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INTEGRATED SAFEGUARDS DATA SHEET
APPRAISAL STAGE

Report No.: ISDSA8507

Date ISDS Prepared/Updated: 22-Apr-2014

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I. BASIC INFORMATION

1. Basic Project Data

Country:	Pakistan	**Project ID:**	P121507
Project Name:	Dasu Hydropower Stage I Project (P121507)		
Task Team Leader:	Masood Ahmad		
Estimated Appraisal Date:	21-Apr-2014	**Estimated Board Date:**	29-May-2014
Managing Unit:	SASDE	**Lending Instrument:**	Specific Investment Loan
Sector(s):	Hydropower (90%), General water, sanitation and flood protection sector (10%)		
Theme(s):	Other economic management (67%), Water resource management (33%)		
Is this project processed under OP 8.50 (Emergency Recovery) or OP 8.00 (Rapid Response to Crises and Emergencies)?	No		
Financing (In USD Million)			
Total Project Cost:	4247.70	Total Bank Financing:	576.60
Financing Gap:	0.00		

Financing Source	**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

Environmental Category:	A - Full Assessment
Is this a Repeater project?	No

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2. Project Development Objective(s)

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.

3. Project Description

The proposed Dasu Hydropower Project (DHP) is a run-of-river project with total generation capacity at 4,320 MW. Due to capital constraints faced by GoP and WAPDA, it is 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 to provide 2,136 MW capacity. The total Project cost is about US$4,250 million for Stage-I which consists of two phases with a total installed capacity of 2,160 MW (1,080 MW in each phase).

The Project consists of the following five components:

Component A: Construction of the Main Hydraulic Structure on the Indus River (US$1,479.7 million): 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 spillway structure would be built in the main hydraulic structure to pass the floods. Nine, Low Level Outlets (LLO) will be built in the main structure and two flushing tunnels on the right bank to flush the sediment coming from upstream and that me be deposited in the reservoir. The main dam structure would be constructed with Roller Compacted Concrete (RCC). This project would have an operational storage capacity of 0.82 BCM.

Component B: Power Generation Facilities (US$1,397.8 Million): As indicated above the power generation facilities would be developed in two stages and four phases. Four Headrace Tunnels (HTs) would divert water from the reservoir for power generation to the Power House (PH) constructed underground. Water passing through the turbines would be discharged from the power house to the river through four Tailrace Tunnels (TTs). Each Headrace Tunnel would supply water to three generation units of 360 MW each. A total of 12 units with a total installed capacity of 4,320 MW at full development. Similarly each TT would discharge water from three generating units. The underground sub-stations would be constructed to serve the power house. The component would have two sub-components: (B1) works for waterways for the power generation facilities that is head race tunnels, power house and tailrace tunnels 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 C: Preparatory and Permanent Works (US$344.8 Million): These include access roads, relocation of a section of Karakoram Highway (KKH), construction of 132 kV transmission line from Dubair to Dasu, offices, on-site housing, and possibly access tunnel to the power house.

Component D: Transmission Line (US$350 Million): For transmission of power, a double circuit

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500KV line would have to be installed from Dasu to Islamabad (via Mansehra) that can serve two phases i.e. an installed capacity of 2,160 MW. The component would have three sub-components: (D1) construction of Dasu Transmission Line (DTL); (D2) construction supervision and project management; and (D3) social and environmental management. Transmission line (D1) and related activities under D2 and D3 components would be constructed by the National Transmission and Dispatch Company (NTDC) that is including the implementation of Social and Environmental Management plans and supervision and monitoring of construction works.

Component E: Implementation of Social and Environmental Management Plans, and Glacial, Sediment River Monitoring (US$503.9 Million):

Sub-Component E1: Social and Resettlement Management Plan (US$438.9 Million): The Social and Resettlement Management Plan (SRMP) will include designed programs to address social dimensions of the Project, including compensation for assets, , resettlement, livelihood development, public health and gender measures and local area development interventions for all affected by the project infrastructure for the full DHP, including the main hydraulic structure construction, reservoir area as well as the waterways. The cost of social environmental interventions related to the Transmission Line is included in component D of the project to be implemented by the NTDC.

Component E2: Environmental Management Plan (US$ 54.5 Million). All construction related environmental issues would be addressed in the construction contracts, thus cost of such measures is included in the construction components. This component would include those issues which are not or cannot be covered under the construction contracts, including plans addressing indirect and cumulative impacts, development and implementation of programs for ecological conservation, fisheries and forestry management, and costs associated with monitoring and supervision of EMP implementation.

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Component E3: Flood warning system, watershed, sediment and river monitoring (US$10.5 million): Most of the water resources of the Indus River are derived from glacial melt, and the DHP is designed to withstand probable maximum floods that may be caused by glacial lake outbursts. Nevertheless, continued monitoring of glaciers is crucial for the water security of the country, and useful for developing the knowledge base for the operation of the dam and for planning future hydropower investments in the Indus Basin. This sub-component would support the Glacier Monitoring and Research Center (GMRC) under the WAPDA General Manager Planning for monitoring and research on the Upper Indus Basin (UIB) glaciers. The component would support, improved monitoring of flows and watershed improvements. It would also support sediment, river and project infrastructure monitoring program that would help in optimal operation of the project and development of further projects of the Indus Cascade.

Component F: Construction Supervision, Monitoring and Evaluation of the Project Impacts and Social and Environmental Management Plans (US$99.1 million):

Sub-component F1: Construction Supervision and Implementation Support (US$91.1 million, of which IDA $40 million): This sub-component would cover the cost of consulting and other services for Project implementation, including construction supervision and Project management support, namely the construction supervision consultants (CSCs). It would also cover implementation of all activities under the Project, including: procurement, contract administration, quality control, certification of payments, financial management, preparation of any additional designs, and bidding

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documents, etc.

Sub-Component F2: Monitoring and Evaluation of the Project Impacts and of Social and Environmental Management Plans (US$8.0 million, of which IDA $8.0 million): The monitoring and evaluation (M&E) activities would provide continuous feedback to the Government of Pakistan (GoP), Ministry of Water and Power (MoWP) and WAPDA on the Project's performance and impact of its various components, so that corrective actions could be undertaken in a timely manner. The component would support independent monitoring of implementation of the environment and social management plans and Project Management Support to WAPDA as owner of the project.

Component G: Project Management Support, Capacity Building of WAPDA, Technical Assistance and Training and Future Project Preparation and Strategic Studies (US$72.4 million):

Sub-Component G1: Project Management Support and Audits (US$42.40 million, of which IDA $30.0 million): This sub-component would support WAPDA in implementing Project related activities, including support for operation of the PMU, capacity building, incremental staff salaries, operations cost and audits, etc.

Sub-Component G2: Strengthening of WAPDA, Independent Panel of Experts and Technical Assistance (US$10.0 million, of which IDA $10.0 million): This sub-component would build the capacity of WAPDA to effectively implement the Project, O&M of the dams it manages, and fully carry out its mandated functions. It would also strengthen WAPDA's capacity in developing financing plans and mobilize funding for this project, for other large water and hydropower infrastructure and other elements of the Indus Cascade.

Sub-Component G3: Future Project Preparation and Strategic Studies (US$20.0 million, of which IDA $20.0 million): This co mponent would support strategic studies to address technical, financial or management issues, mitigation measures, pilot projects and preparation of future projects that may be identified during Project implementation and agreed upon with the Bank.

