



No. PD PPMU/1260/2014
PUNJAB POWER MANAGEMENT UNIT (PPMU)
ENERGY, DEPARTMENT
GOVERNMENT OF THE PUNJAB
77 SHAH JAMAL COLONY, LAHORE

Dated January 25, 2015

✓ The Registrar

National Electric Power Regulatory Authority (NEPRA)
2nd Floor, OPF Building,
G-5/2, Islamabad

Subject: **4.04 MW Deg-Outfall Hydropower Project, Sheikhpura- Application for Generation License**

Dear Sir,

4. I, Moeed-ud-Din Sheikh, Project Director, Punjab Power Management Unit (the "PPMU"), being the authorized representative of the Punjab Power Development Company Limited (the "PPDCL") by virtue of the authority granted by Board of Directors of PPDCL' resolution dated 31-1-2014 (Copy attached hereto for reference) hereby apply to the National Electric Power Regulation Authority for the grant of a generation license for Deg-Outfall Hydropower Project to the PPDCL pursuant to Chapter III—License Regulation 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

5. I, certify that the documents—in-support attached with this application are prepared and submitted in conformity with the provisions of the National Electric Power Regulatory Authority Licensing (Application and Modification Procedure) Regulation 1999, and undertake to abide by the terms and provisions of the above-said Regulations. I, further undertake and confirm that the information provided in the attached documents-in-support is true and correct to the best of my knowledge and belief.

6. A Cheque No. 167672 dated January 13, 2015 in the sum of Rs. 136,624/= (Rupees one hundred sixty seven thousand, six hundred seventy one only) being license application fee calculated in accordance with Schedule II to the National Electric Power Regulatory Authority Licensing (Application and Modification Procedure) Regulations, 1999, as subsequently amended is attached in a separate sealed cover.

With best regards

Yours Truly,

(Moeen-ud-Din Sheikh)

Project Director



Flag A-1

No. PPDCL/1845/2014

PUNJAB POWER DEVELOPMENT COMPANY LTD
Energy Department, Government of the Punjab
77- Shah Jamal Colony, Lahore 042-99239871

Dated 04/03/2014

To

The Registrar,
National Electric Power Regulatory Authority (NEPRA)
Islamabad

Sub: **RESOLUTION OF BOD**

The Punjab Power Development Company Limited (PPDCL) has been established under the aegis of Government of the Punjab, Energy Department, in pursuance of Section-32 of the Companies Ordinance-1984. The Board of Directors of PPDCL during its 26th Meeting held on 31st January, 2014 has resolved as under:

"Resolved to authorize the Project Director, Punjab Power Management Unit of Renewable Energy Development Sector Investment Programme (REDSIP) of Asian Development Bank to file applications for Generation License and Tariff Petitions with NEPRA on behalf of PPDCL"


(Ikram Naveed)
Company Secretary

C.C

1. P.S. Additional Chief Secretary (Energy), Govt. of the Punjab, Lahore
2. Chief Executive Officer, PPDCL
3. Project Director, PPMU
4. Master File

144
04/03/2014

APPLICATION FOR THE
GENERATION LICENSE

**Deg-Outfall
Hydropower Project**

New Generation Facility (Hydel) – License Application

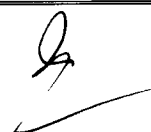
1. Name of Company: Punjab Power Development Company Limited (PPDCL)
2. Capacity : 4.04 MW Deg-Outfall - Sheikhpura
3. Prepared/Updated on: 25-01-2015
4. Application is being filed pursuant to NEPRA Regulations 1999 (Application and Modification Procedure)

Regulation #	Information/Documents Required	Compliance		Comments/Remarks
		Yes	No	
3(1)	An application for a license shall be made in the form specified in Schedule 1 to these rules. Authorization from Board of Directors Resolution/Power of Attorney	Yes	-	Format given in Schedule 1 has been used. Authorization from Board of Directors (BOD) of Punjab Power Development Company Limited (PPDCL) attached with application.
3(3)	The Registrar shall not receive the application unless it is accompanied with the correct amount of application fee. (including indexation)	Yes	-	A cheque drawn on National Bank of Pakistan (NBP), Lahore bearing number 167672 amounting to Rs.136, 624/= is attached with application for Deg-Outfall Hydropower Project (DHP).
3(4)	The application for a license shall be submitted in triplicate	Yes	-	Three Copies attached. One Original & two certified copies
3(5)(a)(i)	Certified copy of <u>Certificate of incorporation</u> shall be filed as documents -in-support along with application for license.	Yes	-	Certificate of Incorporation of Punjab Power Development Company Limited (PPDCL) is attached with this application.
3(5)(a)(ii)	Certified copy of <u>Memorandum and Articles of Association</u> shall be filed as documents -in-support along with application for license.	Yes	-	Certified Copies of <u>Memorandum and Articles of Association</u> obtained from Securities & Exchange Commission of Pakistan (SECP) are attached. However, it may be mentioned that Punjab Power Development Company Limited (PPDCL) is



				a public sector company fully owned by the Punjab Government. Flag A.
3(5)(a)(iii)	Certified copy of <u>Annual Return in case of applicant required to be submitted to the Registrar of companies pursuant to Section 156 of the Ordinance</u> , shall be filed as documents -in-support along with application for license.	-	No	Not Applicable as Punjab Power Development Company Limited (PPDCL) is purely a public sector company fully owned by the Punjab Government.
3(5)(a)(iv)	In case of an applicant to whom sub-clause (a)(iii) of Sub-clause (5) is not applicable , a return comprising all such information, in as close a form and content as possible, laid down in the third schedule to the Ordinance	-	No	Not Applicable
3(5)(b)	A reasonably detailed profile of the experience of the applicant , its management staff and its members in the electricity industry	Yes	-	Details are given in attached with Organogram Flag B. Brief on PPDCL is enclosed. Flag B-1
3(5)(c)	The curriculum vitae of the applicant's senior management, technical and professional staff	Yes	-	The requisite CV's are attached. Flag C.
3(5)(d)(i)	Evidence , satisfactory to the Authority, of the availability of adequate financial and technical resources to the applicant for the purpose of the generation, transmission or distribution business, as the case may be, and such evidence may consist of : <u>Cash balances held in reserve along with the bank certificates;</u>	Yes	-	Government of the Punjab provides requisite funds through budget for revenue and development expenditure to Punjab Power Management Unit and PPDCL, implementing the ADB funded Project. Copies of Release Order of Finance Department to PPDCL are attached Flag D. Details of assignment accounts and releases to PPMU can also be provided

				if required. Cash balances held in reserve along with bank certificates details-hence Not Applicable.
3(5)(d)(ii)	Evidence , satisfactory to the Authority, of the availability of adequate financial and technical resources to the applicant for the purpose of the generation, transmission or distribution business, as the case may be, and such evidence may consist of : <u>expression of interest to provide credit or financing along with sources and details thereof;</u>	Yes	-	Renewable Energy Development Sector Investment Program (REDSIP) is financed through a soft loan by Asian Development Bank (ADB). As per funding modalities of the ADB Loan Agreement, the Punjab Government would provide 20% of the total Project Cost as Equity through Annual Development Program. Recently the Punjab Government has committed to provide additional funds beyond 20% agreed Equity if loan proceeds fall short of financial requirements to complete the REDSIP Projects. Loan Agreement & requisite Commitment Letter and Punjab Finance Department's funds Release order for PPDCL / PPMU being a purely government-owned company / entity are attached. Flag E.
3(5)(d)(iii)	Evidence , satisfactory to the Authority, of the availability of adequate financial and technical resources to the applicant for the purpose of the generation, transmission or distribution business, as the case may be, and such evidence may consist of :	Yes	-	Loan Agreement with Asian Development Bank (ADB) is attached herewith. Flag F. Copies of relevant pages of Annual Development Program (ADP) circulated by Punjab Finance Department as an Annual Budget



	<u>latest financial statements of the applicant;</u>			Documents are placed at Flag G.
3(5)(d)(iv)	Evidence , satisfactory to the Authority, of the availability of adequate financial and technical resources to the applicant for the purpose of the generation, transmission or distribution business, as the case may be, and such evidence may consist of: <u>employment records of engineering and technical staff of the applicant proposed to be employed;</u>	Yes	-	Requisite employment records are given in CV's of the staff attached with the application. Flag C-1 EPC/Turnkey Contract (Flag H) with Chinese Contractor M/s. SINOTEC-SHPE (JV) is attached. The EPC/Turnkey Contract has been awarded through International Competitive Process (ICB) as per procurement guidelines of ADB i.e. Single Stage two-envelopes after being the lowest bid and technical qualification of the Contractors;
3(5)(d)(v)	Evidence , satisfactory to the Authority, of the availability of adequate financial and technical resources to the applicant for the purpose of the generation, transmission or distribution business, as the case may be, and such evidence may consist of: <u>profile of sub-contractors, if any, along with expressions of interest of sub-contractors; and;</u>	-	No	Not Applicable
3(5)(d)(vi)	Evidence , satisfactory to the Authority, of the availability of adequate financial and technical resources to the applicant for the purpose of the generation, transmission or distribution business, as the case may be, and such evidence may consist of: <u>verifiable references in respect</u>	Yes	-	The EPC/Turnkey Contract has been awarded through ICB process after technical qualification of the Contractors; -Previously Power Wing of the Punjab's Irrigation and Power Department was dealing with power issues of the Province. Its domain



	<u>of experience of the applicant and its proposed sub-contractor;</u>			was limited and primarily meant for regulation and administration. But with REDSIP initiative, the required expanded role was needed. Hence PPDCL and PPMU were established as required by ADB. These entities are now attached with a newly created Energy Department, Punjab to provide required focused and concentrated efforts for the development of energy sector.
3(5)(e)	In respect of a going concern, details of any charges or encumbrances attached to the company's assets;	-	No	-Asian Development Bank has provided loan through Economic Affairs Division, Government of the Pakistan; -Not Applicable as the development initiative currently on the table is a new public sector foreign-aided project.
3(5)(f)	In case of a first application for a license by a going concern, technical and financial proposals in reasonable detail for the operation, maintenance, planning and development of the generation, transmission, or distribution facility or system in respect of which the license is sought;	-	No	-The project is being executed as EPC/Turnkey Contract, signed with Chinese firms SINOTEC-SHPE (JV). -Not Applicable as the project is new. However, the project being implemented by Punjab Power Management Unit (PPMU) and will be handed over to PPDCL for operation & maintenance i.e. commercial operation through their technical staff and revenue generated through sale of



				electricity.
3(5)(g)(a)	In case of ; <u>generation license applications, the type, technology, model, technical details and design of the facilities proposed to be acquired, constructed, developed or installed;</u>	Yes	-	The required details are provided in the Project Description.
3(5)(g)(b)(i)	Distribution and transmission license applications: <u>the type, technology , model, technical details and design of the facilities proposed to be acquired, constructed, developed or installed;</u>	-	No	Not Applicable
3(5)(g)(b)(ii)	Distribution and transmission license applications: <u>a territorial map of the service area proposed to be covered;</u>	-	No	Not Applicable
3(5)(g)(b)(iii)	Distribution and transmission license applications: <u>particulars in respect of the availability, sources, rates and evidence of commitments from the sources of electric power;</u>	-	No	Not Applicable
3(5)(h)(i)	In case of a license for a new facility or system, a feasibility report in respect of the project, specifying in details: <u>the type, technology, model, technical details and design of the facilities proposed to be constructed, developed or installed;</u>	Yes	-	The Feasibility Study of the sub-projects was initially carried out by ADB under Technical Assistance (TA) grant. These Feasibility Studies were carried out by ADB appointed consultants prior to offering loan to Government of Pakistan (Borrower) for on-lending to the concerned provinces i.e. the Punjab & Khyber Pakhtoon Khawa for harnessing the renewable energy potential. As required by ADB, review of these Feasibility Studies was



				made by Management Consultants under the Loan and Tender Level Designs. Project now being implemented through EPC/Turnkey Contractor, who is responsible for detailed designs. The approved copy of detail design report by EPC/Turnkey Contractor, attached. Flag I
3(5)(h)(ii)	In case of a license for a new facility or system, a feasibility report in respect of the project, specifying in details: <u>the expected life of the facility or the system;</u>	Yes	-	Thirty Three (33) years as per Government Standards i.e. 30 years of PPA (Power Purchase Agreement) including 3 years of construction phase.
3(5)(h)(iii)	In case of a license for a new facility or system, a feasibility report in respect of the project, specifying in details: <u>the location of the facility or the system, or the territory with outer boundaries within which the facilities or the system is proposed to be installed and operated by the licensee, along with maps and plans; and</u>	Yes	-	The Project is being built on Upper Chenab Canal (UCC), which is located in Sheikhpura District of Punjab Province. The requisite Map is attached. Flag J.
3(5)(i)	A Prospectus	Yes	-	Attached

SCHEDULE III [Regulation 3(6)]

(C) NEW GENERATION FACILITIES (HYDEL)

1.	Location (location maps, site map)	Yes	-	Details have been provided in project description/details and requisite maps attached
2.	Plant: Run of the River, storage, veir	Yes	-	Run of River (ROR). The project will be built on Upper Chenab Canal (UCC)



3.	Head: Minimum, Maximum	Yes	-	Max: Net Head 5.65 m Min: Net Head 3.30 m
4.	Technology: Francis, Pelton, etc size, number of units	Yes	-	Turbine: Pit Type Horizontal Shaft Kaplan (Double Regulated) Units: 2
5.	Tunnel (if proposed): length, diameter	Yes	-	Tunnel is not required
6.	ESSA (Environmental & Social Soundness Assessment)	Yes	-	Copy attached. Approval letter attached
7.	Detailed Feasibility Report	Yes	-	Copy provided
8.	Resettlement Issues	Yes	-	No such issues have been confronted
9.	Consents	Yes	-	EIA (Environmental Initial Assessment) already approved. Customs and other duties at concessionary rates will be applicable as per GOP/GOPb Policy.
10.	Infrastructure development	Yes	-	Included in EPC (Copy provided)
11.	Interconnection with National Grid Company. Distance and name of the nearest grid, voltage level (single line diagram)	-	-	Requisite studies i.e. Load Flow, Short Circuiting and Dynamic Stability, along with Transmission Route Study as well as assessment of equipment for proper interfacing for dispersal of energy, already underway by the Contractor. These studies would be provided when completed and validated by LESCO (Lahore Electric Supply Company). Grid Station: Sheikhpura , 11 KV Bus Bar,



12.	Project Cost , information regarding sources and amounts of equity and debt	Yes	-	Local Financial Cost (Rs. M) =445.72 Eqvi Foreign Financial Cost (Rs. M) =1799.34 (US\$ 16.84 M) Total = 2245.07 (Rs. M) -Debt Equity Ratio= 80:20 -Debt: Asian Development Bank (Eqvi Rs. 1796.05 M) -Equity: Punjab Government (Rs. 449.01 M)
13.	Project Schedule, expected life	Yes	-	Construction period is 885 days with DLP of 12 months. Project life is assumed as 30 years for the purpose of financial and economic calculations and tariff
14.	Peaking /base load operation	Yes	-	Base Load
15.	Plant characteristics: generation voltage, power factor, frequency, automatic generation control, ramping rate, control metering and instrumentation	Yes	-	Transmission Voltage 11 kv Power Factor: 0.8 Frequency: 50 Hz Interconnection is proposed at 132 KV Attabad Grid Station 12 km from the generation facility
16.	System studies load flow short circuit, stability studies	Yes	-	Studies already underway through Consultant by SINOTEC Contractor. These studies would be provided after validation by LESCO.
17.	Training and Development	-	No	Not Applicable



Plant Details & Other Details

1. General Information

- Name of Applicant Punjab Power Development Company Limited (the "PPDCL")
- Address of the registered office 77-Shah Jamal Colony, Lahore
- Plant Location District Sheikhpura-Punjab
- Type of Facility Low Head Hydropower Project

2. Plant Configuration

- Low Head Hydropower turbines
- Capacity of the Power Plant 4.04 MW (Gross)
- Type of Technology Very Low Head Hydropower Generation
- Number of Units / Capacity 02
- Power Plant Make and Model Low Head Kaplan Pit Type Turbines
- Commissioning Date July 2015

3. Fuel Details

- Type of Fuel Hydropower Generation
- Fuel (Imported / Indigenous) Indigenous
- Fuel Supplier N.A
- Water Use Agreement With Irrigation Department GOPb

4. Emission values

- SO_x NA
- NO_x NA
- CO NA
- PM10 NA

5. Installed Capacity 4.04 MW

6. De-rated Capacity to be provided later

7. Expected Life of the Facility 30 years

8. Operation Record New Plant to be commissioned by July 2015

9.



10. Plant Characteristics

- Generating Voltage 11 KV
- Frequency..... 50 Hz
- Power Factor Leading 0.95 at Lagging 0.8
- Automatic Generation Control No
- Ramping Rate..... to be provided later
- Alternative Fuel..... No
- Auxiliary Consumption 40 kW
- Time required to Synchronize to be provided later

Schedule H

The Net Capacity of the Licensee's Generation Facility

- Gross Installed Capacity of the Plant (ISO).....4.04 MW
- De-rated Capacity of the Plant.....to be provided later
- Auxiliary Consumption of the Plant40 kW
- Net Capacity of the Plant4000 kW
- Construction Period885 days
- Expected date of Commercial Operation of the Plant — July , 2015

Note: These are indicative figures provided by the Licensee.

The Net Capacity of the Plant available for dispatch to Power Purchaser will be determined through procedures contained in the EPC Agreements or Grid Code.



Interconnection Arrangement with National Grid for Power Dispersal of the Plant

The transmission line will connect Power House complex with the nearest LESCO's 132 KV Grid Station at Attabad substation. The transmission line will be a double circuit 11 KV overhead line with 12 km length for evacuation of energy generated by the project. The cost of transmission line is included in the lump sum EPC Bid. For this purpose the Contractor being EPC Contractor has engaged a consultant to conduct Load Flow Study, Short Circuit Study and Dynamic Stability Study besides studying the route and length of transmission line from the power house to grid station. The Consultant will also study the assessment/requirements of additional equipments needed for proper inter-facing. The study upon submission for validation & appraisal on the basis of WAPDA specifications will be provided to LESCO so that the Contractor (SINOTEC) could construct the transmission line as part of EPC contract.

These arrangements have been incorporated in the Project's physical scope to ensure the energy dispersal and inter-connectivity on the immediate basis after the commissioning of the power house. Traditional arrangements about transmission line would cause the delay the energy evacuation /dispersal.



4.04 MW Deg Outfall Hydropower Project
Upper Chenab Canal – District Sheikhpura
Punjab – Pakistan

Prospectus



4.04 Deg Outfall Hydropower Project

PROJECT DESCRIPTION

Asian Development Bank (ADB) offered a multi-tranche loan of US\$ 500 Million to the Govt. of Pakistan for development of renewable energy resources under Renewable Energy Development Sector Investment Programme (REDSIP). The first tranche of J¥ 5599 million for Punjab, was negotiated in Oct. 2006, however loan was signed on October 5, 2007, upon approval of PC-Is by ECNEC. Govt. of Pakistan is the "BORROWER" for on – lending to the Govt. of Punjab (GOPb). The GOPb is responsible to share 20% equity in addition to the ADB Loan. The revised allocation of the ADB Loan No. 2286 (OCR) for construction of projects is J¥ 7882 million based on actual bidding.

The Feasibility Reports and the original PC-1s were framed by ADB Consultants under PPTA (Project Preparation Technical Assistance) in 2005-06. Management Consultants for REDSIP, Punjab were appointed under ADB Loan conditions in 2009 and the Feasibility Studies were reviewed by the Management Consultants under their TORs approved by ADB. During review of the Feasibility Studies, the proposed Layouts and Designs of Civil as well as Electro Mechanical Plants (E&M) were thoroughly examined and limitations of the Irrigation Canal System, over looked in the Feasibility Studies, were also considered. The siltation problem in the canal system and its impact on capacity of the canals, in view of some existing hydropower plants on canals since 1960s was also focused. Accordingly workable "Tender Level Designs" for Layouts and appropriate E&M Plant, suitable to the conditions was made, having basic changes in the Feasibility Designs and Layouts. The Tender Documents, based on the Tender Level Designs were framed, and cleared by ADB. Accordingly, International Competitive Bidding (ICB) for EPC/Turnkey Contracts was made as per ADB's Procurement Rules & Guidelines under single stage - two envelopes procedures. Being first experience of EPC/Turnkey Contracts in Punjab, the Chief Minister constituted a Steering Committee (SC), under the Chair of Chairman P&D Board, Punjab with its TORs, as attachment. The major TORs of the SC are monitoring the transparency of bidding process and approval of the lowest bids. All the bids have been approved by SC, after clearance / NOC by ADB. The latest revision of the PC-Is has been approved by ECNEC on Oct. 27, 2013 on the basis of actual approved bids as result of ICB.

The Feasibility Reports and the original PC-1s were framed by ADB Consultants under PPTA (Project Preparation Technical Assistance) in 2005-06. These Feasibility Reports & PC-1s were framed / prepared on the basis of feasibility level designs and Punjab Government's Composite Schedule of Rates (CSRS). The competent statutory body i.e. ECNEC approved the project in its meeting held on September 19, 2007.

The project/program, however, could not be launched as scheduled hence caused a lot of problems for the Program. After the elapse of almost two years, the impeding problems were finally surmounted and the Government of the Punjab (GOPb) decided to re-launch the Project. It is worth mentioning here that the Project got delayed primarily due to delay in approval of the Project by ECNEC and loan signing, time-taking procedures of ADB, inter-departmental approvals, review of Punjab Power



Generation Policy/ADB Loan, site specific issues and change in design during tender design stage. But the soaring / ever increasing prices of project inputs rendered the feasibility level Project cost impracticable. Therefore, the Project Steering Committee under the convenorship of Chairman P&D Board of the GOPb with vast mandate directed PPMU / Energy Department to revise the project costs and process for its approval.

During Feasibility Studies, the consultants had proposed an On-Channel Layout with a diversion channel to construct a combined structure of power house and spillway. The said diversion arrangement was considered impractical during Tender Level design studies due to sharp curves with abnormally less radius for a large canal. To avoid turbulence, head losses and constant side erosions and a serious risk of breach of Diversion canal as well as threat to loss of construction work of Power House, the Consultants proposed tender level designs according to standard design practice of Hydraulics. Therefore the minimum length of diversion channel was increased to approx. 1300 m against 430 m as proposed. Hence, the Layout with Power House, on R/s By-Pass arrangement was finally proposed by Consultants and agreed by Monitoring Committee of the Project. The significant advantage is that sufficient government land already exists and acquisition of private land is minimum. The proposal is free of diversion, associated canal closures and construction of Power House, as a critical task; can be taken up any time. It is pertinent to mention that, the existing Hydel Power Station like Nandipur and others in Punjab have already been constructed on canals with similar arrangements. Consequently due to a properly worked out Layout, the quantities and cost of civil works have increased against the hypothetical studies at Feasibility Level.

As defined in ADB Loan Agreement, the mode of implementation of the REDSIP is EPC /Turnkey, which in the terms of ADB is "Procurement of Plant, Design, Supply and Install" on Turnkey basis. In EPC mode, the Contractor takes full responsibility of detailed designs, engineering, procurement and construction / commissioning of Plant and carries the associated risks against the offered bid price in view of time schedule as per requirements of sponsors of the Project.

PROJECT LOCATION

Deg-Outfall Hydropower Project will be built on main canal; Upper Chenab Canal (Main Line Lower) and is located in Sheikhpura District of Punjab Province. The project site (Latitude 31°37'53" and Longitude 74° 06' 09") is located at R.D. 283+500 of Upper Chenab Canal (Main Line Lower) about 6 km from the Lahore-Faisalabad road and is about 19 from Sheikhpura City, the district headquarters. Sheikhpura city is located along Lahore-Peshawar Motorway and also Lahore-Faisalabad Highway.

The project area is accessible from Karachi Port through a good road network of national highways. The road distance between Lahore-Karachi is about 1,292 km. The Lahore-Faisalabad highway crosses upper Chenab Canal Lower at RD 266+000 about 13 km short of Sheikhpura. A 6 km metalled road along the right bank of Upper Chenab Canal Lower links the project area with the Lahore-Faisalabad highway. Telephone and telegraph facilities are available in Sheikhpura which is connected with other main towns of the country through the nationwide dialing system. International Direct Dialing (IDD) exists, too. Internet access is available with limited speed through the telephone network. Lahore Airport is the nearest facility to the project area and is about 35 km from the project site. International and national flights are scheduled from there. Telephone and telegraph facilities are available in Sheikhpura which is connected with other main towns of the country through the



nationwide dialing system.

Upper Chenab Canal (Main Line Lower) is controlled from Bombanwala head regulator. The designed discharge of the head regulator is $315 \text{ m}^3/\text{sec}$. A number of fall structures exist along this canal where hydropower projects can be developed. The Scope of Civil works activities start from the fall structure at RD 266+000 to RD 283+819 of the Upper Chenab Canal system. The Deg Outfall hydropower project mainly consists of combination of two falls (RD 266+000 and RD 283+100) to utilize the head for energy output. A power canal (in a bypass arrangement) situated at right side of UCC between RD 280+400 and R.D 283+819 and the power house will be constructed approximately midway (opposite RD 282+225 of UCC). It includes intake section, gated spillway, power house and tail race section etc. The bed level and the embankment of the power canal upstream of power house shall be constructed to the existing level of UCC upstream of the fall structure at RD 266+000. The power canal downstream of the power house shall be designed and constructed to the bed level of UCC at RD 283+819 in accordance with the bed level downstream of fall structure at R.D 283+500.

UPPER CHENAB CANAL

The Upper Chenab Canal (UCC) is fed from the Marala Barrage, leading water from the Chenab River into a number of tributaries of the Punjab irrigation system in Gujranwala, Sheikhpura, Depalpur, Sahiwal and Okara districts of the Punjab Province. The Upper Chenab Canal Main has a design capacity of $477 \text{ m}^3/\text{sec}$. The canal aims primarily as a link canal and to supply water to Upper Chenab Canal Lower, Bambanwala Ravi Badian Depalpur Canal and Nokhar Branch off-taking at its tail RD 133+296. The canal is a perennial link and closed for about one month only every year during December and January for annual maintenance purposes.

Salient Features

Background

Pakistan has been facing energy shortage for quite some time now as the gap between demand and effective power supply has widened enough that the country is under huge power outages these days. Pakistan does not have enough proven resources of fossil fuels and being a developing country does not have enough resources to import fuels for power generation purposes. The only viable alternative is to depend on less costly and clean hydroelectric potential available along river, stream and canal constructed for irrigation.

In Punjab, the hydropower potential exists on canal falls of irrigation system only. Preliminary studies were made by WAPDA, indicating 317 sites with a total potential of more than 600 MW on canal falls and barrages, out of which 48 sites are preferred sites having hydropower potential of 2 MW and more. The falls on canals and barrages range from 0.5 m to 5 m, most of which cannot be developed as a single fall hydropower project therefore combination of falls to avail minimum water head of 2 m and



above (preferably 3 m and more) for VLH is essential in most of the cases which involves additional costs as compared to high and medium head.

Salient Design Features

The very Low Head Deg-Outfall Hydropower Project has been designed for a maximum design discharge of 60 cumecs, available in Kharif and will be reduced in Rabi, with a variable head of 3.43 m to 5.80 m. The design capacity is 4.04 MW with estimated annual generation of 27.65 GWh. The technology is 2 units of pit type horizontal Kaplan Turbines with double regulation arrangements. Other details and the salient features are narrated below.

