grid six months prior to the generation by Tarbela Dam Tunnel 5.</td></tr>
<tr><td>Policy Assurance</td><td>The VP Policy and Strategy confirms an overall assurance that the Bank is in compliance with the policies applicable to the Project.</td></tr>
</table>

II. STRATEGIC CONTEXT

A. Country Context

1. Pakistan's economic performance is improving. Real GDP growth was 4.2 percent in fiscal year 2014-2015 (FY14/15), despite natural disasters and a difficult political and security situation, and is expected to rise further next year. The threat of a balance of payments crisis, severe a year ago, has receded. Foreign exchange reserves had risen to over 3 months of imports by about midyear and have remained above that level since. The fiscal deficit was 5.3 percent of GDP in FY14/15. Inflation was 4.5 percent at the end of the year, helped by lower energy prices. The IMF program is on track, with the eighth review completed at the end of September 2015. While the outlook is for moderately higher growth, the economy is still vulnerable to shortages of energy, natural disasters, and lower than expected inflows of remittances, foreign direct investment and tax revenues.

B. Sectoral Context

2. Pakistan's energy sector performance is improving but challenges remain. Subsidies to the sector were reduced in FY14/15 to about 0.8 percent of GDP, down from 1.5 percent in FY12/13. Falling oil prices have reduced input costs for electricity generation, enabling tariffs to be adjusted downwards. A gap between costs and revenues, including subsidies, of about PKR 2.7/kWh remains, however, and the sector continues to suffer acute liquidity shortages. As a result, accumulated arrears of payment by the public electricity distribution companies to their suppliers, commonly known as the circular debt, reached an estimated PKR 314 billion, at the end of FY14/15, or a little over one percent of that year's GDP. Targeting of subsidies towards the poorest remains an issue, as does the need to ensure that the sector develops in a socially and environmentally sustainable way.

III. THE PROJECT

A. Rationale

3. The Project will enable the installation and commissioning of additional power output for the existing Tarbela hydropower dam. The overall implementation performance to date of the Tarbela Fourth Extension Hydropower Project (T4HP) has been satisfactory and given the need for low cost generation to address the sector's financial and energy issues in the shortest possible timeframe, the Project is well justified. The Project will generate approximately additional 1,800 GWh utilizing the current flows,[1] at a very low cost compared to alternative generation from thermal or other hydropower projects, because all other infrastructure such as the dam and Tunnel 5 are already constructed. Most importantly, the gestation period of the Project is short (39 months from the start of construction). This would help alleviate severe blackouts and highly costly self-generation. Project designs have been reviewed by an Independent Panel of Experts engaged by the Government of Pakistan (GoP), draft tender documents have been prepared and the Project is ready for implementation.

[1] During the high flow months of July-October, the flow in the Indus River is much higher than can be passed through the existing generation facilities and the remainder is discharged over the spillways and therefore does not provide any power benefits.

B. Project Objectives

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

C. Project Description and Components

5. The financing for T4HP was approved by the World Bank (WB) in March 2012 and became effective on April 27, 2012. Financing included a Loan from the International Bank for Reconstruction and Development (IBRD) of US$400 million and a Credit from the International Development Association of US$440 million. All major contracts have been awarded and work is on schedule. Implementation progress has been rated as satisfactory since effectiveness. T4HP is in compliance with legal covenants and the fiduciary and safeguards performance are rated as satisfactory.

6. The proposed Project would support new activities under the existing Tunnel 5. The activities under the Project comprise the following:

(a) The construction of a power house and modification to Tunnel 5 (Component A);

(b) The supply and installation of power units and ancillary equipment for the power house on Tunnel 5 (Components B.l and B.2) to generate power;

(c) The construction of a transmission line (Component B.3) to evacuate power;

(d) The implementation of an environmental and social management plan (ESMP) and a social action plan (SAP), dam safety monitoring surveillance program, and monitoring and research on sedimentation management.

(e) Supervision and implementation support (Component D); and

(f) Project Management Unit (PMU) support and audits, capacity building technical assistance, training, solar power pilot study, and strategic studies for the hydropower sector and preparation of future projects (Component E).

Of the above, Bank financing would be used for activities (a) and (b).

7. It is planned that power from T5 HP would be evacuated to the Islamabad West Substation. This substation would be constructed under a separate project, the Transmission Line Modernization Project, which is currently in the WB financing pipeline to be approved later this year. Land acquisition costs associated with the construction of the substation would also be financed under the Transmission Line Modernization Project.

8. The proposed Project would help further the development of Pakistan's hydropower potential along the Indus River Cascade, which is the cornerstone of the GoP's energy policy to reduce load-shedding, reduce cost of electricity production, and improve financial sustainability of the power sector. The Project would provide a low cost and clean renewable energy option in a relatively short period of time. This would help alleviate severe blackouts and expensive, unhealthy and polluting self -generation using small gasoline and diesel-run generators.

