



Report and Recommendation of the President to the Board of Directors

Project Number: PAK 38928
October 2005

Proposed Loan to Laraib Energy Limited for the New Bong Escape Hydropower Project in the Islamic Republic of Pakistan

In accordance with ADB's public communications policy (PCP, 2005), this abbreviated version of the RRP excludes confidential information and ADB's assessment of project or transaction risk as well as other information referred to in paragraph 126 of the PCP.

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 30 September 2005)

Currency Unit	–	\$
PR₹1.00	=	\$.0168
\$1.00	=	PR₹s 59.67
RM1.00	=	\$.26
\$1.00	=	RM3.7690

ABBREVIATIONS

ADB	–	Asian Development Bank
AJ&K	–	Azad Jammu and Kashmir
CAGR	–	compound average growth rate
CDM	–	Clean Development Mechanism
CSP	–	country strategy and program
DSCR	–	debt service coverage ratio
EMP	–	environmental management plan
EPA	–	environmental protection agency
EPC	–	engineering, procurement and construction
GOAJK	–	Government of Azad Jammu and Kashmir
hydel	–	Hydroelectric
IEE	–	initial environmental examination
IPP	–	independent power producer
KESC	–	Karachi Electric Supply Corporation
LIBOR	–	London interbank offered rate
NEPRA	–	National Electric Power Regulatory Authority
NTDC	–	National Transmission and Dispatch Company Limited
O&M	–	operation and maintenance
PPA	–	power purchase agreement
PPIB	–	Private Power and Infrastructure Board of the GOP
PPP	–	public–private partnership
Project	–	New Bong Escape hydropower project
PSOD	–	Private Sector Operations Department of ADB
USA	–	United States of America
WAPDA	–	Water and Power Development Authority
WUA	–	water use agreement

WEIGHTS AND MEASURES

GWh (gigawatt-hour)	–	1 million kilowatt-hours
km	–	kilometer
kV (kilovolt)	–	1,000 volts
kW (kilowatt)	–	1,000 watts
kWh (kilowatt-hour)	–	1,000 watt-hours
m	–	meter
m ³ /sec	–	cubic meter per second
MAF	–	million acre feet
MVA	–	megavolt-ampere
MW (megawatt)	–	1 million watts

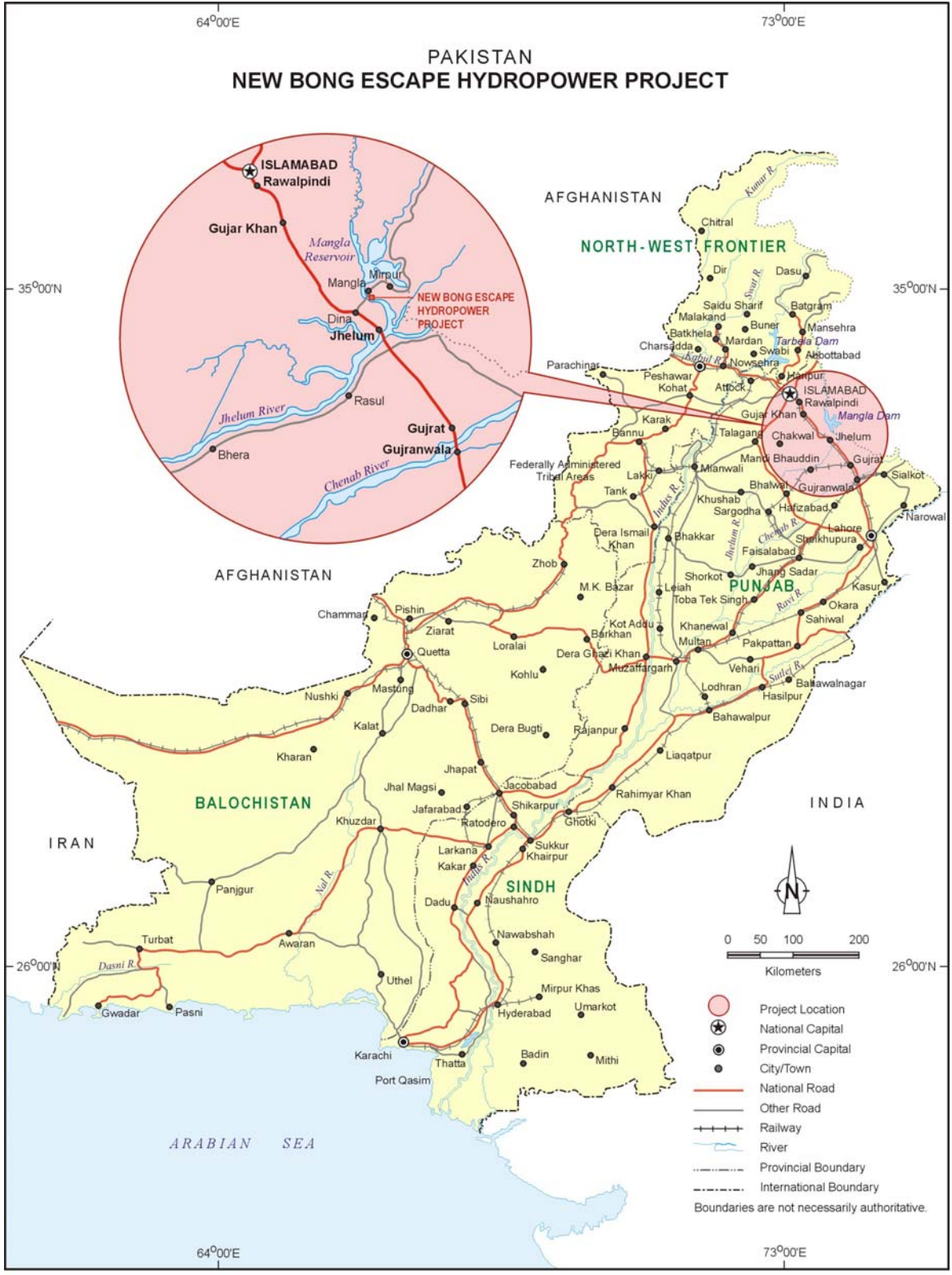
NOTES

- (i) In this report, "\$" refers to US dollars and ¢ to US cents.
- (ii) In this report, PRe and RRs refer to Pakistani rupee(s), the legal tender of Pakistan, and RM refers to the legal tender of Malaysia
- (iii) The fiscal year (FY) ends on 31 December. FY before a calendar year denotes the year in which the fiscal year ends.
- (iv) The proposed Project will be carried out in Azad Jammu and Kashmir, an area over which Pakistan and India have been in dispute since 1947. By financing the proposed Project, the Asian Development Bank does not intend to make any judgment as to the legal or other status of any disputed territories or to prejudice the final determination of the parties' claims.

This report was prepared by a team consisting of M. Barrow (project team leader) (PSOD) and T. Norton de Matos (PSOD).

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I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan without guarantee to Laraib Energy Limited (Laraib) for the New Bong Escape Hydropower Project (the Project) in Azad Jammu and Kashmir, Pakistan. If approved, the Project will be the first private hydroelectric (hydel) power generation project in Pakistan financed by the Asian Development Bank (ADB) via its private sector operations. It will also be the first private sector cofinancing between ADB and the Islamic Development Bank (IDB).

II. INTRODUCTION

2. Laraib, which was formed in August 1995 by a group of private investors, applied for and received a letter of interest to develop the Project, under a build-own-operate-transfer public-private partnership scheme, and to carry out a feasibility study. Laraib was issued a letter of support on 18 May 1996 allowing it to develop the Project, negotiate a tariff with the Pakistan Water and Power Development Authority (WAPDA) and proceed to finance, build, and operate the Project. Following delays largely attributable to the economic downturn and to disputes with thermal independent power producers (IPPs) in the late 1990s, the company has recently signed project agreements with the Government of Pakistan, the government of Azad Jammu and Kashmir (GOAJK), and their relevant power sector entities, including agreements pertaining to water use, power purchase, and government approvals and undertakings.

3. The situation in the power sector in Pakistan has improved markedly over the last few years, and it is today deemed an attractive sector for investment by both local and overseas sources. This can be attributed to the resolution of disputes between WAPDA, the Government, and the IPPs; continued efforts at sector reform; a dramatic reversal of the capacity oversupply prevalent in the mid to late 1990s; and very robust economic growth. This turnaround is evidenced by the proposed new IPP development, proposed expansions of existing IPPs, and IPP refinancing activity. Private hydel development is particularly encouraged today as it will add much-needed generation capacity in an environmentally acceptable way, rebalance the hydro/thermal generation mix (all current IPP generation is thermal), and exploit indigenous renewable resources, all of which are consistent with the Government's power sector policies. Pakistan has a strong comparative advantage in hydel power generation, and the Project should help the country to realize that advantage within the private sector. The Project, being at an advanced stage of development and already specifically featured in WAPDA's least-cost Generation Expansion Plan, merits ADB's particular support.

4. The Project is at an advanced stage of development with its contractual structure largely in place. The Project's original developers have now attracted a major international corporate investor in the form of Ranhill Berhad of Malaysia to cosponsor the Project, demonstrating that the climate for private sector investment generally, and for private power development particularly, and for private hydel projects specifically, has vastly improved. The conditions are now felt to be highly supportive for realizing this landmark transaction.

5. The financing of the Project is being closely coordinated with IDB, and it is expected that ADB and IDB will lead the financing with similar participation (up to \$37.3 million each). This will be IDB's first private sector project financing in Pakistan, and it will be the first private sector cofinancing between ADB and IDB.

6. The Project is also in line with ADB's policy for the energy sector in Pakistan¹ where the focus is on structural reform, privatization, cleaner fuels, and renewable energy, as well as with ADB's multisector rehabilitation and improvement project for AJ&K,² which has an important power sector component. The Project will help to strengthen the role of NTDC within the power sector (a role that ADB has strongly supported³), as well as help to stabilize the power network by building generation in the north of the country. The Project may also encourage the development of the market for certified emissions reduction credits. The central and local governments have confirmed both their support for the Project and for ADB's participation.

7. Substantial due diligence has been undertaken, and ADB has been heavily involved in structuring this transaction. The Fact-Finding and Initial Due Diligence Mission was fielded from 17 to 18 February 2004, and the Project received concept clearance on 6 October 2004. The main Appraisal Mission was fielded during the last week of November 2004. In addition, the ADB project team joined an IDB-led due diligence mission and has participated in numerous subsequent due diligence and negotiation missions to Pakistan and Malaysia.

III. BACKGROUND

A. The Power Sector in Pakistan

1. Demand and Supply

8. Pakistan's electricity consumption increased at a compound annual growth rate of 4.84% from 1999 to 2003, with faster rates of growth registered among certain classes of users such as domestic, commercial, and industrial. Future electricity consumption is expected to exceed recent economic growth rates of about 6%, with WAPDA registering unit sales growth of 8.6% in 2004. Strong economic growth is also expected to contribute to greater levels of per annum per capita consumption of electricity (413 kilowatt-hours [kWh] compared to the Philippines' 497 kWh and Thailand's 1,414 kWh) and thus magnify demand growth. This growth in demand has essentially erased a significant capacity overhang to the point where, today, load shedding and other adverse economic impacts of declining reserve margins relative to peak demand are becoming pronounced. WAPDA shed 676 gigawatt-hours (GWh) from July 2003 to June 2004, slightly more than the annual generation of 426 GWh expected from the Project. The situation is not helped by significant levels of technical and non-technical losses and the lack of recent sizable investment in generation and transmission and distribution systems to meet expected demand (notwithstanding the recent completion of the Ghazi Barotha Hydropower Project).