Sr. No.	Features	Details / Description
1.	Location	District Sheikhpura, Punjab
2.	River System	Upper Chenab Canal System Near Fall Structure at RD 282+225
3.	Discharge	Mean Monthly: 88.30 m ³ /s Total Annual Average: 2,785 10 ⁶ m ³ /y
4.	Main Structures	Design Discharge: 120 m ³ /s Maximum Discharge: 231 m ³ /s
5.	Spillway	Units: 7 Type: Radial Gates Sill Level: 204.79 masl Design Pressure at Sill: 2.05 m Height: 2.65 m Width: 7.10 m
6.	Trash Racks	Width: 7.50 m Height: 9.928 m Inclination: 80° Bar Distance: 100 mm
7.	Stop Logs	<i>Intake</i> Width: 7.50 m Height: 7.516 m <i>Spillway</i> Width: 7.10 m Height: 2.65 m
8.	Draft Tube	Units: 2 Type: Roller Gates Head on Sill: 5.80 m Height: 5.775 m Width: 6.40 m
9.	Headrace Channel	Water Level at Entrance: 206.86 masl Canal Width: 68.275 m Flow Depth: 2.987 m Bed Slope: 0.15
10.	Power House	Powerhouse Level: 203.60 masl

Sr. No.	Features	Details / Description	
		Machine Hall Length:	25.0 m
		Machine Hall Width:	18.6 m
		Machine Hall Height:	14.10 m
11.	Tailrace Channel	Bed Level:	200.41 masl
		Canal Width:	68.275 m
		Bed Slope:	0.15
12.	Nominal Head at Maximum Power Output	Headrace Water Level:	206.86 masl
		Max. Tailrace Water Level:	203.43 masl
		Min. Tailrace Water Level:	201.04 masl
		Maximum Gross Head:	5.80 m
		Minimum Gross Head:	3.43 m
		Head Loss:	0.15 m
13.	Hydro-mechanical Equipment	Type of Turbine:	Hor. Shaft Kaplan
		Units:	2
		Rated Flow for each Unit:	60 m ³ /s
		Capacity:	2.134 MW
		Rotational Speed:	133.3 rpm
		Rated Head:	4.00 m
14.	Electrical Equipment	<i>Generator</i>	
		Unit:	2
		Speed:	600 rpm
		Capacity:	2.53 MVA
		<i>Transformer:</i>	6.3/11 kV
		<i>Switchgear:</i>	11 kV
15.	Power and Energy	Power:	2 x 2.02 MW
		Mean Annual Energy	27.65 GWh
		[On contract capacity basis (Not Yet Finalized)]	

ENVIRONMENTAL & SOCIAL ASPECTS OF THE PROJECT

Environmental Impacts

There are no significant Environmental impacts of the project neither on archaeological sites nor on the wildlife or fisheries. Owing to the existing falls in the canals system and annual closure regime, there are no significant fisheries. The impacts identified in the Land Acquisition & Resettlement Plan (LARP) and Environment Management Plan (EMP) is mostly due to construction related activities. The loss of land is restricted to the least possible minimum level, for which compensation and mitigation measures have been proposed. For Environmental Clearance, 'NOC' has been acquired from Environment Protection Authority (EPA).



Environmental Mitigation

Mitigation measures included in the EMP are as indicated below:

Summary of Mitigation

Potential Impact	Mitigation
Construction Impacts – loss of temporary water quality, loss of trees and access	Implementation through detailed EMP attached to the IEE including provision of stand pipes for drinking water, bridge access across the existing canal.
Permanent loss of small amount of agricultural land and some trees	Compensation package for permanent loss of land & for trees. Implement tree planting program.

Land Acquisition and Resettlement

This project, because of its relatively small size, less than 50 MW, is classified as a category "B" project, in accordance with Asian Development Bank (ADB) Guidelines for Environmental Assessment, 2003. An Initial Environmental Examination (IEE) has been approved by Environmental Protection Department for the Project. The detail environmental examination and Land Acquisition & Resettlement Plan (LARP) including impacts and mitigation measures for Deg-Outfall HPP has been prepared in accordance with the ADB guidelines.

According to the ADB's handbook on Involuntary Resettlement, project is categorized based on the following benchmarks:

- Significant impact: if > 200 people are resettled or will lose > 10% or more of their income generating assets are classified as category "A" requiring a full LARP.
- Insignificant Impact: if < 200 people will be resettled or experience a loss of <10% of income generating assets are classified category "B" requiring a short LARP.

A total of 06 households (17 persons) in March-April 2011 having ownership of 53.61 Acres and 31 Affected Households (AHs) (64 persons) having common Khaiwat / ownership of 2.85 acres affected by DOHPP. According to project ADB guidelines on project categorization, the impacts are considered insignificant as less than 200 people are losing their income generating assets. The DOHPP is classified as category "B" and a Short LARP for DOHPP has been prepared accordingly. The LARP for DOHPP has been approved by ADB for its implementation.

The objective of this Short Land Acquisition and Resettlement Plan (SLARP) is to describe the impacts of DOHPP, compensation entitlements, and resettlement principles. The Short LARP sets out provisions for compensation of land, structures, crops, trees, tube-wells, utilities and severity impact allowances under the Land Acquisition Act, 1894, and ADB's policy on involuntary resettlement (1995) and Handbook on Resettlement- A Guide to Good Practices.

All the Affected Households (AHs) are absentee Affected Persons (APs) and none of the AHs resides in the project location therefore, no households will be displaced. Most of the AHs also have other sufficient source of incomes for their livelihoods. As the AHs are losing their assets i.e. land, they have been compensated at replacement cost for their losses under ADB guidelines and Land Acquisition



Ac 1894.

A total of 86.29 Acres (56.46 Acres Private Land and 29.83 Acre Government Land, Irrigation Department) on permanent basis has been acquired permanently for the construction of the Power Channel including powerhouse, headrace channel, tailrace channel, realignment of some portion of Mangtanwala & Sikhanwali Distributaries, sub-station, Offices and (O & M) staff residencies etc. The total No. of Affected Households (AHs) is 06 which are cultivating the 56.46 Acres (Private land). Out of 56.46 Acres, 53.61 Acres owned by said 06 AHs and remaining 2.85 Acres has been divided between 31 AHs due to common Khaiwat/Khatoni (Common Ownership according to their share) but not cultivating the land. All the Affected Persons (APs) are absentees because they do not reside in the project area. The DOHPP will also affect 01 tube-well, 03 bore holes 01 No. Dera (used for agriculture purpose), water course and 198 trees of different species (fruit and non-fruit) standing in the acquired land.

All the households are Muslim and ethnically Punjabi. There is neither tribal nor minority people amongst these AHs. The ADB's Policy on Indigenous People, as specified in the Indigenous Peoples Development Framework (IPDF) prepared for this program is not triggered; therefore neither an Indigenous Peoples Development Plan (IPDP) nor special action is required for DOHPP.

The budget for this Short LARP has been calculated using the rates derived through consultation with the APs, Revenue, Agriculture, Building, Irrigation, and Forest Department and with the local markets at replacement cost. Assessment of compensation rates are in line with ADB's requirement regarding land and other assets to be compensated at replacement costs. The total compensation cost including compulsory acquisition charge @ 15%, sever Impact Allowance for the losses of the 06 AHs & 31 AHs having common Khaiwat / common shareholders and external monitoring is estimated at Rs. 69.416 Million and provided in the Short LARP.

Resettlement Budget

The total compensation cost for resettlement including land acquisition and land based assets that are crops, trees, building infrastructure, Irrigation Facilities, Transmission Line, Severity Impact Allowance, Monitoring & Evaluation and the contingencies is estimated Rs. 69.416 Million. The Punjab Power Management Unit (PPMU), Energy Department is responsible for financing to implement this Land Acquisition and Resettlement Plan (LARP) on Deg outfall Hydro Power project. The break-up of the resettlement activities and budgeting is as under.

Budget Summary of DOHPP

Sr. #	Resettlement Activities	Quantity	Unit	Cost/Unit (Rs)	Cost (Million Rs)	Remarks
1.	Compensation for Land					Including 15 % compulsory acquisition charges.
	Private Land	56.46	Acre	920,000	51.943	
	Government Land Irrigation Department (Free of Cost)	29.83		-		
2.	Compensation for Crops					Replaceme

Sr. #	Resettlement Activities	Quantity	Unit	Cost/Unit (Rs)	Cost (Million Rs)	Remarks
	Wheat	44.58	Acre	60, 400/-	4.229	nt Cost
	Squashes	4.51		100, 000/-		
	Cucumber	6.0		160, 000/-		
	Water Melon	1.0		125, 000/-		
	Total	56.09				
Compensation for Trees						
	Private Trees	198	No.		0.514	As per Replacement Cost
Compensation for Building / Structure						
4.	Dera (a kind of farm house)	01	No.		1.555	As per Replacement Cost
Compensation for Irrigation Facilities						
5.	Tube-Wells Bore Holes	04	No.	150,910/-	0.604	As per Replacement Cost
	Hand pumps	03	No.	10,000/-	0.030	"
	Water Course / tank / Tube-Well Chamber	660	Rft.	195,000/-	0.195	"
Compensation for Shifting / Realignment of Transmission Line						
6.	Shifting of Transmission Line		Lump Sum		1.242	As per Replacement Cost
Severity Impacts Allowance						
7.	Wheat+Squashe+Water Melon+Cucumber	16.19	Acre		1.796	Equal to Crop Compensation

Sr. #	Resettlement Activities	Quantity	Unit	Cost/Unit (Rs)	Cost (Million Rs)	Remarks
8.	Hiring of External Agency for Monitoring and Evaluation		Lump Sum	1,000,000	1.000	
Sub Total					63.105	
9.	Special Security Measures				6.311	
Total (Rs. in millions)					69.416	

Socio Economic Effects of the Project

Social Benefits:

The project will save substantial amount of funds annually that would otherwise be required for import of oil needed for an equivalent thermal plant. The revenues of the government would increase due to direct and indirect taxation, duties and levies on the production of goods and services that will result from the power generation benefits within the project area as well as from the electricity duty collected by the Federal Government, Government of Punjab or any other agency. Sale of electricity is the direct revenue which will be collected by Energy Department, Punjab.

Indirect or the secondary benefits would include creation of employment opportunities and improved standard of living of the people of the area and vicinity. There will be multiple effects on socio-economic development of the region as well. Communication, infrastructures, livestock, forestry, cottage industry, livestock development and other opportunities would open up with construction of the proposed project. Most of the indirect benefits are difficult to quantify in monetary terms but should not be ignored while making the decision for the implementation of the Project.

DEG-OUTFALL HYDROPOWER PROJECT WILL PLAY ITS DUE ROLE IN THE SOCIO-ECONOMIC UPLIFT OF THE PEOPLE OF THE ADJOINING AREAS IN PARTICULAR, THE PUNJAB PROVINCE AND THE COUNTRY IN GENERAL. SINCE IT IS AN INDIGENOUS RESOURCE BASED PROJECT WITHOUT ANY FUEL ELEMENT BEING CONSIDERED AS PASS THROUGH, THE PROJECT WILL CONTRIBUTE IN BRIDGING THE GAP OF PRICE DIFFERENTIAL, WHICH CURRENTLY POWER PURCHASER IS FORCED TO PAY. THIS WILL HELP IN EASING OUT THE ISSUE OF CIRCULAR DEBT ETC.

Project Cost and Tariff

Total Financial cost of the Project at present on the basis of EPC Contract Equivalent Rs.2245.07 million with foreign exchange component (FEC) 16.84 million US\$. The currently envisaged financing structure is based on a debt equity ratio of 80:20 %. Project life for the purpose of the tariff is estimated to be 30 years. The project tariff is within the acceptable range considering that it is a small project based on very low head technology i.e. Rs.10.0478/kWh or US Cent 9.7615/kWh. The real benefits of the project will be available when the debt is retired in 20 years from COD stage and the project becomes debt free. At that time, electricity from the project will be available at a very nominal price.



Page 24 of 24

Project Director
Punjab Power Management Unit
 Government of the Punjab
 Energy Department

PPDCL

Flag - 'A'



SECURITIES AND EXCHANGE COMMISSION OF PAKISTAN
COMPANY REGISTRATION OFFICE

LAHORE

CERTIFICATE OF INCORPORATION

[Under section 32 of the Companies Ordinance, 1984 (XLVII of 1984)]

Company Registration No.0064048


I hereby certify that **PUNJAB POWER DEVELOPMENT COMPANY LIMITED** is this day incorporated under the Companies Ordinance, 1984 (XLVII of 1984) and that the company is limited by shares.

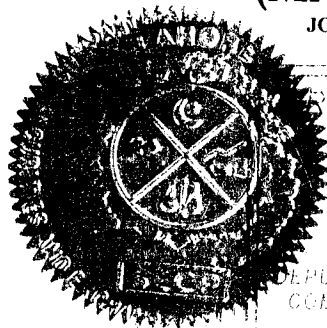
Given under my hand at LAHORE this 15th Day of January, 2008 (Two Thousand and Eight).

Fee Rs.52,000/=


No. ARL/ 11861

DATED:- 16-01-08


(MAHBOOB AHMAD)
JOINT REGISTRAR OF COMPANIES
LAHORE.



CERTIFIED TO BE TRUE COPY


01/01/2015

DEPUTY REGISTRAR OF COMPANIES
COMPANY REGISTRATION OFFICE
LAHORE.

PPDCL

THE COMPANIES ORDINANCE, 1984

PPDCL

(PUBLIC COMPANY LIMITED BY SHARES)

Memorandum of Association

of

PUNJAB POWER DEVELOPMENT

COMPANY LIMITED

- I. The name of the Company is "PUNJAB POWER DEVELOPMENT COMPANY LIMITED".
- II. The Registered Office of the Company will be situated in the Province of the Punjab.
- III. The objects for which the Company is established are all or any of the following:-
 1. To carry on the business of setting up of all types of Power Projects, construction of Grid Station, transmission lines and other works incidental there to.
 2. To carry on all or any of the businesses of generating, purchasing, importing, transforming, converting, distributing, supplying, exporting and dealing in electricity and all other forms of energy and products or services associated therewith and of promoting the conservation and efficient use of electricity and to perform all other acts which are necessary or incidental to the business of electricity generation, transmission, distribution and supply.
 3. To locate, establish, construct, equip, operate, use, manage and maintain hydro power plants, thermal power plants and coal fired power plants, geothermal power plants, solar power plants, wind power plants, biomass based power plants, power grid station, transforming, switching, conversion, and transmission facilities, grid stations, cables, overhead lines, sub-stations, switching stations, tunnels, cable bridges, link boxes, heat pumps, plant and equipment for combined heat and power schemes, offices, computer centres, shops, dispensing machines for pre-payment cards and other devices, showrooms, depots, factories, workshops, plants, printing facilities, warehouses and other storage facilities.

4. To carry on all or any of the businesses of wholesalers, retailers, traders, importers, exporters, suppliers, distributors, designers, developers, manufacturers, installer, filters, testers, repairers, maintainers, contractors, constructors, operators, users, inspectors, reconditioners, improvers, alterers, protectors, removers, hirers, replacers, importers and exporters of and dealers in, electrical appliances, systems, products and services used for energy conservation, equipments, machinery, materials and installations, including but not limited to cables, wires, meters, pylons, tracks, rails, pipelines and any other plant, apparatus equipment, systems and things incidental to the efficient generation, procurement, transformation, supply and distribution of electricity.
5. To ascertain the tariff for bulk supply that will secure recovery of operating costs, interest charges and depreciation of assets, redemption at due time of loans other than those covered by depreciation, expansion projects, payment of taxes, and reasonable return on investment, to quote the tariff to bulk purchasers of electrical power, and to prefer petition to the appropriate authority for approval of the schedule of tariff and of adjustments or increases in its bulk supply tariff, where desirable or necessary.
6. For the purposes of achieving the above objects, the company is authorized:-
 - (1) to purchase/import raw materials and allied items required in connection thereto in any manner the company may think fit;
 - (2) to do and perform all other acts and things as are incidental or conducive to the attainment of the objects of the company;
 - (3) to own, establish or have and maintain shops, branches and agencies all over Pakistan or elsewhere for sale and distribution of cables, wires, meters, pylons, tracks, rails, pipelines and any other plant, apparatus equipment, systems and things incidental to the efficient generation, procurement, transformation, supply and distribution of electricity;
 - (4) to make known and give publicity to the business and products of the company by such means as the company may think fit;
 - (5) to purchase, acquire, protect, renew, improve, use and sell, whether in Pakistan or elsewhere any patent, right, invention, license, protection or concession which may appear advantageous or useful to the company for running the business;

- (6) To enter into partnership, to amalgamate, or merge movable with immovable and/or to buy on all interests, assets, liabilities, stocks, or to make any arrangement for sharing profits, union of interests, co-operation, joint-venture, reciprocal concession or otherwise with any person, firm or company carrying on or proposing to carry on any business which this Company is authorised to carry on or which is capable of being conducted so as directly or indirectly to benefit this Company and to have foreign collaborations and to pay royalties/technical fees to collaborators subject to the provisions of the Companies Ordinance, 1984.
- (7) to pay all costs, charges and expenses, if any, incidental to the promotion, formation, registration and establishment of the company;
- (8) to borrow and arrange the repayment of money from Asian Development Bank, World Bank or other national or international developmental financial institution, banks/financial institutions or any lawful sources whether in Pakistan or elsewhere and in such manner as the company may think fit, including the issue of debentures, preference shares, bonds, perpetual or otherwise charged upon the whole or any part of the company's property or assets, whether present or future, and to purchase, redeem or payoff such securities;
- (9) to purchase, hold and get redeemed shares, debentures, bonds of any business, company, financial institution or any Government institutions;
- (10) to guarantee the performance of contracts, agreements, obligations or discharge of any debt of the company or on behalf of any company or person in relation to the payment of any financial facility including but not limited to loans, advances, letters of credit or other obligations through creation of any or all types of mortgages, charges, pledges, hypothecations, on execution of the usual banking documents or instruments or otherwise encumbrance on any or all of the movable and immovable properties of the company, either present or future or both and issuance of any other securities or sureties by any other means in favour of banks, Asian Development Bank, World Bank or other national or international developmental financial institution, Non-Banking Finance Companies (NBFCs) or any financial institutions and to borrow money for purpose of the company on such terms and conditions as may be considered proper.
- (11) to acquire, sell or dispose off part or all of the assets of the company to another company with similar objects.

- (12) to guarantee the performance of a financial obligation of another company having similar or different objects and in this respect issue guarantees, promissory notes, instruments and undertakings.

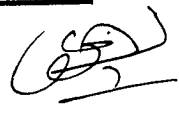



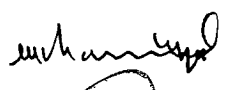
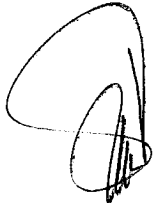

7. It is, hereby, undertaken that the Company shall not engage in banking business or any business of investment company or non-banking finance company or insurance or leasing or business of managing agency or in any unlawful business and that nothing contained in the object clauses shall be so construed to entitle it to engage in such business directly or indirectly and the Company shall not launch multi-level marketing

(MLM), Pyramid and Ponzi schemes. *Notwithstanding anything stated in any object clause, the Company shall obtain such prior approval or licence from the competent authority as may be required under any laws.*

- IV. The liability of the members is limited. *Mark*

- V. The authorized capital of the company is Rs. 15,000,000/- (Rupees Fifteen Million only) divided into 1,500,000 ordinary shares of Rs. 10/- each with power to enhance, reduce or consolidate the share capital and to divide the shares of the company into different classes and kinds subject to the provisions of the Companies Ordinance, 1984.

We, the several persons whose names and addresses are subscribed below, are desirous of being formed into a Company, in pursuance of this Memorandum of Association, and we respectively agree to take the number of shares in the Capital of the Company as set opposite to our respective names.

Name and Surname (Present & Former) in Full (in Block Letters)	Father's Name in Full	Nationality with any former Nationality	Occupation	Residential Address (in Full)	Number of shares taken by each sub- scriber	Signature
1. GOVERNMENT OF THE PUNJAB, IRRIGATION & POWER DEPARTMENT, PUNJAB	Under the Federation of Pakistan	Pakistani	An Autonomous Body of the Provincial Government	Govt. of the Punjab, Irrigation & Power Department, Old Anarkali, Lahore	94	
2. MR. ARIF NADEEM N.I.C. No. 35202-7817681-9	Muhammad Ashraf	Pakistani	Secretary Govt. of the Punjab, Irrigation & Power Department, Lahore	Govt. of the Punjab, Irrigation & Power Department, Old Anarkali, Lahore	1	
3. MR. IMDAD ULLAH BOSAL N.I.C. No. 34401-0645271-7	Muhammad Iqbal Bosal	Pakistani	Additional Secretary (Economic Services) Govt. of Punjab Finance Department, Lahore	Govt. of the Punjab, Finance Department, Civil Secretariat, Lahore	1	
4. DR. MUHAMMAD ABID BODLA N.I.C. No. 35202-3013538-5	Muhammad Sana Ullah Bodla	Pakistani	Member Engineering Govt. of the Punjab, P & D Department, Lahore	Govt. of the Punjab, Planning & Development Department, Lahore	1	
5. MR. MUHAMMAD YAQOOB N.I.C. No. 34101-2727731-1	Muhammad Shafi	Pakistani	Chief Engineer (Power) Irrigation & Power Department, Lahore	Govt. of the Punjab, Irrigation & Power Department, Old Anarkali, Lahore	1	
6. MR. SIKANDER KHAN N.I.C. No. 35200-1424373-1	Agha Jahangir Ali Khan	Pakistani	Electrical Engineer, CEO of JJ Petroleum (Pvt.) Ltd. Lahore	JJ Petroleum (Pvt.) Ltd. 43 - L, MM Alam Road, Lahore	1	
7. MR. LIAQAT ALI N.I.C. No. 35201-2984182-1	Mian Ali Muhammad	Pakistani	Project Director Govt. of the Punjab, Irrigation & Power Department, Lahore	209 - C, 1st Floor, Tech Housing Society, Canal Bank, Lahore	1	
Total Number of Shares Taken					100	

Dated this 8th day of January, 2008.

Witness to the above Signatures :

Full Name : H. MASUD GURESHI

N.I.C. No. : 35202-2462926-5

Father's/Husband's

Full Name : M. SHAFI GURESHI

CERTIFIED TO BE

Signature

Nationality : Pakistani

Occupation : Manager Accounts

Full Address : YUSAF SAEED & CO.

CHARTERED ACCOUNTANTS

6-A, BLOCK-S, GULBERG-II,

LAHORE. PHONES: 5764717-8

FAX NO. 5764719



1. COMPANY REGISTRATION NO: 64728
2. SERIAL NO OF DOCUMENT.
3. NAME OF THE COMPANY
4. POWER DESCRIBED IN THE DOCUMENT
5. DATE OF THE DOCUMENT
6. DATE OF REGISTRATION OR RECORDED. 15/1/18

[Signature]
JOINT REGISTRAR OF COMPANIES
LAHORE REGION 3

cm/22

PPDCL

THE COMPANIES ORDINANCE, 1984

PPDCL

(PUBLIC COMPANY LIMITED BY SHARES)

Articles of Association
of
PUNJAB POWER DEVELOPMENT
COMPANY LIMITED

PRELIMINARY

1. The regulations in Table "A" in the First Schedule to the Companies Ordinance, 1984 shall not apply to the Company except as reproduced herein :

Table 'A' Not to
apply.

2. In these Articles, unless the context or the subject matter otherwise requires :

Interpretation

- (a) "Articles" means these Articles as originally framed or as from time to time altered in accordance with law.
- (b) "Board" means a meeting of the Directors duly called and constituted or as the case may be, the Directors assembled at a Board.
- (c) "Company" means "PUNJAB POWER DEVELOPMENT COMPANY LIMITED".
- (d) "Directors" means the Directors for the time being of the Company or as the case may be, the Directors assembled at a Board.
- (e) "Month" means calendar month according to the English Calendar.
- (f) "Office" means the Registered Office for the time being of the Company.
- (g) "Ordinance" means the Companies Ordinance, 1984 or any modification or re-enactment thereof for the time being in force.
- (h) "Register" means, unless the context otherwise requires, the register of members to be kept pursuant to Section 147 of the Ordinance.
- (i) "Seal" means the common or official Seal of the Company.
- (j) "Section" means Section of the Ordinance.
- (k) "Special Resolution" means the special resolution of the Company as defined in Section (2)(1)(36) of the Ordinance.

- (l) Words importing masculine gender include the feminine gender.
- (m) Words importing singular number include the plural number and vice versa.
- (n) Expression referring to writing shall, unless the contrary intention appears, be construed as including references to printing, lithography, photography and other modes of representing or reproducing words in a visible form.
- (o) Words importing persons shall include bodies corporate.
- (p) The head notes are inserted for convenience and shall not affect the construction of these Articles.
- (q) Unless the context otherwise requires words or expressions contained in these Articles shall bear the same meaning as in the Ordinance.

PUBLIC COMPANY

3. The Company is a Public Company within the meanings of Section 2(1)(30) of the Companies Ordinance, 1984.

CAPITAL

4. The Authorised Capital of the Company is Rs. 15,000,000/- (Rupee Fifteen Million only) divided into 1,500,000 ordinary shares of Rs. 10/- (Rupees Ten only) each. The Company shall have the powers to increase, reduce or alter the capital in accordance with law.

5. The Directors shall, as regards any allotment of shares duly comply with such of the Provisions of Section 68 to 73 as may be applicable to the Company. The minimum subscription upon which the Directors may proceed to make the first allotment has been fixed as ~~Rs. 15,000,000/- (Rupees Fifteen Million only)~~ *Rs. 15,00,000/- (Rupees one lac fifty thousand only)* *M. S. Q.*

6. Every person whose name is entered as a member in the Register shall, without payment, be entitled to receive within ninety days after allotment or within forty-five days of the application for registration of transfer, a certificate under the Seal specifying the share or shares held by him and the amount paid up thereon. Provided that, in respect of a share or shares held jointly by several persons, the Company shall not be bound to issue more than one certificate, and delivery of a certificate for a share to one of several joint holders shall be sufficient delivery to all.

7. If a Share Certificate is defaced, lost or destroyed, it may be renewed on payment of such fee, if any, not exceeding one rupee, and on such terms, if any, as to evidence and indemnity any payment of expenses incurred by the Company in investigating title as the Directors think fit.

8. Except to the extent and in the manner allowed by Section 95, no part of the funds of the Company shall be employed in the purchase of, or in loans upon the security of, the Company's shares.

TRANSFER OF SHARES

9. The instrument of transfer of any share in the Company shall be executed both by the transferor and transferee and the transferor shall be deemed to remain holder of the share until the name of the transferee is entered in the Register in respect thereof.

Transfer

10. Shares in the Company shall be transferred, without fee, in the following form, or in any usual or common form which the Directors shall approve ;

Form of Transfer

I.....of..... in consideration of the sum of Rs.....Paid to me by..... of.....(hereinafter called the "Transferee") do hereby transfer to the Transferee.....the share(s) numbered..... toinclusive, in **PUNJAB POWER DEVELOPMENT COMPANY LIMITED** to hold into the transferee, his executors, Administrators and assigns, subject to the several conditions on which I held the same at the time of the execution hereof, and I, the Transferee, do hereby agree to take the said share (or shares) subject to the conditions aforesaid.

As witness our hands this.....day of.....20

Transferor

Transferee

Signature

Signature

WITNESSES :

1. _____

2. _____

(Signature)

(Signature)

Full Address : _____

Full Address of _____

11. The Directors shall not refuse to transfer any fully paid shares unless the transfer deed is defective or invalid. The Directors may also suspend the registration of transfer prior to the determination of entitlement or rights of the shareholders by giving seven days previous notice in the manner provided in the Ordinance. The Directors may decline to recognize any instrument of transfer unless the duly stamped instrument of transfer is accompanied by the certificate of the shares to which it relates, and such other evidence as the Directors may reasonably require to show the right of the transferor to make the transfer.

Non-refusal of
Transfer of Shares

tice in case of
fusal

12. If the Directors refuse to register a transfer of shares, they shall within thirty (30) days after the date on which the transfer deed was lodged with the Company send to the transferee and the transferor notice of the refusal indicating the defect or invalidity to the transferee, who, shall, after removal of such defect or invalidity be entitled to re-lodge the transfer deed with the Company. The transferor or transferee or the person who gave intimation of the transmission by operation of law, as the case may be, may appeal to the commission against any refusal of the Company to register the transfer or transmission or against any failure on its parts within period as specified in Section 78 for which Section 78/A will be applicable.

TRANSMISSION OF SHARES

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13. The executors, administrators, heirs, or nominees as the case may be, of a deceased sole holder of a share shall be the only persons recognized by the Company as having any title to the shares. In the case of a share registered in the names of two or more holders, the survivor or survivors, or executors or administrators of the deceased survivor shall be the only persons recognized by the Company as having any title to the share.

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14. Any person becoming entitled to a share in consequence of the death or insolvency of a member shall, upon such evidence being produced as may from time to time be required by the Directors, have the right, either to be registered as a member in respect of the share or, instead of being registered himself, to make such transfer of the share as the deceased or insolvent person could have made ; but the Directors shall, in either case have the same right to decline or suspend registration as they would have had in the case of a transfer of the share by the deceased or insolvent person before the death or insolvency.

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15. A person becoming entitled to a share by reason of the death or insolvency of the holder shall be entitled to the same dividends and other advantages to which he would be entitled if he were the registered holder of the share, except that he shall not, before being registered as a member in respect of the share be entitled in respect of it to exercise any right conferred by membership in relation to meetings by the Company.

ALTERATION OF CAPITAL

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ease Capital

16. The Company may from time to time, by special resolution increase the share capital by such sum, to be divided into shares of such amount, as the resolution shall prescribe.

or to existing
nbers

17. Subject to the Provisions of the Ordinance, all new shares shall, before issue be offered to such persons as at the date of the offer are entitled to receive notices from the Company of General Meetings in proportion, as nearly as the circumstances admit, to the amount of the existing shares to which they are entitled. The offer shall be made by notice specifying the number of shares offered, and limiting a time within which the offer if not accepted, will be deemed to be declined and after the expiration of that time, or on the receipt of an intimation from the person to whom the offer is made that he declines to accept the shares offered, the Directors may dispose of the same in such manner as they think most beneficial to the Company. The Directors may likewise so dispose of any new shares which (by reason of the ratio which the new shares bear to shares held by persons entitled to an offer of new shares) cannot, in the opinion of the Directors, be conveniently offered under this regulation.