Financing Strategy: The best approach for this project is to arrange the financing in a sequenced manner, in line with the sequenced construction schedule, with a mix of concessional and commercial funding sources. Based on the financing strategy, a first IDA credit of US$576.6 million (SDRs 371.9 million equivalent) is proposed for project startup and an IDA partial Credit Guarantee (PCG) of US$460 million from IDA16. This would be followed by an additional financing credit of US$545.2 million and an IDA PCG additional financing of US$460 million during IDA17.

4. Project location and salient physical characteristics relevant to the safeguard analysis (if known)

Proposed Dasu Hydropower Project (DHP) is a run-of-river project located on the Indus River about 240 km upstream from Tarbela dam. It is another 8 km from Dasu town (capital of Kohistan District of Khyber Pakhtunkhwa Province) and 350 km from Islamabad. At this site the river Indus flows in a deep and narrow valley (elevation 750 - 800 m asl) which is strongly incised into the lower Himalayan mountains with an average altitude of 2,000 to 4,000 m. The Indus River presents some important biota with longitudinal connectivity along its main stem. The project area is accessible through the Karakorum Highway (KKH), which is the only road connection between Islamabad and the northern parts of Pakistan and China (Kashgar).

Northern parts of Pakistan (including Kohistan) are covered with 29 percent forests. However, the

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project area, which is mainly situated below el. 1500 m consists of steep slopes full of rubble and rocks with hardly any vegetation other than low scrubs and stunted trees. This area does not include any forests. The forests from higher altitudes above el. 2000 m produce substantial amounts of timber and non-timber forestry products. A large proportion of the harvested forestry products is transported southward; local people are heavily dependent on the forests and forestry products for their income. Officially, all forests in the project area are classified as “Private Forests”, owned by the local community, but managed by the KP Forest Department. There are no protected areas or forests or nature reserves in the project area other than Kaigah Nullah Game Reserve. Inside the valley of the Kaigah tributary (nullah) there is a 5,000 ha Community Conservation Area for Markhor sheep (Capra falconeri falconeri), which was established through an act of the NWFP (now KP) Government in 2000. The area also provides protection to other mammal and bird species. This area, supported by WWF, was holding the largest population of Markhor in Indus Kohistan during the 2005 census (150 individuals). In terms of transmission line for power evacuation from the project area, the TL corridor passes through Palas valley, which is an environmentally sensitive area supporting some unique biodiversity and is also an important bird area. The TL corridor also crosses through international migratory birds rout No.7. The project will have minimal impact on these critical habitats. The project has prepared an Environmental Assessment and Review Framework (EARF), which provides guidelines to be used during EIA for the 'Analysis of Alternatives' and options to mitigate potential negative impacts likely to arise due to the routing of access roads for the construction of TL. These issues will be looked into detail during the EIA in the light of guidelines provided in the EARF. The project plans to undertake detailed EIA in FY 15 in commensurate with the detailed designing study of the TL.

There are important cultural or archaeological resources in the vicinity of the Project. They are the following: (i) rock carvings near Shatial, these will not be submerged and are rather unique for the Buddhist period. DHP has prepared plans to protect them, (ii) a total of 33 mosques will be flooded by the reservoir, together with the houses and other structures in the affected villages. Five of these mosques have wooden structure; the remaining ones have either brick-mortar (pucca) or stone-mud (kutcha) structure. , (iii) sixteen; older and more recent graveyards and (iv) moveable artifacts/chance finds. Since the narrow Indus valley has been the only connection between the Indian subcontinent and China since pre-historic times the possibility of unexpected “chance finds” in the project area is high.

Kohistan District is sparsely populated with only 63 persons per sq. km. People in the project area are divided along ethnic, religious and tribal lines. The maliks, ulemas (religious leaders) and tribal elders are members of the local jirga, which is the main forum for collective decision-making for all matters in Kohistan. Kohistan has a highly patriarchal society and polygamy is the norm in Kohistani society. The main sources of livelihoods in Kohistan are livestock, agriculture and collection of forest products. Seasonal migration is very common up and down the mountain slopes between the river valley and high elevation areas. This is mainly for climate and economic reasons. In winter people live near the river in their more permanent ‘winter residences below 1,500 meters. Two agricultural crops are possible at this height but there is little suitable land available for farming. So farmers cultivate the higher level land (2,000- 2,500m) with only one crop annually. Here they build their “summer residence”. The pastoralists herd their livestock in summer at higher altitudes (2,500- 3,000m), coming down with their livestock in winter time. There is no land records system but tribal demarcation of territory is very distinct and people know each other’s territories very well.

5. Environmental and Social Safeguards Specialists

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6. Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/ BP 4.01	Yes	
Natural Habitats OP/BP 4.04	Yes	
Forests OP/BP 4.36	Yes	
Pest Management OP 4.09	No	
Physical Cultural Resources OP/ BP 4.11	Yes	
Indigenous Peoples OP/BP 4.10	No	
Involuntary Resettlement OP/BP 4.12	Yes	
Safety of Dams OP/BP 4.37	Yes	
Projects on International Waterways OP/BP 7.50	Yes	
Projects in Disputed Areas OP/BP 7.60	No	

II. Key Safeguard Policy Issues and Their Management

A. Summary of Key Safeguard Issues

1. Describe any safeguard issues and impacts associated with the proposed project. Identify and describe any potential large scale, significant and/or irreversible impacts:

The Project in the present thermal dominated energy mix is a non-carbon renewable energy generation facility with net positive environmental impacts. Further, there will be a net reduction of about 223 million tCO2e in GHG emissions over the project life as GHG emissions are negligible compared to thermal alternatives. The project has prepared an environmental and social assessment (ESA) studies. These studies for the project assessed the impacts on biological, physical and socio-economic aspects. In terms of impacts on biodiversity, it is concluded that the area has a relatively lower footprint and most of the ecologically sensitive flora and fauna is rather located at higher altitudes (located at 2,000 meters or above). In terms of fisheries, major impact will be a change in the habitat from present high velocity river flow to the lake type. During the construction stage, limited work space within the project area, heavy traffic volumes, air and water quality issues, workers health and safety, need for large construction material from outside the project area, noise and vibration are analyzed as some key issues. Major issues that have been identified for operation stage include impacts on downstream water uses due to first-time filling of the reservoir and its timing, negligible flows in the river reach between the dam and the tail-race connecting with the river, change in river ecology in the reservoir area and its impact on fisheries,

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and possible impact on downstream ecosystem during peaking and sediment releases, which are expected to take place several years after the commissioning of the power plant. In addition, there are likely to be some induced impacts on the forest resources at the higher altitudes caused by the resettlement of the population necessitated by land acquisition for the project and that of in-migration of large number of work force to the area. These major issues are discussed in detail below.

For the power evacuation from DHP, two parallel-running 500 kV transmission lines of 250 kms length will be constructed in the five districts of KP province. The Environmental Assessment And Review Framework (EARF) report reveals two major issues which are partly siting of high-voltage transmission line in the Internationally Migratory Bird Route No. 7 (Indus flyway) and its passing through Palas valley, which is an environmentally sensitive area.

Some major impacts, as identified in the ESA report are described below:

Loss of river connectivity, and changes to downstream flows: During project operation, the presence of the dam and the diversion tunnels will break the natural connectivity of the Indus River in the 4.4km stretch between the dam and the confluence of the tailrace with the river, creating a barrier to fish movement and impacting the aquatic fauna and overall ecology of the river in this reach. The impact in the dewatered stretch will be partially mitigated by expected backflow of water from the tailrace up to about 1.2 km downstream of the dam during regular run-of-river base load operations, due to a favorable profile of the riverbed. In addition, a small tributary Sieglo stream joins the Indus at about 1.2 km below the dam, contributing an average of 1.7 m3/s of flow, and up to 0.5 m3/s during low flow season. Therefore, the loss of flow during base-load operations will be most significant in the first 1.2 km of river below the dam.