9. Total installed power generating capacity in Pakistan amounts to 19,252 megawatts (MW), of which 11,196 MW is provided by WAPDA (58.1%), 5,808 MW by IPPs (30.2%), 1,756 MW by KESC (9.1%) and 30 MW by AJ&K Hydel (0.2%), the remainder being government

¹ ADB. 2002. *Country Strategy and Program (2002—2004): Pakistan*. Manila; and ADB. 2004. *Country Strategy and Program (2002-2004): Pakistan*. Manila.

² Multisector Rehabilitation and Improvement Project for Azad Jammu and Kashmir, 21 Dec. 2004.

³ ADB. 2000. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Islamic Republic of Pakistan for Energy Sector Restructuring Program*. Manila and *Report and Recommendation of the President to the Board of Directors on a Proposed Technical Assistance Loan and Technical Assistance Grant to the Islamic Republic of Pakistan for Infrastructure Development*. Manila (Loan No. 2178-PAK) and ADB. 2005. *Technical Assistance to the Islamic Republic of Pakistan for Support of Infrastructure Investments*. Manila (TA No. 4635-PAK).

owned nuclear (462 MW or 2.4%). Hydroelectric generation capacity represents about 6,491 MW, or 34% of total installed generation capacity.

10. Thermal generation (excluding nuclear) is fueled by oil (24%), natural gas (75%), and coal (under 1%). Hydel generation, which is currently all in the public sector, represents about 34% of the existing generation capacity, but that capacity of approximately 6,491 MW uses less than 20% of the estimated hydropower resources of the country. In addition, hydel generation has declined relative to total generation as the large capacity additions in the mid to late 1990s were all oil and gas fired IPPs. This trend is considered unfavorable by the Government and WAPDA, which prefer a more balanced thermal/hydro generation mix. Other considerations are cost and environmental issues and benefits specific to hydel. Like other Himalayan countries, Pakistan has a significant comparative advantage in hydel power.

11. Pakistan is expected to face significant capacity shortfalls relative to peak demand as early as 2006. With seasonal electricity consumption seeing peak consumption occurring in the summer months, the country had about a 1,215 MW surplus in 2004, representing an 8% reserve margin, which is considered tight. This surplus is expected to decline to only 440 MW at the end of 2005. If no capacity is added, the surplus will turn to deficit from 2006 (minus 411 MW), and the Government's Private Power and Infrastructure Board projects that the deficit will exceed 4,000 MW by 2009. WAPDA, whose system delivers 87% of total electricity consumption, projects and confirms a similar deficit. To address this precarious situation, WAPDA has developed a least-cost Generation Expansion Plan (2006-2010) in which this Project is featured as adding 79 MW of hydel capacity in 2009. The plan is designed to add some 3,557 MW of new capacity in that time period (i.e., the next 4 years) via 19 separate projects. Even assuming these projects go ahead and are implemented on time, the deficit in generation relative to peak demand will still amount to 330MW in 2006 and 2,376 MW in 2009 (please refer to Appendix 1). It is in this context that the Project is being developed and ADB's support is being sought.⁴

2. Sector Regulations and Reform

12. The power sector, which encompasses the generation, transmission, and distribution of electricity, is governed and regulated under the National Electric Power Regulatory Authority (NEPRA) Act of 1997. NEPRA, which was constituted under this Act as an independent entity, is exclusively empowered under the act and related rules to regulate all facets of the power sector.⁵ NEPRA is thus empowered to grant licenses for generation, transmission, and distribution; to approve tariffs, rates, and charges across the sector; and to establish uniform industry performance via codes and standards, which it enforcements. NEPRA, although mandated as an independent entity, is governed by a chairman and four members who are all appointed by the Government, with the members recommended by and representing provincial interests. ADB supported NEPRA's capacity building in 2001 and 2003 with technical assistance.⁶

⁴ The data provided in paras. 8–11 is from WAPDA and/or Laraib.

⁵ There are some exceptions related to self-generation, or generation undertaken directly by provinces for within-province distribution, provided that provinces set up their own distribution networks and are not connected to the national grid. It is worth noting that NEPRA does not have jurisdiction in AJ&K, but does over NTDC. However, the Inspectorate of Electricity of AJ&K, which assumes the role of regulator in AJ&K, voluntarily follows the rules, regulations, and tariffs set by NEPRA. It is understood that, in respect of the Project, the primary role of the Inspectorate is to issue the standard consents under the terms of the Electricity Act 1938 (see also footnote 11).

⁶ ADB. 2000. *Technical Assistance to the Islamic Republic of Pakistan for Institutional Capacity Building of the National Electric Power Authority*. Manila

13. Power sector policies and related legislative frameworks are developed and implemented by the Government via the Ministry of Water and Power. The Government initiated the process of power sector reforms and restructuring in the early 1990s on the advice of the World Bank. The power sector restructuring and reform process developed through various stages and policies, such as the Power Policy 1994, Hydel Policy 1995, Transmission Line Policy 1995, Power Policy 1998, and Power Policy 2002. These were designed, to a large extent, to attract private sector participation in a newly restructured power sector. In addition, the NEPRA Act was promulgated to provide the overall regulatory umbrella for the sector. The Government is today unbundling WAPDA into various independent entities. The broad objectives of all these policies have been to inculcate sector-wide efficiencies through competitive generation, transmission, and distribution with appropriate independent regulatory oversight; rationalize prices and subsidies; and encourage private capital formation and investment to meet growing electricity demand. ADB has directly supported these endeavors.⁷

14. As a result, the power sector is in transition and is today semi-privatized and semi-deregulated. The sector has historically been characterized by very significant Government control via the WAPDA and KESC monopolies (which function as vertically integrated utilities encompassing generation, transmission, and distribution) and by significant inefficiency (with losses in excess of 25%) and inability to meet demand. This characterization, at least in terms of outright Government control, has changed over the last decade with significant private sector-led generation via IPPs, which together represent in excess of 30% of total generation capacity. Significant reforms have taken place to break WAPDA's power assets into discreet generation and distribution units, and to place WAPDA's transmission assets into a single corporatized entity, NTDC. NTDC will assume the additional function of acting as the single buyer of wholesale generation from multiple companies in the market (but excluding KESC) for onward transmission and sale to distribution entities, in addition to responsibilities as market and system operator (as an interim step to a fully competitive electricity market). This single-buyer model now being implemented will ultimately evolve into a multiple-buyer and multiple-seller regime in which generators and distributors can contract directly. However, this development is expected to take quite some time, and it is not expected in the foreseeable future that a full merchant market will replace long-term structures under the power purchase agreement (PPA) signed with NTDC on 16 April 2004. PPAs are felt to be the best way of delivering needed power to the system. It is important to note that existing IPPs, and those already approved and under development will be grandfathered under existing legislation preserving their contractual frameworks including tariff structures, which in itself promotes policy consistency. The role and responsibilities of NTDC are more fully described in Appendix 2.

15. GOAJK wishes to develop its hydropower resources to meet some 300 MW of demand, which is currently being met from the national grid. AJ&K is rich in hydropower resources, and thus GOAJK has prioritized hydropower development to meet its own load requirements and create an exportable surplus.⁸ So far there has been only limited success with small-scale projects, and a total capacity of some 36 MW in operation. GOAJK adopted the Government's Hydel Policies of 1995 and 1998 and is developing its own power policy partly based on the Power Policy 2002 to attract and enable private sector development. GOAJK has developed

⁷ ADB. 2000. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Islamic Republic of Pakistan for Energy Sector Restructuring Program*. Manila

⁸ GOAJK's Electricity Department/Inspectorate has administrative control over the development, generation, supply, and distribution of hydel and thermal power in AJ&K, including the administration of relevant Government Acts, and liaison with WAPDA. GOAJK has specifically tasked the Hydro Electric Board, a unit of GOAJK, with responsibility for both public and private hydel projects and with implementing the Government's hydel policy through the private sector.

special hydel concessions, such as leasing state-owned land at attractive rates and attractive tax and levy incentives. GOAJK is also planning a power highway to disperse power from remote hydel sites as well as the development of its own grid to distribute the electricity generated. The Project is not dependant on these efforts as it will connect directly to an NTDC transmission line.

16. The Project is being developed under the Government's Hydel Policy 1995, which offers concessions, facilities, and incentives to the private sector to design, build, own, operate, and ultimately transfer back to government hydropower projects. In 1998, the Government allowed the continued implementation of the Project under the Hydel Policy 1995 subject to negotiation and agreement of the tariff with WAPDA (or its successors). These tariffs have been agreed as described more fully in section C and are viewed by the Government (including NEPRA, NTDC and PPIB), GOAJK, and the private sector as being highly competitive.

17. It should be noted that several of the thermal IPPs that were promoted largely in the early 1990s faced considerable difficulties both because some of them were arguably politically motivated and due to an acute power surplus in the latter part of the 1990s. However, all of the substantive disputes between the Government and the IPPs have been satisfactorily resolved with some tariff renegotiation, a change in government, and with the disappearance of the power surplus. The existing IPPs are now successfully operating, and a number are looking at expansions and/or refinancing on improved terms. Even should further problems occur with the IPPs (a situation that is considered unlikely by both the Government and the IPPs), the Project, with its low tariffs and preferred merit order characteristics, is expected to be one of the least vulnerable to any change in political sentiment.

B. Asian Development Bank Operations

1. Country Strategy

18. The country strategy and program (CSP), approved in May 2002 and updated in September 2004, aims to support poverty reduction in Pakistan through specific interventions in the following three areas: (i) supporting good governance including sector reform; (ii) sustainable pro-poor growth with infrastructure and rural development and employment generation; and (iii) inclusive social development. The CSP acknowledges and supports the priority that the Government accords to developing economic infrastructure as an engine for higher growth and poverty reduction in the medium term, and it recognizes that, given the constraints on public sector resources and capacity, the private sector needs to play an important and growing role in infrastructure development. In particular, the CSP calls for ADB to redirect its ordinary capital resource lending towards infrastructure projects that will have the greatest impact on growth and poverty reduction. One of the identified priorities is addressing critical gaps in the power sector as well as facilitating public-private partnerships (PPPs) for infrastructure development. Experience has also shown that the private sector can reduce the cost of project development by some 30–50% compared with Government-developed projects. This can be seen from the publicly financed Chashma and Ghazi Barotha hydropower projects, where cost escalation and delays significantly increased costs.

19. To support private sector involvement in infrastructure development, ADB will focus on providing assistance in (i) the development of a strategy to determine the role of the private sector in financing, constructing, operating, and maintaining infrastructure through the formation of PPPs; (ii) the creation of policy, regulatory, and institutional frameworks to support such PPPs; and (iii) the development of pilot partnership models for specific projects. Under its private sector

development strategy, ADB's Private Sector Operations Department is directed to provide direct assistance to private sector entities through investments, lending, and guarantees, principally for projects in the power, water, transport, and oil and gas sectors.

2. Energy Sector Strategy

20. ADB's energy sector strategy⁹ designates ADB's operational priorities as (i) reducing poverty by, among other ways, creating energy infrastructure for sustainable economic growth; (ii) promoting private sector involvement by restructuring the energy sector and creating an enabling environment for private investors; (iii) addressing regional and global environmental impacts; and (iv) promoting regional cooperation. In particular, the strategy strongly encourages ADB's interventions to increase private sector participation in the energy sector to take advantage of the higher operational efficiencies that private sector operators can achieve and to meet the large capital requirements of energy infrastructure. ADB's energy sector strategy promotes a shift to cleaner fuels and processes. The strategy also encourages the liberalization of markets and elimination of cross subsidies.