18. Subject to the provisions of Section 87 of the Ordinance, the Company may issue ordinary shares or grant option to convert into ordinary shares the outstanding balance of any loans advances or credit or other non-interest bearing securities and obligations or having a term of not less than three years in the manner provided in any contract with any scheduled bank or financial institution to the extent of twenty per cent (20%) of such balance.

Conversion of Loan
to Ordinary shares

19. The new shares shall be subject to the same provisions with reference to transfer, transmission and otherwise as the shares in the original share capital.

Provisions
applicable to new
Shares

20. The Company may, by ordinary resolution :

Consolidation and
Subdivision

- (a) Consolidate and divide its share capital into shares of larger amount than its existing shares ;
- (b) Sub-divide its existing shares or any of them into shares of smaller amount than is fixed by the Company's Memorandum of Association, subject, nevertheless, to the provisions to clause (d) of sub-section (1) of Section (92).
- (c) Cancel any shares which at the date of passing of the resolution have not been taken or agreed to be taken by any person.

21. The Company may, by Special Resolution, reduce its share capital in any manner and with, and subject to any incident authorized and consent required by law.

Reduction of Share
Capital

GENERAL MEETINGS

22. The Statutory General Meeting of the Company shall be held within the period required by Section 157.

Statutory Meeting

23. A General Meeting to be called Annual General Meeting, shall be held in accordance with provisions of Section 158, within a period of four months following the close of its financial year and not more than fifteen months after the holding of its last preceding Annual General Meeting as may be determined by the Directors.

Annual General
Meeting

24. All General Meetings of the Company other than the Annual General Meeting shall be called Extraordinary General Meetings.

Other Meetings

25. The Directors may whenever they think fit, call an Extraordinary General Meeting, and Extraordinary General Meetings shall also be called on such requisition, or in default, may be called by such requisitionists, as is provided by Section 159. If at any time there are not within Pakistan sufficient Directors capable of acting to form a quorum, any Director of the Company may call an Extraordinary General Meeting in the same manner as nearly as possible as that in which Meetings may be called by the Directors.

Extraordinary
Meeting

NOTICE AND PROCEEDINGS OF GENERAL MEETINGS

26. Twenty one days notice at least (exclusive of the day on which the notice is served or deemed to be served, but inclusive of the day for which notice is given) specifying the place, the day and the hour of Meeting and, in case of special business, the general nature of that business, shall be given in the manner provided by the Ordinance for the General Meeting, to such persons as are, under the Ordinance or the regulations of the Company, entitled to receive such notices from the Company ; but the accidental omission to give notice to, or the non-receipt of notice by, any member shall not invalidate the proceedings at any General Meeting.

27. All business shall be deemed special that is transacted at an Extraordinary General Meeting, and also all that is transacted at an Annual General Meeting, with the exception of declaring a dividend, the consideration of the accounts, balance sheet and the reports of the Directors and auditors, the election of Directors, the appointment of and the fixing, of the remuneration of the auditors.

28. No business shall be transacted at any General Meeting unless a Quorum of members is present at that time when the meeting proceeds to business. Two members present personally who represent not less than twenty five per cent of the total voting power, either on their own account or as proxies shall be a quorum.

29. If within half an hour from the time appointed for the meeting a quorum is not present, the meeting, if called upon the requisition of members, shall be dissolved; in any other case, it shall stand adjourned to the same day in the next week at the same time and place, and, if at the adjourned meeting a quorum is not present within half an hour from the time appointed for the meeting, the members present, being not less than two, shall be a quorum.

30. The Chairman of the Board of Directors, if any, shall preside as Chairman at every General Meeting of the Company, but if there is no such Chairman, or if at any meeting he is not present within fifteen minutes after the time appointed for the meeting, or is unwilling to act as Chairman, any one of the Directors present may be elected to be Chairman, and if none of the Directors is present, or willing to act as Chairman, the members present shall choose one of their member to be Chairman.

31. The Chairman may, with the consent of any meeting at which a Quorum is present (and shall if so directed by the meeting), adjourn the meeting from time to time but no business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting.

32. At any General Meeting a resolution put to the vote of the meeting shall be decided on a show of hands unless a poll is (before or on the declaration of the result of the show of hands) demanded. Unless a poll is so demanded, a declaration by the Chairman that a resolution has, on a show of hands, been carried, or carried unanimously, or by a particular majority, or lost, and an entry to that effect in the book of the proceedings of the Company shall be conclusive evidence of the fact, without proof of the number or proportion or the votes recorded in favour of, or against, that resolution.

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| 33. A Poll may be demanded only in accordance with the provisions of Section 167. | Demand for Poll |
| 34. If a Poll is duly demanded it shall be taken in accordance with the manner laid down in Section 168 and the result of the Poll shall be deemed to be the resolution of the meeting at which the Poll was demanded. | Manner of taking Poll |
| 35. A Poll demanded on the election of Chairman or on a question of adjournment shall be taken at once. | Time of taking Poll |
| 36. In the case of an equality of Votes, whether on a show of hands or on a poll, the Chairman of the meeting at which the show of hands takes place, or at which the Poll is demanded, shall have and exercise a second or Casting Vote. | Casting Vote |

VOTES OF MEMBERS

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| 37. On a show of hands every member present in person shall have one Vote except for election of Directors in which case the provisions of Section 178 shall apply. On a Poll every member shall have voting rights as laid down in Section 160. | Right to Vote |
| 38. In case of Jointholders, the Vote of the senior who tenders a Vote, whether in person or by proxy, shall be accepted to the exclusion of the Votes of the other Jointholders ; and for this purpose seniority shall be determined by the order in which the names stand in the register. | Voting by Joint Holders |
| 39. A member of unsound mind, or in respect of whom an order has been made by any Court having jurisdiction in lunacy, may vote, whether on show of hands or on a poll, by his committee or other legal guardian, and any such committee or guardian, on a poll vote by proxy. | Member of Unsound Mind |
| 40. On a poll vote may be given either personally or by proxy. Provided that nobody corporate shall vote by proxy as long as a resolution of its Directors in accordance with the provisions of Section 162 is in force. | Voting by Corporation Representations |
| 41. The instrument appointing a Proxy shall be in writing under the hand of the appointer or of his attorney duly authorized in writing. A Proxy must be a member of the Company. | Proxy to be in Writing |
| 42. The Instrument appointing a Proxy and the power of attorney or other authority (if any) under which it is signed, or a notarially certified copy of that power or authority, shall be deposited at the Registered Office not less than forty eight hours before the time for holding the meeting at which the person named in the instrument proposes to vote and in default the instrument of proxy shall not be treated as valid. | Instrument appointing Proxy to be deposited |
| 43. An instrument appointing a proxy may be in the following form, or a form as near thereto as may be. | |

PUNJAB POWER DEVELOPMENT COMPANY LIMITED

n of Proxy

44 I/We of (full address)
being the member(s) of **PUNJAB POWER DEVELOPMENT COMPANY LIMITED** hereby appoint Mr. / Mrs. / Miss of (who is also member of the Company vide Registered Folio No. (being member of Company) as my / our Proxy to attend at and vote for my / us and on my / our behalf at the Annual / Extra Ordinary General Meeting of the Company to be held at on at and at any adjournment thereof.

ocation of
ority

45. A vote given in accordance with the terms of an instrument of proxy shall be valid notwithstanding the previous death or insanity of the principal or revocation of the proxy or of the authority under which the proxy was executed, or the transfer of the share in respect of which the proxy is given, provided that no intimation in writing of such death, insanity, revocation or transfer as aforesaid shall have been received by the Company at the office before the commencement of the meeting or adjourned meeting at which the proxy is used.

DIRECTORS

nber of
ctors

46. Unless otherwise determined by the Company in General Meeting the number of Directors shall not be less than three and if the Company applies for listing on Stock Exchanges, then the number of Directors shall not be less than Seven.

sent
ctors

47. The following are the present Directors of the Company who shall hold office upto first Annual General Meeting and thereafter shall be eligible for re-election.

1. **MR. ARIF NADEEM**
(Nominee Director of the Govt. of the Punjab, Irrigation & Power Department, Punjab)
2. **MR. IMDAD ULLAH BOSAL**
(Nominee Director of the Govt. of the Punjab, Finance Department, Punjab)
3. **DR. MUHAMMAD ABID BODLA**
(Nominee Director of the Govt. of the Punjab, Planning & Development Department, Punjab)
4. **MR. MUHAMMAD YAQOOB**
(Nominee Director of the Govt. of the Punjab, Irrigation & Power Department, Punjab)
5. **MR. SIKANDER KHAN**
(Nominee Director of the Govt. of the Punjab, from Private Sector)
6. **MR. LIAQAT ALI**
(Nominee Director of the Govt. of the Punjab, Irrigation & Power Department, Punjab)

ilification of
ctors

48. Save as provided in Section 187, no person shall be appointed as a Director unless he is a member of the Company and holds shares of the minimum value of Rs. 1,000/- in his own name relaxable in the case of Directors representing interest holding shares.

49. The remuneration of a Director for performing extra services, including holding of the office of Chairman, and the remuneration to be paid to any Director for attending the meetings of the Directors or a committee of Directors shall from time to time be determined by the Board of Directors in accordance with law.

Remuneration of
Directors

CHAIRMAN

50. The Directors may from time to time appoint one of their members to be the Chairman of the Company for a period not exceeding three years on such terms and conditions as they deem fit. The Chairman shall preside over the meetings of the Board of Directors and members of the Company. In his absence, the Directors may elect one of them to preside over the Board Meeting. The questions arising at the meeting of the Directors shall be decided by a majority of votes. In the case of equality of votes, the Chairman, or the Director presiding over the meeting, as the case may be, shall have a casting vote.

Chairman

CHIEF EXECUTIVE

51. The first Chief Executive of the Company will be appointed by the Board of Directors within fifteen days from the date of incorporation of the Company who shall hold office till the first Annual General Meeting.

Chief Executive

POWERS AND DUTIES OF DIRECTORS

52. The business of the Company shall be managed by the Directors, who may pay all expenses incurred in promoting and registering the Company, and may exercise all such powers of the Company as are not by the Ordinance or any statutory modification thereof for the time being in force, or by these regulations, required to be exercised by the Company in General Meeting, subject nevertheless to the provisions of the Ordinance or to any of these regulations, and such regulations being not inconsistent with the aforesaid provisions, as may be prescribed by the Company in General Meeting but no regulation made by the Company in General Meeting shall invalidate any prior act of the Directors which would have been valid if that regulation had not been made.

General
Management
Powers

BORROWING POWERS

53. The Board may from time to time borrow any money for the purposes of the Company from its members or from any other person, firms, companies, corporations, Government Agencies, institutions or the Directors may themselves lend moneys to the Company.

Borrowing Powers
and giving of
Securities

54. The Board may raise and secure payment of such sums of money in such manner and upon such terms and conditions in all respects as it may think fit, and in particular by the issue of TFC's bonds, perpetual or redeemable debentures or by mortgage or charge or other security on the whole or any part of the property, assets and rights of the Company (both present and future), of the Company.

Raising Moneys

55. Any TFC's, bonds, debentures or other securities issued or to be issued by the Company shall be under the control of the Board which may issue them upon such terms and conditions and in such manner and for such consideration as shall be considered to be for the benefit of the Company.

Condition of
Bond/Securities

Special Powers
to issue
securities

56. Any TFC's, bonds, debentures or other securities may be issued with any special privileges as to redemption, surrender, drawing, convertibility into shares, attending and voting at General Meetings of the Company, appointment of Directors, and otherwise, provided that debentures with the right to vote or to be converted into shares shall be issued with the consent of the Company in General Meeting in terms of Section 114 of the Ordinance.

Power to
appoint Attorney

57. The Directors may from time to time, by Power of Attorney under the Company's seal, appoint any person or persons to be the Attorneys of the Company for such purposes and with such powers, authorities, and discretions (not exceeding those vested in, or exercisable by, the Directors under these presents) and for such period and subject to such conditions as the Directors may from time to time think fit. Any such attorney(s) may, if authorised by the Directors, delegate all or any of the powers vested in him/them.

As of
directors

58. The Directors shall duly comply with the provisions of the Ordinance and in particular with the provisions in regard to the registration of the particulars of mortgages and charges affecting the property of the Company or created by it, to the keeping of a register of the Directors, and to the sending to the Registrar of an annual list of members and a summary of particulars relating thereto and notice of any consolidation or increase of share capital, or sub-division of shares, and copies of Special Resolutions and a copy of the register of Directors and notifications of any changes therein.

Minutes Books

59. The Director shall cause minutes to be made in books provided for the purpose of :

- (a) all appointments of officers made by the Directors ;
- (b) the names of the Directors present at each meeting of the Directors and of any Committee of the Directors ;
- (c) all resolutions and proceedings at all meetings of the Company and of the Directors and of Committees of Directors ;
- (d) and every Director present at any meeting or Directors of Committee of Directors shall sign his name in a book to be kept for that purpose.

DISQUALIFICATION OF DIRECTORS

Disqualification
of directors

60. No person shall become a Director of the Company if he suffers from any of the disabilities or disqualifications mentioned in Section 187 and, if already a Director, shall cease to hold such office from the date he so becomes disqualified or disabled or provided, however, that no Director shall vacate his office by reason only of his being a member of any company which has entered into contracts with, or done any work for the Company but such Director shall not vote in respect of any such contract or work, and if he does so his vote shall not be counted.

PROCEEDINGS OF DIRECTORS

Quorum of
directors

61. The Directors may meet together for the despatch of business, adjourn and otherwise regulate their meetings, as they think fit. The quorum for a meeting of Directors shall not be less than **two-third or four** whichever is greater. Questions arising at any meeting shall be decided by a majority of votes. In case of an equality of votes, the Chairman shall have and exercise a second or casting vote. A Director may, and the secretary on the requisition of a Director shall, at any time, summon a meeting of Directors. It shall not be necessary to give notice of a meeting of Directors to any Director for the time being absent from Pakistan.

62. The Directors may elect a Chairman of their meetings and determine the period for which he is to hold office but, if no such Chairman is elected, or if at any meeting the Chairman is not present within ten minutes after the time appointed for holding the same or is unwilling to act as Chairman, the Directors present may choose one of their number to be Chairman of the meeting.

Chairman of
Directors Meetings

63. The Directors may delegate any of their powers not required to be exercised in their meeting to Committees consisting of such member or members of their body as they think fit. Any Committee so formed shall, in the exercise of the powers so delegated, conform to any restrictions that may be imposed on them by the Directors.

Committee

64. A Committee may elect a Chairman of its meetings, but, if no such Chairman is elected, or if at any meeting the Chairman is not present within ten minutes after the time appointed for holding the same or is unwilling to act as Chairman, the members present may choose one of their number to be Chairman of the meeting.

Chairman of
Committee
Members

65. A Committee may meet and adjourn as it thinks proper. Questions arising at any meetings shall be determined by a majority of votes of the members present. In case of an equality of votes, the Chairman shall have and exercise a second or casting vote.

Proceedings of
Committee
Members

66. All acts done by any meeting of the Directors or of a committee of Directors, or by any person acting as a Director, shall, notwithstanding that it be afterwards discovered that there was some defect in the appointment of such Directors or persons acting as aforesaid, or that they or any of them were disqualified, be as valid as if every such person had been duly appointed and was qualified to be a Director.

Validity of Directors
Acts

67. A resolution in writing circulated to all the Directors signed by all the Directors or affirmed by them through telex or telegram shall be as valid and effectual as if it had been passed at a meeting of the Directors duly convened and held.

Resolution in
Writing

ELECTION AND REMOVAL OF DIRECTORS

68. At the first Annual General Meeting of the Company, all the Directors shall stand retired from office, and thereafter shall be re-elected in their place in accordance with Section 178 for a term of three years.

Election & Term of
Directors

69. A retiring Director shall be eligible for re-election.

Eligibility for Re-
election

70. The Directors of the Company, unless the number of persons who offer themselves to be elected is not more than the number of Directors fixed by the Board of Directors, shall be elected to office by the members in General Meeting in the following manner :

Mode of Election

- (a) A member shall have such number of votes as is equal to the product of the number of voting shares or securities held by him and the number of Directors to be elected.
- (b) A member may give all his votes to a single candidate or divide them between more than one of the candidates in such manner as he may choose.
- (c) The candidate who gets the highest number of votes shall be declared elected as Director and then the candidate who gets the next highest number of votes shall be so declared and so on until the total number of Directors to be elected has been so elected.

71. Subject to the provisions of the Ordinance, the Company may from time to time in General Meeting increase or decrease the number of Directors.

72. Any Casual vacancy occurring on the Board of Directors may be filled up by the Directors, but the person so chosen shall be subject to retirement at the same time as if he had become a Director on the day on which the Director in whose place he is chosen was last elected as Director.

73. The Company may remove a Director but only in accordance with the provisions of the Ordinance.

NOMINEE DIRECTOR

74. In addition to the elected Directors, the Financial Institutions, shall be entitled, during the currency of their respective loan(s) to the Company, to appoint one person on the Board of Directors of the Company to be called Nominee Director and to recall and/or replace such a person from time to time. Such Nominee Director on the Board of Directors of the Company may not be holder of Share(s) in the Capital of the Company and the Articles 67 to 72 and other regulations and or rules pertaining to the election, retirement, qualification and/or disqualification of the Director shall not apply to him.

THE SEAL

75. The Directors shall provide a Common Seal of the Company which shall not be affixed to any instrument except by the authority of a resolution of the Board or by a committee of Directors authorised in that behalf by the Directors, and two Directors or one Director and the secretary of the Company shall sign every instrument to which the Common Seal is affixed.

76. The Directors may provide for the use in any territory, district or place not situated in Pakistan, of an Official Seal which shall be a facsimile of the Common Seal of the Company, with the addition on its face of the name of every territory, district or place where it is to be used. The provisions of Section 213 shall apply to the use of the Official Seal.

DIVIDENDS AND RESERVES

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| <p>77. The Company in General Meeting may declare dividends but no dividend shall exceed the amount recommended by the Directors.</p> | <p>Declaration of Dividends</p> |
| <p>78. The Directors may from time to time pay to the members such interim dividends as appear to the Directors to be justified by the profits of the Company.</p> | <p>Interim Dividends</p> |
| <p>79. No dividend shall be paid otherwise than out of profits of the year or any other undistributed profits.</p> | <p>Dividends Payable out of Profits</p> |
| <p>80. Subject to the rights of persons (if any) entitled to shares, all dividends shall be declared and paid according to the amounts paid on the shares, but if and so long as nothing is paid upon any of the shares in the Company, dividends may be declared and paid according to the amounts of the shares.</p> | <p>Dividends Payable on Amount Paid on Shares</p> |
| <p>81. The Directors may, before recommending any dividend set aside out of the profits of the Company such sums as they think proper as a reserve or reserves which shall, at the discretion of the Directors, be applicable for meeting contingencies, or for equalizing dividends, or for any other purpose to which the profits of the Company may be properly applied, and pending such application may, at the like discretion, either be employed in the business of the Company or be invested in such investments (other than shares of the Company) as the Directors may, subject to the provisions of the Ordinance, from time to time think fit.</p> | <p>Reserve Fund</p> |
| <p>82. The Directors may carry forward any profits which they may think prudent not to distribute, without setting them aside as a reserve.</p> | <p>Profit carried Forward</p> |
| <p>83. Any General Meeting may resolve that any moneys, investments, or other assets forming part of the undivided profits of the Company standing to the credit of any reserve or other fund or in the hands of the Company and available for dividend (or representing premiums received on the issue of shares and standing to the credit of the shares premium account) be capitalized and distributed amongst such of the shareholders as would be entitled to receive the same if distributed by way of dividend and in the same proportions on the footing that they become entitled thereto as capital and that all or any part of such capitalized fund be applied on behalf of such shareholders in paying up in full, any unissued shares, debentures or debenture-stock of the Company which shall be distributed accordingly and that such distribution or payment shall be accepted by such shareholders in full satisfaction of their interest in the said capitalized sum.</p> | <p>Capitalization of Reserve</p> |
| <p>84. A transfer of shares shall not pass the right to any dividend declared thereon before the registration of the transfer.</p> | <p>Effect of Transfer</p> |
| <p>85. If several persons are registered as jointholders of any share, any one of them may give effectual receipt for any dividend payable on the shares.</p> | <p>Dividends to Joint Holders</p> |

lice of
dividend

86. Notice of any dividend that may have been declared shall be given in the manner hereinafter mentioned to the persons entitled to share therein.

period for
payment of
dividend

87. The dividend shall be paid within the period laid down in Section 251.

unclaimed
dividends

88. All dividends unclaimed for six years after having been declared shall be kept in trust by the Company but may be invested or otherwise made use of by the Directors for the benefit of the Company until claimed.

ACCOUNTS

Books of
Account

89. The Directors shall cause to be kept proper Books of Account as required under Section 230.

Place where
Books kept

90. The Books of Account shall be kept at the Registered Office of the Company or at such other place as the Directors shall think fit and shall be open to inspection by the Directors during business hours.

Inspection by
Members

91. The Directors shall from time to time determine whether and to what extent and at what time and places and under what conditions or regulations the accounts and books or papers of the Company or any of them shall be open to the inspection of members not being Directors, and no member (not being a Director) shall have any right of inspecting any Account and Book or papers of the Company except as conferred by law or authorised by the Directors or by the Company in General Meeting.

Annual
Accounts

92. The Directors shall as required by Sections 233 and 236 cause to be prepared and to be laid before the Company in General Meeting such Profit and Loss Accounts and Balance Sheets and reports as are referred to in those sections.

Balance Sheet
Profit and
Loss Account

93. A Balance Sheet, Profit and Loss Account, and other reports referred to in the preceding Article shall be made out in every year and laid before the Company in the Annual General Meeting made up to a date not more than six months before such meeting. The Balance Sheet and Profit and Loss Account shall be accompanied by a report of the auditors of the Company and the report of Directors.

Copy of
Accounts to be
sent to Members

94. A copy of the Balance Sheet and Profit and Loss Account and reports of Directors and auditors shall, at least twenty one days preceding the meeting, be sent to the persons entitled to receive notices of General Meetings in the manner in which notices are to be given as hereinafter provided.

Corrected
Accounts

95. Every Account of the Directors when audited and approved by a General Meeting shall be conclusive except as regards any errors discovered therein within three months next after the approval thereof. Whenever any such error is discovered within that period the account shall forthwith be corrected and thenceforth shall be conclusive.

96. The Directors shall in all respect comply with the provisions of Sections 230 to 236.

Compliance with Ordinance

AUDIT

97. Once at least every year the accounts of the Company shall be audited and the correctness of Profit and Loss Account and Balance Sheet ascertained by one or more Auditors. The Auditors shall be appointed and their duties regulated in accordance with Sections 252 to 255 of the Companies Ordinance 1984.

Audits

SECRETARY

98. The Board may appoint a Secretary of the Company who shall perform such functions and duties as are required in these Articles, or as may be directed by the Board.

Secretary

NOTICES

99. Notices shall be given by the Company to Members and Auditors of the Company and other persons entitled to receive notices in accordance with Section 50.

Notice to Members etc.

SECURITY

100. Every Director, Manager, Adviser, Auditor, Trustee, Member of a Committee, Officer, Servant, Agent, Accountant or other person employed in the business of the Company shall, if so, required by the Directors, before entering upon his duties, sign a declaration pledging himself to observe a strict secrecy respecting all transactions of the Company with its customers and the state of accounts with individuals and in matters relating thereto, and shall by such declaration pledge himself not to reveal any of the matters which may come to his knowledge in the discharge of his duties except when required to do so by the Directors or by any General Meeting or by any Court of Law and except so far as may be necessary in order to comply with any of the provisions in these presents.

Secrecy

101. No member or other person (not being a Director) shall be entitled to enter upon the property of the Company or examine the Company's premises or properties without the permission of the Directors, and to require discovery of or any information respecting any detail of the Company's trading or any matter which is or may be in the nature of a trade secret, mystery of trade, or secret process or of any matter whatsoever which may relate to the conduct of the business of the Company and which in the opinion of the Directors will be inexpedient, in the interest of the members of the Company to communicate.

Members access to Company premises

RECONSTRUCTION

102. On any sale of the undertakings of the Company the Directors or the liquidators on a winding up may, if authorised by a Special Resolution, accept fully paid shares, debentures or securities of any other company, either then existing or to be formed for the purchase in whole or in part of the property of the Company, and the Directors (if the profits of the Company permit), or the liquidators (in a winding up), may distribute such shares or securities, or any other properties of the Company

Reconstruction

amongst the members without realization, or vest the same in trustees for them and any Special Resolution may provide for the distribution or appropriation of the cash, shares or other securities, benefits or property, otherwise than in accordance with the strict legal rights of the members or contributories of the Company for the valuation of any such securities or property at such price and in such manner as the meeting may approve and all holders of shares shall be bound to accept and shall be bound by any valuation or distribution so authorised and waive all rights in relation thereto save only such statutory rights (if any) as are, in case the Company is proposed to be or in the course of being wound up, incapable of being varied or excluded by these presents.

WINDING UP

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olution

103. If the Company is wound up, the liquidator may, with the sanction of a Special Resolution of the Company and any other sanction required by Ordinance, divide amongst the members in specie or kind the whole or any part of the assets of the Company (whether they consist of property of same kind or not) and may, for such purpose, set such value as he deems fair upon any property to be divided as aforesaid and may determine how such division shall be carried out as between the members or different classes of members. The liquidator may, with the like sanction, vest the whole or any part of such assets in trustees upon such trust for the benefit of the contributories, as the liquidator with the like sanction, shall think fit, but so that no member shall be compelled to accept any shares or other securities whereon there is any liability.

INDEMNITY

nnification

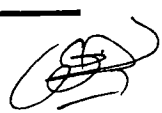






104. Every officer or agent for the time being of the Company may be indemnified out of the assets of the Company against any liability incurred by him in defending any proceedings, whether civil or criminal, arising out of his dealings in relation to the affairs of the Company, except those brought by the Company against him, in which judgement is given in his favour or in which he is acquitted, or in connection with any application under Section 488 in which relief is granted to him by the Court.

ARBITRATION

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ator(s)

105. Whenever any difference arises between the Company on the one hand and any of the members, their executors, administrators or assignees on the other hand, touching the true intent or construction, or the incident or consequences of these Articles or of the statutes or touching anything there or thereafter done, executed, omitted or suffered in pursuance of these Articles or of the statutes or touching any breach or alleged breach of these Articles, or any claim on account of any such breach or alleged breach, or otherwise relating to the premises, or to these Articles or to any statute affecting the Company or to any of the affairs of the Company, every such difference shall, as a condition precedent to any other action at law be referred in conformity with the Arbitration Act, 1940, or any statutory modification thereof and any rules made thereunder, to the decision of an Arbitrator to be appointed by the parties in difference or if they cannot agree upon a single Arbitrator to the decision of two Arbitrators of whom one shall be appointed by each of the parties in difference, or in the event of the two Arbitrators not agreeing, then of an umpire to be appointed by the two Arbitrators, in writing, before proceeding on the reference, and such decision shall be final and binding on the parties.

We, the several persons whose names and addresses are subscribed below, are desirous of being formed into a Company, in pursuance of these Articles of Association, and we respectively agree to take the number of shares in the Capital of the Company as set opposite to our respective names.

Name and Surname (Present & Former) in Full (in Block Letters)	Father's Name in Full	Nationality with any former Nationality	Occupation	Residential Address (in Full)	Number of shares taken by each sub- scriber	Signature
1. GOVERNMENT OF THE PUNJAB, IRRIGATION & POWER DEPARTMENT, PUNJAB	Under the Federation of Pakistan	Pakistani	An Autonomous Body of the Provincial Government	Govt. of the Punjab, Irrigation & Power Department, Old Anarkali, Lahore	94	
2. Nommiee Members of the Above Provincial body MR. ARIF NADEEM N.I.C. No. 35202-7817681-9	Muhammad Ashraf	Pakistani	Secretary Govt. of the Punjab, Irrigation & Power Department, Lahore	Govt. of the Punjab, Irrigation & Power Department, Old Anarkali, Lahore	1	
3. MR. IMDAD ULLAH BOSAL N.I.C. No. 34401-0645271-7 <i>Nommiee member of Govt of Punjab Finance Dept. Punjab</i>	Muhammad Iqbal Bosal	Pakistani	Additional Secretary (Economic Services) Govt. of Punjab Finance Department, Lahore	Govt. of the Punjab, Finance Department, Civil Secretariat, Lahore	1	
4. DR. MUHAMMAD ABID BODLA N.I.C. No. 35202-3013538-5 <i>Nommiee member of Govt of Punjab Planning & Development Dept, Punjab</i>	Muhammad Sana Ullah Bodla	Pakistani	Member Engineering Govt. of the Punjab, P & D Department, Lahore	Govt. of the Punjab, Planning & Development Department, Lahore	1	
5. MR. MUHAMMAD YAQOOB N.I.C. No. 34101-2727731-1	Muhammad Shafi	Pakistani	Chief Engineer (Power) Irrigation & Power Department, Lahore	Govt. of the Punjab, Irrigation & Power Department, Old Anarkali, Lahore	1	
6. MR. SIKANDER KHAN N.I.C. No. 35200-1424373-1	Agha Jahangir Ali Khan	Pakistani	Electrical Engineer, CEO of JJ Petroleum (Pvt.) Ltd Lahore	JJ Petroleum (Pvt.) Ltd. 43 - L, MM Alam Road, Lahore	1	
7. MR. LIAQAT ALI N.I.C. No. 35201-2984182-1	Mian Ali Muhammad	Pakistani	Project Director Govt. of the Punjab, Irrigation & Power Department, Lahore	209 - C, 1st Floor, Tech Housing Society, Canal Bank, Lahore	1	
Total Number of Shares Taken					100	

Dated this 8th day of January, 2008.