Following construction of the Diamer Basha hydropower project and completion of stage two of Dasu construction, peaking power generation (if pursued) would furthermore generate additional downstream impacts due to the intentional holding followed by controlled release of river flows. During the 18-20 hour periods between peaking generation cycles, both backflow into the dewatered stretch between dam and tailrace as well as discharges downstream of the tailrace would be greatly reduced, and potentially zero during dry season. Regular run-of-river (non-peaking) operation is meanwhile not expected to alter the flow regime downstream of the tailrace, with the exception of the first-filling of the reservoir, although this will be carried out during the high flow season and at a rate of about 2m a day, which will result in only minimal impact on downstream flows (e.g., retention of about 215 m3/s of flow, with the remaining 4,000+ m3/s continuously released).

Ecological flow: To mitigate these impacts, the project is committed to maintain a minimum ecological flow of 20 m3/s in the “dewatered” reach – which represents about 4% of the average winter flow and 7% of the lowest recorded flow – as well as to run at least one turbine at all times (which will generate continuous discharge from the tailrace of at least 222 m3/s) including during future peaking operations, if pursued. The only water uses in this stretch are to maintain aquatic life, predominantly snow carp. All other uses including for domestic and agricultural purposes are not from this section of the Indus river, but rather are met by water from the Seiglo nullah. The International Panel of Experts for the project reviewed and approved this ecological flow determination for the proposed project.

Impacts to fish and fisheries: The presence of the dam will also permanently alter the upstream aquatic ecology and habitat by transforming the fast-moving sediment-laden river into a narrow

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controlled reservoir, which will cause changes, both biotic (altered habitat) and abiotic (less turbidity, changes to temperature profile), to about 570 ha of river and tributaries. Flow velocities in the reservoir will be high in comparison to most lakes and storage reservoirs, but nonetheless lower than in pre-reservoir conditions. Some existing fish species may gradually disappear fro m the main stream. However, the reservoir area may also provide suitable habitat for non-migrating species (e.g. carp species) as has been shown in the Tarbela reservoir. Meanwhile, it is expected that fish spawning areas in the current confluence zones between the Indus main stem and tributaries will be able to be re-established at the new confluence with the reservoir, mitigating the loss of these important areas of existing aquatic habitat to inundation. Setting up of a compensatory fishing hatchery and commissioning of study on fish migration to help establish the baseline data are some of the major proposed mitigation measures.

Impacts to sediment transport: The Dasu dam will trap an estimated 27% of annual sediment flow into the reservoir. Beginning in its 15th year, dam maintenance will therefore require annual flushing of sediments, which will include drawing down and then refilling the reservoir and discharging accumulated sediments. Both sediment entrapment and subsequent flushing will affect the size, flow patterns and aquatic ecology of the reservoir itself, as well as downstream water quality. Once Basha is constructed, the annual sediment load entering Dasu will drop from 200 million to 46 million tons (mostly fine fraction). The combined effect of the two projects will be significantly reduced sediment flow downstream to Tarbela. This cumulative effect on the composition and quantity of the sediments (relatively more fine fraction) reaching downstream areas will be positive in terms of lengthening the life of the Tarbela reservoir by up to 30 years; however, there may also be an incremental negative impact to aquatic ecology between Dasu and Tarbela as a result of changes to water quality from the combined reduction in sediment loads. In addition, sediment flushing from the two reservoirs – once Basha fills to the point where flushing becomes required – will need to be coordinated, which could also result in a net larger increase in sediments downstream of Dasu during the combined flushing as compared to during flushing of just Dasu, in the absence of Basha. Monitoring of downstream water quality and habitat, besides recommending sediment flushing only during the peak flow season are some of the key mitigation measures suggested in the ESA report. Continuous operation of one turbine has also been proposed to avoid any significant adverse impact on the fish and fisheries downstream.

Impacts to terrestrial habitat and wildlife: The project will submerge about 1800 ha of terrestrial habitat, including a small amount of the privately held and managed Kaigah Community Conservation Area (KCCA), which is considered critical habitat as per World Bank Policy on Natural Habitats OP 4.04. The KCCA, which is supported by WWF, was established through an act of the NWFP (now KP) Government in 2000 primarily to protect the endangered Markhor sheep (Capra falconeri falconeri) as well as other mammal and bird species, and was holding the largest population of Markhor in Indus Kohistan during the 2005 census (150 individuals). The total area to be directly intervened within the KCCA (including submerged area as well as land required for the KKH realignment) is 82 ha, out of the KCCA's 5,000 ha, or about 1.6% of the protected area. The KCCA will also experience impacts during the construction phase related to quarrying activities, as the main project quarry will be located on or adjacent to the KCCA land in the future submergence zone. The project has proposed undertaking at least two community-led conservation activities in the project area near Kaigha game reserve, and providing compensation to community for any loss from the sales of hunting permits during the construction stage.

Impacts to highland forests: The influx of project related personnel as well as the resettlement of displaced communities to higher elevation sites will generate indirect impacts by placing

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additional pressure on the natural resource base of the region, including most importantly its already dwindling forests located at higher altitudes. These forests are of significant importance particularly given that Pakistan's remaining forests cover a mere 2.0 percent of its territory. Based on household surveys conducted, local people are also heavily dependent on the forests for timber and other forest products for their income. This effect will be even more significant when considering the cumulative impact of DHP and Diamer-Basha, which together will lead to influx of many thousands of people to the region over a period of 25 to 30 years and combined resettlement much greater than for Dasu alone. As a result of both projects, there will be more collection and commercial trade in firewood and herbs, illegal deforestation, logging, reclamation of land for agriculture and other activities. Illegal practices such as poaching, trapping and hunting will increase. The EIA reports proposes planting of natives trees near resettlement villages and along roads, promote using of alternatives fuels for wood-burning, preparing and implementing plans for rejuvenation of forests at higher altitudes, improvement in community forest management developing and implementing code of practice for workers and employees ad raising awareness through training to protect flora and fauna in the area are some of the major mitigation and enhancement measures suggested in the ESA report.

Impacts to physical cultural resources: DHP will cause submergence of 33 mosques and 16 graveyards (old and new). These impacts were thoroughly discussed in consultations with local communities, and mitigation measures developed based on community feedback include complete salvage and relocation of the mosque to a higher elevation at one of the resettlement sites, along with in-situ protection of graves to prevent dislodging. A large field of pre-historic and historic rock carvings (50,000 rock drawings and 5000 inscriptions) is found on both sides of the Indus at the upper reaches of the future reservoir, over a distance of more than 100 km. The rock art dates from Stone Age (8-9th millennium BC) to Buddhist and Islamic periods and is internationally known as the "guest book of the Silk Route". The proposed Dasu project will not directly or indirectly impact any of the known rock carvings. About 20,000 of these engravings will be lost due to submergence from the Diamer Basha reservoir if ever constructed in future. Therefore, the importance of strengthening protection of the remaining engravings which are outside both Dasu and Basha submergence zones is heightened, given their archaeological significance. Although there will be minimal impact on the physical and cultural resources due to the project, community led mitigation measures have been agreed like re-construction of submerged mosques, and coverage of graveyards with heavy slabs. One of the 33 mosques, which is historic, its material will be salvaged and used in the reconstruction of this mosque.