9. Tunnel 5 is currently being used to release water for irrigation only when the reservoir level is below the minimum spillway operating level and water release from the existing power units is

not adequate. With a power house installed, it would continue to carry out the same function and in addition the water released from the spillway would be diverted through Tunnel 5 to generate 1,800 GWh. This would maximize use of the existing facilities and help to meet critically needed power requirements for the country.

10. Part of Component E will include a pilot project of a floating solar power plant in the reservoir area and would add 10 MW to the power output of the Dam. If successful, the floating power plant could be expanded over the rest of the area, leading to a potential capacity of about 7,000 MW.

D. Cost and Financing

11. The Project is estimated to cost US$823.5 million, including taxes, duties and financing charges during implementation (see Table 1 below).

12. The GoP has requested the Bank to co-finance the Project, together with the WB. The Bank would jointly co-finance Components A, B.1 and B.2 of the Project. The proposed financing plan comprises: (a) a sovereign-backed loan of US$300 million from the Bank; (b) a sovereign-backed loan of US$390 million from the WB (IBRD); and (c) US$133.5 million counterpart funding from the GoP.

13. Subject to changes, if any, during loan negotiations, the sovereign-backed loan from the Bank will have a 20-year term, including a grace period of 6 years. The loan will be made on the standard pricing terms for Bank sovereign-backed loans with the same average maturity.

Table 1. Estimated Cost of Tarbela 5 Hydropower Extension Project and Financing Plan (US$ Millions)

Component	Total	WB/ IBRD AF	AIIB	WAPDA (GoP)	NTDC (GoP)
A. Power House and Tunnel Works	**302.7**	**109.0**	**133.2**	**60.5**	
B. Turbines, Generators and auxiliaries					
B1. Turbines generators and related equipment	251.4	90.5	110.6	50.3	
B2. Transformers, switchyard electrical connection	68.4	24.6	30.1	13.7	
B3.1Transmission to Islamabad West	45.0	36.0			9.0
B3.2 EAP and SAP cost of Transmission line	5.0	5.0			
Sub total B	**369.8**	**156.1**	**140.7**	**64.0**	**9.0**
C. Implementation of SAP and ESMP, Dam Monitoring					
C1. SAP for legacy issues	4.2	4.2			
C2. ESMP	3.0	3.0			
C3. Dam safety and monitoring program	5.8	5.8			
Sub total C	**13.0**	**13.0**			
D. Consultancies for Supervision					
D1. Construction supervision consulting services	28.5	28.5			
D2. M&E, supervision of ESMP and SAP	3.5	3.5			
Sub total D	**32.0**	**32.0**			
E. Project Management, TA, Training					
E1. PMU support and audits	8.8	8.8			
E2. Capacity Building, TA, POE, Training	6.2	6.2			
E3. Strategic studies, pilots and future project preparation	27.6	27.6			
Sub total E	**42.6**	**42.6**			
Fees and IDC	**63.5**	**37.4**	**26.1**		
Total Project Cost	**823.5**	**390.0**	**300**	**124.5**	**9.0**
Share as percentage of Total Project Cost		47%	36%	15%	1%
Tax content at 19%	144.0				
WAPDA/GoP share – Component A, A and B: 20%, AIIB 44% and WB 36%					

Notes: The above cost estimates include: (a) physical contingences of 10% for all works and 5% for electro mechanical plant and equipment; and (b) price contingencies estimated based on international (US$) inflation of 2% annually over the Project period.

E. Implementation Arrangements

WB Supervision

14. The WB will be the lead co-financier and will supervise the Project and administer the Bank's loan on behalf of the Bank, in accordance with the WB's applicable policies and procedures, and a Project Co-lenders' Agreement, to be signed between the Bank and the WB, in accordance with the existing Co-financing Framework Agreement between the Bank and the WB.

15. The Bank has reviewed: (a) the WB's Operational Policies (OP) and Bank Procedures (BP) applicable to the Project, specifically, OP/BP 4.01, (Environmental Assessment), 4.12 (Involuntary Resettlement) 4.37 (Safety of Dams) and 7.50 (International Waterways); (b) the WB's Procurement and Consultant Guidelines (2014); and (c) the WB's sanctions policies and procedures, including the WB's Anti-Corruption Guidelines. It has found all of them satisfactory for application to the Project, in accordance with the requirements, respectively, of the Bank's Environmental and Social Policy (ESP) and Environmental and Social Standards (ESSs) (ESS1–Environmental and Social Assessment and Management, and ESS2–Involuntary Resettlement)[2]; (b) the requirements of the Bank's Procurement Policy;[3] and (c) the Bank's Policy on Prohibited Practices.[4] The Bank will accordingly rely on the WB's determination of compliance with the above WB policies and procedures applicable to the Project. Project monitoring and reporting, as well as financial management, will also be carried out in accordance with the WB's requirements. This approach will ensure that one set of policies will apply to the entire Project; it will also provide a single point of contact for the GoP and therefore facilitate a more efficient and seamless approach to Project implementation.

