PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE

Report No.: PIDA4348

Project Name	Dasu Hydropower Stage I Project (P121507)
Region	SOUTH ASIA
Country	Pakistan
Sector(s)	Hydropower (90%), General water, sanitation and flood protection sector (10%)
Theme(s)	Other economic management (67%), Water resource management (33%)
Lending Instrument	Specific Investment Loan
Project ID	P121507
Borrower(s)	Government of Pakistan
Implementing Agency	WAPDA - DASU PMU
Environmental Category	A-Full Assessment
Date PID Prepared/Updated	22-Apr-2014
Date PID Approved/Disclosed	22-Apr-2014
Estimated Date of Appraisal Completion	25-Apr-2014
Estimated Date of Board Approval	29-May-2014
Decision	

I. Project Context

Country Context

1. Pakistan has important strategic endowments and development potential. The country is located at the crossroads of South Asia, Central Asia, China and the Middle East, and is thus at the fulcrum of a regional market with a vast population, large and diverse resources, and untapped potential for trade. Pakistan faces significant economic, governance and security challenges to achieve durable development outcomes. The persistence of conflict in the border areas and security challenges throughout the country is a reality that affects all aspects of life in Pakistan and impedes development. The18th Constitutional Amendment passed by the National Assembly on April 8, 2010, enhanced provincial autonomy and reshaped federal–provincial relations while the 7th National Finance Commission (NFC) Award of 2010 shifted greater funding to the provinces. The elections of May 2013 heralded the first democratic to democratic transfer of power in the country's history and delivered a mandate to the government to address the "four Es": extremism, energy, economy and education.

2. Growth over the past five years has been weak. Recovery from the 2008–09 global financial crises has been the weakest in South Asia, with GDP growth averaging 2.9 percent

between fiscal years 2008/2009 (FY08/09) and FY 12/13, about half the FY03/04 to 06/07 rate. Fiscal deficits of 6 percent or more prevailed for four years in a row, and the deficit of 8.5 percent of GDP for FY11/12 was the second highest ever. These deficits stem largely from high and untargeted power subsidies and from poor tax collection. Financing the deficit has crowded out private sector credit, dampening growth further. External accounts and reserves have also been under pressure. The country aims to achieve 6–7 percent growth and cut inflation to 7 percent. Key measures under the IMF Extended Fund Facility (EFF), include rebuilding reserves and ensuring fiscal consolidation (2 percent of GDP). Working closely with international financial institutions including the IMF, Asian Development Bank, several bilateral donors and the Bank, the government has set out a program of structural reforms, particularly in energy, taxes and state owned enterprises to secure a positive response from private investors and lower Pakistan's future reliance on foreign aid.

3. Pakistan has made considerable progress in reducing absolute poverty and improving shared prosperity over the last two decades. Between 1991 and 2011, the proportion of people with an income of less than $1.25 a day was more than halved, led by rural areas. The percentage of the population below the national poverty rate has fallen from 34.7 percent in FY01/02 to an estimated 13.6 percent in FY10/11. Real per capita consumption growth of the bottom 40 percent of the population – a measure of shared prosperity – also exceeded that of the top 60 percent in the same period. Growth has been broadly inclusive, with the national Gini coefficient falling from 0.34 to 0.29 between FY98/99 and FY10/11. Social safety nets such as the Benazir Income Support Program (BISP) have redistributed wealth to the poor and vulnerable and have become especially important as growth has become more volatile.

Sectoral and institutional Context

4. As of June 2013, Pakistan's nominal installed capacity, including that operated by publicly-owned Generation Companies, (Gencos), WAPDA Hydel, K-Electric (formerly the Karachi Electricity Supply Company) and IPPs amounted to 23,663MW, little changed over the past several years. Of that installed capacity, an estimated 14,000-14,500MW is available for generation on a typical summer day and about 11,500-12,000MW in winter. This must be compared with peak demand for a summer weekday, which is close to 21,000MW and for a winter weekday about 14,000MW. The shortfall in generation results in load shedding of about 6-8 hours a day in the summer, and sometimes as much as 20 hours.

5. At 449 kilowatt-hours (kWh), annual per capita electricity consumption in Pakistan is lower than the average for lower middle income countries, at 734 kWh per person per year in 2011. Consumption has grown more slowly in Pakistan than among its peers; since 1990 it has grown by only about 67 percent. Neighboring countries in South Asia such as Bangladesh, India, Nepal and Sri Lanka witnessed a growth in electrical consumption by about 441, 187, 154 and 218 percent respectively while Malaysia grew by 271 percent and China by 546 percent over the same period. The proportion of people with access to grid electricity in 2011 was estimated to be 69 percent, which compared poorly with India and Nepal at 75 and 76 percent respectively but is somewhat better than Bangladesh at 60 percent. Malaysia and China are over 99 percent electrified. The electric power faces four challenges in the sector:

- Tariff revenues do not cover costs, resulting in high levels of subsidy being paid by government to the power distribution sector.
- Costs are high and difficult to control, because of a heavy dependence on imported oil for

generation.