3. Project Consistency with Asian Development Bank Strategies

21. The Project promotes and is fully in line with ADB's country and energy sector strategies and its thematic priorities of economic development, private sector development, good governance, and environmental protection. The Project will contribute to the economic development and reform of the power sector, which are vital for economic growth and efficiency. The Project will promote private sector investment in infrastructure development, freeing up government resources for other types of expenditure. The Project will enable NTDC to distribute electricity to the consumer, where demand is currently not fully met, and will help meet the energy needs of the industrial and commercial sectors, thus enabling economic growth. The Project will also help to stabilize the grid and promote the lowering of system losses, given its proximity to the load center. The Project will use clean energy, which is essential for sustainable development. The Project may be eligible for certified emissions reduction credits, upon application, under the provisions of the Kyoto Protocol, which would help to promote the Clean Development Mechanism (CDM) market.¹⁰ ADB has supported the Government's efforts in restructuring the power sector to enable it to attract more private sector investments. ADB's financial assistance to the Project will represent a natural and consistent extension of its prescribed policy support to Pakistan.

⁹ ADB. 2000. *Energy 2000: Review of the Energy Policy of the Asian Development Bank*. Manila.

¹⁰ The Project may be eligible to apply for certified emissions reduction credits, subject to its meeting certain prescribed criteria and independent third party validation, pursuant to the CDM established under the Kyoto Protocol. Pakistani projects are now eligible to apply for CDM treatment under the Kyoto Protocol, which Pakistan ratified on 11 January 2005, and its pre-cursor, the United Nations Framework Convention on Climate Change, which Pakistan ratified on 1 June 1996.

IV. THE PROPOSED PROJECT

A. Sponsors and Ownership

22. The Project was conceived and developed by a group of private investors. These private investors incorporated Laraib Energy Limited as a public limited company to undertake the Project pursuant to a Letter of Support issued by the Government of Pakistan and dated 18 May 1996. Mr. Khalid Faizi, who leads Laraib as chief executive officer, and his co-investors financed Laraib's long development process and have managed to negotiate a financially sustainable project that meets NTDC's capacity generation and tariff requirements. It also fits well with WAPDA's least-cost Generation Expansion Plan, in which it is listed, and is underpinned by a robust contractual structure. Laraib's success can be attributed largely to the persistence and professional and technical capabilities of Laraib's initial owners and management team. Laraib's owners and managers are associated with several other business enterprises built over many years including, for example, representing Sumitomo Corporation's power, energy, and communications interests in Pakistan. Laraib's owners are also involved, via separate companies, in a captive hydropower generating plant that generates 10 GWh per annum. It is the only private hydel plant in Pakistan, serving a steel furnace and other small-scale hydropower development initiatives in AJ&K.

23. Laraib's initial owners' and investors' intention was to attract additional large-scale investors to the Project once it achieved a sufficient level of development. The original owners of Laraib have recently achieved this important objective with the introduction into the Project of Ranhill, which will take a 51% stake in Laraib.

24. Ranhill Berhad, which has been listed in the Main Board of the Kuala Lumpur Stock Exchange since 2001, was originally established in 1973 by the Australian consulting engineers Rankine and Hill to provide mechanical and electrical engineering design services. Ranhill became wholly Malaysian owned in 1981 and expanded its range of engineering services to the oil and gas sector through a partnership with Flour Daniel of the USA. Its business objectives have since expanded to include power, infrastructure, water, and oil and gas. Ranhill today provides full engineering and construction services, from initial concept design to detailed engineering, construction, and commissioning, and its activities encompass engineering, procurement, and construction contracts; project management and operations; and maintenance. Ranhill's activities are international in scope and include work performed in Southeast Asia, the Indian subcontinent including Pakistan, the Middle East, and Africa. Ranhill's investment in Laraib is part of its recent strategy since 1999 of developing outright ownership of infrastructure and utility assets, domestically and internationally, as a way to stabilize cash flows over economic cycles. Ranhill Berhad is also Malaysia's first fully integrated private water company (from water source to tap) under a 30 year concession serving 2.2 million customers in the state of Johor.

25. The management resources of Laraib will be supplemented by the resources of the designated operation and maintenance contractor, a subsidiary of Union Fenosa of Spain, which has extensive hydropower assets and operating experience, and which will provide, subject to agreement on terms, support during the initial years of project operation.

26. The project construction administration will be established including an owners' engineer to provide strong overview and control by the owner.

B. Project Description

27. The Project involves construction and operation of a run-of-the-river, low-head, 79 MW hydel power-generating complex. The Project is located at the New Bong Escape, 7.5 km downstream of the existing Mangla Dam, which was completed in 1967 on the Jhelum River in AJ&K. The project site is 120 km from Islamabad. The Project will be fed by water originating from the Mangla Reservoir, which is released through the Mangla powerhouse (1,000 MW) into the Bong Canal. There is no new reservoir or other water storage envisaged for the Project. The project site, scheme, and environmental aspects are illustrated in Appendix 3.

28. The key components of the Project include the headrace channel, power intake, powerhouse complex, tailrace channel, substation, switchyard, road, bridge, subsidiary outfall structure, and interconnection with 132 kV transmission line. The headrace channel is around 500 meters (m) long and will connect the Bong Pond and the proposed powerhouse. The headrace channel is concrete lined, with a capacity of 1,080 cubic meters per second (m³/sec) of water flow. The powerhouse complex will house four sets of bulb turbines and generators, and associated electrical and mechanical systems. The tailrace channel is 4,014 m long and will release water from the powerhouse to the Hari River, a channel of the Jhelum river. The switchyard will provide connectivity with the existing 132 kV system through an in-out arrangement on the 132 kV Mangla–Kharian transmission line passing over the project site.

29. Project construction will take approximately 36 (required 42 months), including civil works taking approximately 24 months and electro-mechanical works taking approximately 36 months. The delivery, installation, and commissioning of the first of four turbines will take place in the 26th month, and of subsequent turbines after that. The powerhouse should commence electricity production some 27 months after the start of construction with full capacity being reached at the end of the 36th month. The Project's technical aspects, including hydrology and construction arrangements, will be comprehensively reviewed by Mott MacDonald of the United Kingdom, which has been retained as independent engineer to ADB and IDB. It is envisaged that this role will continue through construction and initial operations. Mott MacDonald has visited the project site, and its initial assessments are satisfactory.

C. Key Project Implementation Arrangements

30. Sherman & Sterling and Kabraji & Talibuddin have been retained by ADB and IDB as lenders' external legal counsel to coordinate legal due diligence on project permitting and licenses, implementing legislation, and project contracts and financing arrangements. The legal due diligence process is under way.

1. Power Offtake

31. The power generated by the Project will be sold to NTDC under a long-term PPA during a 25-year concession period. The PPA contains a take-or-pay undertaking whereby energy production not purchased by NTDC will be compensated through a minimum energy payment, based on the possible energy production and historic hydrology.

32. NTDC, which is more fully discussed in Appendix 2, was incorporated on 6 November 1998 and commenced commercial operations on 1 March 1999. Ultimately, NTDC's financial strength and operational capacity stems from being wholly owned by the Government. This Government's support of NTDC's critical role in the power sector is evidenced, in the case of the Project, by the Government's guarantee of NTDC's performance obligations under the PPA.

33. Operationally, NTDC links power generation units and load centers around the country, purchasing power from public and private sector generators (noting that the process of transfer of purchase obligations for private power from WAPDA to NTDC is ongoing) and selling this to the eight distribution companies through its network of some 32,000 km of transmission lines, 624 grid stations, and 47 consumer substations of varying capacities all over the country. This network makes NTDC one of the largest contiguous grid systems in the world.

2. Project Tariff, Project Award, and Government Approval

34. The project concession was awarded to Laraib under the Government's Hydel Policy 1995. This policy, like the thermal policy before it, lays down a framework and process for selecting and developing private hydel power projects. Laraib applied for and received a letter of interest to develop the Project as a raw site and carry out a feasibility study. After completing the feasibility study, Laraib was issued a letter of support on 18 May 1996, allowing it to further develop the Project, negotiate the tariff with WAPDA, and proceed to financial closing, construction, and commercial operations. Two years after promulgation of the Hydel Policy 1995, the Government decided that all projects that had been issued letters of support would not be automatically eligible for the Hydel Policy 1995 tariff but would have to negotiate directly with the power purchaser. This disrupted the development process and caused a delay in finalizing the tariff with NTDC (originally, WAPDA). The change in policy was a direct repercussion of the tariff disputes with the thermal IPPs. The upside of this process, and of the finely negotiated tariff that resulted from it, are the creation of a "willing buyer-willing seller" agreement and the tariff security that this brings. Further, the tariff has been approved by NEPRA, the regulator that oversees the tariff regime in Pakistan and seeks to balance the rights of consumers with the commercial imperatives of the generating companies.

35. The Government's selection criteria for awarding such concessions include, but are not limited to, the following:

- (i) sponsors' financial strength, technical capability, and past experience;
- (ii) project parameters such as the requirements that projects must generate at least 40% of their design capacity in the January-June winter months of low water flow, plant factors must be 50% or above, and projects must be located on smaller rivers or canals, as projects on main rivers require special permission; and
- (iii) the Hydel Policy 1995 tariff must be met, such that, for example, levelized and nominal tariffs are within prescribed ranges.

36. To achieve a level playing field and economic efficiency, the Government indicated target tariffs for projects of different sizes. It was then made incumbent on the developer to frame its tariff profile to meet the target tariff guidelines provided. The ultimate tariff negotiated and agreed would have to take into account the plant factor, project cost, and any other project-specific features, but was essentially designed to reflect cost recovery with a maximum permitted indicative equity internal rate of return. The Government ensured its goal of low-cost generation by capping tariffs and thus returns, leaving private sector developers to develop their

projects to meet its needs. Thus, by controlling the tariff and indirectly capping project costs, the Government was able to achieve transparency and cost control, which is critical to its goal of low-cost electricity.

37. International experience shows that the tariff is competitive, while the project cost is also well within accepted international norms for such projects based on bulb turbines, low heads, and a relatively large volume of water flow. The lenders' independent engineer has already provided an initial validation, and this subject will be covered in detail in its due diligence report.

38. The Project is situated within an area of high demand near a generation-deficient load center. Based on load studies, forecasts, and information available for the power market, it is expected that there will be high demand for the Project's output. The Project is designed to feed into a transmission line at 132 kV and will mainly feed the nearby Gujranwala Electric Power Company (GEPCO) load center, which is currently deficient in generation. As such, the Project will not only meet GEPCO's load center needs but also reduce NTDC's 500 kV and 220 kV power flow imports that presently feed GEPCO, relieving the burden on NTDC's higher voltage transmission system and reducing NTDC's transmission losses. In addition, the Project is a source of reactive power to the 132 kV systems and thus improves its voltage profile and stability. Consequently, the Project is expected to rank high in dispatch merit among the peak load power plants in AJ&K and Pakistan generally, as is the case with the Mangla plant. NTDC's intent in this regard is explicit, as NTDC is specifically obligated under the PPA to give preferential dispatch to the Project ahead of thermal plants. In addition, hydropower plants such as the Project are ideally suited for frequency control and peak demand operation. In any power system, peaking power is the most expensive, and using hydropower for peaking imputes the maximum value to hydel capacity. Further benefits of hydel power include rapid response to sudden system requirements, and the low cost of generation. As water released by the Mangla powerhouse (1,000 MW) will be utilized by the Project in the same pattern and volume, the Project's generation will shadow that of the Mangla plant and will thus provide additional, and much needed, critical peaking power to the system.