Implementation Management

16. The implementing agency for Components A, B.1 and B.2 (as well as Components C, D, and E) is the Water and Power Development Authority (WAPDA). The National Transmission and Dispatch Company Ltd. (NTDC) will implement Component B.3.[5] A PMU will be supported by two sets of consultants recruited by WAPDA – Construction Supervision Consultants (CSCs) and Project Management Support and Monitoring and Evaluation Consultants (PM&ECs). The CSCs will help in construction supervision, contract management, and other management aspects of the Project. For civil works contracts, the Project Director will serve as the Employer's Representative, and the CSCs will serve as the Engineer for construction supervision. At the site, Resident Engineers, appointed by the CSCs, together with a team of specialists and inspectors, will supervise the contractor. The PM&ECs will assist in Project Management and in carrying out the role of the employer in the works contracts, and M&E. The PM&ECs will also supervise the

[2] Under the ESP, the Bank may agree to the application, in a project, of the environmental and social policies and procedures of co-financiers (paragraph 10). As a precondition, the Bank must be satisfied that these policies and procedures are consistent with the Bank's Articles of Agreement and materially consistent with the Bank's ESP and relevant ESSs, and that appropriate monitoring procedures are in place. In that case, the Bank may rely on the co-financier's determination of compliance with the co-financier's policies and procedures.

[3] Under the Procurement Policy, the Bank may agree on a common procedure framework with other co-financiers for a jointly-co-financed Project, if the Bank has determined that the co-financiers' procurement policies are consistent with the Bank's Core Procurement Principles and Procurement Standards (paragraph 5.11.3). In that case, the lead co-financier is normally responsible for overseeing the procurement process, applying its own procurement policy and internal review and clearance procedures, and determining whether the procurement has been conducted in accordance with its own policy. In all cases, the Bank's eligibility requirement will apply, permitting firms and individuals from all countries to offer goods, works and services for a Bank-financed contract.

[4] Under the Bank's Policy on Prohibited Practices, the Bank may agree to the application of the prohibited practices or similar policy and investigations and sanctions processes of certain co-financiers for a Project (paragraph 12.6). As a precondition, the Bank must be satisfied that the co-financier's policy and processes are consistent with the Bank's Articles of Agreement and materially consistent with the Bank's Policy on Prohibited Practices. In that case, the Bank may agree that the co-financier will be responsible for the investigations and sanctions processes and the Bank may agree to give full force and effect to the co-financier's sanctions decisions with respect to investigations arising from the Project.

5 NTDC will be the implementing agency for Component B.3. This particular component will be financed by the WB only.

implementation of the SAP and ESMP, and carry out independent M&E for Project activities and implementation. The International Panel of Experts, appointed by the GoP for T4HP, comprising social, environmental, technical, procurement and contract management expertise, would continue to oversee the Project during the construction phase and advise WAPDA and the GoP on Project issues that may arise during the construction and/or project implementation period. The Panel will continue to work during implementation of the Project, commencement of operation as well as during the warranty period of the major works, and meet as often as needed, but at least every six months.

17. The construction period for the Project is estimated to be about 39 months, taking into account the logistical and technical constraints that require proper sequencing of the ongoing construction activities on Tunnels 3 and 4 under the original requirements for T4HP, and the start of construction activities for Tunnel 5 to meet the irrigation requirements.

18. If the contracts can be awarded in 2016 (under an advance procurement method) then the generation could start from the high flow season of the 2019 summer, about 2 years after the commissioning of the Tunnel 5 power house. Intake work on Tunnel 5 can be completed later, by January 2021, without disrupting the generation.

Procurement

19. Procurement for all co-financed contracts (Components A, B.1 and B.2) will be conducted in accordance with the WB's International Competitive Bidding procedures, which are fully aligned with the Bank's International Open Competitive Tender procedures. The invitation to apply for pre-qualification for Component A was issued on March 4, 2016 on an advanced contracting basis. Evaluation of the applications received is currently ongoing.

Fund Flow Arrangements and Disbursements

20. The fund flow arrangements and disbursements are provided below in Table 2.

Table 2. Fund Flow Arrangements and Disbursements

	Expected Disbursements (in US$ Million) (including all Sources of Financing)					
Year*	**July 2016 through June 2017**	**July 2017 through June 2018**	**July 2018 through June 2019**	**July 2019 through June 2020**	**July 2020 through June 2021**	**July 2021 through June 2022**
Annual	20.0	30.0	150.0	220.0	300.0	103.5
Cumulative	20.0	50.0	200.0	420.0	720.0	823.5

*Note: the years shown in this table are WB fiscal years (July 1-June 30).