- There has been inadequate investment in low-cost baseload generation capacity. From 2000-2008 there was almost no investment in generation and from 2009 to June 30, 2013 there was a net increase in capacity of just 3,000 MW against a backdrop of demand growth of about seven percent a year.
- To date, sector reform efforts have been largely unsuccessful, mainly the result of ineffective implementation and weak governance as well as a want of political will.

Strategies to Address the Challenge

6. Pakistan's goal is to develop an efficient and consumer oriented electric power system that meets the needs of its people and economy sustainably and affordably. The three guiding principles of the 2013 National Power Policy are efficiency, competition and sustainability, and it focuses on five main targets – (i) decrease supply demand gap, (ii) improve affordability by decreasing cost of generation, (iii) decrease aggregate technical and commercial transmission and distribution losses; (iv) improve collection of billed electricity, and (v) improve governance by decreasing decision making times at ministries, related departments and regulators.

7. The government has developed an Action Plan to implement the National Power Policy over the next 3 to 5 years. The action plan ties together the policies and actions required to implement the specific strategies of the 2013 National Power Policy. The strategies are closely interlinked. Achieving financial sustainability requires improving cash flows through tariffs reflective of efficient costs, promoting efficiency and performance of the companies through commercialization, and reducing losses, in particular theft. Reductions in the cost of generation will come from increasing hydropower and gas in the generation mix and better efficiency, promoted through least cost planning. Subsidies must increasingly be targeted only to low-income households. Creating awareness and consensus for the policy implementation requires increasing transparency through greater access to information, strengthening the capacity of NEPRA and improving its accountability.

8. The donor community is strongly supporting the structural reform of the power sector. The IMF has agreed a 36 month EFF in the amount of US$6.68 billion. The Fund supported program includes reforms to the power sector. The program was approved in August 2013 and the second review was satisfactorily concluded on March 24, 2014 and a disbursement of $555.6 million approved. The Bank's Power Sector Reform Development Policy Credit Series, the first of which is to be considered on May 1, 2014 supports the reforms and has been developed in collaboration with Asian Development Bank (ADB) and Japan International Cooperation Agency (JICA). It reinforces the IMF reforms particularly relating to subsidy and tariff reform, further development of the market and improving transparency and accountability.

9. Support is also needed on the investment side. The National Power Policy goals to reduce generation cost and close the gap between supply and demand will require additional generation capacity to be built. In 2011, National Transmission and Dispatch Company (NTDC) prepared a least cost power system expansion plan for FY11/12 to FY29/30 for generation and transmission. All candidate investments were considered, including hydropower, thermal generation, regional power trade, and energy efficiency programs. Expansion of hydropower generation is fundamental to addressing Pakistan's long-term power needs, particularly through the development of the Indus Cascade, which would use the same water to produce electricity several

timesAn estimated US$60-70 billion of investment will be required to meet the electricity deficit in the country.

10. The proposed DHP-I is an important element of the government's strategy to restore Pakistan's energy sector to a role that will support long term economic growth. It is a strategic investment that: (i) enables a structural shift to a low cost, low carbon fuel mix that improves energy security; (ii) reduces the cost of electricity generation ranging between 7 to 19 percent depending upon assumptions; (iii) reduces the sector deficit by injecting positive cash flow and saving foreign exchange for the Government of Pakistan by displacing imported fuel; and (iii) builds the broader institutional capacity of WAPDA to harness the hydropower potential of the country in a sustainable manner, in particular the development of the Indus Cascade; and (iv) provides a financing and investment model that can be followed for other hydropower projects in Pakistan.

II. Proposed Development Objectives

The overall project development objective is to facilitate the expansion of electricity supply of hydro-power in Pakistan. The Project would also improve access to socio-economic services for local communities in the project area and build WAPDA's capacity to prepare future hydropower projects. This would be achieved by installing a 2,160 MW hydropower plant on the main Indus River, which can be expanded to 4,320 MW in future with very low cost. The Project is a "high-risk-high reward" operation aimed at providing low cost non-carbon renewable energy.

III. Project Description

Component Name

Component A: Construction of the Main Hydraulic Structure on the Indus River

Comments (optional)

This component would primarily consist of the civil works required for main dam structure on the Indus River to raise the water level and thus create energy for running the power generating turbines and generators. The main dam structure would be constructed with Roller Compacted Concrete (RCC).