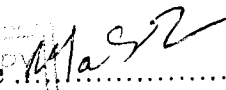
Witness to the above Signatures :

Full Name : H. HASUD QURESHI

N.I.C. No. : 35202-2462926-5

Father's/Husband's

Full Name : M. SHAFI QURESHI

Signature : 

Nationality : Pakistani

Occupation : Manager Accounts

Full Address : YUSAF SAEED & CO.

YUSAF SAEED & CO.

CHARTERED ACCOUNTANTS

6-A, BLOCK-S, GULBERG-II,

LAHORE. PHONES: 5764717-8

FAX NO. 5764719



1. COMPANY REGISTRATION NO: 64528
2. SERIAL NO. 157108
3. NAME OF THE COMPANY
4. BRIEF DESCRIPTION OF THE DOCUMENT
INCLUDES THE FOLLOWING:
5. THE DATE OF THE DOCUMENT
REGISTERED AND ON RECORDED.

Handwritten signature
JOINT REGISTRAR OF COMPANIES
LAHORE REGION

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PUNJAB POWER DEVELOPMENT COMPANY LTD

(PPDCL)

Introduction

Punjab Power Development Company Limited (PPDCL) is a Government of the Punjab owned, corporate entity duly incorporated under section 32 of Companies Ordinance 1984. The company was established in January, 2008. The company is aimed at developing power generation projects based on different technologies for sale to National Grid (National Transmission and Dispatch Company-NTDC) or Distribution Companies. PPDCL also looks forward for supplying quality electric supply in bulk to Industrial Estates or retail electric supply to industrial units in Industrial Estates in a commercially viable manner.

Objectives of the Company:

- Development of power projects in public sector or development of power projects in Joint Venture (JV) mode with private sector;
- Arrange funding through local banks or International donor agencies or public subscription;
- Operation and management of power projects in commercial viable manner;
- Sale of power to National Transmission and Dispatch Company (NTDC-WAPDA) or Distribution Company;
- Sale of power to Industrial Estates in Bulk;
- Sale of un-interrupted power to Industrial units within specified areas (Ordinarily in Industrial Estates)
- Development of pilot projects for innovative technologies

Vision

To utilize all available sources in province to provide affordable electric supply to all segments of provincial economy through increase in generation

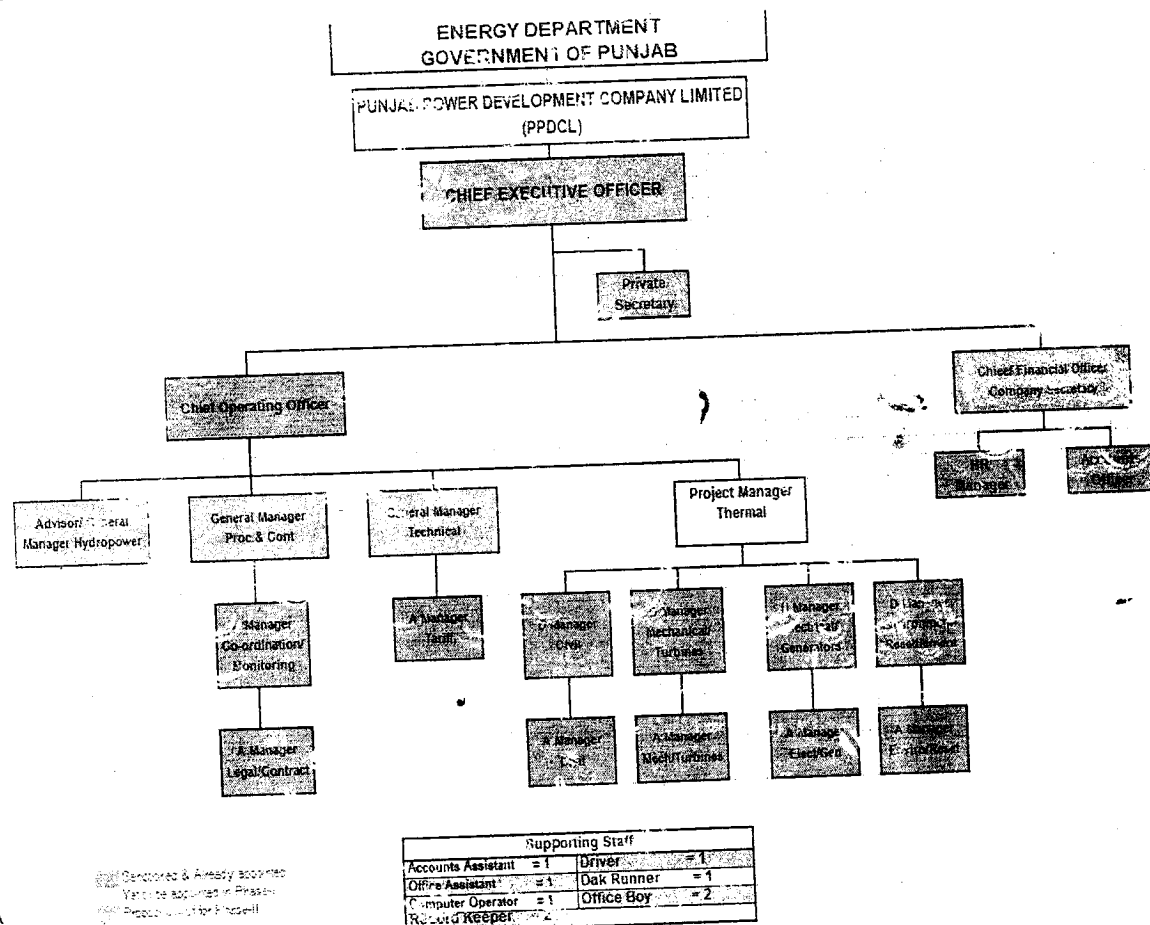
Mission statement:

Assure sustainable electric supply in the province through responsible development of energy generation projects and to supplement the Federal Government in electricity generation.

Company Profile/Board of Directors

Sr. #	NAME	STATUS
1	Mr. Arif Saeed, Servis Group	Chairman
2	Mr. Muhammad Jehanzeb Khan, Secretary, Finance Department, Government of the Punjab	Member
3	Mr. Muhammad Jehanzeb Khan, Additional Chief Secretary (Energy), Government of the Punjab	Member
4	Dr. Muhammad Abid Bodla, Member Infrastructure, Planning and Development Department Government of the Punjab	Member
5	Syed Yawar Ali, Chairman Nestle Pak Ltd	Member
6	Mr. Fazal Ahmed Khan Ex-Member (Power) WAPDA Lahore	member
7	Dr. Javed Younas Uppal, Chairman, Institute of Engineers (Pak) Lahore	Member
8	Mr. Nauman Khan, Managing Director, M/s Almoiz Industries Ltd. Lahore	Member
9	Mr. Asad Ali, ABACUS Consultant, Lahore	Member
10	Syed Mohammad Feisal Hussain Naqvi, Bhinder and Naqvi Law Associates Lahore	Member
11	Syed Farrukh Ali, Chief Executive Officer, Punjab Power Development Company Ltd.	Member

Organogram of the Company



Power Projects

Hydropower Projects under ADB Loan

Asian Development Bank extended a multi-tranche facility of US\$ 525 Million in year 2003 under "Renewable Energy Development Sector Investment Program" (REDSIP) for the development of renewable energy projects in the country. Punjab Government availed 1st tranche of US\$ 65 Million including 20% equity share for the construction of hydropower projects at Marala (Sialkot), Chianwali (Gujranwala), Deg Out Fall (Sheikhpura), Pakpattan and Okara.

A Power Project Management Unit (PPMU) has been established for the implementation of the projects financed by ADB. The projects are being implemented on EPC mode by inviting International Competitive Bidding (ICB) under the procedures of ADB where contractor is responsible for "Engineering, Procurement

and Construction". Four (4) Hydropower projects has awarded through international Competitive Bidding process as per the guidelines of ADB. A Steering Committee constituted by Punjab Government is empowered to approve the bid price as well as monitoring the progress of implementation. The projects details are given below:

Project Name	Capacity (Mw)	Date of Award of Contract	Effective Date of contract	Completion Period (days)	COD
Marala HPP	7.64	24-09-2011	28-05-2012	900	14-11-2014
Pakpattan HPP	2.82	24-09-2011	28-05-2012	885	30-10-2014
Deg Out Fall HPP	5.38	17-12-2012	23-02-2013	885	27-08-2015
Chianwali HPP	4.04	17-12-2012	23-02-2013	1080	06-02-2016

FPDCL will be responsible for O&M of the hydropower projects in a commercial viable manner.

Coal Fired Power Projects

- a) **2x55 MW Coal Projects at Sunder Lahore and M-3 Industrial City Faisalabad**
in order to mitigate load shedding, Government of Punjab took policy decision to install dedicated coal fired power projects near industrial estates in Punjab for supplying un-interrupted electric supply to industrial units. FPDCL has been assigned the tasks to install two (2) 2x55 MW Coal Fired Power Project near i) Sunder Lahore ii) M-3 Industrial City Faisalabad in public sector. As a first step, the feasibility studies of the projects have been completed by hiring consultants. The projects will be implemented in public mode.

The projects are expected to be commissioned in year 2016-17

- b) **2x660 MW Coal Projects in District Sahiwal on EPC plus finance mode.**
Punjab Government has decided to undertake installation of 2x660MW Coal Power Projects in EPC plus finance mode in District Sahiwal. As a first step, the feasibility studies of the projects are being prepared by hiring consultants. The projects will be implemented in public mode.

The projects are expected to be commissioned in FY 2018-19

D

**GOVERNMENT OF THE PUNJAB
FINANCE DEPARTMENT**

TO BE SUBSTITUTED BEARING THE SAME NUMBER AND DATED 31-10-2013

SUBJECT: - REVISED SNE OF PPDCL FOR FINANCIAL YEAR 2013-14.

Will the Section Officer (Admn.), Government of the Punjab, Energy Department, Lahore, kindly refers to letter No. PPPDC/ 1402/2013 dated 28-11-2013 received from Chief Executive Officer, Punjab Power Development Company (PPDCL) on the subject cited above?

2. In accordance with the approval granted by Chief Minister Punjab on a Summary, Finance Department agrees to the creation of 6 posts for Punjab Power Management Unit (PPMU), already established for Establishment of Punjab Power Development Company Limited (PPDCL) at a total cost of Rs.13.461 million (Rupees thirteen million four hundred sixty one thousand only), in anticipation to the provision of funds through supplementary grant during the current financial year 2013-14 under Grant No.PC21008 (008)-Other Taxes and Duties, LQ5320-Charges under Electricity Act. The detail of allocation / posts is as under:-

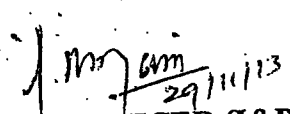
POSTS

Sr.#	Name of Post / BS	Number of Post	Pay
1.	General Manager (Technical) Lumpsum Rs.200,000/-	1	1,800,000
2.	General Manager (Hydropower) Lumpsum Rs.200,000/-	1	1,516,000
3.	General Manager (Procurement & Contract) Lumpsum Rs.200,000/-	1	1,800,000
4.	Project Manager (Thermal) Lumpsum Rs.200,000/-	1	1,800,000
5.	Accounts Assistant (BS-14) Lumpsum Rs.25,000/-	1	225,000
6.	Dak Runner (BS-01) Lumpsum Rs.12,000/-	1	105,000
	Total:-	6	7,246,000
Codes	Object / Classification	Amount (In Rs.)	
A011-1	Basic Pay of Officers		
A01101	Pay of Officers	6,916,000	
A01151	Basic Pay of Other Staff		
A01151	Pay of other staff	330,000	
	Total Pay:-	7,246,000	
	Allowances		
	Others	124,000	
A01273	Honorarium	1,000	
A01274	Medical Charges	75,000	
	Total Allowances:-	200,000	
A03	Operating Expenses		
A03201	Postage & Telegraph	25,000	
A03202	Telephone & Trunk Calls	50,000	
A03303	Electricity Charges	150,000	
A03304	Hot & Cold Weather Charges	5,000	
A03805	T.A/D.A	50,000	
A03807	P.O.L. Charges	50,000	
A03901	Stationery	50,000	

J. Singh
28/11/13

A03902	Printing & Publication	50,000
A03905	Newspapers Periodicals	10,000
A03907	Advertising & Publication	40,000
A03933	Service Charges	350,000
A03942	Cost of Other Store	50,000
A03970	Others	80,000
A03407	Rate & Taxes	40,000
	Total Operating Expenses:-	1,000,000
A09	Physical Assets	
A097501	Purchase of Transport	5,000,000
	Total Physical Assets:-	5,000,000
A13	Repair & Maintenance	
A13001	Transport	5,000
A13101	Machinery & Equipment	5,000
A13201	Furniture & Fixture	5,000
	Total Repair & Maintenance:-	15,000
	GRAND TOTAL:	13,461,000

3. The above said creation is subject to the condition that Salary Packages in respect of contract employees would be got cleared from the Committee formulated by S&GAD date 28-06-2007 and Public Sector Officers in accordance with Finance Department's letter No.FD.SR-1/9-20/2006 dated 11-11-2011.
4. The purchase of Physical Assets is subject to approval from Austerity Committee.
5. The expenditure will be incurred after completion of all the codal / legal / procedural formalities.
6. The expenditures involved will be debitale to Grant No.PC21008(008)-Other Taxes and Duties, 01-General Public Service, 011-Executive & Legislative Organs, 0112-Financial & Fiscal Affairs, External Affairs, 011205-Tax Management (Customs, Income Tax, Excise etc.), LQ5320-Charges under Electricity Act, LO 5041, during the current financial year 2013-14.
7. Administrative Department may get the audit copy authentication by Finance Department accordingly.


SECTION OFFICER (I&P)

To
The Section Officer (Admn.),
Government of the Punjab,
Energy Department, Lahore.
 U.O. No. FD.SO (I&P) 1-8/2007 Vol-I (SNE)
No. & Date Even.

Dated Lahore the 29th November, 2013

A copy is forwarded for information and necessary action to the Budget Officers (I&VI), Government of the Punjab, Finance Department.


SECTION OFFICER (I&P)



GOVERNMENT OF THE PUNJAB
FINANCE DEPARTMENT

TO BE SUBSTITUTED BEARING SAME NUMBER AND DATED 23-05-2013.

SUBJECT:- SCHEDULE OF NEW EXPENDITURE OF PPDCL FOR FY 2013-14 (11 NOS POSTS).

Will the Section Officer (Admin), Government of the Punjab, Energy Department, Lahore kindly refer to letter No. SO (Admin) (ED) 16-10/2012 dated 24-05-2013 on the subject noted above?

2. Finance Department agrees to the continuance of 11 posts for Punjab Power Management Unit (PPMU) Irrigation and Power Department already established for Establishment of Punjab Power Development Company Limited (PPDCL) through SNE 2013-14 at a total cost of Rs.10.324 million (Rupees ten million three hundred twenty four thousand only) under Grant No. PC-21008- LQ5320-Charges under Electricity Act., during the year 2013-14. The detail of allocation / posts is as under:-

POSTS

Sr. No.	Name of Post / BS	Number of Post	Pay
1	Chief Executive Officer (MP-1/20)	1	2,520,000
2	Chief Finance Officer (MP-2/19)	1	1,000
3.	Advisor	1	1,124,000
4.	Company Secretary (MP-3/18)	1	783,000
5.	PS. To Chief Executive Officer	1	308,000
6.	Computer Operator/ Office Assistant (BS-14)	1	180,000
7.	Record Keeper/ Junior Clerk (BS-07)	2	360,000
8.	Driver (BS-05)	1	144,000
9.	Office Boy / Naib Qasid (BS-01)	2	240,000
	Total:-	11	5,660,000

EXPENDITURE

Codes	Object / Classification	Amount (Rs.)
A01101	Pay of officer	4,428,000
A01151	Pay of other staff	1,232,000
A01202	House Rent Allowance	1,781,000
A01203	Conveyance Allowance	50,000
A01217	Medical Allowance	26,000
A01240	Utilities (MP-I)	201,000
A0120X	Adhoc Allowance 2010	86,000
A0121A	Adhoc Relief 2011	28,000
A0121M	Adhoc Relief Allowance 2012	62,000
A03	Communication	
A03201	Postage & Telegraph	35,000
A03202	Telephone & Trunk Calls	100,000

Punjab Power Development Company Ltd.
Energy Department

Diary No: 7819

Date: 16/07/2013

1-11/7/13

A03303	Electricity Charges	200,000
A03304	Hot & Cold Weather Charges	20,000
A03805	T.A/D.A	150,000
A03807	P.O.L. Charges	300,000
A039	Total General	
A03901	Stationery	125,000
A03902	Printing & Publication	125,000
A03905	Newspapers Periodicals	10,000
A03907	Advertising & Publicity	150,000
A03942	Cost of Other Store	50,000
A03970	Others	20,000
A034	Total Occupancy	
A03402	Rent of Office Building	925,000
A03407	Rates & Taxes	60,000
A130	Total Repair & Maintenance of Transport	
A13001	Transport	50,000
A13101	Machinery and Equipment	50,000
A13201	Furniture & Fixture	30,000
	GRAND TOTAL:	10,324,000

3. The above said SNE is subject to the condition that Salary Packages in respect of contract employees would be got cleared from the Committee formulated by S&GAD dated 28-06-2010 and for Public Sector Officers in accordance with Finance Department's letter No.FD.SR-I/9-20/2006 dated 11-11-2011.

4. The expenditure will be incurred after completion of all the codal / legal / procedural formalities.

5. The expenditures involved will be debitable to Grant No. PC-21008, 01-General Public Service, 011-Executive & Legislative Organs, 0112-Financial & Fiscal Affairs, External Affairs, 011205-Tax Management (Customs, Income Tax, Excise etc), LQ5320-Charges under Electricity Act., during the year 2013-14.

To

The Section Officer (Projects)
Government of the Punjab,
Energy Department,
Lahore.

U.O. No.SO(I&P) 1-8/2007 (SNE) Vol-I
No. & Date Even.

Dated Lahore the 6th June, 2013

A copy is forwarded for information and necessary action to the Budget Officer (VI), Government of the Punjab, Finance Department.

SECTION OFFICER (I&P)



STATE BANK OF PAKISTAN
SBP BANKING SERVICES CORP. (Bank)
Banking Division (Payment Unit)
LAHORE

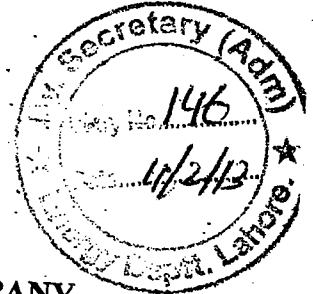
No. PAP (U)/

/2013

4-2-2013

The Manager,
The Bank of Punjab,
Main Branch,
LAHORE.

Dear Sir,



**RELEASE OF FUNDS TO PUNJAB POWER DEVELOPMENT COMPANY
LIMITED DURING THE YEAR 2012-13**

We advise having credited your account with us on **4-2-2013** with a sum of **Rs.100,000,000.00** (Rupees One Hundred Million only) for onward credit to Punjab Power Development Company Limited (PPDCL) through its Bank Account No.CPA-0023350006 maintained with The Bank of Punjab, Tufail Road Branch, Lahore Cantt by debiting to Government of Punjab Account No.1 (Non-Food).

Yours faithfully,

sd

RUBINA FAISAL
ASTT. CHIEF MANAGER
Ph# (042)99210429
PABX# 99210461-10/2255
FAX# 99213270

Ph
9-2-13
of date.

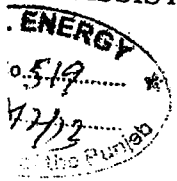
ASE
D5(A)
11/1/13

Endst. No. PAD (P)/ **1384** /2013
Copy forwarded for information to:-

- 1 The Director, Accounts Department, State Bank of Pakistan SBP BSC (Bank), Head Office, Karachi with reference to his letter No.AD.Govt /946/40 (A)-2013 dated 4-2-2013.
- 2 The Accountant General Punjab, Lahore. The expenditure is debitable to Deposits Accounts- Provincial-1 (Non Food). Fund No.PC12043 Demand No.043 (Capital)-Loans to Municipalities Port Funds etc.01-General Public Service 014-Transfers 0142-Transfers (others) 014202-Transfer to Non-Financial Institutions -LE4411-Transfer to Non Financial Institutions-A08-Loans and Advances A085-Non Financial Institutes A08501-Loan to Non Financial Institutions-LO12001079-Loans to Punjab Power Development Company Limited during the year 2012-2013 (Coat Center LZ-4118).
- 3 The Secretary, Govt. of the Punjab, Energy Deptt.
- 4 The Advisor, Punjab Power Development Company Ltd, 77-Shah Jamal Colony, Lahore.
- 5 The Additional Finance Secretary, Finance Department, Govt of Punjab Lahore
- 6 The Treasury Officer, Lahore.
- 7 The Manager, The Bank of Punjab, Tufail Road Branch, Lahore.



ASSISTANT CHIEF MANAGER



27.10.61
15/12

For sd
P 12/2

11/02/13

SEALED AUTHORITY
T.C.S.

No. FD(L)1-362/2012
GOVERNMENT OF THE PUNJAB
FINANCE DEPARTMENT
Lahore, February 02, 2013

To

The Director of Accounts,
State Bank of Pakistan,
SBP Banking Services Corporation (Bank),
Head Office, Subsidiary House,
I.I. Chundrigar Road, Karachi.

SUBJECT: RELEASE OF FUNDS TO PUNJAB POWER DEVELOPMENT COMPANY LIMITED DURING THE YEAR 2012-13.

Kindly debit Punjab Government's Account No.1 (Non-Food) with a sum of loan of Rs. 100.000 million (Rupees one hundred million only), in anticipation of provision of funds through supplementary grant, per contra credit to Punjab Power Development Company Limited (PPDCL) through its Account No. CPA-0023350006 maintained with the Bank of Punjab, Tufail Road Branch, Lahore Cantt., as seed money.

2. The amount is adjustable in the accounts for 2012-2013.

(FAISAL RASHID)
DEPUTY SECRETARY (RESOURCES)
Phone No. 042-99211072

No. & DATE EVEN

Copy is forwarded for information and necessary action to:-

1. The Accountant General, Punjab, Lahore.
The expenditure involved is debitable to Fund No. PC12043 Demand No. 043 (Capital)-Loans to Municipalities, Port Funds etc. 01-General Public Service 014-Transfers 0142-Transfers (Others) 014202-Transfer to Non-Financial Institutions -LE4411-Transfer to Non Financial Institutions- A08-Loans and Advances A085-Non Financial Institutes A08501-Loan to Non Financial Institutions -LO12001079-Loans to Punjab Power Development Company Limited during the year 2012-2013. (Cost Center LZ 4118)

The amount of Rs.100.000 million would be diverted from the allocation of Rs.5,000.000 million, Fund No. PC12043 Demand No.043 (Capital)-Loans to Municipalities/ABs etc. 01-General Public Service, 014-Transfers, 0142-Transfers (Others), 014202-Transfer to Non-Financial Institutions, LE4365- Loan to Non Financial Institutions, LO11000381- Loans to WASAs and TMAs for clearing outstanding PEPCO dues, A08501-Loan to Non Financial Institution.

The loan will be governed by the following terms and conditions:-

- i) Repayment: Within 5 years including 2 years grace period
- ii) Interest: 0.25% per annum
- iii) Penalty: 4% per annum in case of delay in repayment

This brings the total release of loan of Rs. 100.000 million to Punjab Power Development Company Limited, during the year 2012-2013. The expenditure will be incurred only after completion of all codal formalities.

2. The Secretary, Government of the Punjab, Energy Department.
3. The Advisor, Punjab Power Development Company Limited, 77-Shah Jamal Colony, Lahore w.r.t. his letter No. PPDCL/664/2013 dated 31.01.2013.
4. The Accountant General, Punjab (Budget Section), Lahore.
5. The Additional Finance Secretary/Director (Budget), Finance Department.
6. The Assistant Chief Manager, State Bank of Pakistan, SBP Banking Services Corporation (Bank), Lahore.
7. The Manager, The Bank of Punjab, Tufail Road Branch, Lahore Cantt.
8. The Treasury Officer, Lahore.


DEPUTY SECRETARY (RESOURCES)



NO. SO(PROJECTS)(ED)15-66/12-13(P-I)
GOVERNMENT OF THE PUNJAB
ENERGY DEPARTMENT

Dated Lahore, the 19th March, 2013

The Chief Executive Officer,
Punjab Power Development Company Limited,
Energy Department,
Lahore.

SUB: -

HIRING OF DESIGN REVIEW MONITORING REPORTING AND
CONSTRUCTION SUPERVISION CONSULTANTS FOR MEGA IRRIGATION
PROJECTS IN ENERGY DEPARTMENT (REVISED)

Ref:

Minutes of PDWP Meeting held on 18.01.2013.

Governor of the Punjab is pleased to accord Administrative Approval of the scheme on Feasibility Study for Development of Coal Based Power Projects in Industrial Estates in Punjab at a cost of Rs.184.829 million (Rupees One hundred eighty four million, eight hundred and twenty nine thousand only) subject to the fulfilling all the codal, legal and procedural formalities and availability of funds. The expenditure would be chargeable to the following Head of Account:

Head of Account:

Grant No.PC-12037 (Capital)

Rs.184.829 million

04 Economic Affairs
043 Fuel and Energy
0435 Electricity - Hydel
043502 Electricity - Hydel

SECRETARY
ENERGY DEPARTMENT

C.C.

1. The Accountant General Punjab, Lahore.
2. The Director General, Accounts (works), Punjab, Lahore.
3. The Treasury Officer, Lahore.

1.11.7 am
20/3/13
SECTION OFFICER (I&P)
FINANCE DEPARTMENT

C.C.

1. The Budget Officer (VI), Government of the Punjab, Finance Department, Lahore.
2. The Section Officer (I&P), Government of the Punjab, Finance Department, Lahore.
3. PS to Secretary Energy Department, Punjab.

SECTION OFFICER (PROJECTS)

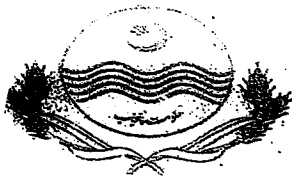
Punjab Power Development Company Ltd.
Energy Department

Diary No:

9419

Date

21/03/2013



E

No.4(12)ECA/P&D/04
GOVERNMENT OF THE PUNJAB
PLANNING & DEVELOPMENT DEPARTMENT

Dated Lahore, the 8th March, 2013

To

The Section Officer (ADB-II),
Government of Pakistan,
Economic Affairs Division (EAD),
Islamabad.

Subject: - RENEWABLE ENERGY DEVELOPMENT SECTOR INVESTMENT PROGRAMME FINANCED BY ADB FUNDS.

The Renewable Energy Development Sector Investment Programme (REDSIP), financed by ADB envisages the construction of Marala, Chianwali, Deg-Out Fall, Okara and Pakpattan Hydro power Projects (HPPs) on Canal Falls of Punjab. The projects are being implemented under "International Competitive Bidding" (ICB) on Turnkey basis.

ADB funds (80%) and equity by Government of the Punjab (20%) for REDSIP Loan #2286(Tranche-I) was assessed on the basis of revised PC-Is in June 2011 and available loan was considered insufficient.

ADB was approached to re-allocate non-committed loan /saving with KPK under Tranche-I. Accordingly ADB re-allocated KPK saving and confirmed the re-allocated loan of Japanese ¥ 7882.62 million against the original allocation of 5599.11 million for Punjab under loan # 2286/PAK (OCR).

At present re-allocated loan for Punjab is ¥ 7882.62 million which is Eq US\$ 86.20 million. Out of five HPPs, four sub-projects have been awarded and loan amount committed by ADB for these four projects is US \$ 81.11 million.

Okara sub-project requires approximately US\$ 19.40 million as 80% share of ADB, whereas available un- Committed loan is US\$ 5.09 million.

It is confirmed that the Govt of the Punjab is committed to take up the additional financing in addition to its 20% counter part share to cover the financing gap, so that all five-projects under REDSIP may be implemented successfully.

ADB may be informed accordingly.


(JABBAR AZIZ)
PLANNING OFFICER (ECA-I)

CC:

1. The Country Director Asian Development Bank Pakistan Resident Mission, Islamabad.
2. The Secretary Energy, Govt of the Punjab Lahore.