Other Relevant Issues

Risk of earthquakes. The Dasu project site is located in a zone with high seismic activity, classified as 'Serious Seismic Danger Zone'. The dam design is in accordance with the international standards (International Commission on Large Dams - ICOLD) for dam construction in an earthquake zone of class VIII. According to these standards the dam is considered to be safe under strong earthquake action. In the seismic hazard assessment also the risk of reservoir-triggered earthquakes was considered. A committee of international experts recruited by WAPDA finally reviewed and approved the dam design. This was done in accordance with World Bank Policy OP 4.37 Safety of Dams.
Risk of landslides. Landslides are common and natural phenomena in the mountain slopes along the KKH. Landslide-prone areas near the project site and reservoir have been identified and mapped. Any blasting activities required in these areas have to be controlled and contained within a limited area.

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Risk of flooding. Although the risk of flooding in the Indus Basin might increase in the coming years due to rising air temperature, shift in rainfall pattern and increased melting of glaciers in the upstream regions, the risk of flooding and related damage in the area is low. Large floods as occurred with the unprecedented catastrophic flood events in July 2010 are not very likely to occur, since the Upper Indus Basin is outside the influence of the monsoon rains. More often rivers are blocked by an ice dam from glaciers. A lake is formed behind the glacier and through overtopping or collapse of the natural dam a sudden outburst flood can occur, sometimes with devastating results. About 60 North Pakistan glacial outburst floods have been reported since 1830.

Climate change. During the last decade substantial research is carried out to study the effects of long-term climate change on precipitation, air temperatures and droughts. Some of the main conclusions of these studies are:

- between 1980 and 2005 the frequency of heat waves (T >40º C) has been increased in north-western Pakistan. It is expected that there will be more frequent periods with extreme drought;
- based on predictions in scenarios of the International Panel on Climate Change (IPCC) estimates have been made by the Pakistan Meteorological Service of the increase in maximum daily temperatures, which ranges from 2.8º C to 4.2º C in the year 2080 for northern Pakistan;

From the studies it has been concluded that glaciers in the Himalaya and Karakorum are receding faster than happens in any other part of the world. From digital terrain models and satellite observations it might be concluded that the reduction of the thickness of ice in the Western Himalayan glaciers ranges between 0.50 to 0.90 m per year, although in some areas in the Karakorum an extension and increase of glaciers has been reported. After a period with increased flows due to accelerated glacial melt it is expected that summer and late spring discharges of the Indus will be consistently be reduced around 2050.

Social impacts. Major adverse impacts under the project are related to land acquisition and involuntary resettlement for various components of the project, such as the construction of the dam, its ancillary structures, formation of reservoir and relocation of Karakoram Highway. A total of 4,643 ha of land will need to be acquired for the reservoir, relocation of KKH and other associated ancillary works. Most of the lands are barren land and only about 600 ha of them are agricultural lands, consisting of terraced farm land, grazing areas and orchards. A total of 945 houses and residential structures, 197 shops, 31 mosques, seven schools, two basic health units, three community centers and 17 graveyards will need to be relocated. These would result in the displacement of 6,953 persons from 767 households, requiring development of new sites for their resettlement. These would also have impact on the household income of those losing agricultural lands and those whose commercial business would be disrupted along the KKH and would need to be relocated along the new sections of KKH.

There will be an influx of “outsiders” into Kohistan District during the construction of the project, including construction workers, project management staff and people seeking business and job opportunities. The size of population influx will vary, reaching the maximum at the peak of construction phase. This influx of population will put increased pressure on local capacity to provide services as well as local resources use. This may create competition and lead to conflicts with local population. The population increase and increased interactions with local population

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are likely to increase exposure of local population to public health risks. Besides, considering the social norms under the tribal culture, inappropriate conduct on the part of the "outsiders" could potentially lead to tension and conflict with the construction forces as well. Contractor operations, confined to this narrow valley, will also bring in the issue of safety for local population. An impact assessment was carried out on downstream impacts, particularly fishery. The assessment survey identified the communities that include households who conduct fishing in the river. The assessment reveals that there are no professional full-time fishermen along this stretch of the river, fishing is mostly for self-consumption, and fishing activities mostly take place along the tributaries rather than the main stem of the river. The assessment concludes that the project is unlikely to have major impacts on fishing income downstream of the dam.

Safety of Dam: Since the project involves the construction of a large dam including associated infrastructure, WAPDA appointed an international Panel of Experts, including five renowned experts, which has reviewed and signed off on the engineering designs of the dam and its safety aspects, including stability and stress/deformation behavior analysis, seismic engineering analysis, RCC design and construction technology, dam safety against norm al and catastrophic extreme loading conditions and thermal stress, geology/geotechnical (including safety of temporary and permanent excavations and rock slope stability / stabilization measures), hydrology, sediment management, hydraulic structures (including spillway, outlet works, and intake) and hydropower generation system, and safety of cofferdam foundations and sealing method. Dam safety monitoring equipment will be installed, and regular monitoring of appropriate safety parameters will be carried out throughout the life of the project. WAPDA's Dam Safety Organization will furthermore annually conduct safety surveillance and inspection, including the monitoring of dam safety instruments and the movement of sediment. Twelve engineers from WAPDA have recently completed training on Dam Safety from USBR under a separate Bank funded Pakistan Water Sector Capacity Development project (WCAP). The construction supervision and quality control plan has been prepared, and the consultant is on board. The instrumentation plan has been prepared as part of detailed design and technical specification of the bidding document. The preliminary O&M and Emergency Preparedness Plans have been prepared. The detailed O&M and Emergency Preparedness Plans will be prepared six months and twelve months prior to the first impoundment of the dam reservoir. Further, an early warning system will be installed, and an emergency response plan will be implemented in case of any dam related emergency. The Panel of Experts will continue to remain involved throughout the project implementation period, first impoundment and during the warranty period of the major works. During operation of the project an internationally recognized safety inspection regime would be followed as it has been in case of Tarbela Project. This would consist of annual inspection of the project infrastructure and every three year inspection by an external and international panel of experts.

2. Describe any potential indirect and/or long term impacts due to anticipated future activities in the project area:

A cumulative impact assessment has also been prepared as part of the ESA, to evaluate the impacts of the Dasu project when taken together with impacts from other planned water resources and hydropower projects within the Indus Basin (including main stem and tributaries) which are considered likely to be developed within the next 20 years. Non-hydro or water resource related developments are not considered likely in this mountainous and rugged terrain belonging to the lower Himalayan and Karakorum mountain range. Although the first phase of WAPDA's "Vision 20205" program for Indus Cascade development envisions an eventual 4 dams along the Indus main stem upstream of Tarbela – namely, Thakhot, Pattan, Dasu and Diamer-Basha, given fiscal space constraints for the financing of such large investments, realistically only Dasu and Diamer-

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Basha are expected to take place within the next 20 years. As such, the cumulative impact assessment focused on these two projects, plus six smaller projects planned for Indus tributaries between Diamer Basha and Tarbela. The evaluation is based on the assumption that DHP (phase 1 and 2) will be constructed during the period 2015- 2022, and will begin generating electricity in 2020. Diamer Basha project and other smaller hydropower projects proposed for Indus tributaries between Diamer Basha and Tarbela producing electricity by or before 2030, assuming that everything goes as planned. The temporal and spatial scope of the Cumulative Impact Assessment is inevitably limited in order to ensure that the assessment remains relevant and adds value to the project-level assessment process. Major impacts identified due to the development in the Upper Indus Basin are as under:

Hydrology: The operation of DHP as a run-of-river facility used for base load power production will essentially not change the hydrological regime of the Indus downstream. No change in the Indus flow between Dasu and Tarbela is expected. The downstream flow will only slightly be reduced during the first-filling of the reservoir and during yearly flushing operation, which starts after 15 years. In case the Basha dam is constructed by that time flushing is only needed after 30 years. The reduction in the discharge will be relatively small and will not happen in a critical period for downstream areas. Impacts of the change in flow therefore will be almost negligible.