21. Retroactive Financing of up to 10% of the Bank's loan (US$30 million) would be allowed for Project expenditures incurred and paid on or after January 1, 2016. The WB will provide disbursement services for the Bank. The GoP will open a new segregated, designated account to receive the proceeds of the Loan. WAPDA will be authorized to withdraw the amounts deposited in this designated account. Disbursements will be made quarterly using the report-based principle. The PMU will prepare and submit Interim Financial Reports (IFRs) within 45 days after the end of each quarter to the WB, which will forward them for information to the Bank. Advances into

the designated account will be made for the following six months based on the forecasted expenditure for that period. Subsequent IFRs will document expenditures against the advance received and provide forecast expenditures for the further six months on the basis of which the amount of Loan proceeds to be deposited in the designated account will be determined. For large foreign currency payment, direct payment would be made to the supplier/contractor. Deposits and direct payments will be made by the WB on behalf of the Bank.

IV. PROJECT ASSESSMENT

A. Technical

22. A technical pre-appraisal mission has been undertaken by the Bank, during which a site visit was conducted with the WB to review the implementation progress of T4HP, the status of the design work for the Project and the proposed implementation arrangements for the Project. The mission reached a shared understanding between the Bank, the WB and the GoP about the Project scope, the design processing timeline, the implementation plan and the proposed co-financing arrangements. Further desk based due diligence and clarification has been conducted by the Bank on some of the technical aspects of the Project details presented in the WB's Project Paper. The proposed Project was found to be in an advanced stage of preparation and is well prepared.

B. Economic[6] and Financial Analysis

23. The ERR for T5HP (excluding environmental benefits) ranges from about 21 to 31% depending upon whether peaking energy is optimized or not. Accounting for environmental benefits will raise the ERR by 3-4%. In terms of GHG emissions from the Project, since the Project is expected to displace gas-based thermal generation (CCGT), it would result in a net reduction of 20.6 million tons of CO_2 over its 30-year life. When evaluated against diesel-based self-generation, the avoided emissions are 33.9 million tons of CO_2.

24. The strong returns reflect the fact that T5HP, like its predecessor T4HP, is an extension scheme (focusing mainly on adding extra turbine capacity) to an already substantial hydro scheme, rather than a green-field scheme with front-end civil works and associated impacts. The sensitivity analysis shows the returns to be remarkably robust against unfavorable outcomes: for example, construction costs could be 110 percent higher and the construction delays resulting in a postponement of the revenue stream could continue for 6 years before the ERR falls to the hurdle rate of 12%. The robustness of economic returns is also tested in a scenario analysis, in which the outcome of plausible worst case is examined, and which shows that economic return does not fall below the hurdle rate.

C. Fiduciary and Governance

Governance and Accountability Action Plan

25. The GoP and WAPDA are fully committed to the Project and its proper implementation because of its importance and transformative impact on the economy and on the development of Pakistan. To mitigate and guard against governance, corruption and fraud risks, and to improve

[6] This economic analysis is largely based on the Feasibility Verification Report prepared by WAPDA's design consultants, Mott Macdonald and Coyne et Bellier, dated July 2015.

transparency and accountability in the implementation of Project activities, a comprehensive Governance and Accountability Action Plan (GAAP) has been prepared in consultation between the WB and the GoP and would be implemented by WAPDA.

26. The key features of the GAAP provide for:

(a) Strengthening of the capacity of the implementation agency;

(b) Internal accountability through internal audit and review of contracts and the appointment of M&E consultants;

(c) A communication strategy that provides enhanced transparency of access to Project information through disclosure on a website of all procurement and Project information, and regular accountability meetings with civil society organizations and the media in the Project area and major cities;

(d) Conduct by the Independent Panel of Experts of independent reviews of the procurement process and contract administration; and

(e) Certification of no conflict of interest required from members of the PMU and members of the evaluation committees; tenderers required to declare their agents and other possible connections to persons involved in WAPDA's procurement management.

Financial Management

27. The PMU under WAPDA General Manager Tarbela will be responsible for the financial management of the Project during implementation. This will include mechanisms for preparing an annual budget, withdrawing the proceeds of the Bank Loan and WB loan, disbursing funds for Project activities, maintaining proper books of accounts, and preparing in-year and annual financial statements. The internal audit division of WAPDA will carry out internal audit of the Project on an annual basis. The mandate and capacity of the internal audit division is limited, and WAPDA will prepare a plan to strengthen internal audit so it complies with international standards. In carrying out financial management, the PMU will be supported by qualified staff and consultants, the CSCs and the PM&ECs. A qualified professional accountant with adequate experience in financial management of large infrastructure projects will work in the PMU as the Financial Management Specialist (FMS) with terms of reference agreed with the WB. Reporting to the Project Director, the FMS will lead the FM functions of the Project with the assistance of a Deputy Director (Finance), an Assistant Director (Finance) and a few other support staff.