FD
Office
F

LOAN NUMBER 2286-PAK

LOAN AGREEMENT
(Ordinary Operations)

(Renewable Energy Development Sector Investment Program – Project 1)

between

ISLAMIC REPUBLIC OF PAKISTAN

and

ASIAN DEVELOPMENT BANK

DATED 5 October 2007

LAL:PAK 34339

LOAN AGREEMENT
(Ordinary Operations)

LOAN AGREEMENT dated 5 October 2007 between ISLAMIC REPUBLIC OF PAKISTAN (hereinafter called the Borrower) and ASIAN DEVELOPMENT BANK (hereinafter called ADB).

WHEREAS

(A) The Borrower has entered into the Framework Financing Agreement (hereinafter called the FFA) with ADB to seek ADB financing for a roadmap and an investment program for renewable energy development (the Investment Program);

(B) The Borrower has applied to ADB for (i) a loan from its ordinary capital resources for the purposes of Part A and Part B of the Project described in Schedule 1 to this Loan Agreement; and (ii) a loan from its Special Funds resources for the purposes of Part C of the Project;

(C) By an agreement of even date herewith between the Borrower and ADB (hereinafter called the Special Operations Loan Agreement), ADB has agreed to lend to the Borrower, from its Special Funds resources, an amount in various currencies equivalent to six million seven hundred ninety three thousand Special Drawing Rights (SDR 6,793,000) for the purposes of Part C of the Project (hereinafter called the Special Operations Loan, and together with this Loan, the Loans);

(D) The Borrower has also applied for a technical assistance grant up to eight hundred thousand Dollars (\$800,000) for the purposes of facilitating the process of the development of the renewable energy policy of the Borrower and capacity development of the Alternative Energy Development Board under the Ministry of Water and Power of the Borrower (hereinafter called AEDB), and ADB has agreed to provide a grant to the Borrower for such purpose;

(E) The Project will be carried out by (i) AEDB, (ii) North West Frontier Province (hereinafter called NWFP) through Sarhad Hydel Development Organization (hereinafter called SHYDO), and (iii) Province of Punjab (hereinafter called Punjab), and for this purpose the Borrower will make available to NWFP and Punjab the proceeds of the Loan provided for herein upon terms and conditions satisfactory to ADB; and

(F) ADB has agreed to make a loan to the Borrower from ADB's ordinary capital resources upon the terms and conditions set forth herein and in the Project Agreements of even date herewith between (i) ADB on the one part and NWFP and SHYDO on the other part; and (ii) ADB and Punjab.

NOW THEREFORE the parties hereto agree as follows:

ARTICLE I

Loan Regulations; Definitions

Section 1.01. All the provisions of the Ordinary Operations Loan Regulations Applicable to LIBOR-Based Loans Made from ADB's Ordinary Capital Resources, dated 1 July 2001, are hereby made applicable to this Loan Agreement with the same force and effect as if they were fully set forth herein.

Section 1.02. Wherever used in this Loan Agreement, unless the context otherwise requires, the several terms defined in the Loan Regulations have the respective meanings therein set forth, and the following additional terms have the following meanings:

- (a) "AEDB" has the meaning given in Recital (D) of this Loan Agreement;
- (b) "Consulting Guidelines" means ADB's Guidelines on the Use of Consultants by Asian Development Bank and its Borrowers dated April 2006, as amended from time to time;
- (c) "FFA" means the Framework Financing Agreement dated 31 October 2006 between ADB and the Borrower;
- (d) "Goods" means equipment and materials to be financed out of the proceeds of the Loans, including related services such as transportation, insurance, installation, commissioning, training, and initial maintenance, but excluding consulting services;
- (e) "Implementing Agency" means any of the agencies, responsible for the day-to-day implementation of the Project, as described in paragraph 2 of Schedule 5 to this Loan Agreement;
- (f) "IPD" means the Irrigation and Power Department, and includes its successor entities;
- (g) "NWFP" has the meaning given in Recital (E) of this Loan Agreement;
- (h) "NWFP component" means each component to be implemented by NWFP as more fully described in Schedule 1 to this Loan Agreement;
- (i) "PPA" means a power purchase agreement;
- (j) "Procurement Guidelines" means ADB's Procurement Guidelines dated April 2006, as amended from time to time;
- (k) "Procurement Plan" means the procurement plan for the Project dated 31 October 2006 and agreed between the Borrower and ADB, as updated from time to time in accordance with the Consulting Guidelines, the Procurement Guidelines, and other arrangements agreed with ADB;

(l) "Project" means, for the purposes of this Loan Agreement, Part A and Part B of the Project described in Schedule 1 to this Loan Agreement;

(m) "Project Executing Agency" for the purposes of, and within the meaning of, the Loan Regulations and Special Operations Loan Regulations (as defined herein) means (i) AEDB at the federal level, and (ii) IPD of NWFP and IPD of Punjab at the provincial level, all being responsible for the carrying out of the Project;

(n) "Punjab" has the meaning given in Recital (E) of this Loan Agreement;

(o) "Punjab component" means each component to be implemented by Punjab as more fully described in Schedule 1 to this Loan Agreement;

(p) "SHYDO" has the meaning given in Recital (E) of this Loan Agreement;

(q) "Special Operations Loan Agreement" has the meaning given in Recital (C) of this Loan Agreement;

(r) "Special Operations Loan Regulations" means the Loan Regulations referred to in Section 1.01 of the Special Operations Loan Agreement;

(s) "Subprojects" means subprojects under the Project that have been selected and approved as described in paragraph 4 of Schedule 5 to this Loan Agreement and

(t) "Works" means construction or civil works to be financed out of the proceeds of the Loans, including services such as drilling or mapping, and project related services that are provided as part of a single responsibility or turnkey contract, but excluding consulting services.

ARTICLE II

The Loan

Section 2.01. (a) ADB agrees to lend to the Borrower from ADB's ordinary capital resources an amount of twelve billion five hundred eight million six hundred fifty thousand Japanese Yen (¥12,508,650,000), as such amount may be converted from time to time through a Currency Conversion in accordance with the provisions of Section 2.06 of this Loan Agreement.

(b) The Loan has a term of twenty-five (25) years, including a grace period of five (5) years, as provided in Schedule 2 to this Loan Agreement.

Section 2.02. The Borrower shall pay to ADB interest on the principal amount of the Loan withdrawn and outstanding from time to time at a rate for each Interest

Period equal to the sum of LIBOR and 0.60% as provided by Section 3.02 of the Loan Regulations.

Section 2.03. (a) The Borrower shall pay a commitment charge at the rate of three-fourths of one percent (0.75%) per annum. Such charge shall accrue on amounts of the Loan (less amounts withdrawn from time to time), during successive periods commencing sixty (60) days after the date of this Loan Agreement, as follows:

during the first twelve-month period, on ¥ 1,876,297,500;
 during the second twelve-month period, on ¥ 5,628,892,500;
 during the third twelve-month period, on ¥ 10,632,352,500; and
 thereafter, on the full amount of the Loan.

$$= \frac{1.87}{12.51} \times 100 = 15\%$$

$$= 45\%$$

$$= 85\%$$

(b) If any amount of the Loan is cancelled, the amount of each portion of the Loan stated in paragraph (a) of this Section shall be reduced in the same proportion as the cancellation bears to the full amount of the Loan before such cancellation.

Section 2.04. Interest and other charges on the Loan shall be payable semiannually on 15 June and 15 December in each year.

Section 2.05. The Borrower shall repay the principal amount of the Loan withdrawn from the Loan Account in accordance with the provisions of Schedule 2 to this Loan Agreement.

Section 2.06. (a) The Borrower may at any time request any of the following Conversions of the terms of the Loan in order to facilitate prudent debt management:

- (i) a change of the Loan Currency of all or any portion of the principal amount of the Loan, whether withdrawn and outstanding or unwithdrawn, to an Approved Currency;
- (ii) a change of the interest rate basis applicable to all or any portion of the principal amount of the Loan from a Floating Rate to a Fixed Rate, or vice versa; and
- (iii) the setting of limits on the Floating Rate applicable to all or any portion of the principal amount of the Loan withdrawn and outstanding by the establishment of an Interest Rate Cap or Interest Rate Collar on said Floating Rate.

(b) Any conversion requested pursuant to paragraph (a) of this Section that is accepted by ADB shall be considered a "Conversion", as defined in Section 2.01(6) of the Loan Regulations, and shall be effected in accordance with the provisions of Article V of the Loan Regulations and the Conversion Guidelines.

ARTICLE III

Use of Proceeds of the Loan

Section 3.01. (a) The Borrower shall make the proceeds of the Loan available to NWFP and Punjab, upon terms and conditions satisfactory to ADB as provided herein. The foreign exchange risk shall be borne by the Borrower in accordance with the applicable policy of the Borrower. The Borrower shall cause each of NWFP and Punjab to apply such proceeds to the financing of expenditures on the Project in accordance with the provisions of this Loan Agreement and the respective Project Agreement.

(b) Except as ADB may otherwise agree, the Borrower shall make the proceeds of the Loan available to NWFP in amount of six billion nine hundred nine million five hundred forty thousand Japanese Yen (¥6,909,540,000) on the same terms and conditions as those of the Loan. NWFP shall make the proceeds of the Loan available to SHYDO on terms and conditions satisfactory to ADB.

(c) Except as ADB may otherwise agree, the Borrower shall make the proceeds of the Loan available to Punjab in amount of five billion five hundred ninety one million one hundred ten thousand Japanese Yen (¥5,599,110,000) on the same terms and conditions as those of the Loan.

Section 3.02. The goods and services and other items of expenditure to be financed out of the proceeds of the Loan and the allocation of amounts of the Loan among different categories of such Goods, Works and consulting services and other items of expenditure shall be in accordance with the provisions of Schedule 3 to this Loan Agreement, as such Schedule may be amended from time to time by agreement between the Borrower and ADB.

Section 3.03. Except as ADB may otherwise agree, all Goods, Works and consulting services to be financed out of the proceeds of the Loan shall be procured in accordance with the provisions of Schedule 4 to this Loan Agreement. ADB may refuse to finance a contract where Goods, Works or consulting services have not been procured under procedures substantially in accordance with those agreed between the Borrower and ADB or where the terms and conditions of the contract are not satisfactory to ADB.

Section 3.04. Except as ADB may otherwise agree, the Borrower shall cause all Goods, Works and consulting services financed out of the proceeds of the Loan to be used exclusively in the carrying out of the Project.

Section 3.05. The closing date for withdrawals from the Loan Account for the purposes of Section 9.02 of the Loan Regulations shall be 30 June 2012 or such other date as may from time to time be agreed between the Borrower and ADB.

ARTICLE IV

Particular Covenants

Section 4.01. (a) The Borrower shall cause each Project Executing Agency and each Implementing Agency to carry out the Project with due diligence and efficiency and in conformity with sound administrative, financial, engineering, environmental and social practices. ✓

(b) In the carrying out of the Project and operation of the Project facilities, the Borrower shall perform, or cause to be performed, all obligations set forth in Schedule 5 to this Loan Agreement and the Schedules to the Project Agreements.

Section 4.02. The Borrower shall make available to the Project Executing Agencies and the Implementing Agencies, promptly as needed and on terms and conditions acceptable to ADB, the funds, facilities, services and other resources which are required for the carrying out of the Project.

Section 4.03. The Borrower shall ensure that the activities of its departments and agencies with respect to the carrying out of the Project and operation of the Project facilities are conducted and coordinated in accordance with sound administrative policies and procedures.

Section 4.04. The Borrower shall take all action which shall be necessary on its part to enable the Project Executing Agencies and the Implementing Agencies to perform their obligations under the respective Project Agreements and shall not take or permit any action which would interfere with the performance of such obligations.

ARTICLE V

Suspension; Cancellation; Acceleration of Maturity

Section 5.01. The following is specified as an additional event for suspension of the right of the Borrower to make withdrawals from the Loan Account for the purposes of Section 9.01(l) of the Loan Regulations: the Borrower shall have, in the opinion of ADB, failed to perform any of its obligations under the Special Operations Loan Agreement.

Section 5.02. The following is specified as an additional event for acceleration of maturity for the purposes of Section 9.07(a)(iv) of the Loan Regulations: the event specified in Section 5.01 of this Loan Agreement shall have occurred.

ARTICLE VI

Effectiveness

Section 6.01. The following is specified as an additional condition to the effectiveness of this Loan Agreement for the purposes of Section 10.01(f) of the Loan Regulations: the Special Operations Loan Agreement shall have been duly executed and delivered on behalf of the Borrower, and all conditions precedent to its effectiveness (other than a condition requiring the effectiveness of this Loan Agreement) shall have been fulfilled.

Section 6.02. The following is specified as an additional matter, for the purposes of Section 10.02(d) of the Loan Regulations, to be included in the opinion or opinions to be furnished to ADB: that the Special Operations Loan Agreement has been duly executed and delivered on behalf of the Borrower and is legally binding upon the Borrower in accordance with its terms.

Section 6.03. A date ninety (90) days after the date of this Loan Agreement is specified for the effectiveness of the Loan Agreement for the purposes of Section 10.04 of the Loan Regulations.

ARTICLE VII

Delegation of Authority

Section 7.01. The Borrower hereby designates (i) NWFP for the NWFP components; and (ii) Punjab for the Punjab components, its agents for the purposes of taking any action or entering into any agreement required or permitted under Sections 3.02, 3.03 and 3.05 of this Loan Agreement and under Sections 6.01, 6.02, 6.03 and 6.04 of the Loan Regulations.

Section 7.02. Any action taken or any agreement entered into by NWFP or Punjab pursuant to the authority conferred under Section 7.01 of this Loan Agreement shall be fully binding on the Borrower and shall have the same force and effect as if taken by the Borrower.

Section 7.03. The authority conferred on NWFP and Punjab under Section 7.01 of this Loan Agreement may be revoked or modified by agreement between the Borrower and ADB.

ARTICLE VIII

Miscellaneous

Section 8.01. The Secretary, Economic Affairs Division, Ministry of Economic Affairs and Statistics of the Borrower is designated as representative of the Borrower for the purposes of Section 12.02 of the Loan Regulations.

Section 8.02. The following addresses are specified for the purposes of Section 12.01 of the Loan Regulations:

For the Borrower

Secretary
Economic Affairs Division
Ministry of Economic Affairs and Statistics
Islamabad, Pakistan

Cable Address:

ECONOMIC
ISLAMABAD

Telex Number:

5634 ECDIV PK

Facsimile Numbers:

(9251) 920-5971
(9251) 921-0734.

For ADB

Asian Development Bank
P.O. Box 789
0980 Manila, Philippines

Cable Address:

ASIANBANK
MANILA

Telex Numbers:

29066 ADB PH (RCA)
42205 ADB PM (ITT)
63587 ADB PN (ETPI)

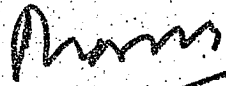
Facsimile Numbers:

(632) 636-2444


(632) 636-2428.

IN WITNESS WHEREOF the parties hereto, acting through their representatives thereunto duly authorized, have caused this Loan Agreement to be signed in their respective names and to be delivered at the principal office of ADB, as of the day and year first above written.

ISLAMIC REPUBLIC OF PAKISTAN

By 
Authorized Representative

ASIAN DEVELOPMENT BANK

By 
PETER L. FEDON
Country Director
Pakistan Resident Mission

SCHEDULE 1

Description of the Project

1 The Project is an integral part of the Investment Program. The Project's impact is improved economic development in NWFP and Punjab through expanded power supply at competitive prices. The outcomes include (i) expansion of the electricity service area and improvements in the reliability and quality of supply; (ii) increased utilization of clean and renewable energy sources; (iii) enhanced capacity of the provincial governments and power utilities to identify and conduct feasibility study on potential renewable energy schemes; and (iv) improved technical capability in renewable energy and overall financial performance of the provincial power utilities.

2 The Project consists of the following parts and components:

Part A: Clean Energy Development

NWFP component

- (i) Expand small hydropower generating capacity by construction of three (3) grid-connected plants ranging from 2.6 megawatt (MW) to 36 MW in NWFP.

Punjab component

- (ii) Construct five (5) small to medium hydropower stations ranging from 3.2 MW to 7.2 MW in Punjab.

Part B: Feasibility Studies of New Sites

NWFP component

- (i) Undertake three (3) feasibility studies of raw sites in NWFP.

Punjab component

- (ii) Undertake five (5) feasibility studies of raw sites in Punjab.

Part C: Capacity Development

NWFP component

- (i) Support training, capacity development and institutional strengthening of the Project related entities to operate and maintain new hydropower stations.

Punjab component

- (ii) Support training, capacity development and institutional strengthening of the Project related entities to operate and maintain new hydropower stations.

Schedule 1

3.

The Project is expected to be completed by 31 December 2011.

SCHEDULE 2

Amortization Schedule

(Renewable Energy Development Sector Investment Program – Project 1)

The following table sets forth the Principal Payment Dates of the Loan and the percentage of the total principal amount of the Loan payable on each Principal Payment Date (Installment Share). If the proceeds of the Loan shall have been fully withdrawn as of the first Principal Payment Date, the principal amount of the Loan repayable by the Borrower on each Principal Payment Date shall be determined by ADB by multiplying: (a) the total principal amount of the Loan withdrawn and outstanding as of the first Principal Payment Date; by (b) the Installment Share for each Principal Payment Date, such repayment amount to be adjusted, as necessary, to deduct any amounts referred to in paragraph 4 of this Schedule, to which a Currency Conversion applies.

<u>Payment Due</u>	<u>Installment Share</u> (Expressed as a %)
15-Dec-2011	0.83
15-Jun-2012	0.87
15-Dec-2012	0.91
15-Jun-2013	0.96
15-Dec-2013	1.01
15-Jun-2014	1.06
15-Dec-2014	1.11
15-Jun-2015	1.16
15-Dec-2015	1.22
15-Jun-2016	1.28
15-Dec-2016	1.35
15-Jun-2017	1.42
15-Dec-2017	1.49
15-Jun-2018	1.56
15-Dec-2018	1.64
15-Jun-2019	1.72
15-Dec-2019	1.81
15-Jun-2020	1.90
15-Dec-2020	1.99
15-Jun-2021	2.09
15-Dec-2021	2.20
15-Jun-2022	2.31
15-Dec-2022	2.42
15-Jun-2023	2.54
15-Dec-2023	2.67

Schedule 2

<u>Payment Due</u>	<u>Installment Share</u> (Expressed as a %)
15-Jun-2024	2.80
15-Dec-2024	2.94
15-Jun-2025	3.09
15-Dec-2025	3.25
15-Jun-2026	3.41
15-Dec-2026	3.58
15-Jun-2027	3.76
15-Dec-2027	3.94
15-Jun-2028	4.14
15-Dec-2028	4.35
15-Jun-2029	4.57
15-Dec-2029	4.79
15-Jun-2030	5.03
15-Dec-2030	5.29
15-Jun-2031	5.54
TOTAL	100.00

2. If the proceeds of the Loan shall not have been fully withdrawn as of the first Principal Payment Date, the principal amount of the Loan repayable by the Borrower on each Principal Payment Date shall be determined as follows:

(a) To the extent that any proceeds of the Loan shall have been withdrawn as of the first Principal Payment Date, the Borrower shall repay the amount withdrawn and outstanding as of such date in accordance with paragraph 1 of this Schedule.

(b) Any withdrawal made after the first Principal Payment Date shall be repaid on each Principal Payment Date falling after the date of such withdrawal in amounts determined by ADB by multiplying the amount of each such withdrawal by a fraction, the numerator of which shall be the original Installment Share specified in the table in Paragraph 1 of this Schedule for said Principal Payment Date (the Original Installment Share) and the denominator of which shall be the sum of all remaining Original Installment Shares for Principal Payment Dates falling on or after such date, such repayment amounts to be adjusted, as necessary, to deduct any amounts referred to in paragraph 4 of this Schedule, to which a Currency Conversion applies.

3. Withdrawals made within two calendar months prior to any Principal Payment Date shall, for the purposes solely of calculating the principal amounts payable on any Principal Payment Date, be treated as withdrawn and outstanding on the second Principal Payment Date following the date of withdrawal and shall be repayable on each Principal Payment Date commencing with the second Principal Payment Date following the date of withdrawal.

Schedule 2

4. Notwithstanding the provisions of paragraphs 1 and 2 of this Schedule, upon a Currency Conversion of all or any portion of the withdrawn principal amount of the Loan to an Approved Currency, the amount so converted in said Approved Currency that shall be repayable on any Principal Payment Date occurring during the Conversion Period, shall be determined by ADB by multiplying such amount in its currency of denomination immediately prior to said Conversion by either: (i) the exchange rate that reflects the amounts of principal in said Approved Currency payable by ADB under the Currency Hedge Transaction relating to said Conversion; or (ii) if ADB so determines in accordance with the Conversion Guidelines, the exchange rate component of the Screen Rate.
5. If the principal amount of the Loan withdrawn and outstanding from time to time shall be denominated in more than one Loan Currency, the provisions of this Schedule shall apply separately to the amount denominated in each Loan Currency, so as to produce a separate amortization schedule for each such amount.

SCHEDULE 3

Allocation and Withdrawal of Loan Proceeds

General

1. The table attached to this Schedule sets forth the Categories of Goods, Works, consulting services and other items to be financed out of the proceeds of the Loan and the allocation of amounts of the Loan to each such Category (hereinafter called the Table). (Reference to "Category" or "Categories" in this Schedule is to a Category or Categories of the Table.)

Percentages of ADB Financing

2. Except as ADB may otherwise agree, the items of the Categories listed in the Table shall be financed out of the proceeds of the Loan on the basis of the percentages set forth in the Table.

Interest and Commitment Charge

3. The amount allocated to Category 4A and 4B is for financing interest and commitment charge on the Loan during the implementation period of the Project. ADB shall be entitled to withdraw from the Loan Account and pay to itself, on behalf of the Borrower, the amounts required to meet payments, when due, of such interest and commitment charge.

Reallocation

4. Notwithstanding the allocation of Loan proceeds and the withdrawal percentages set forth in the Table,

(a) if the amount of the Loan allocated to any Category appears to be insufficient to finance all agreed expenditures in that Category, ADB may, by notice to the Borrower, (i) reallocate to such Category, to the extent required to meet the estimated shortfall, amounts of the Loan which have been allocated to another Category but, in the opinion of ADB, are not needed to meet other expenditures, and (ii) if such reallocation cannot fully meet the estimated shortfall, reduce the withdrawal percentage applicable to such expenditures in order that further withdrawals under such Category may continue until all expenditures thereunder shall have been made; and

(b) if the amount of the Loan then allocated to any Category appears to exceed all agreed expenditures in that Category, ADB may, by notice to the Borrower, reallocate such excess amount to any other Category.

Disbursement Procedures

5. Except as ADB may otherwise agree, the Loan proceeds for all Goods, Works and consulting services to be financed out of the Loan proceeds shall be disbursed in accordance with ADB's "Loan Disbursement Handbook" dated January 2001 (ADB's Loan Disbursement Handbook) and ADB's "Interim Guidelines for Disbursement Operations, LIBOR-Based Loan Products" dated July 2002, both as amended from time to time.

Imprest Account; Statement of Expenditures

6. (a) Except as ADB may otherwise agree, the Borrower shall establish immediately after the Effective Date, an imprest account at the National Bank of Pakistan. The imprest account shall be established, managed, replenished and liquidated in accordance with ADB's Loan Disbursement Handbook and detailed arrangements agreed upon between the Borrower and ADB. The currency of the imprest account shall be Japanese Yen. The initial amount to be deposited into the imprest account shall not exceed the lower of (i) the estimated expenditure for the first six months of Project implementation, or (ii) the equivalent of ten (10) percent of the Loan amount.

(b) The statement of expenditures (SOE) procedure may be used for reimbursement of eligible expenditures for the Project and to liquidate advances provided into the imprest account, in accordance with ADB's Loan Disbursement Handbook and detailed arrangements agreed upon between the Borrower and ADB. Any individual payment to be reimbursed or liquidated under the SOE procedure shall not exceed the equivalent of \$100,000.

Condition of Withdrawals from Loan Account

7. Notwithstanding any other provision of this Loan Agreement, no withdrawals shall be made from the Loan Account:

(a) for payment for generators and power transformers (which are under the Equipment Category) for the NWFP component of Part A, until a PPA, in a form and substance acceptable to ADB, is entered into between NWFP and a power purchaser; and

(b) for payment for generators and power transformers (which are under the Equipment Category) for the Punjab component of Part A, until a PPA, in a form and substance acceptable to ADB, is entered into between Punjab and a power purchaser.

TABLE

ALLOCATION AND WITHDRAWAL OF LOAN PROCEEDS (Renewable Energy Development Sector Investment Program - Project 1)			
CATEGORY			ADB FINANCING
Number	Item	Amount Allocated ¥ \ Category	Percentage and Basis for Withdrawal from the Loan Account
Punjab components			
1A	Works	1,429,560,000 ✓	80 percent of total expenditure*
2A	Equipment	2,418,339,000	80 percent of total expenditure*
3	Consulting Services	690,954,000 ✓	100 percent of total expenditure* ✓
3A	Management, Design and Supervision	273,999,000	100 percent of total expenditure* ✓
3B	Feasibility Study	416,955,000	100 percent of total expenditure*
4A	Interest and Commitment Charge	595,650,000	100 percent of amounts due
5A	Unallocated	464,607,000 ✓	
	Total	5,599,110,000 ✓	
NWFP components			
1B	Works	1,989,471,000	80 percent of total expenditure*
2B	Equipment	3,097,380,000	80 percent of total expenditure*
3	Consulting Services	631,389,000	100 percent of total expenditure*
3C	Management, Design and Supervision	345,477,000	100 percent of total expenditure*
3D	Feasibility Study	285,912,000	100 percent of total expenditure*
4B	Interest and Commitment Charge	714,780,000	100 percent of amounts due
5B	Unallocated	476,520,000	
	Total	6,909,540,000	
	Grand Total	12,508,650,000	

* Exclusive of taxes and duties

SCHEDULE 4

Procurement of Goods and Works, and Consulting Services

A. General

1. All Goods and Works, and consulting services, to be financed out of the proceeds of the Loan shall be subject to and governed by the Procurement Guidelines, and the Consulting Guidelines, respectively.

2. All terms used and not otherwise defined in this Loan Agreement have the meanings provided in the Procurement Guidelines and/or the Consulting Guidelines, as applicable.

B. Procurement for Goods and Works

3. Except as ADB may otherwise agree, Goods and Works shall only be procured on the basis of the methods of procurement set forth below:

International Competitive Bidding
National Competitive Bidding
Limited International Bidding

The methods of procurement are subject to, among other things, the detailed arrangements and threshold values set forth in the Procurement Plan. The Borrower may only modify the methods of procurement or threshold values with the prior agreement of ADB, and modifications must be set out in updates to the Procurement Plan.

4. Domestic Preference. The Borrower may grant a margin of preference in the evaluation of bids under international competitive bidding in accordance with paragraphs 2.55(a) and 2.56 of the Procurement Guidelines for domestically manufactured Goods and paragraphs 2.55(b) and 2.56 of the Procurement Guidelines for domestic Works.

5. National Competitive Bidding. No procurement activity may be undertaken under national competitive bidding procedures until ADB and the Borrower shall have agreed in writing on any necessary modifications or clarifications to the NWFP Procurement Rules (2000), Public Works Department Code (Punjab), and Punjab Purchase Manual (1985), as amended, to ensure consistency with the Procurement Guidelines. Such modifications or clarifications shall be reflected in the Procurement Plan and are hereby incorporated by reference in this Loan Agreement.

C. Selection of Consulting Services

6. Quality- and Cost-Based Selection. Except as ADB may otherwise agree, the Borrower shall apply quality- and cost-based selection for selecting and engaging consulting services.

Schedule 4

7. Individual Consultants. The Borrower shall recruit individual consultants for capacity development, project supervision and safeguard assessment in accordance with ADB's procedures for recruitment of individual consultants.

D. Industrial or Intellectual Property Rights

8. (a) The Borrower shall ensure that all Goods and Works procured (including without limitation all computer hardware, software and systems, whether separately procured or incorporated within other goods and services procured) do not violate or infringe any industrial property or intellectual property right or claim of any third party.

(b) The Borrower shall ensure that all contracts for the procurement of Goods and Works contain appropriate representations, warranties and, if appropriate, indemnities from the contractor or supplier with respect to the matters referred to in subparagraph (a) of this paragraph.

9. The Borrower shall ensure that all ADB-financed contracts with consultants contain appropriate representations, warranties and, if appropriate, indemnities from the consultants to ensure that the consulting services provided do not violate or infringe any industrial property or intellectual property right or claim of any third party.

E. ADB's Review of Procurement Decisions

10. All contracts procured under international competitive bidding procedures and contracts for consulting services shall be subject to prior review by ADB, unless otherwise agreed between the Borrower and ADB and set forth in the Procurement Plan.

SCHEDULE 5

Execution of Project and Operation
of Project FacilitiesProject Implementation Arrangements

1 AEDB shall be the Project Executing Agency at the federal level, responsible for overall coordination of the Project. At the provincial level, IPD of NWFP shall be the Project Executing Agency, responsible for the carrying out of the NWFP components, and IPD of Punjab shall be the Project Executing Agency, responsible for the carrying out of the Punjab components.