Sediment transport and water quality: Annually about 200 million ton of sediment are flowing into the reservoir. Sand will be trapped but most of the suspended silt will pass the turbines and the LLOs from Dasu. Without flushing it is expected that the Dasu reservoir will be filled in 20-25 year. Once the flushing commences after 15 year (assuming Basha is not completed) about 27 percent of the annual sediment inflow would be trapped and 73 percent would be flushed through the flushing tunnels and LLO. This will have an impact on the composition of the sediments (relatively more fine fraction) reaching downstream areas, with possibly some changes in the aquatic ecology. The reduction of the sediment quantity and composition as a result of the construction of DHP is not expected to have a large impact on the water quality of the Tarbela reservoir. But after completion of Basha the situation will change drastically. The construction of Basha will have a considerable impact on both Dasu and Tarbela reservoir. The Basha reservoir with a large storage volume will then act as a sediment trap and the inflow in Dasu reservoir will be reduced to 46 million ton of sediment (mainly fine fraction). The cumulated impacts of both Dasu and Basha together will have a considerable positive impact on Tarbela reservoir and may extend its life with another 30 years.

Natural forests and wildlife: The construction of both DHP and the Diamer-Basha project may have a significant cumulative and induced impact on the high-altitude natural forests and wildlife of the area. There will be large influx of many thousands of people including construction workers, operational staff, and business people together with their dependents and over a period of 25 to 30 years. They will settle in the main urban centers in the area around Dasu/Komilla and Chilas. The construction of new resettlement sites for both projects at higher altitudes will also increase the population pressure of the rural population at higher elevations particularly on forest resources and wildlife including a whole range of rare and endangered plants and fauna. As a result there will be more collection and commercial trade in fire wood and herbs, illegal deforestation, logging, reclamation of land for agriculture and other activities. Illegal practices such as poaching, trapping and hunting will increase.

Preservation of archaeological resources: While DHP will not have any impact at all on any of the rock carvings, a large field of pre-historic and historic rock carvings (50,000 rock drawings and

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5000 inscriptions) is found on both sides of the Indus between Shatial and Raikot bridge over a distance of more than 100 km. The rock art dates from Stone Age (8-9th millennium BC) to Buddhist and Islamic periods and is internationally known as the "guest book of the Silk Route". About 20,000 of these engravings will be lost due to submergence from the Diamer Basha reservoir. The rock carvings around Shatial will not be submerged, but are not protected and endangered by on-going developments by construction works and other activities related to the project. A joint mitigation plan implemented by Basha and Dasu project is recommended to rescue, document and protect these rock drawings and inscriptions from further destruction. This might be also an opportunity to stimulate tourism development by establishing a museum and information center in Chilas or Shatial.

The proposed project is a major investment in Kohistan District. It is expected to contribute significantly to the socioeconomic development in the local areas. Apart from the social programs that will assist the affected population to improve their livelihoods, both in terms of income generation and residential conditions, local population are expected to benefit from employment opportunities during the project construction phase as well as improvement of local infrastructure, public services and livelihood development support. The development and operation of this project is expected to have profound long term impacts on local communities, improving their access to information regarding market and employment opportunities, access to education and health services and more economic opportunities.

3. Describe any project alternatives (if relevant) considered to help avoid or minimize adverse impacts.

The project environmental assessment considered number of alternatives, which included: (i) without-project alternative; (ii) site selection of main structure and hydraulic and electrical infrastructure; (iii) alternatives for the type of structure - (a) Roller Compacted Concrete structure (RCC), (b) Concrete Faced Rock fill structure and (c) an Earth fill structure; (iv) alternatives for the lay-out of intake and tail race tunnels; (v) alternative sources of construction material; (vi) alternatives for the selection of generating equipment; (vii) alternative construction schedules; and (viii) alternatives for resettlement.

These are briefly described below:

(i) Without Project Alternative: The "without project" alternative is not realistic, because Pakistan will build additional generating plants to eliminate power shortages. Indeed, given the increasing prohibitive costs of fuel oil-based electricity generation, development of Pakistan's hydro resources at a variety of scales represents the only reasonable prospect of eliminating these shortages. Indeed, until such time as power shortages are significantly reduced and system reliability increased the incremental output of Dasu would serve primarily to reduce these shortages – the benefits of which are largely the same as that of the "without project alternative" counterfactual: i.e., substituting grid electricity for diesel self-generation and kerosene for lighting.

Energy Efficiency and Demand Side Management: In Pakistan there exist a series of options such as demand side management and improved utilization efficiency, and reduced transmission and distribution losses that have high economic returns and are already being undertaken by various Pakistani organizations. However, these are complementary to, rather than mutually exclusive substitutes for Dasu and they will be implemented regardless of whether Dasu is built or not.

Alternative Hydropower Projects: Pakistan has a large potential of renewable and clean energy

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resources in the form of hydropower. Out of an estimated potential of 46,000 MW so far only about 6,500 MW or 14 percent is utilized. The majority of the hydropower potential can be found in the Upper Indus Basin. Compared to various ongoing and planned hydro schemes in the country, DHP has the lowest cost per kWh generated and the least environmental and social impacts because of its nature (run-of-river).

Other Sources of Renewable Energy: Alternate renewable sources such as wind and solar power cannot be developed to a scale comparable to DHP since they will be three times more expensive than DHP. Both of these options need to be developed to the extent technically and financially feasible. They are complementary, but not substitutes for DHP. Moreover, from the perspective of mobilizing the necessary finance for the power sector, they do not compete for the same sources of finance: wind and small hydro can be 100% financed from local commercial banks, whose resources are simply not available for large hydro projects. It is not anticipated that, DHP would crowd out the ability of the GoP, Provincial Governments and/or private sector to finance small and medium scale investments in renewable energy.

Thermal Generation: Investing in hydropower development can provide additional generating capacity more cheaply and cleaner than any thermal alternative, with almost no long-term fuel cost. The domestic gas resources in Pakistan are limited, oil is mostly imported and exploitation of Thar coal is still under investigation. Development of hydropower potential can contribute in reducing the cost of electricity generation, reducing the sector deficit by injecting positive cash flow, saving foreign exchange by displacing imported fuel and reducing greenhouse gas emissions.

(ii) Site selection of main structure and hydraulic and electrical infrastructure: DHP was initially identified as a potential hydropower project in 1981 and the location of the project was projected about 7 km upstream of Dasu bridge. The feasibility study of DHP (2009) was carried out in the assumption that the Dasu project would be implemented after completion of the Diamer-Basha dam. In this study several locations between 3 to 9 km upstream from Dasu bridge were investigated. During the studies the initial six locations for the main structure were reduced (on geo-technical grounds) to three technically feasible alternatives. The final selection of the site was done after extensive consultations with the affected population. The selected site appeared to be technically and economically more feasible and had considerable lower environmental and social impacts, with lower needs of resettlement of people. The site alternative also considered local community request and made it possible to preserve the attractive historic 400 year old mosque in the village of Seo, an important cultural and religious site. The alternative was widely supported by the residents from the area.

(iii) Alternatives for the type of structure: Three types of main structure were considered during the feasibility study, (i) a Roller Compacted Concrete structure (RCC), (ii) a Concrete Faced Rock fill structure and (iii) an Earth fill structure. The feasibility study recommended a RCC structure on basis of availability of construction material locally, lower cost and technical advantages. No significant differences in environmental impacts were expected between the three alternatives.