Component Name

Component B: Power Generation Facilities.

Comments (optional)

As indicated above the power generation facilities would be developed in two stages and four phases. The component would have two sub-components: (B1) works for waterways for the power generation facilities that is head race tunnels (HTs), power house and tailrace tunnels (TTs) and associated infrastructure such as gates and other control structures, etc. ; and (B2) Turbines, generations, and electro-mechanical equipment etc. As indicated above under the DHP-I only two waterways i.e. two HTs, two TTs and power house would be completed and equipment would be installed for a generation capacity of 2,160 MW i.e. six units of 360 MW each.

Component Name

Component C: Preparatory and Permanent Works.

Comments (optional)

These include access roads, Karakoram Highway (KKH) relocation, construction of 132 kV transmission line from Dubair to Dasu, offices, on-site housing, and possibly access tunnel to the power house.

Component Name

Component D: Transmission Line

Comments (optional)

The component would have three sub-components: (D1) construction of a double circuit 500kV Dasu Transmission Line (DTL) from Dasu to Islamabad (via Mansehra); (D2) preparation of detailed designs, social and environmental assessments and management plans as well as construction supervision and project management; and (D3) costs of social and environmental management plans. This component would be implemented by NTDC.

Component Name

Component E: Social and Environmental Management Plans, and Glacial, Sediment River Monitoring.

Comments (optional)

This component will support implementation of (E1) Social and Resettlement Management Plan – SRMP , (E2) Environmental Management Plan – EMP and (E3) improved monitoring of flows and watershed improvements. It would also support sediment, river and project infrastructure monitoring program.

Component Name

Component F: Construction Supervision, Monitoring and Evaluation of the Project Impacts and Social and Environmental Management Plans.

Comments (optional)

This will provide technical assistance to carry out the construction supervision and implementation support, monitoring and evaluation of the project progress, quality, impact as well as independent supervision of the social and environmental management plans.

Component Name

Component G: Project Management Support, Capacity Building of WAPDA, Technical Assistance and Training.

Comments (optional)

This will support WAPDA's efforts in project management, and strengthen its capacity to plan, develop and manage the hydropower infrastructure in the long run.

IV. Financing *(in USD Million)*

Total Project Cost:	4247.70	Total Bank Financing:	576.60
Financing Gap:	0.00		

For Loans/Credits/Others	**Amount**
BORROWER/RECIPIENT	545.20
International Development Association (IDA)	98.80
IDA Guarantee	460.00
Borrowing Agency	680.00
IDA recommitted as a Credit	477.80
Export Credit (unidentified)	546.00
Foreign Private Commercial Sources (unidentified)	1439.90
Total	4247.70

V. Implementation

11. The proposed Dasu Hydropower Project (DHP) is a run-of-river project located on the Indus River about 240 km upstream from the Tarbela dam. It is about 8 km from Dasu town (capital of Kohistan District of Khyber Pakhtunkhwa Province) and 350 km from Islamabad. The total size of the project is 4,320 MW. Due to the long gestation of the project and capital constraints for the GoP and WAPDA, it proposed to develop the project in two stages with each stage further divided into two phases of 1,080 MW each. Under the DHP Stage I (DHP-I), the two phases of 1,080 MW each would be developed simultaneously, bringing the first generating unit online as soon as possible. The first phase of Stage I, at a cost of US$3,650 million, will contain the majority of the infrastructure, site preparation and social and environmental safeguards for the whole project. The high upfront cost for Phase 1 is offset by high generation, which despite the front-loading of main infrastructure and other social and environmental management costs, gives good economic returns of more than 21% (excluding environmental benefits). The generation from Phase I is over 8,000 GWh, as sufficient water flows are available in the river throughout the year to run a 1,080 MW hydropower plant. This allows for a very high plant factor of over 85 percent, which is extraordinary for a hydro project. The cost of Phase II is quite low (about US$600 million) and will increase the installed capacity to 2,160 MW and annual generation to about 12,225 GWhs with a plant factor of over 65%, which is still very high. The cost per unit would be even lower, increasing the ERR to 25%.

12. Phased Financing for Phased Construction. The proposed technical implementation of DHP-I through phased construction also lends itself to phased implementation of its financing. Financing large hydropower plants (HPPs) is complex. High capital expenditure costs and long construction times are key challenges. As a consequence, many large HPPs in the world are financed in a sequenced manner. Similarly DHP-I is also proposed to be financed in a sequenced manner, in line with the sequenced construction schedule, with a mix of concessional and commercial funding sources. The tentative financing plan consist of first IDA credit of US$576.6 million, commercial financing for works of about US$1,900 million and export credits for equipment and machinery US$546 million backed by IDA guarantees, WAPDA's and NTDC contribution of US$600 million and US$80 million respectively. Depending upon the availability of commercial financing and export credits addition IDA funding and guarantees may have to be provided in future.