2 SHYDO shall be the Implementing Agency, responsible for the day-to-day implementation of the NWFP components, and IPD of Punjab shall be the Implementing Agency until the Punjab Power Development Company Limited (PPDCL) shall have been legally established in accordance with the applicable laws of the Borrower, and become fully operational in a manner satisfactory to ADB.

3 The Borrower shall ensure that (a) the Project is carried out in accordance with the FFA and all the Schedules (including Annexes) attached thereto; and (b) without limiting the generality of the foregoing, the implementation of the Project is consistent with the implementation frameworks set forth in Schedule 3 to the FFA.

Subproject Selection Criteria and Approval Process

4 All Subprojects to be financed using the proceeds of the Loan shall be selected and approved in accordance with the criteria and approval process set forth in Schedule 4 to the FFA.

Safeguard Frameworks

5 The Borrower shall ensure that each Project Executing Agency and Implementing Agency implements the Project in accordance with Schedule 5 to the FFA, including all Annexes attached thereto.

Anticorruption and Good Governance

6 The Borrower shall cause the Project Executing Agencies and the Implementing Agencies to ensure that (a) relevant provisions of ADB's *Anticorruption Policy*, are included in the bidding documents for the Project; (b) all contracts financed using the Loan proceeds include provisions specifying ADB's right to audit and examine the records and accounts of the Project Executing Agencies and the Implementing Agencies, and all contractors, suppliers, and consultants and other service providers as they relate to the Project.

Schedule 5

7. The Borrower shall cause the Project Executing Agencies to publicly disclose on the website information on how the Loan proceeds are being used for the intended beneficiaries following applicable procedures. The website shall (a) present financial statements; (b) track procurement contract awards, and (c) include information on, among others, the list of participating bidders, name of the winning bidder, basic details on bidding procedures adopted, amount of the contract awarded, the list of goods and/or services purchased, and their intended and actual utilization. In addition, the Project Executing Agencies shall ensure that (a) national and provincial newspapers in Urdu, Pushtoo and English carry such details on a regular basis, at least semiannually; and (b) TV and radio broadcasts are made in these language broadcasts at national and provincial levels, as appropriate, giving these same details.

Roadmaps

8. The Borrower shall ensure timely implementation of its roadmaps for energy sector, power sector and renewable energy development, as more fully described in Schedule 1 to the FFA.

Tariffs

9. The Borrower shall ensure that tariffs are set at the level necessary to ensure financial sustainability and viability.

Clean Development Mechanism and Global Environmental Facility

10. The Borrower, NWFP and Punjab shall cooperate with ADB in harnessing benefits from clean development mechanism and the global environmental facility.

2 / 1
LOAN NUMBER 2287-PAK(SF)

LOAN AGREEMENT
(Special Operations)

(Renewable Energy Development Sector Investment Program – Project 1)

between

ISLAMIC REPUBLIC OF PAKISTAN

and

ASIAN DEVELOPMENT BANK

DATED 5 October 2007

LAS:PAK 34339

2/2

LOAN AGREEMENT
(Special Operations)

LOAN AGREEMENT dated 5 October 2007 between ISLAMIC REPUBLIC OF PAKISTAN (hereinafter called the Borrower) and ASIAN DEVELOPMENT BANK (hereinafter called ADB).

WHEREAS

(A) The Borrower has entered into the Framework Financing Agreement (hereinafter called the FFA) with ADB to seek ADB financing for a roadmap and an investment program for renewable energy development (hereinafter called the Investment Program);

(B) The Borrower has applied to ADB for (i) a loan from its Special Funds resources for the purposes of Part C of the Project described in Schedule 1 to the Ordinary Operations Loan Agreement (as defined herein in Recital (C)); and (ii) a loan from its ordinary capital resources for the purposes of Part A and Part B of the Project;

(C) By an agreement of even date herewith between the Borrower and ADB (hereinafter called the Ordinary Operations Loan Agreement), ADB has agreed to lend to the Borrower, from its ordinary capital resources, an amount of twelve billion five hundred eight million six hundred fifty thousand Japanese Yen (¥12,508,650,000), for the purposes of Part A and Part B of the Project (hereinafter called the Ordinary Operations Loan, and together with this Loan, the Loans);

(D) The Borrower has also applied for a technical assistance grant up to eight hundred thousand Dollars (\$800,000) for the purposes of facilitating the process of the development of the renewable energy policy of the Borrower and capacity development of the Alternative Energy Development Board under the Ministry of Water and Power of the Borrower (hereinafter called AEDB), and ADB has agreed to provide a grant to the Borrower for such purposes;

(E) The Project will be carried out by (i) AEDB, (ii) North West Frontier Province (hereinafter called NWFP) through Sarhad Hydel Development Organization (hereinafter called SHYDO), and (iii) Province of Punjab hereinafter called Punjab), and for this purpose the Borrower will make available to NWFP and Punjab the proceeds of the Loan provided for herein upon terms and conditions satisfactory to ADB; and

(F) ADB has agreed to make a loan to the Borrower from ADB's Special Funds resources upon the terms and conditions set forth herein and in the Project Agreements of even date herewith between (i) ADB on the one part and NWFP and SHYDO on the other part; and (ii) ADB and Punjab;

NOW THEREFORE the parties agree as follows:

ARTICLE I

Loan Regulations; Definitions

Section 1.01. All the provisions of the Special Operations Loan Regulations of ADB, dated 1 January 2006 (hereinafter called the Loan Regulations), are hereby made applicable to this Loan Agreement with the same force and effect as if they were fully set forth herein.

Section 1.02. The definitions set forth in the Loan Regulations and Ordinary Operations Loan Agreement are applicable to this Loan Agreement, unless the context requires otherwise. In addition, the following term has the following meaning: "Ordinary Operations Loan Agreement" means the Loan Agreement referred to in Recital (C) of this Loan Agreement.

ARTICLE II

The Loan

Section 2.01. ADB agrees to lend to the Borrower from ADB's Special Funds resources an amount in various currencies equivalent to six million seven hundred ninety three thousand Special Drawing Rights (SDR 6,793,000).

Section 2.02. (a) The Borrower shall pay to ADB an interest charge at the rate of one percent (1%) per annum during the grace period, and one and one-half percent (1.5%) per annum thereafter, on the amount of the Loan withdrawn from the Loan Account and outstanding from time to time.

(b) The term "grace period" as used in paragraph (a) of this Section means the period prior to payment of the first principal amount of the Loan on the payment date in accordance with the amortization schedule set forth in Schedule 1 to this Loan Agreement.

Section 2.03. The interest charge and any other charge on the Loan shall be payable semiannually on 15 June and 15 December in each year.

Section 2.04. The Borrower shall repay the principal amount of the Loan withdrawn from the Loan Account in accordance with the amortization schedule set forth in Schedule 1 to this Loan Agreement.

Section 2.05. The currency of repayment of the principal of the Loan and the currency of payment of the interest charge for the purposes of Sections 4.03(a) and 4.04 of the Loan Regulations shall be Japanese Yen.

ARTICLE III

Use of Proceeds of the Loan

Section 3.01. (a) The Borrower shall make the proceeds of the Loan available to NWFP and Punjab upon terms and conditions satisfactory to ADB. Except as ADB may otherwise agree, such terms and conditions shall include interest at the rate of one percent (1%) per annum during the grace period, and one and one-half percent (1.5%) per annum thereafter, and a repayment period of thirty-two (32) years including a grace period of eight (8) years. The foreign exchange risk shall be borne by the Borrower.

(b) Except as ADB may otherwise agree, the Borrower shall make the proceeds of the Loan available to NWFP in amount of three million three hundred ninety six thousand (3,396,000) SDR. NWFP shall make the Loan proceeds available to SHYDO.

(c) Except as ADB may otherwise agree, the Borrower shall make the proceeds of the Loan available to Punjab in amount of three million three hundred ninety seven thousand (3,397,000) SDR.

(d) The Borrower shall cause NWFP and Punjab to apply the proceeds of the Loan to the financing of expenditures on the Project in accordance with the provisions of this Loan Agreement and the respective Project Agreement.

Section 3.02. The Goods, Works and consulting services and other items of expenditure to be financed out of the proceeds of the Loan and the allocation of amounts of the Loan among different categories of such Goods, Works and consulting services and other items of expenditure shall be in accordance with the provisions of Schedule 2 to this Loan Agreement, as such Schedule may be amended from time to time by agreement between the Borrower and ADB.

Section 3.03. Withdrawals from the Loan Account in respect of Goods, Works and consulting services shall be made only on account of expenditures relating to

- (a) Goods which are produced in and supplied from and services which are supplied from such member countries of ADB as shall have been specified by ADB from time to time as eligible sources for procurement, and
- (b) Goods, Works and consulting services which meet such other eligibility requirements as shall have been specified by ADB from time to time.

Section 3.04. Except as ADB may otherwise agree, all Goods, Works and consulting services to be financed out of the proceeds of the Loan shall be procured in accordance with the provisions of Schedule 4 to the Ordinary Operations Loan Agreement.

Section 3.05. The Loan Closing Date for the purposes of Section 8.02 of the Loan Regulations shall be 30 June 2012 or such other date as may from time to time be agreed between the Borrower and ADB.

ARTICLE IV

Particular Covenants

Section 4.01. In the carrying out of the Project and operation of the Project facilities, the Borrower shall perform, or cause to be performed, all obligations set forth in Schedule 5 to the Ordinary Operations Loan Agreement and the Schedule to the Project Agreement.

Section 4.02. The Borrower shall enable ADB's representatives to inspect the Project, the Goods and Works financed out of the proceeds of the Loan, all other plants, sites, properties and equipment of the Borrower, and any relevant records and documents.

Section 4.03. The Borrower shall take all action which shall be necessary on its part to enable the Project Executing Agency and the Implementing Agencies to perform their obligations under the respective Project Agreements; and shall not take or permit any action which would interfere with the performance of such obligations.

ARTICLE V

Suspension; Cancellation; Acceleration of Maturity

Section 5.01. The following is specified as an additional event for suspension of the right of the Borrower to make withdrawals from the Loan Account for the purposes of Section 8.01(m) of the Loan Regulations: the Borrower shall have, in the opinion of ADB, failed to perform any of its obligations under the Ordinary Operations Loan Agreement.

Section 5.02. The following is specified as an additional event for acceleration of maturity for the purposes of Section 8.07(d) of the Loan Regulations: the event specified in Section 5.01 of this Loan Agreement shall have occurred.

ARTICLE VI

Effectiveness

Section 6.01. The following is specified as an additional condition to the effectiveness of this Loan Agreement for the purposes of Section 9.01(f) of the Loan Regulations: the Ordinary Operations Loan Agreement shall have been duly executed and delivered on behalf of the Borrower, and all conditions precedent to its effectiveness (other than a condition requiring the effectiveness of this Loan Agreement) shall have been fulfilled.

Section 6.02. The following is specified as an additional matter, for the purposes of Section 9.02(d) of the Loan Regulations, to be included in the opinion or opinions to be furnished to ADB: that the Ordinary Operations Loan Agreement has been duly executed and delivered on behalf of the Borrower and is legally binding upon the Borrower in accordance with its terms.

Section 6.03. A date ninety (90) days after the date of this Loan Agreement is specified for the effectiveness of the Loan Agreement for the purposes of Section 9.04 of the Loan Regulations.

ARTICLE VII

Delegation of Authority

Section 7.01. The Borrower hereby designates (i) NWFP for the NWFP components, and (ii) Punjab for the Punjab components, its agents for the purposes of taking any action or entering into any agreement required or permitted under Sections 3.02 and 3.05 of this Loan Agreement and under Sections 5.01, 5.02, 5.03 and 5.04 of the Loan Regulations.

Section 7.02. Any action taken or any agreement entered into by NWFP or Punjab pursuant to the authority conferred under Section 7.01 of this Loan Agreement shall be fully binding on the Borrower and shall have the same force and effect as if taken by the Borrower.

Section 7.03. The authority conferred on NWFP and Punjab under Section 7.01 of this Loan Agreement may be revoked or modified by agreement between the Borrower and ADB.

ARTICLE VIII

Miscellaneous

Section 8.01. The Secretary, Economic Affairs Division, Ministry of Economic Affairs and Statistics of the Borrower is designated as representative of the Borrower for the purposes of Section 11.02 of the Loan Regulations.

Section 8.02. The following addresses are specified for the purposes of Section 11.01 of the Loan Regulations:

For the Borrower

Secretary
Economic Affairs Division
Ministry of Economic Affairs and Statistics
Islamabad, Pakistan

Cable Address:

ECONOMIC
ISLAMABAD

Telex Number:

5634 ECDIV PK

Facsimile Numbers:

(9251) 920-5971
(9251) 921-0734.

For ADB

Asian Development Bank
P.O. Box 789
0980 Manila, Philippines

Cable Address:

ASIANBANK
MANILA

Telex Numbers:

29066 ADB PH (RCA)
42205 ADB PM (ITT)
63587 ADB PN (ETPI)

Facsimile Numbers:


(632) 636-2444
(632) 636-2428.

IN WITNESS WHEREOF the parties hereto, acting through their representatives thereunto duly authorized, have caused this Loan Agreement to be signed in their respective names and to be delivered at the principal office of ADB, as of the day and year first above written.

ISLAMIC REPUBLIC OF PAKISTAN

By 
Authorized Representative

ASIAN DEVELOPMENT BANK

By 
PETER L. FEDON
Country Director
Pakistan Resident Mission

SCHEDULE 1

Amortization Schedule

(Renewable Energy Development Sector Investment Program – Project 1)

Date Payment DuePayment of Principal
(expressed in Special
Drawing Rights)*

15-Dec-2014	141,521.00
15-Jun-2015	141,521.00
15-Dec-2015	141,521.00
15-Jun-2016	141,521.00
15-Dec-2016	141,521.00
15-Jun-2017	141,521.00
15-Dec-2017	141,521.00
15-Jun-2018	141,521.00
15-Dec-2018	141,521.00
15-Jun-2019	141,521.00
15-Dec-2019	141,521.00
15-Jun-2020	141,521.00
15-Dec-2020	141,521.00
15-Jun-2021	141,521.00
15-Dec-2021	141,521.00
15-Jun-2022	141,521.00
15-Dec-2022	141,521.00
15-Jun-2023	141,521.00
15-Dec-2023	141,521.00
15-Jun-2024	141,521.00
15-Dec-2024	141,521.00
15-Jun-2025	141,521.00
15-Dec-2025	141,521.00
15-Jun-2026	141,521.00
15-Dec-2026	141,521.00
15-Jun-2027	141,521.00
15-Dec-2027	141,521.00
15-Jun-2028	141,521.00
15-Dec-2028	141,521.00
15-Jun-2029	141,521.00
15-Dec-2029	141,521.00
15-Jun-2030	141,521.00
15-Dec-2030	141,521.00
15-Jun-2031	141,521.00

Schedule 1Date Payment DuePayment of Principal
(expressed in Special
Drawing Rights)*

15-Dec-2031	141,521.00
15-Jun-2032	141,521.00
15-Dec-2032	141,521.00
15-Jun-2033	141,521.00
15-Dec-2033	141,521.00
15-Jun-2034	141,521.00
15-Dec-2034	141,521.00
15-Jun-2035	141,521.00
15-Dec-2035	141,521.00
15-Jun-2036	141,521.00
15-Dec-2036	141,521.00
15-Jun-2037	141,521.00
15-Dec-2037	141,521.00
15-Jun-2038	141,513.00
TOTAL	6,793,000.00

The figures in this column represent SDR equivalents determined as of the respective dates of withdrawal. The arrangements for payment of each maturity are subject to the provisions of Sections 3.04 and 4.03 of the Loan Regulations.

SCHEDULE 2

Allocation and Withdrawal of Loan Proceeds

General

1. The table attached to this Schedule sets forth the Categories of Goods, Works, consulting services and other items to be financed out of the proceeds of the Loan and the allocation of amounts of the Loan to each such Category (hereinafter called the Table). (Reference to "Category" or "Categories" in this Schedule is to a Category or Categories of the Table.)

Percentages of ADB Financing

2. Except as ADB may otherwise agree, the items of the Categories listed in the Table shall be financed out of the proceeds of the Loan on the basis of the percentages set forth in the Table.

Interest Charge

3. The amount allocated to Category 5A and 5B is for financing the interest charge on the Loan during the implementation period of the Project.

Reallocation

4. Notwithstanding the allocation of Loan proceeds and the withdrawal percentages set forth in the Table,

(a) if the amount of the Loan allocated to any Category appears to be insufficient to finance all agreed expenditures in that Category, ADB may, by notice to the Borrower, (i) reallocate to such Category, to the extent required to meet the estimated shortfall, amounts of the Loan which have been allocated to another Category but, in the opinion of ADB, are not needed to meet other expenditures, and (ii) if such reallocation cannot fully meet the estimated shortfall, reduce the withdrawal percentage applicable to such expenditures in order that further withdrawals under such Category may continue until all expenditures thereunder shall have been made; and

(b) if the amount of the Loan then allocated to any Category appears to exceed all agreed expenditures in that Category, ADB may, by notice to the Borrower, reallocate such excess amount to any other Category.

Disbursement Procedures

5. Except as ADB may otherwise agree, the Loan proceeds for all Goods, Works and consulting services to be financed out of the Loan proceeds shall be disbursed in accordance with ADB's "Loan Disbursement Handbook" dated January 2001 (ADB's Loan Disbursement Handbook), as amended from time to time.

Schedule 2Imprest Account; Statement of Expenditures

6. (a) Except as ADB may otherwise agree, the Borrower shall establish immediately after the Effective Date, an imprest account at the National Bank of Pakistan. The imprest account shall be established, managed, replenished and liquidated in accordance with ADB's Loan Disbursement Handbook and detailed arrangements agreed upon between the Borrower and ADB. The currency of the imprest account shall be Japanese Yen. The initial amount to be deposited into the imprest account shall not exceed the lower of (i) the estimated expenditure for the first six months of Project implementation, or (ii) the equivalent of ten (10) percent of the Loan amount.

(b) The statement of expenditures (SOE) procedure may be used for reimbursement of eligible expenditures for Part C of the Project and to liquidate advances provided into the imprest account, in accordance with ADB's Loan Disbursement Handbook and detailed arrangements agreed upon between the Borrower and ADB. Any individual payment to be reimbursed or liquidated under the SOE procedure shall not exceed the equivalent of \$100,000.

Attachment to Schedule 2

TABLE

ALLOCATION AND WITHDRAWAL OF LOAN PROCEEDS
(Renewable Energy Development Sector Investment Program – Project 1)

CATEGORY			ADB FINANCING
Number	Item	Amount Allocated SDR Category	Percentage and Basis for Withdrawal from the Loan Account
Punjab components			
<i>(SDR = 1:47 US\$)</i>			
1A	Works	815,000 ✓	80 percent of total expenditure*
2A	Equipment	272,000 ✓	80 percent of total expenditure*
3A	Training/Fellowships	476,000 ✓	100 percent of total expenditure*
4	Consulting Services	1,291,000 ✓	100 percent of total expenditure*
4A	Architecture, design and supervision	136,000 ✓	100 percent of total expenditure*
4B	Capacity Development	1,155,000 ✓	100 percent of total expenditure* ✓
5A	Interest Charge	339,000	100 percent of amounts due
6A	Unallocated	204,000	
	Total	3,397,000	
NWFP components			
1B	Works	543,000	80 percent of total expenditure*
2B	Equipment	204,000	80 percent of total expenditure*
3B	Training/Fellowships	340,000	100 percent of total expenditure*
4	Consulting Services	1,359,000	100 percent of total expenditure*

$$1.155 \times 1.41 = 1.6285 \text{ U.S. \$}$$

1.41

Attachment to Schedule 2
(Page 2)

4C	Architecture, design and supervision	204,000	100 percent of total expenditure*
4D	Capacity Development	1,155,000	100 percent of total expenditure*
5B	Interest Charge	339,000	100 percent of amounts due
6B	Unallocated	611,000	
	Total	3,396,000	
	Grand Total	6,793,000	

* Exclusive of taxes and duties.

LOAN NUMBER 2286/2287(SF)-PAK

PROJECT AGREEMENT

(Renewable Energy Development Sector Investment Program – Project 1)

between

ASIAN DEVELOPMENT BANK

and

PROVINCE OF PUNJAB

DATED 5 October 2007

PAL:PAK 34339

2/2

PROJECT AGREEMENT

PROJECT AGREEMENT dated 5 October 2007 between ASIAN DEVELOPMENT BANK (hereinafter called ADB) and PROVINCE OF PUNJAB (hereinafter called Punjab).

WHEREAS

(A) By a Loan Agreement of even date herewith between ISLAMIC REPUBLIC OF PAKISTAN (hereinafter called the Borrower) and ADB (hereinafter called the Ordinary Operations Loan Agreement), ADB has agreed to make to the Borrower a loan (hereinafter called the Ordinary Operations Loan) of twelve billion five hundred eight million six hundred fifty thousand Japanese Yen (¥12,508,650,000) on the terms and conditions set forth in the Ordinary Operations Loan Agreement;

(B) By a Loan Agreement of even date herewith between the Borrower and ADB (hereinafter called the Special Operations Loan Agreement, and together with the Ordinary Operations Loan Agreement, the Loan Agreements), ADB has agreed to make to the Borrower a loan (hereinafter called the Special Operations Loan, and together with the Ordinary Operations Loan, the Loans) in an amount equivalent to six million seven hundred ninety three thousand Special Drawing Rights (SDR6,793,000) on the terms and conditions set forth in the Special Operations Loan Agreement;

(C) ADB has agreed to make the Loans only on the condition that a portion of the proceeds of the Loans be made available to Punjab and that Punjab agree to undertake certain obligations towards ADB as hereinafter set forth; and

(D) Punjab, in consideration of ADB entering into the Loan Agreements with the Borrower, has agreed to undertake the obligations hereinafter set forth;

NOW THEREFORE the parties hereto agree as follows:

ARTICLE I

Definitions

Section 1.01. Wherever used in this Project Agreement, unless the context otherwise requires, the several terms defined in the Loan Agreements and in the Loan Regulations (as so defined) have the respective meanings therein set forth, except that for purposes of this Project Agreement, the term "the Project" means Punjab components of the Project, as described in Schedule 1 to the Ordinary Operations Loan Agreement.

ARTICLE II

Particular Covenants

Section 2.01. (a) Punjab shall carry out the Project with due diligence and efficiency, and in conformity with sound administrative, financial, engineering, environmental and social practices.

(b) In the carrying out of the Project and operation of the Project facilities, Punjab shall perform all obligations set forth in each of the Loan Agreements to the extent that they are applicable to Punjab and all obligations set forth in the Schedule to this Project Agreement.

Section 2.02. Punjab shall make available, promptly as needed, the funds, facilities, services, equipment, land and other resources which are required, in addition to the proceeds of the Loans, for the carrying out of the Project.

Section 2.03. (a) In the carrying out of the Project, Punjab shall employ competent and qualified consultants and contractors, acceptable to ADB, to an extent and upon terms and conditions satisfactory to ADB.

(b) Except as ADB may otherwise agree, all Goods, Works and consulting services to be financed out of the proceeds of the Loans shall be procured in accordance with the provisions of Schedule 4 to the Ordinary Operations Loan Agreement. ADB may refuse to finance a contract where Goods, Works or consulting services have not been procured under procedures substantially in accordance with those agreed between the Borrower and ADB or where the terms and conditions of the contract are not satisfactory to ADB.

Section 2.04. Punjab shall carry out the Project in accordance with plans, design standards, specifications, work schedules and construction methods acceptable to ADB. Punjab shall furnish, or cause to be furnished, to ADB, promptly after their preparation, such plans, design standards, specifications and work schedules, and any material modifications subsequently made therein, in such detail as ADB shall reasonably request.

Section 2.05. (a) Punjab shall take out and maintain with responsible insurers, or make other arrangements satisfactory to ADB for, insurance of the Project facilities to such extent and against such risks and in such amounts as shall be consistent with sound practice.

(b) Without limiting the generality of the foregoing, Punjab undertakes to insure, or cause to be insured, the Goods to be imported for the Project and to be financed out of the proceeds of the Loans against hazards incident to the acquisition, transportation and delivery thereof to the place of use or installation, and for such insurance any indemnity shall be payable in a currency freely usable to replace or repair such Goods.

Section 2.06. Punjab shall maintain, or cause to be maintained, records and accounts adequate to identify the Goods, Works and consulting services and other items of expenditure financed out of the proceeds of the Loans, to disclose the use thereof in the Project, to record the progress of the Project (including the cost thereof) and to reflect, in accordance with consistently maintained sound accounting principles, its operations and financial condition.

Section 2.07. (a) ADB and Punjab shall cooperate fully to ensure that the purposes of the Loans will be accomplished.

(b) Punjab shall promptly inform ADB of any condition which interferes with, or threatens to interfere with, the progress of the Project, the performance of its obligations under this Project Agreement, or the accomplishment of the purposes of the Loans.

(c) ADB and Punjab shall from time to time, at the request of either party, exchange views through their representatives with regard to any matters relating to the Project, Punjab and the Loans.

Section 2.08. (a) Punjab shall furnish to ADB all such reports and information as ADB shall reasonably request concerning (i) the Loans and the expenditure of the proceeds thereof; (ii) the Goods, Works and consulting services and other items of expenditure financed out of such proceeds; (iii) the Project; (iv) the administration, operations and financial condition of Punjab; and (v) any other matters relating to the purposes of the Loans.

(b) Without limiting the generality of the foregoing, Punjab shall furnish to ADB quarterly reports on the execution of the Project and on the operation and management of the Project facilities. Such reports shall be submitted in such form and in such detail and within such a period as ADB shall reasonably request, and shall indicate, among other things, progress made and problems encountered during the quarter under review, steps taken or proposed to be taken to remedy these problems, and proposed program of activities and expected progress during the following quarter.

(c) Promptly after physical completion of the Project, but in any event not later than three (3) months thereafter or such later date as ADB may agree for this purpose, Punjab shall prepare and furnish to ADB a report, in such form and in such detail as ADB shall reasonably request, on the execution and initial operation of the Project, including its cost, the performance by Punjab of its obligations under this Project Agreement and the accomplishment of the purposes of the Loans.

Section 2.09. (a) Punjab shall (i) maintain separate accounts for the Project; (ii) have such accounts and related financial statements (balance sheet, statement of income and expenses, and related statements) audited annually, in accordance with appropriate auditing standards consistently applied, by independent auditors whose qualifications, experience and terms of reference are acceptable to ADB; and (iii) furnish to ADB, promptly after their preparation but in any event not later than 6 months after the close of the fiscal year to which they relate, certified copies of such audited accounts and financial statements and the report of the auditors relating thereto (including the auditors' opinion on the use of the proceeds of the Loans and compliance with the financial covenants of the

Loan Agreements as well as on the use of the procedures for imprest account/statement of expenditures), all in the English language. Punjab shall furnish to ADB such further information concerning such accounts and financial statements and the audit thereof as ADB shall from time to time reasonably request.

(b) Punjab shall enable ADB, upon ADB's request, to discuss Punjab's financial statements and its financial affairs from time to time with the auditors appointed by Punjab pursuant to Section 2.09(a) hereabove, and shall authorize and require any representative of such auditors to participate in any such discussions requested by ADB, provided that any such discussion shall be conducted only in the presence of an authorized officer of Punjab unless Punjab shall otherwise agree.

Section 2.10. Punjab shall enable ADB's representatives to inspect the Project, the Goods and Works financed out of the proceeds of the Loans, all other plants, sites, properties and equipment of the Punjab, and any relevant records and documents.

Section 2.11. (a) Punjab shall, promptly as required, take all action within its powers to maintain its corporate existence, to carry on its operations, and to acquire, maintain and renew all rights, properties, powers, privileges and franchises which are necessary in the carrying out of the Project or in the conduct of its business.

(b) Punjab shall at all times conduct its business in accordance with sound administrative, financial, environmental and social practices, and under the supervision of competent and experienced management and personnel.

(c) Punjab shall at all times operate and maintain its plants, equipment and other property, and from time to time, promptly as needed, make all necessary repairs and renewals thereof, all in accordance with sound administrative, financial, engineering, environmental, social, and maintenance and operational practices.

Section 2.12. Except as ADB may otherwise agree, Punjab shall not sell, lease or otherwise dispose of any of its assets which shall be required for the efficient carrying on of its operations or the disposal of which may prejudice its ability to perform satisfactorily any of its obligations under this Project Agreement.

Section 2.13. Except as ADB may otherwise agree, Punjab shall apply the proceeds of the Loans to the financing of expenditures on the Project in accordance with the provisions of the Loan Agreements and this Project Agreement, and shall ensure that all Goods, Works and consulting services financed out of such proceeds are used exclusively in the carrying out of the Project.

ARTICLE III

Effective Date; Termination

Section 3.01. This Project Agreement shall come into force and effect on the date on which both of the Loan Agreements shall come into force and effect. ADB shall promptly notify Punjab of such date.