D. Environmental and Social

28. ***Project Categorization.*** The Project involves large scale construction at the existing Tarbela Dam on the Indus River and is located directly adjacent to the multi-donor 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 would 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 pre-construction, construction, and operation phases.

29. ***Environmental and Social Assessment.*** The power generation element of the Project 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 will be about 50 km long. The Area of Influence of the Project, for assessment purposes, covers an area about 5km upstream and 10km downstream of the dam, 2km on each side of the Indus River (right and left banks), the length of the power evacuation route, plus a 500m buffer from the center of the transmission line along its length. Direct and indirect impacts of the Project will mainly occur in the immediate surroundings (a few km) of the power generation facility, and along the transmission line corridor, with the exception of 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. Negative impacts during operation and maintenance of the Project will be very limited. However, the positive impacts of the Project will be very substantial due to production of clean, low-carbon hydropower. The Project's ESMP in the ESA study builds on the experience gained in the implementation of T4HP. The ESMP 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.

30. ***Environmental Impacts.*** The Project, including the Transmission Line component, does not have impacts on any natural habitat or forest. Similarly, the Project will not use and does not promote use of pesticide as a result of any activity. NTDC will not use chemicals/pesticides for clearing of vegetation under the Transmission Line. In the Project design, a number of project alternatives were analyzed in terms of location and layout of the powerhouse, 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 Tarbela's operational regime.

31. ***Social Impacts of Tunnel 5.*** No direct social impacts are expected from construction of the hydropower generation component of the Project. The Project will utilize the existing Tunnel 5 and the Tarbela 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. Possible social impacts under the Project are expected to be related to construction operations. Key benefits include employment opportunities during construction that will mostly use local labor. Other social issues will include labor employment conditions and safety measures.

32. ***Social Impacts of Transmission Line.*** The transmission line will be about 52 km long 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 (farming is the primary source of income for 50 percent, and a secondary source for the remainder). 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 ESMF and Land Acquisition and Resettlement Framework, a Resettlement Action Plan (RAP) specific to the Transmission Line will be prepared during the detailed design stage, prior to the start of construction.

33. ***Social Impacts of the Islamabad West Grid Station.*** The Islamabad West Grid Station to be funded under the planned Transmission Line Modernization Project 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, the RAP has been prepared. The RAP is based on the findings of the inventory and census surveys as well as meetings and consultations with various project-affected persons. It has been 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. The RAP has developed income and livelihood restoration programs with this aim in mind. In addition to income restoration, capacity building and enhancing social capital of the affected communities are major objectives of this program.

34. ***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 SAP has been included in the Project along with resources, based on experience gained in T4HP, to guide future planning efforts to address such potential impacts and deliver the recommended community assistance schemes. 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 for boys and girls.

35. ***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 under the T4HP. This Commission will be reconstituted to continue to work on remaining legacy cases under the Project. Through social organizers, the Project has already gauged that there is continued demand for settling cases through the Commission and that a number of parties are willing to avail themselves of the Commission's services.

36. ***Analysis of Cumulative Impacts.*** The ESA report also presents analysis on cumulative impacts. The analysis has been carried out in continuation of the analysis done for T4HP and considers the Ghazi Barotha Hydropower Project immediately downstream of the proposed Project, the 1970s Tarbela project and subsequent extensions, and proposed hydropower developments on the Indus over the next twenty years. The most significant valued environmental and social components considered are river hydrology, morphology, irrigation, and biodiversity.

The analysis of cumulative impacts presented in the ESA concludes that the contribution of the Project to the hydrological regime will be negligible as the Project will not alter the reservoir capacity or downstream water flows. Similarly, cumulative impacts are limited to biodiversity present in the Project area.

37. ***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 Substation 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, under RAP implementation 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 at:

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.

38. ***Project-Specific Grievance Mechanisms.*** A Project-specific Grievance Redress Mechanism will be used for the Project. It will address any complaints from the community during the implementation phase. 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. 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. A Labor Monitoring Plan will also ensure that suitable working conditions are in place.

39. ***Implementation of the ESMP.*** The Project will be implemented by WAPDA and NTDC and both the entities have extensive experience in implementing WB-funded projects in the past. The ESMP 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 through consultants and contractor(s). WAPDA appointed staff for overseeing the Project, the CSCs, the PM&ECs and the Contractor will be responsible for ensuring the implementation of the ESMP, and each party will be required to have the capability and capacity to manage environmental and social safeguard obligations. Under T4HP, WAPDA appointed staff to oversee the implementation of environmental and social safeguards issues. Within NTDC/PMU, an Environment and Social Impact Unit will oversee the RAP preparation and implementation for the Transmission Line to Islamabad West Substation.