(iv) Alternatives for the lay-out of intake and tail race tunnels: Three different types of waterways (intake and tail race tunnels) were considered during the feasibility study. However this study didn’t evaluate the stability of the various types of rock and the possible impacts of the presence of the Khoshe fault, a geological contact near to the proposed underground power house. The Khoshe fault is not an active fault, with a weak or fractured rock structure. However its presence could possibly create water leakage and influence the design and construction cost of the tunnels. During

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detailed design four alternatives were studied. The layout for alternative 1, in which the power house is located upstream of the Khoshe fault, was worked out further during the feasibility study. The tail race tunnels are all crossing the fault, with possible negative impacts. In alternative 2 the powerhouse is located downstream of the fault. In alternative 3 any crossing with the fault is avoided, but the tail race tunnels are curved, which is a disadvantage. Alternative 4 is a slight modification of Alternative 1, in which the tail race tunnels are straight without any bend. This alternative is selected because of higher efficiency, since a straight tunnel has much lower head losses due to friction.

(v) Alternative sources of construction material: Coarse aggregates: About 9.2 million ton of coarse aggregate will be required for the construction of the dam. Four quarries were identified on the left bank with suitable material and with easy access (along the old KKH that will be submerged after filling of the reservoir). After studies the quarry at Kaigah (8 km upstream of dam) was selected since (i) the quarry is located in the future reservoir area, thus avoiding additional land acquisition and resettlement, and (ii) enough level space is available for an aggregate processing plant and for storage of aggregates and transportation facilities (conveyor belt), and (iii) after filling of the reservoir the quarry will be covered with alluvial sediments, avoiding visible exposure in the landscape. All potential borrow sites are concentrated on the left bank side, since the right bank side of the Indus is very steep and susceptible for landslides and not suitable for quarrying and not accessible at an early stage of the project. After detailed studies it appeared that three of four sites were unsuitable due to insufficient space needed for installation of crushers and transport facilities. The site at Kaigah nullah remained as the only technically feasible alternative. Adverse environmental impacts: The selection of this site may have consequences for the Kaigah Community-managed Game Reserve, which is bordering the old KKH and the quarry site. In the Game Reserve (5,000 ha) some limited trophy hunting is allowed. The site is managed by the community of Kaigah village, who have been trained in wildlife conservation management and who obtain an annual share of the sales of hunting licenses. During construction the operation of a quarry at Kaigah could negatively affect presence of wildlife in the area. The community also may suffer from loss of income, since hunters might stay away. These negative impacts however seem are considered to be unavoidable, since there are no realistic alternatives at hand. Sand: About 5 million ton of good quality sand is required for construction. River sand is available in small quantities and is often unsuitable. Suitable sand deposits are located far way at some 80 km downstream (Maira) and 120 km upstream from Dasu (Chilas). Use of these deposits is expensive because of high transportation cost and would negatively affect the aquatic ecology of the Indus. For this reason it was decided to use manufactured sand from the Kaigah quarries. Kaigah is already selected for preparing coarse aggregates and the same facilities can be used for manufacturing fine aggregates. Pozzolan: Natural pozzolan is available in the area at three different sites. However all three sites have insufficient quantities of pozzolan and often of variable quality. The material available from these sources has negligible cementaceous value and thus it can only serve as fine material and filler. Therefore, based on the recommendation of the POE the fine material will be manufactured locally.

(vi) Alternatives for the selection of generating equipment: The feasibility study proposed to install eight turbines of 540 MW each for the generation of a total of 4,320 MW. These turbines are huge in size and difficult to transport. It appeared that the current condition of the KKH presents an important limitation to the selection of suitable equipment. A comprehensive study was made to find out the maximum weight and width of generating equipment, which could safely pass the KKH. This was tested during trial transports towards the Basha dam. Another factor which was considered was the possible influence of future changes in the flow regime of the Indus

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due to climate change. Three combinations of generating equipment were evaluated: (a) 8 units of 540 MW, (b) 10 units of 432 MW, (c) 12 units of 360 MW. Option (c) was selected as the most feasible option on basis of energy production and transportation requirements.

(vii) Alternative construction schedules: The DHP requires huge and committed investments. A staged development is the most practical way to achieve early power generation with relatively low investment cost (committed finance from World Bank). This approach could also facilitate in dealing with uncertainties in future investment. Both WAPDA and World Bank agreed on a two staged development of DHP, with each stage divided into two phases. The development of stage two is assumed to be implemented after completion of the Diamer-Basha project construction, which will largely reduce the sediment load into the Dasu reservoir and thereby prolonging the life of DHP.

(viii) Alternatives for resettlement: Various alternatives for resettlement were discussed with the affected communities. After elaborate discussions a combination of various options will be selected, and the following two are the main options:

Option 1: Community-based relocation close to the current settlements, but at a higher location, with site and services to be developed by the project. This option includes the possibility of a self-managed relocation in Dasu Tehsil or in Kohistan District, with additional compensation and benefits prior to relocation. About 90 percent of the community preferred this option.

Option 2: Relocation to “down country” (outside Kohistan), with extra compensation and benefits prior to relocation. A minority of about 10 percent of the affected community preferred this option.

4. Describe measures taken by the borrower to address safeguard policy issues. Provide an assessment of borrower capacity to plan and implement the measures described.

To address the adverse impacts and maximize project benefits, WAPDA has developed a series of interventions on the basis of field surveys and extensive consultations with local communities with the aim to restore and improve livelihoods of the affected population, and support local socioeconomic development. These interventions are packaged into a Social Resettlement Management Plan (SRMP) that includes the following key interventions:

Resettlement: The project will require the relocation of 6,953 people in 767 households. Various potential options have been explored for their resettlement, including group resettlement within the river valley, self-resettlement outside the project area, individual household resettlement within the project area and group resettlement within existing community land at higher elevation. Assessment of these options led to the adoption of a multi-option approach for resettlement under DHP. Moving up to higher elevation within their existing territory is the approach preferred by the majority of the relocating households. The project design team and the communities followed up on this preference and identified 27 potential resettlement sites. These resettlement sites will be further assessed and designed in detail for their development. The project team will continue to work with the relocating groups and households over their relocation plan, including other possible resettlement options. All these issues have been addressed in the RAP and in the RPF, for interventions not fully identified.

Livelihood development: The objective is not only to restore, but also improve the livelihoods of the project affected population. Analysis indicates that the project is not expected to have major adverse impacts on household income of the affected population due to the economic and

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livelihood pattern and spread of the affected households. The development approach consists of short term interventions for income restoration and a ten-year program for sustainable livelihood development. The short-term interventions will start early prior to civil works, focusing on the affected households, assisting them in investing their land compensation money into household-based income generation schemes. An NGO experienced in rural development will be engaged to mobilize the communities and assist individual households to design and implement household-specific income-generation schemes. WAPDA will design and implement a parallel livelihood support program to facilitate household-level income generation activities. The project will establish a Social Development Fund to continue and expand the short-term interventions beyond the project construction period. This program will be developed during the course of project implementation.

Gender assessment and interventions: Based on the gender assessment conducted, the project has proposed a three-prong approach. The first is to educate project staff, including construction forces to raise awareness and increase sensitivity on gender. The second is to educate men, such as local leaders, religious leaders and husbands on the importance for women to access project benefits, creating conducive environment for women to benefit from the project. The third is to identify existing and future entry points and use them as much as possible to benefit women. These are described in the gender strategy and will be detailed during the course of project implementation. It is also cautioned that, given the sensitivity, all interventions related to women will need to be discussed and agreed with the communities first before putting to implementation.