Section 3.02. All the provisions of this Project Agreement shall continue in full force and effect notwithstanding any cancellation or suspension under either or both of the Loan Agreements.

ARTICLE IV

Miscellaneous

Section 4.01. Any notice or request required or permitted to be given or made under this Project Agreement and any agreement between the parties contemplated by this Project Agreement shall be in writing. Such notice or request shall be deemed to have been duly given or made when it shall be delivered by hand or by mail, telegram, cable, telex, facsimile or radiogram to the party to which it is required or permitted to be given or made at its address hereinafter specified, or at such other address as such party shall have designated by notice to the party giving such notice or making such request. The addresses so specified are:

For ADB

Asian Development Bank
P.O. Box 789
0980 Manila, Philippines

Cable Address:

ASIANBANK
MANILA

Telex Numbers:

29066 ADB PH (RCA)
42205 ADB PM (ITT)
63587 ADB PN (ETPI)

Facsimile Numbers:

(632) 636-2444
(632) 636-2428.

For Punjab

Irrigation Secretariat
Government of Punjab
Old Anarkali, Lahore
Pakistan
Attention: Secretary, Irrigation and Power

Facsimile Number:

(042) 921-2116.

Section 4.02. (a) Any action required or permitted to be taken, and any documents required or permitted to be executed, under this Project Agreement or under Section 7.01 of each Loan Agreement by or on behalf of Punjab may be taken or executed by its Governor or by such other person or persons as he shall so designate in writing notified to ADB.

(b) Punjab shall furnish to ADB sufficient evidence of the authority of each person who will act under paragraph (a) of this Section, together with the authenticated specimen signature of each such person.

Section 4.03. No delay in exercising, or omission to exercise, any right, power or remedy accruing to either party under this Project Agreement upon any default shall impair any such right, power or remedy or be construed to be a waiver thereof or an acquiescence in such default; nor shall the action of such party in respect of any default, or any acquiescence in any default, affect or impair any right, power or remedy of such party in respect of any other or subsequent default.

IN WITNESS WHEREOF the parties hereto, acting through their representatives thereunto duly authorized, have caused this Project Agreement to be signed in their respective names and to be delivered at the principal office of ADB, as of the day and year first above written.

ASIAN DEVELOPMENT BANK

By 

PETER L. FEDON
Country Director
Pakistan Resident Mission

PROVINCE OF PUNJAB

By 

Authorized Representative

3/4

SCHEDULE

Execution of Project; Financial Matters

1. Punjab shall carry out the Project in accordance with the FFA and all the Schedules (including Annexes) attached thereto.

Financial Management and Performance Indicators

2. Punjab shall initiate discussions with NTDC or any other potential buyer on tariff as described in the draft PPA and shall ensure that the PPA is signed as a condition for disbursement of the Loan proceeds for payment for generators and power transformers in accordance with paragraph 7(b) of Schedule 3 to the Ordinary Operations Loan Agreement.
3. Punjab shall ensure that as soon as legally established and fully functional, the Punjab Power Development Company Limited (PPDCL) enters into a Project Agreement with ADB.
4. Punjab shall cause PPDCL to define its corporate identity, devise a business plan and a strategic development roadmap, so that a single corporate body is accountable for a given business not later than 30 June 2008.
5. Punjab shall cause PPDCL to implement the institutional strengthening plan agreed with ADB to attain financial and operational independence not later than the FY ending 2007.
6. Punjab shall cause PPDCL to maintain a debt service coverage ration (DSCR) of 1.2, operating ratio of 80 percent, return on net fixed assets of 5 percent, and 70:30 debt to equity ratio from FY2009 onwards.

Land Availability and Resettlement

7. Without limiting the generality of Schedule 5 to the FFA and all the Annexes attached thereto, Punjab shall, subject to compliance with the relevant provisions of the Resettlement Framework (RF), the Resettlement Plan (RP), Environmental Assessment Framework (EAF) and Environmental Management Plan (EMP), and in accordance with all applicable laws and regulations of the Borrower and Punjab, acquire or make available the land and rights to land free from any encumbrances, and clear utilities, trees, and any other obstruction from such land, required for commencement of construction activities in accordance with the schedule agreed under the related civil works contract.
8. Punjab shall ensure that all land and rights-of-way required by the Subprojects are made available in a timely manner and that the provisions of the RP, including compensation and entitlements for affected households and persons, are implemented in conformity with all applicable laws and regulations of the Borrower, including as amended from time to time, and the entitlement benefits as listed in the Borrower's applicable laws, and ADB's *Policy on Involuntary Resettlement*, 1995, and the agreed RF.

Schedule

9. Punjab shall ensure that people affected by each Subproject are fairly compensated and in a timely manner on replacement values in accordance with the RP and RF, such that their living standards are not adversely affected. Punjab shall submit progress and completion reports on land acquisition and resettlement under the quarterly progress reports for each Subproject.

10. Within three (3) months of the Effective Date, Punjab shall engage an independent external expert/agency acceptable to ADB for monitoring and verification of the RP implementation under each Subproject that will be responsible for providing ADB through the PMU, quarterly monitoring and evaluation reports on resettlement implementation in accordance with the RP.

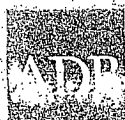
11. Within three (3) months of the Effective Date, Punjab shall also establish a grievance redress committee (GRC) for the Project for addressing any grievances from affected peoples concerning resettlement, environment, and other social issues in a timely manner.

Environment

12. Without limiting the generality of Schedule 5 to the FFA, Punjab shall ensure that environmental assessment of the Subprojects is conducted according to the ADB's *Environment Policy*, 2002, the Borrower's environmental laws, and the EAF.

Midterm Review

13. A midterm review shall be carried out two (2) years after the Effective Date. The midterm review shall, among other things, focus on the engineering, resettlement, environmental aspects of the Project and the financial status of PPDCL.



Asian Development Bank

FAX

Central and West Asia Department
Infrastructure Division
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
Tel (632) 632-6694
Fax (632) 636-2428

Page 1 of 1

To:	Mr. Mohammad Yaqoob Chief Engineer (Power), Irrigation and Power Department Government of Punjab Lahore, Pakistan	Date:	27 June 2007
		Fax:	(9242- 9212796)
Originator:	Tianhua Luo Energy Specialist, CWID tluo@adb.org	Noted by:	Patrick R. Lizot PAU Head, CWID

Subject: Loans 2286/2287(SF)-PAK: Renewable Energy Development Sector
Investment Program (REDSIP)
— Financial Covenants in the Negotiated Loan Agreement

Dear Mr. Yaqoob,

We refer to your fax dated 19 June 2007 requesting for modification of financial covenants as agreed in the negotiated loan agreement.

The financial covenants are set for the purposes of establishing a sustainable institution towards achieving financial and operational independence. We appreciate the government's commitment that the Punjab Power Development Company Limited (PPDCL) will be incorporated in 2007 and operate independently from the Punjab provincial government. The preliminary financial projections indicated that PPDCL is expected to be financially sound from FY2009 onwards, and the financial covenants are established based on such consideration.

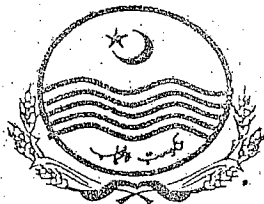
We recognize that the construction and operation of the proposed hydropower projects will be ready by end of 2011, and cash flows from these projects will commence thereafter. With revenue generated from these projects, PPDCL financial capacity will be further enhanced to ensure the compliance with financial covenants.

As you may be aware that the loan agreement has been successfully negotiated in October 2006 and subsequently approved by the ADB management in December 2006, we consider it is not appropriate to amend the approved loan agreement at the current stage. However, we would like to consider amending or relaxing the financial covenants if they reasonably cannot be met by due date.

Sincerely,

SEAN M. O'SULLIVAN
Director
Infrastructure Division
Central and West Asia Department

4/27/07
DR(P)
P.D.



No. CE(P)PD/2007/5486
OFFICE OF THE CHIEF ENGINEER (POWER)
IRRIGATION & POWER DEPARTMENT

1st Floor, Central Design Building,
Irrigation Secretariat, Old Anarkali, Lahore
(Ph:9212794-98, Fax:9212796)

Date: 14/6 /2007

To

The Asian Development Bank,
Manila, Philippine.

Subject: MODIFICATION IN THE LOAN NEGOTIATION DOCUMENT.

This is with reference to Loan Negotiation Document signed on 31/10/2006 regarding financial matter section clause 6, which lays down the following conditions:

"Punjab shall cause PPDCL to maintain a debt service coverage ratio (DSCR) of 1.2 operating ratio of 80 percent, return on net fixed assets of 5 percent and 70-30 debt to equity ratio from FY-2009 onwards".

The above conditions have been reviewed while framing the Memorandum and Article of Association for the incorporation of Punjab Power Development Company Limited and it is observed that the conditions put forth in the said clause can not be met with due to the following reasons:

- DSCR of 1.2 can not be achieved till all the projects are implemented and cash flows from the project commence. Moreover the DSCR would be applicable when the first Principal payment is due on the ADB loan which according to the Schedule 2 to the negotiation loan agreement with ADB, is due on December 15, 2011. Hence the DSCR would be applicable at that stage and not from FY 2009 onwards.
- Similarly the operating ratio of 80% and return of 5% on assets can not be achieved till the project is implemented and operational. As per clause 3, Schedule 1 of the negotiated loan agreement between ADB and GOP the project is expected to be completed by 31 December 2011.
- The debt equity ratio of 70-30 has been mentioned in the loan agreement while it is mentioned in all previous documents including PAM that the debt equity ratio would be 80:20 for first PFR.

In view of the above, it is requested that the dates mentioned in Para (a), (b) above be amended according to the completion date of the project, while the debt equity ratio be corrected at 80:20 in Para c above as agreed during loan negotiation.

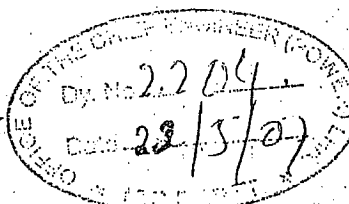
DA/As above

Endorsement No. CE(P)PD/2007/5487 / Dated 14/6 2007

CHIEF ENGINEER (POWER)

A copy is forwarded to the Secretary Irrigation & Power Department for information and necessary action.

CHIEF ENGINEER (POWER)



To:	Mr. Mohammad Yaqoob Chief Engineer (Power); Irrigation and Power Department Government of Punjab Lahore, Pakistan	Date:	21 March 2007
Originator:	Tianhua Luo Energy Specialist, CWID tluo@adb.org	Fax:	(9242- 9212796)
	<i>[Signature]</i>	Noted by:	Tianhua Luo OIC, PAU Head, CWID <i>[Signature]</i>

Subject: Loan 2286 - PAK: Renewable Energy Development Sector Investment Program (REDSIP)
-Comments on Revised Shortlist and Request for Proposal (RFP)

Dear Mr. Yaqoob,

ADB's Consultants Selection Committee (CSC) has reviewed the revised shortlist and draft Request for Proposal (RFP) and we are pleased to note that the revised documents have addressed basically all the issues raised in the preparation of the revised RFP. ADB hereby endorses the shortlist. ADB will post the shortlist in the ADB website with the following information: the names of the shortlisted firms noted on the CSC minutes, the name of the Executing Agency and its contact details, and the RFP issuance date.

The RFP, however, needs further revision:

- (i) The proposed shortlist consists of association arrangements between a lead firm and local consulting firms. In this regard, the EA should not consider the capacity of the associate firms at shortlisting stage as association arrangements may still change during submission of technical proposals. Therefore, only the names of the lead firms should be indicated in the RFP.
- (ii) The joint venture requirement for shortlisted firms seems restrictive, but since it is a Government policy, the shortlisted firms have to comply with it; however, this provision should be deleted from the Data Sheet as it is already covered under the General Conditions of the Contract.
- (iii) The type of technical proposal required, i.e. Full Technical Proposal (FTP), should be indicated in the Data Sheet.
- (iii) (iv) The Narrative Evaluation Criteria were found to be in order except that the percentages given under 'experience in similar geographical areas' must be consistent with the rating scale for QCBS (i.e., 100%, 90%, 80%, 70%, 50%, and 0%). Please make the following revision: Paragraph I.B. Experience in Similar Geographic Areas. Factors to consider: On the basis of specific criteria established assess the experience of each firm. The scoring method is to be based on number of relevant reference three projects - one project 70%; two projects 80%; and three or more projects 100%. Likewise, the Summary and Personnel Evaluation Sheets were also in order; the EA is reminded to include the evaluation sheets in the RFP.

*Pl. finalize RFP in
the light of above observations
and giving TOR closed for P.O.*

*Y
22.5.07*

*P.D.
101*

Please revise the RFP taking into consideration items (i) to (iv) above after which you may proceed with the issuance of the RFP. Please provide us with a copy of the RFP as issued.

Sincerely,

SEAN M. O'SULLIVAN
Director
Infrastructure Division
Central and West Asia Department

: nessie

cc: Mr. K. Mujahid Sadiq, Director General, International Affairs, AEDB, Islamabad, (Fax: 9251-9205790)
P. Fedon, Country Director, PRM; Asad Aleem, PRM
PAU Head, CWID; Nessie Rullan, CWID; Chrono-TL

ENERGY

Punjab Annual Development Programme 2013-14

(Million Rs.)

GS No	Scheme Information Approval Date / Location	Est. Cost	Accum. Exp June, 13	Provision for 2013-14			MTDF Projections		Throw fwd Beyond June, 2016
				Cap	Rev	G. Total (Cap+Rev)	2014-15	2015-16	
1	2	3	4	5	6	7	8	9	10

ON-GOING SCHEMES

Survey Investigation and Research

971	Setting up of Centre for Energy Research and Development at KSK Campus, UET, Lahore. 14-09-2012 Sheikhupura, Ferozewala	292.000	147.000	137.000	8.000	145.000	0.000	0.000	0.000
972	Feasibility Study for development of coal based power projects at industrial estates in Punjab. 18-01-2013 Lahore, Faisalabad	185.000	40.000	50.000	0.000	50.000	55.000	40.000	0.000
Sub-Total: Survey Investigation and Research		477.000	187.000	187.000	8.000	195.000	55.000	40.000	0.000

Solar Energy

973	Provision of solar panels to the households below the poverty line -Chief Minister's Ujala Programme. 30-11-2012 Punjab	4,000.000	2,450.398	1,000.000	14.000	1,014.000	535.602	0.000	0.000
974	Solar Power System for Government offices. 13-12-2012 Punjab	47.700	1.000	46.700	0.000	46.700	0.000	0.000	0.000
Sub-Total: Solar Energy		4,047.700	2,451.398	1,046.700	14.000	1,060.700	535.602	0.000	0.000

Foreign Aided Schemes

975	Renewable Energy Development Sector Investment Programme (REDSIP) 29-07-2011 Sialkot, Gujranwala, Sheikhupura, Okara and Pakpattan, Sialkot, Gujranwala, Sheikhupura, Okara and Pakpattan	11,932.000	2,552.000	3,265.000	35.000	3,300.000	4,200.000	1,007.000	5.000
			Local: 665.000		35.000				
			Foreign: 2,600.000		0.000				
Sub-Total: Foreign Aided Schemes		11,932.000	2,552.000	3,265.000	35.000	3,300.000	4,200.000	1,007.000	5.000
Total: ON-GOING SCHEMES		16,456.700	5,190.398	4,498.700	57.000	4,555.700	4,790.602	1,047.000	0.000

NEW SCHEMES

Solar Energy

976	Installation of Solar Photovoltaic Power Plant at Islamia University of Bahawalpur 23-04-2013 Bahawalpur	465.845	0.000	300.300	0.000	300.300	165.845	0.000	0.000
977	Subsidy on Solar Tubewells Approved Punjab	7,500.000	0.000	0.000	7,500.000	7,500.000	0.000	0.000	0.000
Sub-Total: Solar Energy		7,965.845	0.000	300.300	7,500.000	7,800.300	165.845	0.000	0.000

Account Officer
Punjab Power Management Unit
Energy Department
Government of the Punjab

**ENERGY DEPARTMENT
GOVERNMENT OF THE PUNJAB**



CONTRACT AGREEMENT

FOR

**PROCUREMENT OF PLANT, DESIGN, SUPPLY AND INSTALL
OF DEG OUTFALL HYDROPOWER PROJECT (DHP)
ICB NO. Pb - 003**

BETWEEN

ENERGY DEPARTMENT, GOVERNMENT OF THE PUNJAB

AND

SINOTEC - SHPE JV

VOLUME - I

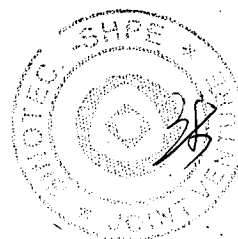
DECEMBER - 2012

**Letter of Acceptance
Contract Agreement and Appendices hereto
General Conditions of Contract (GCC)
Special Conditions of Contract (SCC)
Letter of Price Bid and Price Schedules submitted by the Contractor**

PUNJAB POWER MANAGEMENT UNIT



CONTRACT AGREEMENT AND APPENDICES



Contract Agreement

For

PROCUREMENT OF PLANT, DESIGN, SUPPLY AND INSTALL OF
DEG OUTFALL HYDROPOWER PROJECT (DHP)
ICB No. Pb - 003

THIS AGREEMENT made the 17th day of December, 2012,

BETWEEN

Government of the Punjab, Energy Department through Project Director, Punjab Power Management Unit (PPMU) and having its principal place of business at 77-Shah Jamal Colony, Lahore - Pakistan, (herein after called "the Employer").

AND

SINOTEC-SHPE JV, Joint Venture of Sinotec Co. Ltd. and Hunan Sunny Hydropower Equipment Corporation, corporations incorporated under the laws of P.R. CHINA and having its principal place of business at House No. 33A, Block G, Gulberg III, Lahore. Pakistan (hereinafter called "the Contractor").

WHEREAS the Employer desires to engage the Contractor to design and construct civil works and design, manufacture, test, deliver, install, complete and commission certain plant & equipment (the Facilities) and the Contractor have agreed to such engagement upon and subject to the terms and condition hereinafter appearing.

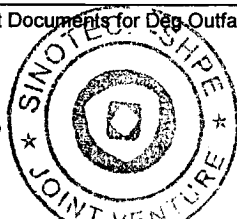
NOW IT IS HEREBY AGREED as follows:

**Article 1
Contract
Documents**

1.1 Contract Documents (Reference GCC Clause 2)

The following documents shall constitute the Contract between the Employer and the Contractor, and each shall be read and construed as an integral part of the Contract:

- (a) This Contract Agreement and the Appendices hereto
- (b) Letter of Price Bid and Price Schedules submitted by the Contractor and Post Bid Clarifications
- (c) Letter of Technical Bid and Technical Proposal submitted by the Contractor.
- (d) Special Conditions of Contract.
- (e) General Conditions of Contract.
- (f) Specifications / Employer's Requirements.
- (g) Drawings
- (h) Other completed Bidding Forms submitted with the Letters of Technical and Price Bids
- (i) Minutes of meeting of the final negotiation, before award of contract, endorsed by steering committee of the project and ADB.



1.2 **Order of Precedence** (Reference GCC Clause 2)
In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

1.3 **Definitions** (Reference GCC Clause 1)
Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions.

Article 2
Contract Price and
Terms of Payment

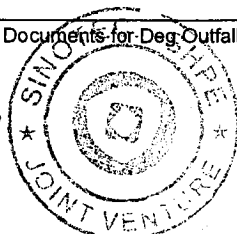
2.1 **Contract Price** (Reference GCC Clause 11)
The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price, applying "Discount (18%-Eighteen Percent of Grand Total Price)" offered in the Letter of Price Bid, shall be the aggregate of: **US\$16,413,885 i.e. Sixteen Million, Four Hundred Thirteen Thousand, Eight Hundred and Eighty Five US Dollars and Pak Rs.238,141,922 i.e. Two Hundred Thirty Eight Million, One Hundred Forty One Thousand, Nine Hundred and Twenty Two PAK Rupees only** as specified in the Grand Summary of Price Schedule No. 5, or such other sums as may be determined in accordance with the terms and conditions of the Contract.

2.2 **Terms of Payment** (Reference GCC Clause 12)
The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in the Appendix (Terms and Procedures of Payment) hereto.

The Employer shall instruct its bank to issue an irrevocable confirmed documentary credit made available to the Contractor in a bank in the country of the Contractor. The credit shall be for an amount of **US\$3,171,523 Three Million, One Hundred Seventy One Thousand, Five Hundred and Twenty Three US Dollars** and shall be subject to the Uniform Customs and Practice for Documentary Credits 1993 Revision, ICC Publication No. 500.

Article 3
Effective Date

3.1 **Effective Date** (Reference GCC Clause 1)
The Effective Date upon which the period until the Time for Completion of the Facilities shall be counted from is the date when all of the following



[Handwritten signature]

conditions have been fulfilled:

- (a) This Contract Agreement has been duly executed for and on behalf of the Employer and the Contractor;
- (b) The Contractor has submitted to the Employer the performance security and the advance payment guarantee;
- (c) The Employer has paid the Contractor the advance payment.
- (d) The Contractor has been advised that the documentary credit referred to in Article 2.2 above has been issued in its favor

Each party shall use its best efforts to fulfill the above conditions for which it is responsible as soon as practicable.

- 3.2 If the conditions listed under 3.1 are not fulfilled within two (2) months from the date of this Contract notification because of reasons not attributable to the Contractor, the parties shall discuss and agree on an equitable adjustment to the Contract Price and the Time for Completion and/or other relevant conditions of the Contract.

Article 4 Communications

- 4.1 The address of the Employer for notice purposes:

**Project Director,
Punjab Power Management Unit,
Energy Department
77 - Shah Jamal Colony
Lahore, Pakistan**

- 4.2 The address of the Contractor for notice purposes, pursuant to GCC 4.1 is:

**House No. 33A, Block G, Gulberg III, Lahore,
Pakistan.**

Article 5. Appendices

- 5.1 The Appendices listed in the attached List of Appendices shall be deemed to form an integral part of this Contract Agreement.
- 5.2 Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by, for and on behalf of the Employer



Project Director,
Punjab Power Management Unit (PPMU),
Energy Department,
Government of the Punjab,
Lahore, Pakistan. 17/12/12

in the presence of

[Signature]

[Title]

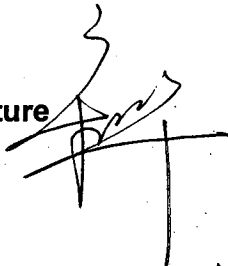


20.12.12.

SECRETARY
GOVERNMENT OF THE PUNJAB
ENERGY DEPARTMENT

Signed by, for and on behalf of the Contractor

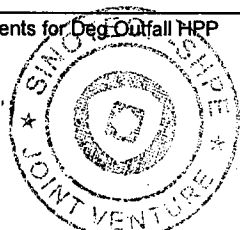
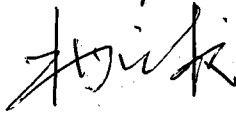
Song Shuangping
Chief Representative
SINOTEC-SHPE Joint Venture



in the presence of

[Signature]

[Title]



Appendices

Appendix 1 - Terms and Procedures of Payment.....	2
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Appendix 5 - List of Major Items of Plant and services and List of Approved Subcontractors	12
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Appendix 7 - List of Documents for Approval or Review	15
Appendix 8 - Functional Guarantees in Respect of Plant.....	16



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Appendix 1 - Terms and Procedures of Payment

In accordance with the provisions of GCC Clause 12 (Terms of Payment), the Employer shall pay the Contractor in the following manner and at the following times, on the basis of the Price Breakdown given in the section on Price Schedules. Payments will be made in the currencies quoted by the Contractor unless otherwise agreed between the parties. Applications for payment in respect of part deliveries may be made by the Contractor as work proceeds.

(A) Terms of Payment

SCHEDULES OF PAYMENT FOR PLANT & EQUIPMENT AND CIVIL WORKS

Schedule No. 1 - Plant and Equipment Supplied from Abroad

In respect of plant and equipment supplied from abroad, the following payments shall be made:

Ten percent (10%) of the total CIP amount as an advance payment against receipt of invoice and an irrevocable advance payment security for the equivalent amount made out in favor of the Employer. The advance payment security may be reduced in proportion to the value of the plant and equipment shipped FOB and delivered to the site, as evidenced by shipping and delivery documents.

Eighty percent (80%) of 80% of the total or pro rata FOB or FCA amount upon Incoterm "FOB" or "FCA," within fifty six (56) days after receipt of invoice and shipping documents. In the event that shipping is delayed upon the written instruction of the Employer for more than twenty-eight (28) days beyond the date shown in the Program of Performance provided in accordance with GCC Sub-Clause 18.2, the Contractor may make application for this part of the payment against warehouse receipts, provided always that the plant and equipment are ready for shipment on the date shown in the said Program.

Eighty percent (80%) of the total or pro rata CIP amount upon Incoterms "CIP" upon delivery to Site within Fifty six (56) days after receipt of invoice, less eighty percent (80%) of the FOB amount already paid or authorized for payment.

Five percent (5%) of the total or pro rata CIP amount upon issue of the Completion Certificate, within Fifty six (56) days after receipt of invoice.

Five percent (5%) of the total or pro rata CIP amount upon issue of the Operational Acceptance Certificate, within fifty six (56) days after receipt of invoice.

Schedule No. 2 - Plant and Equipment Supplied from within the Employer's Country

In respect of plant and equipment supplied from within the Employer's country, the following payments shall be made:

Ten percent (10%) of the total "EXW" amount as an advance payment against receipt of invoice, and an irrevocable advance payment security for the equivalent amount made out in favor of the Employer. The advance payment security may be reduced in proportion to the value of the plant and equipment delivered to the site, as evidenced by shipping and delivery documents.

Eighty percent (80%) of the total or pro rata "EXW" amount upon Incoterms "on Site" upon delivery to the site within fifty six (56) days after receipt of invoice.

Five percent (5%) of the total or pro rata EXW amount upon issue of the Completion Certificate, within fifty six (56) days after receipt of invoice.

Five percent (5%) of the total or pro rata on site amount upon issue of the Operational Acceptance Certificate, within fifty six (56) days after receipt of invoice.

Schedule No. 3 - Design Services for Plant

In respect of design services for both the foreign currency and the local currency portions, the following payments shall be made:

Ten percent (10%) of the total design services (for civil works as well as plant) amount as an advance payment against receipt of invoice and an irrevocable advance payment security for the equivalent amount made out in favor of the Employer.

Ninety percent (90%) of the total design services on pro rata basis during the contract period within fifty six (56) days after receipt of invoice.

Schedule No. 4A - Installation of Plant

In respect of installation services for both the foreign and local currency portions, the following payments shall be made:

Ten percent (10%) of the total installation amount as an advance payment against receipt of invoice and an irrevocable advance payment security for the equivalent amount made out in favor of the Employer. The advance payment security may be reduced in proportion to the value of work performed by the Contractor as evidenced by the invoices for installation services.

Eighty percent (80%) of the measured value of work performed by the Contractor, as identified in the said Program of Performance, during the preceding month, as evidenced by the Employer's authorization of the Contractor's application, will be made monthly within fifty six (56) days after receipt of invoice.

Five percent (5%) of the total or pro rata value of installation services performed by the Contractor as evidenced by the Employer's authorization of the Contractor's monthly applications, upon issue of the Completion Certificate, within fifty six (56) days after receipt of invoice.

Five percent (5%) of the total or pro rata value of installation services performed by the Contractor as evidenced by the Employer's authorization of the Contractor's monthly applications, upon issue of the Operational Acceptance Certificate, within fifty six (56) days after receipt of invoice.

In the event that the Employer fails to make any payment on its respective due date, the Employer shall pay to the Contractor interest on the amount of such delayed payment at the rate of eight percent (8%) per annum in case of Pakistan Rupee for period of delay until payments has been made in full.

Schedule No. 4B – Civil Works

Payment for Civil Works for both the foreign and local currency portions shall be made:

Ten percent (10%) of the total amount as an advance payment against receipt of invoice and an irrevocable advance payment security for the equivalent amount made out in favor of the Employer. The advance payment security may be reduced in proportion to the value of work performed by the Contractor as evidenced by the invoices for civil works.

Eighty percent (80%) of the measured value of work performed by the Contractor, as identified in the said Program of Performance, during the preceding month, as evidenced by the Employer's authorization of the Contractor's application, will be made monthly within fifty six (56) days after receipt of invoice.

Five percent (5%) of the total or pro rata value of civil works performed by the Contractor as evidenced by the Employer's authorization of the Contractor's monthly applications, upon issue of the Completion Certificate, within fifty six (56) days after receipt of invoice.

Five percent (5%) of the total or pro rata value of civil works performed by the Contractor as evidenced by the Employer's authorization of the Contractor's monthly applications, upon issue of the Operational Acceptance Certificate, within fifty six (56) days after receipt of invoice.

In the event that the Employer fails to make any payment on its respective due date, the Employer shall pay to the Contractor interest on the amount of such delayed payment at the rate of eight percent (8%) per annum in case of Pakistan Rupee for period of delay until payments has been made in full.