40. ***Greenhouse Gas Emissions.*** Net Greenhouse Gas Emissions from implementation of the Project is negative, or a reduction of 20 million tons of CO_2e, using the WB's Guidance Note: Greenhouse Gas Accounting for Energy Investment Operations, 2013, and the 2006 guidelines of the Intergovernmental Panel on Climate Change. The gross reduction is 1.1 million tons of CO_2; estimated emissions from the hydropower component contain about 0.2 million tons of CO_2 and

from the transmission line about 0.9 million tons. The Project provides significant environmental benefits in the long run by providing renewable, non-carbon energy without the major environmental and social impacts normally associated with hydropower schemes. The Project will also help utilize more efficiently the scarce water resources of the Indus Basin by installing modern and more efficient turbines and machines for generation of electricity.

41. ***International Waterways.*** Tarbela Dam is located on the Indus River, which is an international waterway, thus triggering the WB's policy on international waterways (OP 7.50). However, the Project 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 and AIIB Project teams have also reviewed the Indus Waters Treaty of 1960 between India and Pakistan[7] 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.

E. Risks and Mitigation Measures

Technical Design and Implementation

42. As with any large infrastructure project there are risks of inadequate technical designs and engineering works leading to failure or poor performance. The sheer scale of the operation represents a risk and, indeed, the Project is a large undertaking for WAPDA. However, WAPDA has previous experience in such undertakings, and WAPDA staff will draw on such past knowledge and experience. To provide additional comfort in ensuring that the design of the hydropower plant is robust, an internationally renowned company has been recruited competitively by WAPDA to design the works. To mitigate implementation risks, the multi-disciplinary International Panel of Experts will be maintained by the GoP throughout the Project to provide technical advice regarding designs and engineering issues, as well as environmental and social aspects. In addition, the turbines, generators and other related equipment will be designed and supplied by a world leading manufacturer. Project implementation, procurement and contract management will be supervised by a reputable internationally recruited firm which will also be designated as the engineer in the civil works contract. The WB Team will place a staff member and/or a consultant in the country who will visit the Project site on a regular basis, particularly in the first two years, to monitor the Project planning, implementation program for construction activities, communication strategy, and ESMP and SAP activities.

43. It is planned that power from T5HP will be evacuated to the Islamabad West Substation. This substation will be constructed under a separate project, the Transmission Line Modernization Project, which is currently in the WB financing pipeline to be approved later this year. Land acquisition costs associated with the construction of the substation will also be financed under the Transmission Line Modernization Project. T5HP is expected to start generating power in the year

[7] See Annex 4 for a Summary of the *Indus Waters Treaty of 1960*

2020/21. The construction and completion of the substation will take around 18 months and therefore is expected to be completed prior to start of T5HP power generation. In case it appears by next year (July 2017) that the substation cannot be completed in time to accept the evacuation of power from T5HP, the option of evacuating the power to the existing Rawat substation by upgrading the existing 500 kV line from Tarbela to Rawat will be considered.

Political and Governance

44. Pakistan's political and governance risks are substantial due to:

(a) Political pressures related to reforms in the sector could challenge continued progress and undermine governance. While some progress on the GoP's Right to Information legislation has been made, challenges to enforcement and continued transparency and accountability remain.

(b) Weak legal frameworks for corporate governance and public sector regulation, poor performance and taking advantage of office are common in the public sector.

45. Management of these risks will include regular dialogue with the GoP and WAPDA to ensure client ownership, transparency and accountability. The PMU will ensure compliance with the GAAP developed for the Project to minimize adverse outcomes of political uncertainties and any "early warning" indicators of governance and accountability risks will be monitored regularly so that corrective measures can be carried out promptly. The Project will emphasize information dissemination and transparency through disclosure of Project documents in accordance with the WB Access to Information Policy and the GoP's Right to Information legislation.

Annexes

Annex 1: Results Framework and Monitoring

1. WAPDA will monitor and evaluate the progress of the Project and prepare Project reports. The WB will review the Project reports on behalf of the Bank and will forward the Project reports to the Bank and advise the Bank of the status of Project implementation. The Bank may participate in the WB's review missions. Within six months following the Loan Closing Date, the GoP will be required to prepare a Project completion report to evaluate the Project results; this will be reviewed by the WB, and the report and results will be shared with the Bank.