Management of Construction-related Impacts: The construction of the project will bring in a large influx of “migrant population” into Kohistan District, including the construction workers, project management staff, service-providing followers and employment seekers. This may give causes of conflicts over resources, differing cultural conducts and behavior, public health, safety and security issues. WAPDA has prepared a management framework to proactively prepare to address these types of issues. Interventions include awareness raising among local administration and communities over the in-migrants, contractors’ proactive planning about the management of their work forces, including their health plans and code of conduct, strengthening of local institutions to manage conflict and security issues.

Public health action plan. The plan is developed on the basis of an assessment of possible project public health impacts, local public health services capacity and gaps to provide the services required under the project. The plan aims to minimize risks and address possible harmful effects on public health under the project. It will focus on i) dealing with public health issues among the affected population in relocation during the pre-construction period, ii) measures to minimise and address adverse effects on the health of migrant, resident population and the construction workforce during the construction phase and iii) measures to promote future health benefits immediately after completion of the project. Interventions include establishing health baselines, information, education and communication programs, preventive, curative and promotive health activities, monitoring, diagnosis and treatment of specific diseases, emergency response actions and support to strengthen local medical institutions.

Approach to address downstream fishery impacts. A study was carried out to evaluate potential impacts on fishing communities downstream of Dasu Dam. The study covered four districts over 200 km stretch between the proposed Dasu Dam and Tarbela Reservoir. The study established baseline conditions of the fishing communities, reviewed their present fishery activities, income levels and assessed possible impacts during and after project construction. The study indicates that the development of Dasu Hydropower Project will have some but relatively small impacts on

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fishery activities downstream as most of the fishery activities occur along the tributaries rather than the main stem of Indus River. The recommended measures include maintaining minimum flow for the low flow season and establishment of local scale fish hatcheries and training programs.

Local area development support: In addition to impact mitigation and improving livelihoods of the affected communities, the project has proposed to set up an Area Development Fund of $30 million to support local area development in Kohistan District. Possible interventions could include improvement and expansion of education and health facilities, road and communication infrastructure, provision of vocational training and livelihood extension services, and improvement and upgrading of infrastructure facilities in Dasu Town. The management and operation of the fund will be designed in detail during the initial phase of the DHP.

The National Transmission And Despatch Company (NTDC) is responsible for the planning and construction of the Dasu Transmission Line. A general corridor has been selected and the alignment is still under study and yet to be finalized. NTDC has conducted a socioeconomic survey within the alternative corridors to establish the socioeconomic baseline. The survey team conducted initial rounds of consultations in the project districts and carried out screening of possible project impacts. Possible impacts include land acquisition for the tower posts, damages to crops and orchards, disruption of local access routes and restrictions on the land use within the transmission line corridor. NTDC, with IFI support, has developed and adopted a Land Acquisition Resettlement Framework (LARF). The LARF has been reviewed and cleared by ADB and World Bank for compliance with their resettlement policies. This LARF will apply to Dasu Transmission Line. Once the transmission line corridor is finalized, resettlement action plans will be prepared in line with the LARF. The Environment Social Impact Cell of NTDC will be directly responsible for the planning and implementation of the resettlement action plans.

In the past ten years, WAPDA has implemented quite a few World Bank funded mega infrastructure projects. Ghazi Bharotha stands completed while Tarbela 4th Hydropower is under implementation. WAPDA has therefore developed its capacity to supervise environmental and social safeguards' aspects for projects like Dasu. Further, the ESA prepared for the project presents a fairly detailed and well laid-out implementation plan both for ESMP and SRMP. This plan draws on lessons learnt from previous Bank engagements like Ghazi Bharotha and Tarbela 4th. As described in the ESA and SRMP, the overall responsibility for the implementation of the project rests with the Project Management Unit (PMU). Within the PMU there will be an Environment and Social Management Unit (ESMU), responsible for implementing the EMP and the SRMP. The ESMU will include representatives of all actors responsible for EMP/SRMP implementation. The responsibilities of the ESMU are: (i) supervision, facilitation and coordination of environmental and social measures; (ii) ensure that contractors follow PEPA regulations and other requirements mentioned in the EMP; (iii) identify any issues of non-compliance and report these; (iv) suggest mechanisms to link contractor performance in relation to the EMP to the timing of financial payments, incentives or penalties; (v) interaction with stakeholders for their concerns about the construction activities; and (vi) implementation of contingency plans. The ESMU will be supported by a team of national and international experts under an implementation support TA. A team of local experts from different departments of Kohistan District will operate alongside ESMU. Operational NGOs are planned to be recruited to facilitate SRMP implementation at community and household level.

The ESMU will ultimately be responsible to the WEC, stationed in Lahore. It is proposed that

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WEC takes a leading role in the ESMU by charging a senior WEC representative with overall responsibility for ESMU during the construction phase. The potential for institutional strengthening and capacity building of WEC has been identified. Currently WEC is understaffed. WEC operating at proposed sanctioned strength would be adequately resourced to deliver the commitments set out in this EMP and SRMP. The head of the ESMU unit reports directly to the Director PMU.

Composition of ESMU: The proposed composition of the ESMU team is as follows: (i) a Senior Engineer level WAPDA officer with environmental science background; (ii) an HSE Specialist to be appointed by WAPDA; (iii) a Social Scientist to be appointed by WAPDA; (iv) an Environmental and Social Monitor to be appointed by the Design/Supervising Consultant; and (v) an Environmental and Social Supervisor to be appointed by the Contractor.

For the Transmission line component of the project, NTDC has fully functional environmental and social impact cell (ESIC). However, considering the scope and extent of the project, capacity development measures for ESIC have also been suggested and will be detailed during ESA studies.

Other than the proposed plan for the implementation of ESMP, the ESA presents outline for the capacity development of the WAPDA staff through following activities:

Capacity Building and Training: Capacity building will be aimed at strengthening the WAPDA organization in Dasu in the field of environmental management and social development. Members of the environmental/social unit responsible for supervision of environmental and social mitigation measures would be trained in environmental management, environmental quality control, ecology, environmental awareness, participatory approach and social development. Training would not be restricted to WAPDA staff, but selected project staff involved in construction and operation of the project would also be trained. The contractor will also be required to impart environmental and social trainings to its staff, to ensure effective implementation of the EMP and SRMP. A budget of US$ 0.6 million has been earmarked for capacity building and training. In addition to the project-specific capacity building described above, WEC will be strengthened to actively partake in the environmental and social management of the WAPDA projects, particularly towards the effective ESMP implementation of the DHP, as well as the ESA studies and EMP and SRMP implementation of the forthcoming hydropower projects such as the Basha dam. Additional funds of US$ 0.3 million have been allocated to establish a GIS/MIS facility and for institutional strengthening of WEC.

Panel of Experts: WAPDA will continue using services of an independent panel of environment and social experts to advise ESMU and other project entities on all environmental and social matters including effective implementation of EMP and SRMP, particularly on unanticipated situations, impacts, and their mitigation. The Panel will review on a regular basis the various reports and documents produced by EMU, Supervision Consultants and contractors; periodically visit the site to have first-hand information on the environmental and social impacts and EMP/ SRMP implementation; and provide report to WAPDA on the overall environmental and social performance of the project. An amount of US$ 0.43 million has been included in the Project cost for this purpose.

Audits: Internal Environmental Audits will be held once during construction phase and once at the end of the construction activities. The objective of the audits is to review the effectiveness of environmental management. It is proposed that WEC would carry out these audits on s ix-monthly

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basis. External audits on the implementation of the EMP and SRMP will be made by an independent industrial environmental management specialist on an annual basis. These audits would be used to re-examine the continued appropriateness of the EMP and SRMP and to provide advice on any up-dates required.