13. The Water and Power Development Authority (WAPDA) was created in 1958 through an Act as an independent authority to provide for unified and coordinated development of the water and power resources of Pakistan. The Authority consists of a Chairman and three Members, one each for Water, Power and Finance, who also act as Managing Directors of their respective sections. WAPDA would be responsible for the execution and implementation of the Project through the Project Management Unit (PMU) established under the office of the General Manager (GM) DHP. The GM of DHP would also be Project Director for the Project and report to the Member (Water) and the Authority. The current PMU established under GM Hydropower Projects would be moved to GM DHP and strengthened by providing additional staff. It would also be supported by consultants, advisors and appropriate Non-Governmental Organizations (NGOs) for implementation of the Project.

14. The PMU would be supported by two sets of consultants – Construction Supervision Consultants (CSCs) and Project Management Support and Monitoring and Evaluation Consultants (PM&ECs). The CSCs would help in construction supervision, contract management, and other

management aspects of the Project. For civil works contracts, the Project Director (PD) would serve as the Employer's Representative, and the CSCs' supervising consultant would serve as the Engineerfor construction supervision. At the site, Resident Engineers, appointed by the CSCs, together with a team of specialists and inspectors, would supervise the contractor. The PM&ECs would assist in Project Management and in carrying out WAPDA the role of the employer in the works contracts, and monitoring and evaluation. The PM&ECs would also supervise the implementation of the SRMP and EMP, and carry out independent monitoring and evaluation for Project activities and implementation.

15. The PMU would be responsible for direct implementation of all components of the Project through its engineering unit, with support from the CSC and M&ECs, except for Components D and E3. Component E3 would be implemented by the Dam Monitoring Organization of WAPDA and by Glacier Monitoring and Research Centre (GMRC) established under the General Manager Planning of WAPDA.

16. The Project would be managed under the Water wing of WAPDA, under the overall management of Member (Water). Financial management of the Project would be the responsibility of the GM Finance (Power), under the overall supervision of Member (Finance) of WAPDA.

17. The National Transmission and Dispatch Company Limited (NTDC) was established in 1998 to take over from WAPDA its transmission and dispatch functions and all the related assets and liabilities and to be exclusively responsible for these functions in the whole country except the K-Electric (Formerly K arachi Electric Supply Corporation - KESC) area. NTDC would be responsible for the implementation of transmission line from Dasu to Islamabad (DTL) that is component D of the Project. The NTDC would establish a Project Management Unit (PMU), for implementationof DTL and would be supported by the design and construction supervision consultants. It would manage construction of the transmission line as well as social and environmental aspects related to this construction. NTDC has an operational Environment Social Impact Cell (ESIC). ESIC has been responsible for the planning and would continue to support implementation of environmental and social issues. Under this credit NTDC would be responsible for only design of the transmission line and preparation of social and environmental management plans and their initial implementation.

18. Project Steering Committee. The Project Steering Committee (PSC) would provide planning and strategic guidance for project implementation as well as facilitate inter-agency coordination at the highest level. The PSC would be chaired by the Secretary, Ministry of Water and Power, with Secretaries of Planning, Finance, Economic Affairs Division (EAD), Chairman WAPDA, MD NTDC, MD National Highway Authority (NHA), Chief Secretary KPK, Additional Chief Secretary Development KPK, Commissioner of Hazara Division, Deputy Commissioner of Kohistan and associated districts as its members. The PD of the DHP-I would be the Member-Secretary of the PSC.

19. Independent Panel of Experts (IPOEs). The international social and environment as well as technical panels of experts would continue to oversee the project during construction phase and advise WAPDA and GoP on the project issues that may arise during construction and/or project implementation period. The technical panel would be supplemented by a procurement and contract management specialist who would advise on procurement and contract management issues.

VI. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	x	
Natural Habitats OP/BP 4.04	x	
Forests OP/BP 4.36	x	
Pest Management OP 4.09		x
Physical Cultural Resources OP/BP 4.11	x	
Indigenous Peoples OP/BP 4.10		x
Involuntary Resettlement OP/BP 4.12	x	
Safety of Dams OP/BP 4.37	x	
Projects on International Waterways OP/BP 7.50	x	
Projects in Disputed Areas OP/BP 7.60		x

Comments (optional)

VII. Contact point

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