PDO Level Results Indicators*	Core	Unit of Measure	Baseline	Cumulative Target Values						Frequency	Data Source/ Methodology	Responsibility for Data Collection
				2017	2018	2019	2020	2021	2022			
Generation Capacity of Hydropower Constructed Under the Project	☒	MW	0	0	0	0	0	1,410	1,410	Annually	Project reports, monitoring reports by M&ECs	WAPDA, M&ECs
Electricity supply of renewable energy annually	☐	GWh	14,175	14,175	17,200	17,200	17,200	19,000	19,000	"	"	"
Availability of generation capacity during summer months	☐	MW	3,478	3,478	4,888	4,888	4,888	6,298	6,298	"	"	"
Preparation of hydropower project, completion of pilot solar project and capacity building program	☐	Percentage completion	0	20	40	60	80	100	100	"	"	"
INTERMEDIATE RESULTS												
Component A: Construction of power house, connection to Tunnel and intake modification												
Construction of T5 power house and connection to Tunnel 5	☐	Percent progress	0	0	20	40	80	100	100	"	"	"
Construction of intake modification for Tunnel 5	☐	Percent progress	0	0	0	20	40	80	100	"	"	"
Component B: Installation of power units and ancillary equipment												
Installation of number of power units on Tunnel 5	☐	No.	0	0	0	0	0	3	3	"	"	"
Construction of T5 Switchyard	☐	%	0	0	20	40	80	100	100	"	"	"
Transmission line for power evacuation	☐	%	0	0	20	40	80	100	100	"	"	"

PDO Level Results Indicators*	Core	Unit of Measure	Baseline	Cumulative Target Values						Frequency	Data Source/ Methodology	Responsibility for Data Collection
				2017	2018	2019	2020	2021	2022			
Component C: Environmental and Social Management Plan, Social Action Plan, Dam Monitoring and Surveillance												
Implementation of SAP and ESMP	☐	%	0	10	20	50	80	100	100	"	"	"
Operation of dams monitoring system	☐	%	0	10	20	50	80	100	100	"	"	"
SAP schemes to include consultation with women and reflect their priorities	☐	Text	No consultation with women reported	50% of the schemes are based on priorities identified by women.						"	"	"
CBOs functioning under the Project must have at least 25% women members and at least one female office bearer	☐	%	0	20	40	60	80	100	100	"	"	"
Component D: Construction Supervision, M&E and supervision of ESMP and SAP												
Construction supervision and implementation support (CSC Consultants)	☐	Text		Constant support and supervision by the CSC						"	"	"
Independent M&E of Project impact of SAP and ESMP	☐	Text		Regular Support and monitoring						"	"	"
Annual beneficiary feedback surveys to be conducted as part of M&E	☐	Text	No feedback survey has been done	Respondents report overall satisfaction with the implementation of RAP and SAP						"	"	"
Component E: Project Management, Pilots, Capacity Building, Technical Assistance and Training												
Effectiveness of PMU	☐			Recruit-ment of CSC &MSC and award of T5 works contracts	Minimum Issues with contract implementation and safeguards for T5				Completion of project on time, smooth transition to O&M arrangements	"	"	"
Capacity Building of WAPDA	☐	%	0	20	40	60	80	100	100	"	"	"
Pilot Solar Project	☐	%	0	0	50	100	100	100	100	"	"	"

Annex 2: Sovereign Credit Fact Sheet – Pakistan

(Source: IMF Country Report No. 16/1, January 2016)

A. Recent economic development

Since 2013, Pakistan has made substantial progress in reducing near-term economic vulnerabilities. Economic growth gradually increased to 4.2 percent in FY14/15. Efforts to reduce power subsidies and raise tax revenue have lowered the budget deficit. Monetary and financial sector policies have remained prudent in recent years, and the banking system remains sound. Inflation has declined significantly, helped in part by low international commodity prices. The external position has recently strengthened. Helped by low oil prices and strong remittances, the external current account deficit narrowed in FY14/15 and foreign exchange reserves of the SBP have been rebuilt from 1.5 months of imports in FY12/13 to 3.8 months of imports in September 2015. However, FDI fell by a half in FY14/15 and exports have declined.

B. Economic indicators

	Actual				Projections				
	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Real GDP (at factor cost)	3.8	3.7	4.0	4.2	4.5	4.7	5.0	5.2	5.5
Consumer prices (% change, period average)	11.0	7.4	8.6	4.5	3.7	5.0	5.0	5.0	5.0
Government overall balance (including grants)	-8.6	-8.4	-4.9	-5.3	-4.2	-3.2	-2.9	-2.8	-2.5
Current account balance (in % GDP)	-2.1	-1.1	-1.3	-1.0	-0.9	-0.8	-1.0	-1.0	-1.1
Nominal gross public debt (in % GDP)			64.8	64.9	63.2	63.6	62.2	60.0	57.8
Public gross financing needs (in % GDP)			35.1	28.7	32.4	28.8	28.0	27.6	26.5
Effective interest rate, 1/ (in % GDP)			7.7	7.9	8.0	7.4	8.0	7.8	7.8
Total gross external debt in percent of GDP	29.2	26.3	26.9	24.4	25.4	25.1	24.1	22.5	20.9
Total gross external debt in percent of exports	220.2	193.2	215.1	217.5	251.4	255.5	242.4	223.3	206.7
Gross external financing requirement (in US$ bn)	6.7	5.3	6.5	6.2	7.2	8.0	7.7	9.9	9.8
Gross international reserves in US$ bn	10.8	6.0	9.1	13.5	17.7	19.5	21.1	22.3	23.6
Rating(Company/Foreign/Local)	Moody's	B3		S&P	B-		Fitch	B	

1/ Defined as interest payments divided by debt stock (excluding guarantees) at the end of previous year.