5. Identify the key stakeholders and describe the mechanisms for consultation and disclosure on safeguard policies, with an emphasis on potentially affected people.

The stakeholder analysis conducted as part of the project planning process identified the primary and secondary stakeholders, analyzed their respective views, expectations, roles and responsibilities regarding the DHP. Local consultations and jirga (assembly of elders) meetings were conducted before the starting of the field surveys of the project design work to share preliminary project design information and seeking views and recommendations from local communities. Relevant government agencies including ministries, various departments and civil administration were also closely consulted. WAPDA has held extensive consultations with the project stakeholders, beneficiaries and affectees. In total, three jirga meetings, 34 community level meetings, 1487 one-on-one interviews were held during the planning phase so far. Four national consultation workshops were held, one each in Islamabad, Peshawar, Lahore and Karachi. The purpose of the consultations was to share with the stakeholders the scope and ToR of the ESA and cumulative impact assessment studies and to include their concerns in the mitigation plan. Another round of consultation was done in February 2014 to share with the stakeholders the major issues identified and proposed mitigation plan developed by WAPDA to alleviate the concerns raised by them during the previous round of consultation. This consultative process will continue through the design and implementation of the various environmental and social action plans where the affected population will drive the formulation and implementation of the resettlement program, the livelihood development program. The Public Consultation and Participation Plan (PCPP) of the SRMP presents consultations carried out during the planning phase of the project and its strategy as well as plan for consultation during the project implementation. The draft ESA and SRMP reports have been disclosed locally and at the Bank InfoShop on January 23, 2014.

A communication strategy is developed to guide communications with stakeholders during the project implementation to timely disseminate information among key stakeholders, enhance transparency, promote and increase participation of stakeholders in decision-making. The strategy focuses on ensuring internal communications among staffs of the project and relevant government institutions, timely provision of project implementation information to stakeholders, re-enforcing project participation and grievance redress mechanisms. The Dasu Project Office will coordinate the implementation of this strategy through a communications unit at head-office level and another unit at the project-site. These units will be staffed with communications experts

A four-tier “bottom up” system of grievance redress committee (GRC) will be established under the Project. It includes Village Level GRC, Union Council Level GRC, District-Level GRC and Project Level Independent GRC. The Project Level GRC will be led by a retired civil judge. A grievance redress cell will be established under the Deputy Project Director. The Grievance Redress Plan presents details of the composition, tasks and responsibilities of GRCs at various levels as well as procedures and timeline, covering – for example, filing of cases, review and hearing, records and documentation, and notification of outcomes. The GRC mechanisms established for this Project will be disclose d to the affected persons prior to Project approval. All documents related to GR cases will be maintained in the Deputy Director Office for review or verification by WAPDA. Annual evaluation of GRC activities will be conducted and its result posted in the Project website.

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B. Disclosure Requirements

Environmental Assessment/Audit/Management Plan/Other	
Date of receipt by the Bank	23-Jan-2014
Date of submission to InfoShop	23-Jan-2014
For category A projects, date of distributing the Executive Summary of the EA to the Executive Directors	
"In country" Disclosure	
Pakistan	23-Jan-2014
Comments:	
Resettlement Action Plan/Framework/Policy Process	
Date of receipt by the Bank	23-Jan-2014
Date of submission to InfoShop	23-Jan-2014
"In country" Disclosure	
Pakistan	23-Jan-2014
Comments:	
If the project triggers the Pest Management and/or Physical Cultural Resources policies, the respective issues are to be addressed and disclosed as part of the Environmental Assessment/ Audit/or EMP.	
If in-country disclosure of any of the above documents is not expected, please explain why:	
Disclosed as part of environmental assessment.	

C. Compliance Monitoring Indicators at the Corporate Level

OP/BP/GP 4.01 - Environment Assessment	
Does the project require a stand-alone EA (including EMP) report?	Yes [×] No [ ] NA [ ]
If yes, then did the Regional Environment Unit or Sector Manager (SM) review and approve the EA report?	Yes [×] No [ ] NA [ ]
Are the cost and the accountabilities for the EMP incorporated in the credit/loan?	Yes [×] No [ ] NA [ ]
OP/BP 4.04 - Natural Habitats	
Would the project result in any significant conversion or degradation of critical natural habitats?	Yes [×] No [ ] NA [ ]
If the project would result in significant conversion or degradation of other (non-critical) natural habitats, does the project include mitigation measures acceptable to the Bank?	Yes [×] No [ ] NA [ ]
OP/BP 4.11 - Physical Cultural Resources	
Does the EA include adequate measures related to cultural property?	Yes [×] No [ ] NA [ ]
Does the credit/loan incorporate mechanisms to mitigate the potential adverse impacts on cultural property?	Yes [×] No [ ] NA [ ]
OP/BP 4.12 - Involuntary Resettlement	

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Has a resettlement plan/abbreviated plan/policy framework/ process framework (as appropriate) been prepared?	Yes [×] No [ ] NA [ ]
If yes, then did the Regional unit responsible for safeguards or Sector Manager review the plan?	Yes [×] No [ ] NA [ ]
OP/BP 4.36 - Forests	
Has the sector-wide analysis of policy and institutional issues and constraints been carried out?	Yes [ ] No [ ] NA [×]
Does the project design include satisfactory measures to overcome these constraints?	Yes [×] No [ ] NA [ ]
Does the project finance commercial harvesting, and if so, does it include provisions for certification system?	Yes [ ] No [×] NA [ ]
OP/BP 4.37 - Safety of Dams	
Have dam safety plans been prepared?	Yes [×] No [ ] NA [ ]
Have the TORs as well as composition for the independent Panel of Experts (POE) been reviewed and approved by the Bank?	Yes [×] No [ ] NA [ ]
Has an Emergency Preparedness Plan (EPP) been prepared and arrangements been made for public awareness and training?	Yes [×] No [ ] NA [ ]
OP 7.50 - Projects on International Waterways	
Have the other riparians been notified of the project?	Yes [×] No [ ] NA [ ]
If the project falls under one of the exceptions to the notification requirement, has this been cleared with the Legal Department, and the memo to the RVP prepared and sent?	Yes [ ] No [ ] NA [×]
Has the RVP approved such an exception?	Yes [ ] No [ ] NA [×]
The World Bank Policy on Disclosure of Information	
Have relevant safeguard policies documents been sent to the World Bank's Infoshop?	Yes [×] No [ ] NA [ ]
Have relevant documents been disclosed in-country in a public place in a form and language that are understandable and accessible to project-affected groups and local NGOs?	Yes [×] No [ ] NA [ ]
All Safeguard Policies	
Have satisfactory calendar, budget and clear institutional responsibilities been prepared for the implementation of measures related to safeguard policies?	Yes [×] No [ ] NA [ ]
Have costs related to safeguard policy measures been included in the project cost?	Yes [×] No [ ] NA [ ]
Does the Monitoring and Evaluation system of the project include the monitoring of safeguard impacts and measures related to safeguard policies?	Yes [×] No [ ] NA [ ]
Have satisfactory implementation arrangements been agreed with the borrower and the same been adequately reflected in the project legal documents?	Yes [×] No [ ] NA [ ]

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III. APPROVALS

Task Team Leader:	Name: Masood Ahmad	
Approved By		
Regional Safeguards Advisor:	Name: Zia Al Jalaly (RSA)	Date: 22-Apr-2014
Sector Manager:	Name: Julia Bucknall (SM)	Date: 22-Apr-2014