3. Power Evacuation

39. The Project's electricity will be evacuated through the existing 132 kV Mangla-Kharian transmission line, which passes over the Project site. Minimal new construction is required for connection other than for the switchyard and cable ducts of approximately 500 meters to the existing transmission line, and the engineering, procurement, and construction (EPC) contract includes this cost. Through this line, the power will be transmitted to the AJ&K regional grid for supply to NTDC and its customers. The interconnection and transmission facilities will be built by the Project and included under the EPC contract, thus minimizing connection risks.

4. Water Use and Hydrology

40. The Project's energy generation relies upon the flows through the Bong Canal, less the water requirement of the Upper Jhelum Canal, which is drawn based on irrigation requirements. The Bong Canal is in the Mangla powerhouse tailrace and fed from the Mangla Reservoir, which is in turn fed by the rivers Jhelum, Kanshi, and Punch together with flows of the Jhelum tributaries Kunhar and Neelum. The catchment of the Jhelum River above Mangla is 33,330 square kilometers of which 82% is higher than 1,220 m and 28% is higher than 3,050 m. The basin is bounded on the north by the Great Himalayas and contains the whole Vale of Kashmir. The Mangla Reservoir was constructed in 1967 with a storage capacity of some 5.88 million acre feet (MAF), of which about 1.2 MAF has been lost through sedimentation in its first 37 years.

41. The Project will rely on well-regulated and proven water releases from the existing Mangla powerhouse (which currently has 1,000 MW of capacity). The Mangla Reservoir has an average annual inflow of about 23 MAF. Of this, around 2.6 MAF has been passing through the spillway annually and 6.6 MAF has been the annual requirement of the Upper Jhelum Canal, thus leaving an average of about 13.6 MAF annually for the Project. The Project has been designed to utilize an average of 12.2 MAF per annum.

42. The Project's hydrology risk has been extensively studied and is considered to be low. Reliable hydrological data is available from the Mangla Dam Organization records from 1922 to date. Furthermore, a scheme is currently under implementation on the Mangla Dam itself, which should significantly increase water flows to the Project and thus further reduce hydrological risk. The proposed Mangla Raise project (raising the storage of Mangla Reservoir from 4.7 MAF to 7.6 MAF) was signed on 28 June 2004 and is due for completion in 2007 or 2008. This will contribute an additional 15%–20% of energy generation to the Project, although this additional generation is not included in the base case or economic analysis.

43. The Project will not alter the existing water regime of the area. This conclusion is supported by the summary initial environmental evaluation, which is presented in Appendix 3.

44. A water use agreement (WUA) allowing Laraib exclusive right to use the waters of the Bong Canal was signed between the company and GOAJK on 16 April 2004. The WUA, which is guaranteed by the Government of Pakistan, provides for the grant of exclusive rights to utilize the water of the Bong Canal with water releases assured on the basis of historic hydrology. NTDC is responsible for paying a water charge directly to GOAJK.

5. Government Implementation Agreements and Guarantee

45. Simultaneously with the PPA, two implementation agreements have been signed between Laraib and the Government of Pakistan and GOAJK respectively. The agreements allow Laraib to implement the Project and specify the incentives and concessions offered.

46. In addition to the implementation agreements, a Government of Pakistan guarantee provides an overriding performance security from the Government in favor of Laraib, in addition to the other security provisions set forth in the PPA and the implementation agreements.

6. Engineering, Procurement, and Construction Contract

47. The Project will be constructed under a lump-sum, fixed-price, date-certain turnkey EPC contract. The non-EPC, non-critical parts of the Project, including the housing colony, landscaping, roads, etc., may be contracted out to various local contractors, package-wise on a turnkey basis, but under the responsibility of the EPC contractor.

48. The process of securing a fixed-price, lump-sum, turnkey EPC contract was competitive. Laraib initiated the process in September 2004 when nine firms from Pakistan, Malaysia, China, and Germany were asked to submit fixed-price bids using the Project's feasibility study as the basis for their offer. This initial set of bids, while inconclusive, established a range of prices for the EPC contract works. In view of its past track record, together with its appreciation of EPC contracting, the decision was made to negotiate with Ranhill Engineers and Constructors as the EPC contractor for the Project.

49. The lenders' independent engineer reviewed both the above tendering process and the final prices and has expressed an initial positive opinion on both matters. The Project's EPC cost compares favorably with similar projects elsewhere. Laraib was thus satisfied that the cost of both the EPC contract and the Project as a whole is indeed reasonable when compared to similar projects elsewhere in the world and the best price available in the market at the moment.

7. Operational Arrangements

50. Soluziona, a wholly owned subsidiary of Union Fenosa, the third largest electricity utility in Spain, is expected to be the O&M contractor. Soluziona has significant operational experience, as it is responsible for the operation and management of Union Fenosa's generating assets amounting to some 9,782 MW, including 2,727 MW of hydel, as well as third-party plants. Union Fenosa has annual turnover of €5.8 billion and total group assets of €15.2 billion. Laraib's owners themselves have experience in small-scale hydel operations, and the management team is expected to include one or more hydel experts.

8. Land Lease Arrangements

51. The project site was originally leased by WAPDA from AJ&K as part of the Mangla Dam project in the 1960s. As per the terms of this original arrangement, WAPDA returned the site to AJ&K as land surplus to the needs of the Mangla Dam project. Laraib has now leased 21.4 hectares of this land from AJ&K, with the formal lease notification executed on 9 October 2003. The required lease payment has been made and possession of the land taken by Laraib. The lease period is 25 years with an option for extension.

9. Insurance Arrangements

52. Laraib will take out insurance to cover essential risks for the supply and transportation of plant and machinery for erecting and commissioning and to cover all risks during construction and after commencement of commercial operations. The insurance package will be designed to maximize cover for insurable risks. An insurance advisor to the lenders will be retained to review and implement insurance arrangements.

D. Environmental Aspects and Social Dimensions

1. Environment

53. The Project has been classified environmental category B considering the Project's design as a run-of-the-river scheme and its environmental and ecological setting. Environmental clearance for the Project was received from the Environmental Protection Agency (EPA) of GOAJK and the Government of Pakistan EPA in 20 August 1996 and 6 January 1997, respectively. Clearance was later reconfirmed by GOAJK EPA in August 2004 for increasing the project capacity from 45MW. Notwithstanding the reconfirmation of the environmental clearance, Laraib updated the original environmental and social assessment to reflect any new developments that had taken place after the clearance and to assess any possible impacts due to the increase in project capacity. The updated environmental and social assessment was prepared in the form of an initial environmental examination document, and its summary is presented in Appendix 3. The examination confirmed that the findings and conclusions on the environmental and social impacts of the Project in the original environmental and social soundness assessment¹¹ report remain valid.

¹¹ The designated term for the environmental impact assessment process in Pakistan.

54. During construction, the Project will create certain environmental disturbances, such as the noise and dust invariably associated with construction. These environmental disturbances will be temporary and can be effectively addressed through established sound engineering design and mitigation measures as well as sound environmental management practices in the construction process. These issues will be prescribed and included as part of the EPC contract. The dredging of one channel of the Jhelum River and the embankment works will have no impacts on the river flow regime and ecosystem, as the flood plain is broad and has several channels during the dry season. The Project will utilize water currently discharged from the Mangla hydropower plant into the Jhelum River. Therefore, it will not change the current flow regime of the river. Proper treatment of wastes from the construction and residential quarters and offices, the minor environmental management issue that has been raised, will be mitigated.

2. Social Safeguards

55. No indigenous people live in the area surrounding the Project, no inhabitants occupy the site itself, and so no resettlement issues exist. The only minor social issue is the unauthorized use of about 6 hectares of land on small areas of the Project site by families from two adjacent communities for fodder cultivation and grazing. To resolve this issue, public consultations were held in the two adjacent communities, and the few families concerned agreed to stop their unauthorized land use. Laraib has expressed its willingness to provide suitable compensation to them (see Appendix 3).

3. Development Impact

56. The Project is designed primarily to promote economic growth through increasing the supply of electricity at relatively low cost. The power generated by the Project will help the country to bridge a pending electricity shortfall, thus avoiding energy shedding and economic disruption. Sponsored by private investors, complemented by Malaysian and Spanish engineering and power companies, the Project will provide best practice in energy infrastructure development. As the first private hydel power investment in Pakistan, the Project will provide an important benchmark for future hydel projects that are planned. The Project was developed in the context of the Hydel Policy 1995, which ensures competitive power, and it thus improves sector-wide efficiency. The Project is based on indigenous and renewable energy, which is essential for sustainable economic development and particularly well suited to Pakistan, and will support the development of the CDM market under the Kyoto Protocol, to which Pakistan is a signatory. The Project will catalyze financing from local and/or international commercial banks, encouraging these institutions to develop their private infrastructure lending activities to support the newly evolving private hydel sector and extend the maturities of their financing beyond those typically available in the market at present. The Project will also be the first ADB cofinancing agreement integrating Islamic banking principles and conventional banking instruments. The Project will create employment opportunities for up to 500 workers at any one time during the construction period and some 30–50 workers during operations. Laraib will seek to maximize the hiring of local people and is also committed to equal opportunities for women. A significant number of jobs for women are expected at Laraib as well as at the social facilities (a school and clinic) that will be constructed by Laraib for the benefit of the Project and the local community. This employment creation is particularly important given that this is a relatively poor region of Pakistan and that the Project will thus directly help to create conditions for economic growth and poverty alleviation.

4. Development Effectiveness

57. ADB's Private Sector Operations Department (PSOD) and Operations Evaluation Department are formulating guidelines for implementing the Good Practice Standards for Evaluation of Private Sector Investment Operations, which were prepared by the Evaluation Cooperation Group¹² of the multilateral development banks. These standards cover the roles of the independent evaluation department and the PSOD itself, the evaluation dimensions for private sector operations, the nature of annual reporting, and dissemination of reports and lessons. According to the standards, the three principal dimensions for private sector evaluation are development outcome (encompassing project performance, the project's contribution to economic sustainability, and its contribution to private sector development), investment profitability of the project intervention to the institution itself (i.e., specific returns on the loan, guarantee, or equity investment), and operational effectiveness measured and assessed on an overall department level.

58. The Project has been assessed and described from the perspectives of development effectiveness and project framework in terms of its specific performance, and the Project's contribution to both economic sustainability and private sector development (please refer to Appendix 4). The Project is deemed to be developmentally effective, and its performance measurable. A brief summary discussion follows on each of these parameters.

a. Project Performance

59. The Project will be assessed against its specific investment capital, construction, operational, and financial objectives. Essentially, effectiveness will be measured against how successfully the Project (i) attracted capital (both debt and equity), (ii) secured fixed construction costs and contracting arrangements for on-time construction within budget and specifications, (iii) secured suitable operational arrangements to enable optimal production of electricity and dispatch to NTDC, and (iv) was profitable as measured both by debt repayment capacity and investor returns.

b. Economic Sustainability

60. The Project will be assessed from an economic sustainability point of view on its ability to add needed generation capacity to the country's resources, in a least-cost manner and in an environmentally and socially acceptable way. In addition, the Project's outputs and contributions to the Government are considered, such as contributions to the economy via construction and operational expenditures and employment opportunities created. The Project's contribution to system efficiency (via its competitive tariff) and sector reform are considered.

c. Private Sector Development

61. The Project will be assessed and measured on how it contributes to private sector development. The focus of this assessment is on the Project's commercial and financial viability and its lasting demonstrative and catalytic effect on future private sector developments in the sector itself (with particular note of its demonstrative role as the first private hydel project in Pakistan) and the economy as a whole.