C. Economic outlook and risks

Pakistan's macroeconomic outlook is favorable, **contingent on sustained implementation of key reforms**, amid downside risks from a more challenging external environment. External vulnerabilities include slower growth in key advanced and emerging market economies, hurting exports and remittances. Domestic risks are suspension of fiscal consolidation and key energy and other structural reforms could reverse recent stability gains and affect total factor productivity and potential growth. Pakistan's public debt is projected to decline from 64.9 percent of GDP in 2015 to 55.2 percent by 2021. The downward path is conditional on continued fiscal consolidation and structural reforms over the medium term. High gross financing needs and reliance on short-term borrowing keep public debt dynamics vulnerable to shocks, and this fragility will likely remain in the foreseeable future. Pakistan's debt dynamics are particularly vulnerable to economic growth, primary balance slippage and interest rate shocks because of the significant reliance on short-term debt, highlighting the need for sustained fiscal consolidation and an increase in the average debt maturity.

Annex 3: Coordination with World Bank

1. During Project preparation the Bank has consulted with the WB and conducted appraisal and loan negotiations jointly with WB staff. A Project Co-Lenders' Agreement for project implementation will be signed under the provisions of the AIIB/WB Co-Financing Framework Agreement prior to loan signing. The WB will be the lead financier and provide the following services in accordance with the provisions of the Framework agreement:

- Environmental and Social
- Procurement
- Investigative
- Financial Management
- Disbursement

2. During Project implementation AIIB staff may conduct joint supervision missions with WB staff. The WB will provide the Bank with copies of all relevant documents, reports, recommendations, no objections and communications (whether external or internal) received or sent by the WB in connection with any of the services provided above.

Annex 4: Summary of 'Indus Waters Treaty of 1960'

1. The Indus River begins in the Himalayan Mountains of China. It initially flows about 960 km northwest and then turns south, draining an area that includes the high mountains of India. It then flows through Pakistan before emptying into the Arabian Sea, southeast of Karachi (Pakistan).

2. The Indus river system consists of the main stem Indus and five major tributaries, all of which flow partially or entirely through India before reaching Pakistan, except for the Kabul River, which begins in Afghanistan and flows through its capital, Kabul, before converging with the Indus River in Pakistan. From an international law standpoint, the Indus river is an international watercourse.

3. In the aftermath of the partition, and after close to ten years of negotiation, India and Pakistan in 1960 signed the Indus Waters Treaty. The salient features of the Indus Treaty include: (i) three Eastern Rivers (Ravi, Sutlej and Beas) allocated to India; (ii) three Western Rivers (Indus, Jhelum and Chenab) allocated to Pakistan; (iii) Pakistan to meet its Eastern Rivers needs from the Western Rivers by constructing replacement works; (iv) safeguards incorporated in the Treaty to ensure unrestricted flow of waters in the Western Rivers, subject to some uses by India; (v) both parties to regularly exchange flow-data of rivers, canals and streams; and (vi) a Permanent Indus Commission constituted to oversee implementation of the Treaty.

4. Unlike treaties in most other basins that divide rivers by flow or quantity, the Indus Treaty divides the Indus River system into three Eastern Rivers, to which India has "unrestricted use," and three Western Rivers, to which Pakistan has "unrestricted use." However, these allocations were both subject to certain exceptions. Pakistan agreed not to interfere with the waters of the Eastern Rivers where they formed boundaries between the two countries, and India retained the right to build upstream, non-storage dams on the Western Rivers. It was agreed under the Treaty that Pakistan would build works during a "transition period" to replace the canals on which it had relied to draw water from the Eastern Rivers. During this transition period, India agreed to supply Pakistan with a minimum amount of water, until Pakistan had completed its infrastructure replacements works. To help defray the costs of building this infrastructure, India paid a sum of money to Pakistan. In addition, a number of donors, including the World Bank, provided Pakistan with close to one billion US Dollars, which enabled Pakistan to build, among others, the Tarbela Dam on the Indus River (1976), and the Mangla Dam on the Jhelum River (1967).

(Source: Indus Waters Treaty 1960)