¹² The Evaluation Cooperation Group was established by multilateral development banks to design common evaluation standards for private sector operations. This work is ongoing, and some aspects of the evaluative framework may be subject to change according to best practices.

62. The project was not specifically assessed from an investment profitability point of view, as a profitability assessment is better gauged and measured against a portfolio of similar loans. Similarly, the Project was not assessed and measured against overall operational effectiveness, as this is a department-wide consideration.

63. The EPC cost, which is the major portion of the project cost, is expected to be denominated largely in dollars. It is intended, subject to market conditions and economic constraints, that the funding be provided in a combination of dollars and Pakistani rupees.

E. Economic Evaluation

64. The economic analysis attempts to quantify the net benefits the Project generates for the Pakistani economy in the context of the present and projected electricity demand and supply balance. The Project's capacity output is considered incremental and non-tradable. The incremental benefit is calculated using the Project's quantity output. Output was based on 426 GWh—ignoring an additional potential 95 GWh output based on increased and better regulated flows expected on completion of the Mangla Raise Project being undertaken by WAPDA—and an average end-user tariff. For the purposes of the analysis, a consumer surplus was not considered, as the Project's benefits demonstrate a sufficiently robust economic result. The incremental project benefit, due to the non-tradable nature of electricity, was adjusted using a standard conversion factor of 0.9. The incremental benefit was considered in light of economic costs, namely capital expenditures, O&M costs, and transmission and distribution costs. No hydro costs or water charges were considered due to there being no opportunity cost of the water used by the Project. Similarly, the Project is located on uninhabited scrubland, so the opportunity cost of the land used is considered nil. No resettlement issues or costs attach to the Project.

65. The resulting economic internal rate of return is strong and is an important conclusion given that, while the Project itself represents a negotiated investment consistent with the Government's Hydel Policy 1995, significant economic benefits will accrue to Pakistan as a result of the Project.

V. THE PROPOSED ASIAN DEVELOPMENT BANK ASSISTANCE

A. Loan

66. The proposed loan of up to \$37.3 million without government guarantee from the ordinary capital resources of ADB will be provided under ADB's London interbank offered rate (LIBOR)-based lending facility. The loan amount will be determined so that ADB's total exposure to the Project will not exceed ADB PSOD's single-transaction limit of 25% of total project cost.

B. Justification for Assistance

67. The Project merits ADB's support for the following reasons:

- (i) The Project will help Pakistan meet growing demand for electricity, which is essential for economic growth, in a least-cost manner by generating renewable energy with no detrimental environmental or social impacts.

- (ii) The Project supports the Government's strategy of encouraging private participation in the power sector, and especially in hydropower generation, where Pakistan is deemed to have a very strong competitive advantage. As well as the addition of generating capacity, the Project will help ameliorate the balance of the declining hydro/thermal generation mix in Pakistan, which is an objective of WAPDA and the Government.
- (iii) The Project is in line with ADB's country and energy sector strategies, which emphasize supporting energy infrastructure development with private sector participation and environmentally clean technology. It also supports ADB's thematic priorities of private sector development, sustainable economic growth, and environmental sustainability. The Project is consistent with ADB's public sector operations, which have assisted the Government's effort to restructure the power sector to attract more private sector investments, and ADB's emphasis on pro-poor economic development in AJ&K.
- (iv) Through the Project, ADB will be able to endorse best practices in infrastructure development. Specifically, the Project will provide a benchmark to other hydropower generators and will contribute to the development and reform of the power sector.
- (v) ADB's participation in the Project will enable and support local and overseas equity investment in the Project and catalyze local and/or overseas sources of debt capital. The Project also promotes combining conventional and Sharia-compliant debt facilities for infrastructure projects.
- (vi) The Project will help to support Pakistan's commitment to the Kyoto Protocol and the development of the CDM markets, which is consistent with ADB's thematic interests.

VI. INVESTMENT LIMITS

68. The proposed loan, which is PSOD's 39th in Pakistan, would, if approved by the Board, increase PSOD total exposure¹³ to Pakistan from 2.05% to 4.57%, and increase infrastructure sector exposure from 51.37% to 52.62%. The proposed loan is within ADB's aggregate country, industry, and single-project exposure limits for private-sector projects.¹⁴

VII. ASSURANCES

69. A framework agreement relating to ADB's status, privileges, and immunities with respect to its equity investments, lending operations, and guarantee operations in the private sector is in effect between the Government of Pakistan and ADB.¹⁵ Consistent with the agreement establishing the Asian Development Bank, the Government of Pakistan will be requested to confirm that it has no objection to the proposed assistance to Laraib. No funding will be disbursed until ADB receives such confirmation. ADB will also obtain appropriate assurances from Laraib in the financing documents customary to transactions of this nature including those relevant to related party transactions.

¹³ Exposure refers to drawn and undrawn portions of PSOD committed loans, equity investments, and guarantees as of 31 March 2005, which is the latest data currently available. An investment is considered committed when there are signed legal agreements.

¹⁴ These exposure limits are set in the *Operations Manual*, Section D10/BP, paras. 15–22.

¹⁵ Letters dated 21 June 1983, 9 December 1985, and 17 July 2002 between ADB and the Ministry of Finance and Economic Affairs.

VIII. RECOMMENDATION

70. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and recommend that the Board approve the loan of \$37,300,000 to Laraib Energy Limited for the New Bong Escape Hydropower Project from ADB's ordinary capital resources, with interest to be determined in accordance with ADB's LIBOR-based lending facility; a term of 15 years, including a grace period of 4 years, and such other terms and conditions as are substantially in accordance with those set forth in this report, and as may be reported to the Board.

Haruhiko Kuroda
President

31 October 2005

POWER SECTOR IN PAKISTAN

A. Sector Framework and Reform

1. Electricity represents 16.3% of the total final energy consumption in Pakistan. The power sector, which encompasses the generation, transmission, and distribution of electricity, is governed and regulated under the National Electric Power Regulatory Authority (NEPRA) Act of 1997. NEPRA, which was constituted as an independent entity, is exclusively empowered under the act and related rules to regulate all facets of the power sector. NEPRA is thus empowered to (i) grant licenses for generation, transmission, and distribution; (ii) approve tariffs, rates, and charges across the sector; (iii) establish uniform industry performance via codes and standards; and (iv) enforce the above. NEPRA, although mandated as an independent entity, is governed by a chairman and four members, all of whom are appointed by the Government, with the members recommended by, and representing, provincial interests.

2. Power sector policies and related legislative frameworks are developed and implemented by the Government via the Ministry of Water and Power. The Government initiated the process of power sector reforms and restructuring in the early 1990s on the advice of the World Bank. The power sector restructuring and reform process, developed in various stages and through different initiatives, is reflected today in various policies, such as the Power Policy 1994, Hydel Policy 1995, Transmission Line Policy 1995, Power Policy 1998, and Power Policy 2002. These were designed, to a large extent, to attract private sector participation in a newly restructured power sector. In addition, the NEPRA Act was promulgated to provide the overall regulatory umbrella for the sector. Finally, the Government is today undertaking the unbundling of the Pakistan Water and Power Development Authority (WAPDA) into various independent entities. The broad objectives of all these policies have been to (i) bring efficiencies across the entire sector via competitive generation, transmission, and distribution with appropriate independent regulatory oversight; (ii) rationalize prices and subsidies; and (iii) encourage private capital formation and investment to meet growing electricity demand.

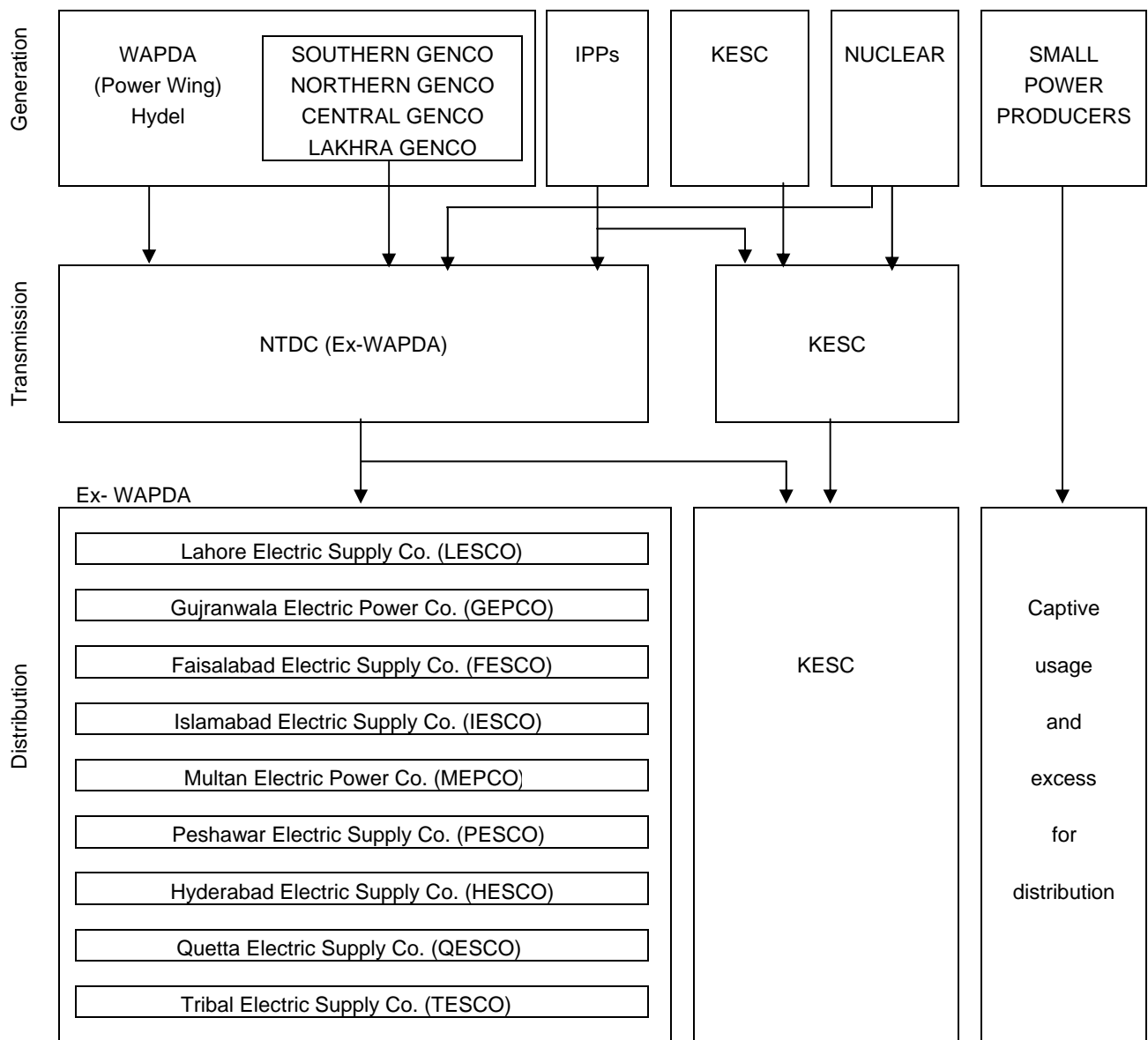
3. The power sector, as a result of the policies and reforms referenced above, has been, and continues to be, in transition and is today semi-privatized and semi-deregulated. The power sector has historically been characterized by very significant Government control through the WAPDA and Karachi Electric Supply Corporation (KESC) monopolies (which function as vertically integrated utilities encompassing generation, transmission, and distribution) and by both significant inefficiency, with losses in excess of 25%, and inability to meet demand. This characterization, at least in terms of outright Government control, has changed over the last decade, and Pakistan today enjoys significant private sector-led generation through independent power producers (IPPs), which together represent in excess of 30% of total generation capacity—and where KESC has recently been privatized. The evident success in attracting private sector generators was not without issues, and most IPPs ended up in sometimes acrimonious contract disputes with the Government and WAPDA. These disputes were largely driven by a significant capacity overhang in the mid-to-late 1990s (the exact opposite situation of today) and consequent tariff implications. Notwithstanding discord, these disputes have ultimately been settled amicably with minimal adjustments to the contracts. In hindsight, the terms of the contracts, although renegotiated, were ultimately honored, which provides a degree of comfort in the present investment environment.

4. Significant reforms are today well underway with the aim of breaking WAPDA's Power Wing into multiple and discreet generation and distribution units, and by placing WAPDA's transmission assets into a single corporatized entity, the National Transmission and Dispatch

Company Limited (NTDC). NTDC will assume the additional function of acting as the single-buyer of wholesale generation from multiple companies in the market (but excluding KESC) for onward transmission and sale to multiple distribution entities, in addition to responsibilities as market and system operator as an interim step to a fully competitive electricity market. The single-buyer model now being implemented will ultimately evolve into a multiple-buyer and multiple-seller regime where generators and distributors can contract directly. It is important to note that existing IPPs and those already approved and under development will be grandfathered under their respective enabling legislative schemes and thus preserve their contractual frameworks, including tariff structures. Such is the case for the Project, which will continue to be implemented under the Hydel Policy 1995 with a 25-year power purchase agreement with NTDC and the benefit of a Government guarantee.

5. The following depicts the proposed structure of the power sector, as currently envisaged but only partly implemented, as shown in Figure A1.1.

Figure A1.1: Present State of Pakistan’s Power Sector



IPP = independent power producer, KESC = Karachi Electric Supply Corp.,
 NTDC = National Transmission and Dispatch Co., WAPDA = Water and Power Development Authority

B. Tariff Structure

6. The retail tariff regime in Pakistan is class-tiered and graduated and includes significant cross subsidies. NEPRA is responsible for determining tariffs under its Tariff Standards and Procedures Rules of 1998, which specify standards by which tariffs are set, and procedures by which tariffs are adjudicated. These standards are sufficiently broad to allow discretion and thus

enable the development of various tariff regimes. Tariff determinations are based on the principle of recovering prudently incurred costs and returns on the applicant's rate base, applicable on a case-by-case basis. They contain certain automatic quarterly increases on account of changes in fuel costs or purchased power costs, as the case may be, in addition to macroeconomic indexation of costs. NEPRA's tariffs become effective once they are officially notified by the Government in its official gazette.

7. Average end-user tariffs for WAPDA and KESC are depicted in Table A1.1 below.

Table A1.1: Average Electricity Tariffs
(Paisa / kWh)

Year	1999	2000	2001	2002	2003	CAGR (%)
WAPDA	279.8	289.9	298.9	373.0	395.0	9.0
KESC	372.9	397.8	406.1	445.1	459.8	5.4

CAGR = compound average growth rate, KESC = Karachi Electric Supply Corporation, WAPDA = Water and Power Development Authority.

Source: NEPRA Annual Report 2003–2004

C. Electricity Demand

8. Pakistan's electricity consumption grew at a compound average growth rate (CAGR) of 4.84% from 1999 to 2003, and amounted to 54,397 gigawatt-hours (GWh) at the end of 2003. This growth is being driven across all classes of consumers (except bulk supply/other) but especially by commercial and industrial consumers, which registered CAGRs of 7.8% and 7.3%, respectively, in the same time period. Consumption has continued to grow on the back of recent annual economic growth rates of 6%, and similar growth rates in electricity demand are expected to continue in the near future on continued projected strong economic growth and higher rates of per capita electricity consumption.

9. Table A1.2 below illustrates Pakistan's electricity demand and growth rates.

Table A1.2: Breakdown of Electricity Demand
(GWh)

Class	1999	2000	2001	2002	2003	CAGR (%)
Domestic	19,267	21,400	22,701	23,171	23,531	5.18
Industrial	12,199	13,203	14,348	15,141	16,181	7.32
Commercial	2,381	2,544	2,774	2,950	3,218	7.82
Agriculture	5,019	4,540	4,924	5,606	6,017	1.73
Public Lighting	225	239	213	211	244	2.08
Other	5,339	5,415	5,344	4,843	5,156	(0.87)
Total	45,030	47,371	50,307	51,922	54,397	4.84

CAGR = compound average growth rate, GWh = gigawatt-hour.

Source: NEPRA Annual Report 2003–2004.

D. Electricity Supply

10. Total installed power generating capacity in Pakistan amounts to 19,252 MW, of which 11,196 MW is provided by WAPDA (58.1%), 5,808 MW by IPPs (30.2%), 1,756 MW by KESC (9.1%), and 30 MW by AJ&K Hydel (0.2%), the remainder being government owned nuclear (462 MW or 2.4%). Hydroelectric generation capacity represents about 6,491 MW, or 33.7% of total installed generation capacity.

11. Table A1.3 describes the breakdown of installed capacity.

Table A1.3: Breakdown of Installed Capacity
(MW)

Description	Total	Thermal	Hydel	Nuclear
WAPDA	11,196	4,735	6,461	
AJ&K	30		30	
IPPs	5,808	5,808		
KESC	1,756	1,756		
Nuclear	462			462
Total	19,252	12,299	6,491	462
Percent	100	63.9	33.7	2.4

AJ&K = Azad Jammu and Kashmir, IPP = independent power producer, KESC = Karachi Electric Supply Corporation, WAPDA = Water and Power Development Authority.

Source: Pakistan Energy Yearbook 2004.

E. Electricity Supply and Demand Projection

12. The Government's Private Power and Infrastructure Board (PPIB), part of the Ministry of Water and Power, forecasts the following relationship between peak demand and firm supply to 2010.

Table A1.4: Firm Supply Versus Peak Demand Projections
(MW)

Year	Firm Supply	Peak Demand	Surplus / (Deficit)
2004	15,046	13,831	1,215
2005	15,082	14,642	440
2006	15,072	15,483	(411)
2007	15,091	16,548	(1,457)
2008	15,055	17,689	(2,634)
2009	15,055	19,080	(4,028)
2010	15,055	20,584	(5,529)

MW = megawatt.

Source: PPIB.

13. WAPDA's Power Wing, in collaboration with both WAPDA's Energy Wing Planning and Development Division and the Government, developed several long-term electricity demand load projections for the WAPDA system (comprising about 87% of total electricity consumption in Pakistan, but excluding KESC), which confirm the above projections. Its medium base case

scenario forecast assumes growth in peak load of about 5% per annum to 2010, compared to PPIB's projected growth from 2004 to 2010 of 6.8%. In conjunction with this exercise, and in order to meet demand, WAPDA developed a least-cost Generation Expansion Plan, which emphasizes indigenous sources of energy such as coal and hydro consistent with the Government's power-sector policies. However, given the uncertainty of each projected capacity addition in terms of development costs, environmental issues and clearances, financing, and implementation—uncertainty in addition to that purely related to the precise timing of each addition—Pakistan is expected to enter into negative capacity availability in the foreseeable future, as projected by PPIB. Table A1.5 illustrates PPIB's peak demand projections relative to WAPDA's projected capacity additions, which in essence represent the best case scenario from a capacity addition point of view, as it assumes that all capacity additions will occur as planned. KESC-specific generation projects are not included due to the unavailability of information.

Table A1.5: Peak Demand, Firm Supply, and Projected Capacity Additions
(MW)

Item	2004	2005	2006	2007	2008	2009	2010
A. Supply							
Firm supply	15,046	15,082	15,072	15,091	15,555	15,055	15,055
B. Least-Cost Generation Expansion Plan (WAPDA)							
Malakand-III Hydel			81	81	81	81	81
Pehur Hydel				18	18	18	18
Allai Khwar Hydel					121	121	121
Khan Khwar Hydel					72	72	72
Duber Khwar Hydel					130	130	130
Keyal Khwar Hydel					130	130	130
Golen Gol Hydel					106	106	106
Jinnah Low Head Hydel					96	96	96
Matiltan Dist. Swat Hydel						84	84
New Bong Escape Hydel/IPP						79	79
Rajdhani Hydel/IPP						132	132
Thar Coal Chinese #1 & #2						600	600
Taunsa Hydel							120
Chashma Nuclear #2							325
Jarwar Combined Cycle (gas)							123
Balloki Combined Cycle (gas)							220
Sukkur Combined Cycle (gas)							120
Ghotki (coal)							180
Thar Coal #3							600
GT Ghakkar #1 (gas)							220
C. Total Projected Capacity	15,046	15,082	15,153	15,190	15,688	16,704	18,542
D. Projected Demand							
Peak demand	13,831	14,642	15,483	16,548	17,689	19,080	20,584
Surplus/(deficit)	1,215	440	(330)	(1,358)	(2,001)	(2,376)	(2,042)

MW = megawatt, WAPDA = Pakistan Water and Power Development Authority.
Source: PPIB and WAPDA Annual Report 2003–2004.

NATIONAL TRANSMISSION AND DISPATCH COMPANY

1. The National Transmission and Dispatch Company (NTDC) exists as a result of the Government's power sector reform initiatives, which continue to be implemented. NTDC lies at the center of the power sector today with a distinct corporate identity. NTDC is one of 12 newly corporatized entities that were previously part of the Pakistan Water and Power Development Authority (WAPDA). In addition to NTDC, eight distribution companies and three thermal generating companies have been established, with WAPDA itself retaining hydroelectric generation assets. The Government's strategy is to corporatize these entities with the final objective of privatizing the generators and the distributors. NTDC will, however, remain wholly owned by the Government given its critical central roles as the sole national transmission network, dispatch coordinator, and market operator.

2. NTDC was incorporated on 6 November 1998 and commenced commercial operation on 1 March 1999. It was organized to take over all the properties, rights, assets, obligations, and liabilities of the 220 kV and 500 kV grid station and transmission lines and network owned by WAPDA. NTDC was granted Transmission License No. TL/01/2002 on 31 December 2002 by the National Electric Power Regulatory Authority (NEPRA) to engage in the exclusive transmission business for a term of 30 years, pursuant to section 17 of the Regulation of Generation, Transmission, and Distribution of Electric Power Act, 1997 (NEPRA Act 1997). This 30-year license calls for NTDC to undertake three specific functions: (i) the transmission operations of the high voltage power network (220 kV and 500 kV voltage capacity), normally referred to as the wire business; (ii) the dispatch of all power generation linked to the national grid; and (iii) the single purchaser/seller of power between generators, including independent power producers (IPPs) and distributors, with the notable exception of the Karachi Electric Supply Corporation (KESC), which conducts its own purchase and distribution functions within its franchise area but is also able, as a distributor, to purchase from NTDC. Although the power trading activities are major new responsibilities for NTDC, the company has to maintain and increase its focus on the wire business in terms of design and planning, as well as the subsequent expansions, with a view to meeting the requirements of a competitive power trading market. These considerations are similar in the case of its dispatch function. The focus of NTDC in terms of dispatch has changed from the integrated utility operations within WAPDA of the past to the single-buyer model of today, which will evolve into a competitive economic dispatch model in due course.

3. Distributors will place their demands on NTDC through their power acquisition or expansion programs by indicating additional demand for load growth and new bulk load additions. Similarly, the generators will intimate their intention to offer generation capacity in the future. In the constantly changing equation of demand and supply (i.e., generation), NTDC is being licensed as a transporter of power from generation companies to distributors able to maintain an optimal balance between generation and demand by ensuring adequate capacity, at all times, under all system conditions. NTDC's function is critical as neither generation companies nor distribution companies may have sufficient overall information to plan the entire transmission system. Moreover, all distributors will be required to inform NTDC about their load forecasts, along with the locations and amount of expected load growth, and other information regarding their transmission requirements. As a result, NTDC will be able to plan and develop an adequate, reliable, and cost-effective transmission system and, in addition, provide the most cost effective means of locating additional generation to meet expected demand. To ensure adequate generation capacity at all times, NTDC is required to publicly announce its generation capacity expansion plan and preferred sites for generation additions, to assist policymakers in

proposing the most economic generation and potential investors in making decisions about their investment in generation.

4. Prior to the commencement of a fully competitive market, NTDC has been designated as the procurer of power on behalf of ex-WAPDA distributors according to their demand. NTDC will—after the fully competitive market is implemented and where generators and distributors may contract directly, as specified under sub-article (2) of the NEPRA Act 1997—procure electric power for balancing services only. However, an important feature is the preservation of contracts previously entered into between the generators and WAPDA/NTDC, which are backed by the sovereign guarantee of the Government of Pakistan. This grandfathering of contracts also applies to the New Bong Escape Hydroelectric Project (the Project), which is being implemented in accordance with previously enacted policies and so benefits from a Government's guarantee of NTDC's obligations under its power purchase agreement.

5. Operationally, NTDC links power generation units and load centers around the country, thus creating one of the largest contiguous grid systems in the world. It is responsible for purchasing the power from hydroelectric stations located in the north and thermal units in the public and private sectors, installed mostly in the central and southern regions of the country, and for selling power to the nine distribution companies. The large power transportation network is composed of transmission lines and grid stations of 500 kV and 220 kV voltage capacities. NTDC is also responsible for the construction, operation, and maintenance of the transmission facilities throughout the country except the area served by KESC (Karachi and the Lasbela district of Balochistan Province). The company also constructs 132 kV and 66 kV grid stations and transmission lines for the distribution companies. NTDC currently operates and maintains nine 500 kV and twenty-four 220 kV grid stations along with 10,167 kilometers of associated transmission lines. NTDC's functions and capabilities include (i) design and engineering services for the construction of transmission lines and grid stations; (ii) comprehensive system operation and specialized technical assistance to power sector participants; and (iii) the proper design, application, and functioning of a protective relay system.

6. Although NTDC has very significant assets inherited from WAPDA and is an indispensable part of the national power sector and system, NTDC's corporatization process is still under development. In this light, NTDC derives the necessary financial strength to operate and meet its obligations from its full Government ownership and, in the case of the Project, full and explicit Government guarantees of its obligations. NTDC is accordingly regarded as a quasi-sovereign/sovereign entity with financial capacity equivalent to that of the Government of Pakistan.

7. NTDC's audited balance sheets for the fiscal year ends of 2003 and 2004 are presented in Table A2.

Table A2: National Transmission and Dispatch Co. Ltd.
Audited Balance Sheets as of 30 June
(PRs millions)

Item	2004	2003
Assets		
Cash and short term investments	430	239
Trade receivables	42,082	27,289
Advances and other receivables	12,463	6,099
Stores and spares	3,887	4,232
Total Current Assets	58,862	37,859
Operating fixed assets	43,063	42,941
Capital works in progress	10,602	17,717
Long term loans and deposits	33	28
Total Assets	112,560	98,545
Liabilities & Equity		
Current portion of long term debts	3,678	3,574
Payables	56,701	40,016
Total Current Liabilities	60,379	43,590
Long-term loans	22,418	23,417
Deferred liabilities	3,654	3,555
Deposit for shares	37,511	37,511
Accumulated losses	(11,402)	(9,528)
Net Equity	26,109	27,983
Total Liabilities and Equity	112,560	98,545

Source: Financial Statements. National Transmission and Dispatch Co. Ltd.

SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

A. Introduction

1. The proposed New Bong Escape Hydropower Project (the Project), with a generation capacity of 79 megawatts (MW), is to be constructed on a 21.3 hectare site on the left bank of the Jhelum River 7.5 kilometers (km) downstream of Mangla Dam in Azad Jammu and Kashmir (AJ&K), about 120 km from Islamabad. The Project was initially conceived with a capacity of 45 MW and received environmental and social clearance from the national and provincial environmental agencies on 20 August 1996 and 6 January 1997, respectively. The clearance for the enhanced capacity was reconfirmed by the provincial environmental agency on 23 August 2004 subject to the condition that sewage from residential and office premises would be subjected to proper treatment.

2. The Project is classified as category B. No people reside on the Project site, and no indigenous people live in the surrounding area. Therefore, relocation and indigenous people are not issues. An initial environmental examination (IEE) was carried out by the project sponsor during October–November 2004 to update and reconfirm the previous findings on the environmental and social soundness of the Project, and a summary IEE was prepared as a standalone document for public disclosure. Only the main IEE findings are summarized and presented in this report and recommendation to the President.

B. Description of the Project

3. The Project facilities will consist of inlet, headrace channel, power house, tailrace channel, switchyard, and houses for about 50 operational personnel; public utilities, including a sewage treatment plant; and a bridge crossing the headrace channel. Technical features of major facilities are summarized below.

Table A3: Technical Features of Major Project Facilities

Project Facility	Technical Features
Headrace channel	Capacity: 1,080 m ³ /sec, length: 500 m, bed width: 78 m, bed slope: 1:6,000, concrete lining
Road bridge	Ordinary reinforced concrete road bridge spanning the headrace channel
Tailrace channel	Capacity: 1,392 m ³ /sec, length: 4,136 m, bed width: 91 to 152 m, bed slope: 1:4,000
Tailrace embankment	Length: 4,663 m, height: 6 m, top width 122 m, side slope 1:1.75, stone pitching
Powerhouse	Width: 66 m, length: 67 m, operating head 10–13 m, design flow: 1,023–1,136 m ³ /sec
New Bong Escape channel embankment	Length: 1,040 m, width: 61 m

m = meter, m³/sec = cubic meters per second.

Source: Laraib Energy Limited.

4. The Project is a run-of-the-river hydropower scheme. It will divert water currently discharged from the Mangla powerhouse through the New Bong Escape structure, into the new project headrace channel to drive four sets of low-head bulb turbine generators before returning the water into the river through the project tailrace channel. The electricity generated will be fed into the existing 132 kilovolt (kV) transmission line passing over the site. The Project tailrace channel will be constructed to develop additional head by excavating the Hari Channel, one of several channels of the Jhelum River, to further drop its water level and create an operating head of about 10–13 meters (m) on the turbines. The spoil from excavation of the tailrace channel will be used for flood protection through construction of an embankment running parallel to the tailrace channel. An embankment will also be constructed along the New Bong Escape channel to divert the flow to the main channel to the Jhelum River.

5. The Project will be constructed on a design-and-build basis. An engineering, procurement, and construction (EPC) contractor will be awarded a comprehensive contract covering detailed design, civil works construction, installation of mechanical and electrical equipment and machines, test run, and commissioning.

1. Natural Environment

6. The Project site, owned by the Water and Power Development Authority (WAPDA) as part of the Mangla Dam project in the 1960s, is vacant land with shrubs and few trees and no archaeological sites, graveyards, or mosques. The project area is a part of the Jhelum Valley and is in an active seismic area. Consequently, the earthquake return period of 1,000 years will be adopted in the design of the powerhouse and major project facilities.

7. The Jhelum River is the principal water resource in the project area, with a mean annual flow of about 28.37 billion cubic meters. Its flow is perennial and characterized by a great fluctuation in its discharge, with large flows during wet monsoons. The Jhelum River drains into the Mangla Dam Reservoir. The water in the reservoir is used to generate electricity in the Mangla powerhouse, with a total generation capacity of 1,000 MW. The water from the Mangla Dam powerhouse is discharged into a tailrace channel, a man-made canal named Bong Canal. Part of the flow of the Bong Canal is fed into the Upper Jhelum Canal to meet irrigation requirements, and the remaining flow is discharged into the Jhelum River through a man-made structure named the New Bong Escape.

8. During low flows, the Jhelum River downstream of the Mangla Dam meanders in several channels through a very broad floodplain that is several kilometers wide in some locations. The Jhelum River floodplain adjacent to the project site is more than 1,800 m in width. One of the channels of the Jhelum River adjacent to the project site, called the Hari Channel, will be used as tailrace channel. This channel represents only a very small portion of the entire floodplain.

9. As the project area is not densely populated and has no major industries, ambient air quality and water quality in the Jhelum River are high.

10. The project area has no ecological or biologically sensitive areas, as it has been subjected to human interventions for decades. Because of the degraded habitat conditions, the project site and its surroundings do not support any flora or faunal of ecological or economic significance.

2. Socioeconomic Environment

11. There are 21 communities within a 5 km radius of the project site. Only two communities, Lehri and Ferozabad, are adjacent to the project site and could be impacted by it. Some families in these two villages use parts of the project site, without authorization from WAPDA, for fodder cultivation and animal grazing. The Project will need to discontinue their use of the project site.

12. Lehri village has about 150 households, of which around a dozen are involved in unauthorized use of parts of the project site. An overwhelming majority of the households are financially supported by relatives living in foreign countries, especially the United Kingdom. Local trade and government and private employment is their secondary source of income. Agriculture and livestock are fringe economic activities, practiced at a level that is even less than subsistence.

13. Ferozabad village has only about 12 houses occupied by one extended local family and some small families that have come to the area after being displaced by conflict in their native northeastern AJ&K. The primary source of livelihood for these families is employment in the government and private sectors. Agriculture is a secondary economic activity. Young men from a couple of families work abroad and remit money.

14. The social infrastructure and public amenities in the two villages are poor, as evidenced by unpaved roads and the absence of schools or clinics. The project proponent intends to assist in improving social infrastructure and public amenities in these two villages.

C. Forecasting Environmental Impacts and Mitigation Measures

1. Impacts during Construction

15. The construction of project facilities will inevitably create environmental disturbances and impacts. But these will be transient and have no adverse ecological consequences, as the project site is small and has no flora or fauna species of ecological importance. Mitigation measures including physical measures and good environmental management practices will be included in the EPC contract to ensure that the design and construction minimize such environmental problems as disposal of excavated materials, soil erosion and degradation, fugitive dust, noise, safety and public health hazards, waste disposal, water turbidity in the Jhelum River during the excavation of the Hari Channel, and blocked access to houses and communal facilities.

16. In addition, the project sponsors are willing to pay compensation to those families that have to discontinue their unauthorized use of land in the project site.

17. The Project will not induce population influx as the area experiences a general trend of out-migration to larger towns and cities. During the detailed design, the project sponsors will consult with the local administration for advanced planning to ensure minimum adverse impacts from any population influx.

18. Although the Project will not have significant adverse social impacts, the project sponsors intend to help build social facilities in collaboration with the local agencies concerned.

2. Impacts During Operation

19. The Project will have no adverse environmental and social impacts during the operation phase, as it will not affect water availability in the Upper Jhelum Canal, and will not reduce the flows in the Jhelum River downstream of the New and Old Bong Escapes. However, after project completion, the New Bong Escape channel will receive water only in case of the shutdown of the project powerhouse. This 1,200 m man-made channel has no ecological significance, and is not used by the local communities. Therefore, its drying up will not have any significant environmental or social impacts.

20. To ensure harmony of the Project with the environment, the project sponsor will implement sound environmental management practices to effectively handle the basic environmental issues, including

- (i) waste management of residential complex and offices, particularly sewage treatment to the required standard and reuse of the treated effluents for gardening;
- (ii) waste management of warehouse, workshops, and motor pools;
- (iii) landscaping and plantation;
- (iv) environmentally responsible conduct of personnel, who will be expected to refrain from such activities as hunting and tree cutting; and
- (v) noise and other public nuisance abatement.

21. The above practices and conducts will be institutionalized in the environmental management system of the company. Appropriate undertakings and associated reporting requirement will be set out in the loan documentation.

D. Institutional Requirements and Environmental Management Plan

1. Environmental Management Plan

22. A project environmental management plan (EMP) was formulated, and it clearly defines (i) organizational structure, (ii) the roles and responsibilities of the various entities concerned, (iii) an impact mitigation plan, (iv) an environmental monitoring plan, (v) communication and documentation, and (vi) environmental training. The EMP was prepared for both the construction phase and the operational phase.

23. As the mitigation measures are part of the construction, their costs are included in the contract cost and represent only a very small part of the project cost. The cost of sewage treatment facilities for 50 operating personnel is also low compared to the cost of houses. The project sponsor has budgeted about PRs7.4 million to meet the cost of environmental management personnel and administrative expenses over the construction period.

24. The project sponsors will assume overall responsibility for compliance with the environmental and social management requirements of the provincial government and the lenders. The EPC contractor will assume overall responsibility for the environmental performance of all the subcontractors, ensuring that the subcontractors effectively implement all environmental management measures stipulated in the EMP and in the contracts. The project manager, representing the project sponsors, will discharge the project company's environmental and social responsibility as part of project implementation management. The project proponent will appoint an environmental and social inspector to assist the project manager and provide

policy support on all environmental and social matters. The project proponent will coordinate with relevant government departments and other stakeholders through its environmental and social inspector.

25. The EPC contractor will appoint an environmental and social supervisor to assist its project manager in overseeing and monitoring the environmental performance of all the subcontractors. Each subcontractor will appoint an environmental and social officer to assist its resident engineer in implementing EMP aspects specific to its contract.

26. The mitigation plan for the construction phase is prepared and presented in the IEE. It contains

- (i) a comprehensive listing of mitigation measures (actions),
- (ii) the person(s) responsible for ensuring the full implementation of the action,
- (iii) the persons responsible for monitoring the action, and
- (iv) a timescale for the implementation of the action to ensure that the objectives of mitigation are fully met.

27. The identified mitigation measures will be translated into environmental requirements and specifications for the detailed design and construction, with legally binding effect.

28. Environmental and social management tasks during the operational phase will be minimal and become routine activities as part of the overall management of the powerhouse. Management of wastes from residential quarters and offices will be the only main task.

2. Monitoring Plan

29. During the construction phase, the environmental performance of all subcontractors will be closely monitored by the EPC contractor under the oversight of the project sponsor. The monitoring will cover both compliance monitoring and effects monitoring in line with the requirements in the mitigation plan focusing on soil erosion, water quality, air quality, noise, and socioeconomic aspects. A detailed monitoring plan will be developed during the detailed design phase of the Project, when specific information on field activities will be known. The monitoring schedule will be linked to the construction schedule.

30. An effective mechanism for storing and communicating environmental information will be established. The data and information will be systematically filed and stored in a central location. Periodic meetings of all parties concerned will review the implementation of the EMP and monitoring results and resolve any identified problems. The EPC contractor will produce periodic monitoring and evaluation reports. At the end of the construction phase, the EPC contractor will prepare a final monitoring and evaluation report to be a part of a Project completion report.

31. In addition, the EPC contractor will establish at the Project site a social complaint register to document all complaints received from local communities. The register will also record the measures taken to mitigate these concerns. All community complaints received will be sent to the project proponent's environmental and social inspector and project manager for their information and further action.

32. The EPC contractor will provide training to the project sponsor staff, the subcontractors, and other staff engaged for the Project. Training will cover the requirements of the IEE and EMP, with special emphasis on sensitizing project staff to the environmental and social aspects of the

Project. A training program will be prepared before the commencement of the Project during the detailed design phase.

E. Public Consultation and Disclosure

33. A consultation was held on 30 October 2004 with representatives of government agencies concerned including WAPDA, the Irrigation Department of the government of Punjab, and the provincial government's Revenue Department. All the representatives expressed their support for the Project and willingness to cooperate.

34. A public consultation was held in Ferozabad on 1 November 2004. The public consultation team visited seven houses that have been using the project site. In each house visit, the public consultation team explained the project layout, scope, and requirements as well as the impacts, particularly on the unauthorized grazing and occasional cultivation on the project site practiced by some families. Their reactions to the various aspects of the Project were sought in a semi-structured discussion. The villagers showed no concerns about environmental disturbances and inconveniences that the Project may cause during construction, since they had similar experiences with much larger projects in the past. The affected households expressed their willingness to discontinue their unauthorized use of the project site but expect some compensation.

35. In Lehri, a group consultation was held on 2 November 2004 involving about 16 household representatives that have been using the project site. The results were similar to those of Ferozabad.

36. The outcomes of the consultations led to a conclusion that the Project would have no significant social impacts. The small extent of unauthorized cultivation and grazing does not significantly contribute to the income of the residents of Lehri and Ferozabad villages. The grazing activity can be conveniently shifted to the adjacent areas.

F. Findings, Conclusions and Recommendations

37. The IEE findings confirm that the Project, being a run-of-the-river hydropower project, is unlikely to cause any significant, lasting environmental or social impacts. Environmental disturbances normally associated with construction activities will be minimized through implementation of the EMP and close monitoring of its implementation. Sound environmental management practices and effective mitigation measures will be prescribed as part of the EPC contract for detailed design and construction.

38. It is concluded that the IEE is adequate to justify environmental and social clearance of the Project. It is recommended that the IEE is considered adequate for environmental and social assessment of the Project.

DESIGN AND MONITORING FRAMEWORK

1. Project Framework

Design Summary	Performance Indicator / Targets
Impact	
<ul style="list-style-type: none"> • To ensure continued and reliable availability of electricity in Pakistan, in an optimal manner, to meet rising electricity demand 	<ul style="list-style-type: none"> • Projected demand/ supply deficit reduced • Increased reliability of power supply • Project meets WAPDA's least-cost Power Generation Plan
Outcome	
<ul style="list-style-type: none"> • To attract private sector investment • To add new competitive capacity available to NTDC for transmission to distributors, especially load centers located near project site • To improve 132 kV system efficiency by delivering electricity directly to NTDC's 132 kV transmission network and relieve NTDC's high voltage transmission lines (>132 kV) that currently feed into project area (thus reducing NTDC's transmission losses) • To create a new renewable source of generation that reduces national reliance on thermal generation sources • To add peaking capacity to NTDC's system • To relieve scarce government financial resources for alternative uses 	<ul style="list-style-type: none"> • Project costs financed by private capital • Full project dispatch as per power purchase agreement with NTDC • Project generation tariffs competitive on a national basis • Reduction in NTDC's transmission system losses related to delivery of electricity to load centers situated near project site • Increased hydel generation on a gross generation basis and as a percentage of total system installed capacity • Reduced load shedding • Increased private investment in AJ&K

Design Summary	Performance Indicator / Targets
Outputs	
<ul style="list-style-type: none"> • Installation of 4 x 20 MW turbines plus powerhouse, intake, headrace, substation, and interconnection with NTDC 132 kV transmission line • Electricity generation that meets power purchase agreement requirements 	<ul style="list-style-type: none"> • Project completion occurs on time and on budget • Commercial operations date occurs • Project performs as per power purchase agreement requirements in terms of plant availability, dispatch, and outages
Activities	
<ul style="list-style-type: none"> • Project development and due diligence • Attract private equity and debt financing 	<ul style="list-style-type: none"> • Project approvals, permits, agreements, and contracts allowing for project implementation • Signed shareholder agreement(s) • Signed loan agreement(s)

AJ&K = Azad Jammu & Kashmir, GWh = gigawatt-hour, kV = kilovolt, MW = megawatt, NTDC = National Transmission and Dispatch Company Limited, WAPDA = Pakistan Water & Power Development Authority.

2. Development Effectiveness

Objectives	Impact
1. Project Performance	
Objectives	
<ul style="list-style-type: none"> • Private equity 	<ul style="list-style-type: none"> • International and domestic private capital formation
<ul style="list-style-type: none"> • Debt capital 	<ul style="list-style-type: none"> • Attract overseas and domestic debt

Objectives	Impact
	capital <ul style="list-style-type: none"> • Enhance cooperation and cofinancing opportunities with MDBs
<ul style="list-style-type: none"> • Fixed-price and on-time construction 	<ul style="list-style-type: none"> • Construction efficiency
<ul style="list-style-type: none"> • Operational efficiency 	<ul style="list-style-type: none"> • Optimal technical performance
<ul style="list-style-type: none"> • Debt repayment and equity returns 	<ul style="list-style-type: none"> • Economic and financial validation of the Project
2. Economic Sustainability	
Items	
<ul style="list-style-type: none"> • Physical infrastructure 	<ul style="list-style-type: none"> • Pro-poor, sustainable, economic growth in AJ&K and Pakistan
<ul style="list-style-type: none"> • New electricity generation capacity 	<ul style="list-style-type: none"> • Meets rising electricity demand
<ul style="list-style-type: none"> • Efficiency 	<ul style="list-style-type: none"> • Least-cost generation
<ul style="list-style-type: none"> • Power sector development 	<ul style="list-style-type: none"> • Meets sectoral objectives for private, hydro, and environmentally benign power generation • Use of indigenous resources and contribution to optimized hydro/thermal capacity and generation mix
<ul style="list-style-type: none"> • Environmental development 	<ul style="list-style-type: none"> • Usage of renewable, environmentally benign generation sources • Generation of certified emission reduction credits under Kyoto Protocol CDM
<ul style="list-style-type: none"> • Economic growth 	<ul style="list-style-type: none"> • Project adds to Pakistan's GDP via construction and operations • Direct employment
<ul style="list-style-type: none"> • Sector reforms 	<ul style="list-style-type: none"> • Project validates

Objectives	Impact
	sector reforms and policies, especially Hydel Policy 1995
Items	
<ul style="list-style-type: none"> • Commercial/technical viability 	<ul style="list-style-type: none"> • Demonstrative effect
<ul style="list-style-type: none"> • Financial viability 	<ul style="list-style-type: none"> • Demonstrative effect
<ul style="list-style-type: none"> • Private power sector (and hydroelectric subsector) development 	<ul style="list-style-type: none"> • Demonstrative effect • Validation of sector policies, reforms, and incentives, including public-private partnership model • First private hydroelectric project in Pakistan • Complements and reinforces existing private IPP generation
<ul style="list-style-type: none"> • Capital markets 	<ul style="list-style-type: none"> • Develop longer maturities and integrated multiple sources of financing into one package for infrastructure financing in Pakistan • First mixed Islamic and conventional financing for a private infrastructure project in Pakistan
<ul style="list-style-type: none"> • Private sector investment 	<ul style="list-style-type: none"> • Highly visible example of private sector investment in Pakistan • Increased private FDI

AJ&K = Azad Jammu & Kashmir, CDM = Clean Development Mechanism, DSCR = Debt Service Coverage Ratio, EPC = engineering, procurement and construction, FDI = Foreign Direct Investment, GDP = Gross Domestic Product, NTDC = National Transmission and Dispatch Company Limited, O&M = operation and maintenance, WAPDA = Pakistan Water & Power Development Authority.