Deg Outfall Hydropower Project (DHP) Tentative Payment Schedule

Estimated in 1,000,000 Rs.

Note:

1. The price in this form is the price after discount.
2. We convert all US Dollar to Pak Rupees at exchange 1US\$ = 85.85 PKR which is conversion rate of US\$ 28 days before tender opening date as specified in the Bidding Documents in this form. But the payment in both Pak Rupees and US Dollar shall be in accordance with the submitted price proposal / bidding documents.

Month	Estimated in M. Rs.	Month	Estimated in M.Rs.
1 (Advance)	164.727	16	63.942
2	19.533	17	61.804
3	19.533	18	52.075
4	48.522	19	151.558
5	19.533	20	26.837
6	40.724	21	25.711
7	69.880	22	18.585
8	60.294	23	19.446
9	60.294	24	10.567
10	78.485	25	7.374
11	221.916	26	1.889
12	51.086	27	2.735
13	62.485	28	1.490
14	56.287	29	0.00
15	154.674	Final	75.287
		Total Bid Price	1,647.274

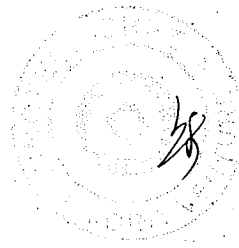


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Appendix 2 - Price Adjustment

Prices payable to the Contractor, in accordance with the Contract, shall be fixed.



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Appendix 3 - Insurance Requirements

(A) Insurances To Be Taken Out By The Contractor

In accordance with the provisions of GCC Clause 34, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, such approval not to be unreasonably withheld.

(a) Cargo Insurance

Covering loss or damage occurring, while in transit from the supplier's or manufacturer's works or stores until arrival at the Site, to the Facilities (including spare parts therefore) and to the construction equipment to be provided by the Contractor or its Subcontractors.

Amount [in US \$]	Deductible limits [in US \$]	Parties insured [names]	From [place]	To [place]
110% of (Contract price for plant & equipment as offered by the Contractor and agreed in the contract)	5,000	Employer to be the Principal Insurer	Source	Site

(b) Installation All Risks Insurance

Covering physical loss or damage to the Facilities at the Site, occurring prior to completion of the Facilities, with an extended maintenance coverage for the Contractor's liability in respect of any loss or damage occurring during the defect liability period while the Contractor is on the Site for the purpose of performing its obligations during the defect liability period.

Amount [in Pak Rupees]	Deductible limits [in Pak Rupees]	Parties insured	From [place]	To [place]
110% of Contract Price	500,000	Employer to be the Principal Insurer	Not Applicable	Not Applicable

(c) Third Party Liability Insurance

Covering bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to property (including the Employer's property and any parts of the Facilities that have been accepted by the Employer) occurring in connection with the supply and installation of the Facilities.

Amount [in Pak Rupees]	Deductible limits [in Pak Rupees]	Parties insured [names]	From [place]	To [place]
25 Million	5,000	Employer to be the Principal Insurer	Not Applicable	Not Applicable

(d) Automobile Liability Insurance

Covering use of all vehicles used by the Contractor or its Subcontractors (whether or not owned by them) in connection with the supply and installation of the Facilities. Comprehensive insurance in accordance with statutory requirements.

(e) Workers' Compensation

In accordance with the statutory requirements applicable in Pakistan.

(f) Employer's Liability

In accordance with the statutory requirements applicable in Pakistan.

(g) Other Insurances

The Contractor is also required to take out and maintain at its own cost the following insurances:

Details:

Amount [in currency(ies)]	Deductible limits [in currency(ies)]	Parties insured [names]	From [place]	To [place]
-----Not Applicable-----				

The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 34.1, except for the Third Party Liability, Workers' Compensation and Employer's Liability Insurances, and the Contractor's Subcontractors shall be named as co-insureds under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 34.1, except for the Cargo, Workers' Compensation and Employer's Liability Insurances. All insurer's rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies.

(B) Insurances To Be Taken Out By The Employer

The Employer shall at its expense take out and maintain in effect during the performance of the Contract the following insurances.

Details:

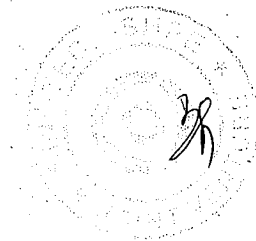
Amount [in currency(ies)]	Deductible limits [in currency(ies)]	Parties insured [names]	From [place]	To [place]
-----Not Applicable-----				



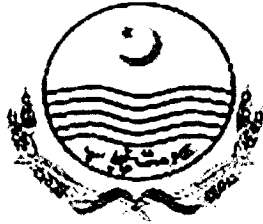
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Appendix 4 - Time Schedule

Time to complete the civil works, plant and services from the effective date specified in Article 3 of the Contract Agreement for determining time for completion of pre-commissioning activities is: 885 calendar days. No credit will be given for earlier completion.



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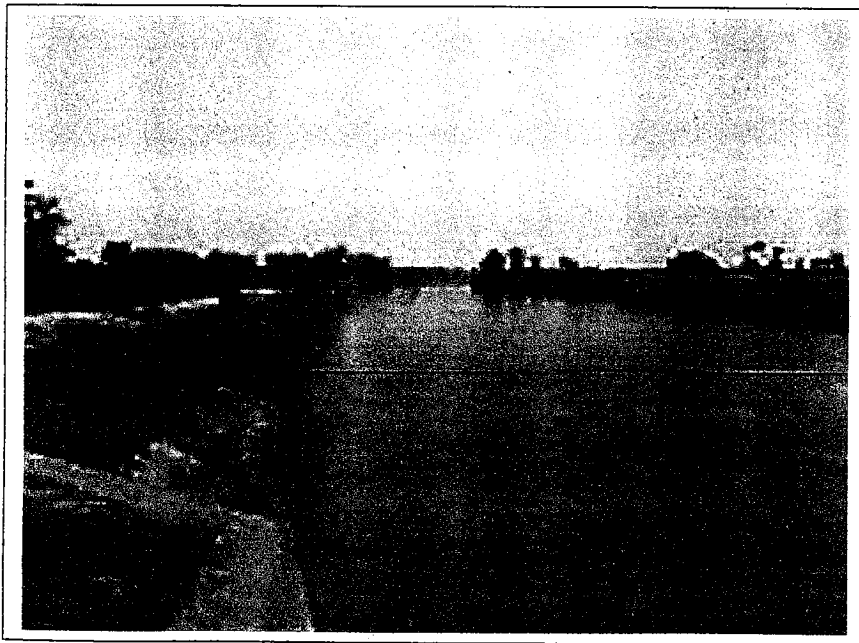


IRRIGATION & POWER DEPARTMENT
GOVERNMENT OF PUNJAB

ADB TA No. 4425-PAK

Renewable Energy Development Project
(TAR 34339-01)

DEG OUTFALL HPP FEASIBILITY STUDY



Integration Environment & Energy Ltd

In association with

ENTEC AG

ABBREVIATIONS

ADB	Asian Development Bank
AD/LAR	Assistant Director/ Land Acquisition and Resettlement
AEDB	Alternative Energy Development Board
am	After morning
AP	Affected person
BKHP	Batal Khwar Hydropower Project
CAS	Compulsory Acquisition Surcharge
CBO	Community Based Organisation
D	Distance
DD	Deputy Director
DFO	Divisional Forest Officer
DRO	District Revenue Officer
D/S	Down Stream
Drwg.	Drawing
E	Energy
EA	Executing Agency
e.g.	For example
El.	Elevation
E&M	Electrical and Mechanical
EM	Electro Mechanical
EPC	Engineering Procurement and Construction
ESDC	Environmental and Social Development Cell
Fig.	Figure
FSL	Full Supply Level
FWD	Forest and Wildlife Department
g	Acceleration due to Gravity
GOP	Government of Pakistan
GSP	Geological Survey of Pakistan
GRC	Grievance Redress Committee
GTZ	Gesellschaft für Technische Zusammenarbeit
GWh	Giga Watt Hour
h	hour
H	Head
ha	Hectare
HEPO	Hydro Electric Planning Organization
HH	household
IA	Implementing Agency
ICCP	Information and Community Consultation Program
IDD	International Direct Dialing
IDPD	Indigenous People Development Plan
I&P	Irrigation and Power
km	Kilometer
kW	Kilowatt
LAA	Land Acquisition Act
LAC	Land Acquisition Collector
L.L.	Liquid Limit
L-Section	Longitudinal Section
MACP	Mountain Area Conservation Program
Max	Maximum
Mill	Million

Min	Minimum
mm	Millimeter
MoU	Memorandum of Understanding
MW	Mega Watt
MWh	Mega Watt hour
m ³ /sec	Cubic Meter Per Second
m/sec ²	Meter Per Square Second
NEPRA	National Electric Power Regulatory Authority
NGO	Non-Governmental Organisation
NSL	Natural Surface Level
NTDC	National Transmission and Despatch Company
NWFP	North-western Frontier Province
P	Power
PC	Planning Commission
PD	Project Director
P.I.	Plasticity Index
P.L.	Plastic Limit
pm	Past morning
PPA	Power Purchase Agreement
ppm	Parts Per Million
PRs	Pakistani Rupees
PSB	Primary School for Boys
PSG	Primary School for Girls
Q	Discharge
RAC	Resettlement Advisory Committee
RD	Running Distance
RP	Resettlement Plan
Rs.	Pakistani Rupee
sec	Second
SHYDO	Sarhad Hydropower Development Organization
SPT	Standard Penetration Test
T	Time
TA	Technical Assistant
TDS	Total Dissolved Solids
U/S	Up Stream
WAPDA	Water and Power Development Authority
η	Efficiency coefficient
%	Percentage
°C	Degree Centigrade

MAIN DESIGN FEATURES

Location Punjab Sheikhupura District		Powerhouse Powerhouse level: 206.87 masl Machine hall length: 28.3m Machine hall width: 11.2m Machine hall height: 6.1 m	
River System Upper Chenab Canal System Upstream of fall structure at RD 282+225 Mean monthly discharge: 88.3 m³/s Total annual average discharge: 2,785 10 ⁶ m³		Tailrace Canal Bed level: 198.28 masl Canal width: 58 m Bed slope: 0.15 ‰	
Main Structures Design discharge: 150 m³/s Maximum discharge: 230 m³/s Gated Spillway Units: 4 Type: Radial gate Sill level: 204.04 masl Design pressure at sill: 0.3 bar Height: 2.83 m Width: 6 m Trash racks Width: 8.6 m Height: 9.7 m Inclination: 78° Bar distance: 40 mm Stop logs Intake: Width: 7.2 m Height: 10.0 m Draft tube: Width: 10.9 m Height: 5.0 m Spillway gates: Width: 7.0 m Height: 5.0 m Headrace Canal Water level at entrance: 206.81 masl Canal width: 58 m Water head: 2.98 m Bed slope: 0.15 ‰		Head Headrace water level: 206.87 masl Tailrace water level at max. power: 202.65 masl Gross head: 4.22 m Head Loss 0.2 m Net Head 4.02 m	
		Hydro Mechanical Equipment Kaplan Turbines Units: 2 Rated flow: 75 m³/s Capacity: 2.511 MW Vertical shaft speed: 120 rpm Rated head: 4.02 m Runner diameter: 3.5 m	
		Electrical Equipment Generator Units: 2 Speed: 1,200 rpm Capacity: 3.25 MVA Transformer: 6.3/11 kV Switchgear: 11 kV Power and Energy Design Discharge 2 Kaplan: 75 m³/s Total: 150 m³/s Energy Output Kaplan: 2.5 MW Total: 5.0 MW Mean annual energy: 29,129 GWh	
		Investment: 11.1 mill. US\$ Specific investment: 2,037 US\$/kW EIRR: 14.5 % FIRR: 7.1% Levellized Tariff: 4.32 cent/kWh	

I INTRODUCTION

A General

1. Pakistan's domestic energy resources are characterized by sizeable reserves of natural gas, substantial hydropower potential, and modest recoverable reserves of crude oil and coal (Table I-1).

Table I-1: Pakistan's Energy Resources

Oil	Recoverable reserves	38,860,000
	Crude oil production	3,035,275
	Consumption**	15,727,409
Natural Gas	Total reserves*	541,190,000
	Production	25,261,972
	Consumption**	23,303,630
Coal	Total reserves (mill t)	185,173
	Production	1,465,452
	Consumption	3,300,491
Electricity	Gross generation	6,582,513
Total Energy	Net supply	31,278,578
	Net consumption	28,983,968

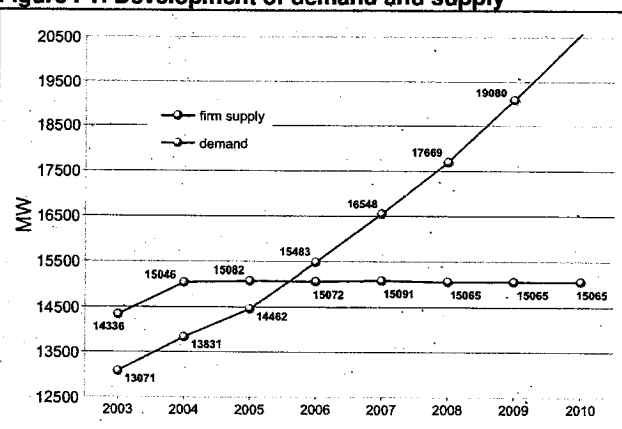
*: gas fields and associated gas resources

**: gross supply

all figures in TOE if not otherwise stated

Source: Pakistan Energy Yearbook, 2004

Figure I-1: Development of demand and supply



2. The country also has a large base of traditional fuels such as fuel-wood and agricultural and animal wastes that mainly meet the energy needs of rural consumers. However, the exploitation of these energy resources has been slow, because of funding constraints and inadequate implementation capability.

3. As a result, Pakistan's dependence on energy imports remains high. Development of the energy sector is crucial to support continued growth of Pakistan's economy. Power shortage is to be expected already for 2006 (Fig. I-1).

4. Recognizing this, a number of efforts have been made during the last century to overcome the shortages:

- 2005: A long-term integrated "Energy Security Plan (ESP)", covering the period up to 2030; approved by the GoP in March 2005
- 2002: "Policy for Power Generation Projects Year 2002"; approved by the GoP in October 2002
- 2002: Hydro Power Development Plan (Vison 2025) by WAPDA
- 1998: "Policy for New Private Independent Power Projects"

- 1997: Nepra Act: Establishing of National Electric Power Regulatory Authority
- 1995: "Policy Framework and Package of Incentives for Private Sector Hydropower Power Generation Projects in Pakistan" and on the "Transmission Line Policy"
- 1994: "Policy Framework and Package of Incentives for Private Sector Power Generation Projects in Pakistan".

5. All policies do put emphasis on the development of the national hydropower resources as an alternative to costly and environmental critical thermal plants¹.

B The Project

6. The Government of Pakistan (GOP) has requested the Asian Development Bank (ADB) to provide project preparatory technical assistance (TA) to prepare an ensuing loan project for developing renewable energy (RE). A TA Fact-Finding Mission visited Pakistan 21–30 July 2004 to formulate the proposed TA and reached an understanding with GOP on the purpose, scope, implementation arrangements, cost estimates, financing arrangements, and terms of reference for consultants.

7. International tendering was conducted in beginning of 2005 and concluded by contract negotiations and approval in May 2005. Works have been commissioned by the select Consultant in May 2005. The total duration of the PPTA was estimated at being 8 months. The following time schedule was agreed upon:

- Commissioning of work: 13th May
- Inception phase: 13.05. – 12.06.2005
- Interim Phase: 13.06. – 12.09.2005
- Final Phase: 13.09. – 12.12.2005
- Final Report: 13.12. – 12.01.2006.

¹ For more details please refer to chapter X.

1 Purpose and Outputs

8. The TA will prepare a project to develop indigenous, nonpolluting, and renewable sources of energy to help meet Pakistan's power shortage and improve the quality and reliability of the power system, especially in rural areas. The TA prepares financing of RE projects through the ensuing loan.

2 Methodology and Key Activities

9. The TA will have two components.

(i) **Component 1-Review of renewable energy potential in each province.** A broad review of the potential for various RE technologies in each province will be conducted to determine the most appropriate (i.e., technically and economically viable) sub-projects suitable for funding by the ensuing loan. The TA will focus on specific RE technologies in each province:

- (a) Balochistan: wind, solar, and hybrid systems;
- (b) North-West Frontier Province (NWFP): small hydropower from perennial high-head rivers that are abundant in the province;
- (c) Punjab: low-head, high-volume small hydropower stations that can be installed in the extensive irrigation canal system in perennial flow in the province; and
- (d) Sindh: small hydro, wind, solar, as well as hybrid systems.

(ii) **Component 2-Feasibility studies.** Based on the reviews, the TA consultants will work with the implementing agencies (IAs) to prioritize subprojects in each province. The subprojects will be selected by least-cost analysis for power system expansion, consistent with ADB's energy policy (2000), and will include analysis of alternatives, as well as conventional energy sources. The TA consultants will then conduct feasibility studies for sample projects in each province (about 2 per province) to be financed by the ensuing loan. The feasibility studies will include technical, economic, financial, environmental and social analyses. The ensuing loan is expected to be a sector loan. As such, the feasibility studies will develop model technical, economic, and financial analyses that can be used by the executing agencies (EAs) in selecting subprojects for loan financing as well as framework for environmental and social assessments.

10. The original plan to include all 4 provinces and wind and solar resources beside hydropower has been dropped down due:

- there were no suitable projects made available by the Government of Sindh Province
- no projects in wind or solar were available which suit the requirements of a commercial loan.

11. Therefore it was finally agreed that the TA will concentrate on hydropower projects in 2 Provinces, namely Punjab and NWFP.

12. Beside, the TA supports Balochistan Province in the elaboration of a strategy for remote village electrification and to strengthen the provincial know-how in these aspects.

13. In addition, it has been agreed upon that the TA will concentrate on the preparation of project loans rather than sector loans for which further requisites have to be prepared first.

3 Organization and Tasks

14. The AEDB has been nominated as the Executing Agency (EA) and the provincial Irrigation and Power Departments as Implementing Agencies (IA) for the PPTA.

15. The role of AEDB as EA for the TA will be to facilitate TA implementation, coordinate its activities, and disseminate the information learned. The TA will be implemented at the provincial level.

16. The IAs will be the Department of Irrigation and Power of each province. The departments will work closely with the TA consultants and will provide them with the necessary information and guidance in carrying out the studies. A project manager of senior standing in the IA will be appointed by the IAs, and a project management unit (PMU), consisting of two or three engineers, will be established in each province to oversee the day-to-day activities and work with the project consultants. The project manager will be appointed and PMU established before the TA begins.

4 Selection of Hydropower Project

17. The two Provinces offered a number of projects to be revised under the ensuing loan (Table I-2) from which 10 have been mutually selected in the Inception meeting.

Table I-2: Projects agreed for review under the PPTA

No	Province	Site Name	RD No.	Capacity (MW)	Discharge (m ³ /s)	Net head (m)
1	Punjab	UGC (Bambanwala)	133+296	3.50	175	2.4
2		UGC Main Lower near Gujranwala	128+000	3.50 - 4.82	135	3.30
3		Deo Fall Sheikhupura	164+400	3.60 - 6.44	100	4.32
4		Upper Cogera Sheikhupura	214+000	1.90	90	2.52
5		Pakpattan Canal	112+350	2.43 - 3.30	84	3.51
6		LBDC	285+454	1.90 - 5.07	175	1.98
7		UCCM Marala	000+000	11.50	336	8.75
8	NWFP	Dara Khwar		35.0	15	308
9		Batal Khwar		8.1	5.78	171
10		Bandila		11.5	3.5	394
11		Summat Gah		28.0	9	390
12		Machal Canal	68+798	3.5	53	8

18. All projects have been discussed during the Inception phase and the Inception meeting. Finally the following projects have been selected as being of first priority (Table I-3). Main reasons for withdrawal from the list have been too little head (below 3 m) and little overall capacity (i.e. 1.9 MW).

Table I-3: Selected Projects to be reviewed under the PPTA

No	Province	Site Name	RD No.	Capacity (MW)	Discharge (m ³ /s)	Net head (m)
1	Punjab	UCC (Bambahwala)	133-296	3.50	175	2.24
2		UCC Main Canal near Gulianwala	125-000	3.30-4.82	135	3.31
3		UCC Tail Siphon (Gogera)	236-700	3.60-6.44	100	4.32
4		Upper Siphon (Gogera)	214-000	1.90	90	2.52
5		Pakistan Canal	112-850	2.43-3.30	84	3.51
6		IBDC	285-454	1.90	175	1.98
7		UCC Main Canal	96-954	5.07	144	4.15
8	NWFP	UCC Main Canal	000-000	1.1-1.60	130	3.75
9		Rata Kawa		35.0	13	308
10		Rata Kawa		3.74	3.74	3.74
11		Ranola		11.5	5.5	394
12		Summa Gali		28.6	1	390
13		Medhal Canal	58-798	3.5	52	3

5 Execution of Work

19. The review of the feasibility studies started in June 2005 and included

- Collection and analyzing of basic data
- Review of the power market
- Technical redesign of the systems if necessary and conducting of layout studies
- Up-dating of unit cost and bills of Quantities
- Economic and financial analyses
- Field surveys with respect to involuntary resettlement and environmental aspects
- Establishing of environmental and resettlement impact mitigation concepts for each of the projects.

20. Seminars and workshops were conducted in order to support the IAs in improving existing know-how in the field of environment and resettlement aspects and with respect to economic and financial analysis.

21. The Consultant team would like to thank the AEDB and the IAs in the Provinces for their support, the close and fruitful cooperation and a lot of open discussions on various issues. We would like to express our special thanks to the focal person of AEDB, Air Comdr (R) Mujahid Sadiq, Engr. Bahadur Shah, Director (P&F) SHYDO and focal person of NWFP to the PPTA and Engr. M. Yaqoob, Director Technical (Power) - I&P Punjab and focal person to this PPTA.

C Background Information on DEG Outfall Hydropower Project

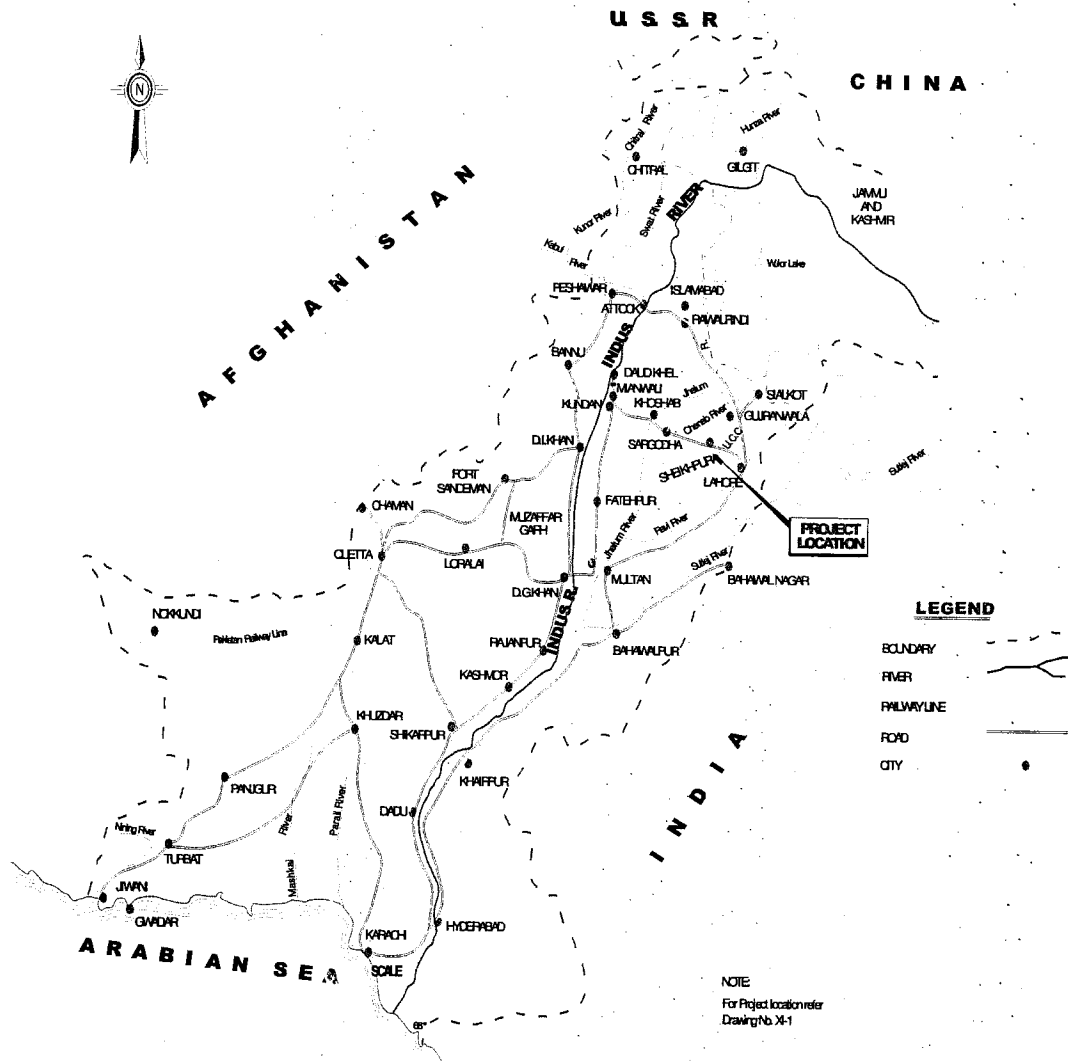
22. DEG OUTFALL hydropower project was first mentioned in the early 80's when studies were conducted by WAPDA to make use of the head available at barrages and canal falls of the country's irrigation network. The following studies were carried out:

- **Ranking study; 1988:** In 1985 a Ranking study of 10 identified sites with a total potential of about 630 MW was completed which was followed by feasibility studies detailed design/detailed engineering of the identified schemes.
- **Inventory of low head potential along existing barrages and canal falls; 1992:** During the course of studies for low head potential at barrages and canal falls, need was felt to prepare a comprehensive inventory of all the available low head potential sites on the irrigation system of the country. Accordingly, a draft inventory report on the basis of data /information collected from the Provincial Irrigation Departments was prepared in June 1992 covering 21 barrages/headworks/dams and 586 sites on canals with an aggregated potential of about 649 MW. The results of the report were only up to identification level and no detailed calculations were made.
- **Feasibility Study; 2003:** In WAPDA Authority meeting held on 17-02-2001, it was decided that WAPDA will update the already prepared inventory report including ranking of the projects and prepare feasibility studies of these projects. Accordingly a PC-II was approved by the Govt. of Pakistan amounting to Rs. 108.282 million on 18-10-2001. The study was then conducted in 2002/2003.

II TOPOGRAPHY

1. The DEG OUTFALL hydropower project is located in the District Sheikhpura in Punjab Province. The scheme was identified by WAPDA/HEPO.
2. The area belongs to the Indo-Gangetic plains and is predominantly flat. The elevation at project site is around 206.25 masl.
3. Topographic maps were elaborated in the course of the WAPDA feasibility study in 2003: The plane table survey (scale 1:1,000) covers an area of about 0.460 km² around RD 283+000 with contour interval of 0.25 m. These maps have been transferred manually and through photocopying to scale 1:3,000 and were used for the feasibility design.
4. In addition canal cross sections at RD 259+450, 260+450, 264+600, 265+750, 266+100, 268+200, 271+800, 275+410, 279+000, 283+250, 283+600, 284+100 and 284+600 were observed during canal closure by sounding. Soundings at 5 m interval or at change of bed level were observed.
5. The following instruments have been used for survey:
 - Total Station Topcon # ET-2 with accuracy rating of $\pm (5 \text{ mm} + 3 \text{ ppm} \times D)$.
 - Topcon Level # TL-20DT.
6. For horizontal checking, traversing was carried out in a closed loop form in the area of interest. The orientation is based on Sun Azimuth determination. The traverse distances were measured in two directions (forward & back) and averaged, provided the two measurements agree to within 1:10,000 or better. The measured distances were corrected for various geodetic corrections.
7. For vertical checking, levelling and check levelling was carried out by using automatic levelling instrument and levelling staves of required quality.

Map II-1: Project Location



III HYDROLOGY AND POWER POTENTIAL

A The Upper Chenab Canal System

1. The Upper Chenab canal main is fed from the Marala Barrage, leading water from the Chenab River into a number of tributaries for irrigation purposes.

1 Marala Barrage

2. The Marala barrage was constructed during 1968 across the Chenab river to divert water to river Ravi and to irrigate fertile agricultural land along left banks of the river through the Upper Chenab Canal (UCC) Main (design discharge: 492.5 m³/s) and Marala Ravi (M-R) Link (design discharge: 623 m³/s). Marala Ravi link and Upper Chenab Canal also divert water from Chenab River to Ravi River. The barrage is located at latitude 32° 40' North and longitude 74° 23', about 48 km upstream of Khanki headworks and about 25 km north of Sialkot City.

3. Its designed discharge capacity is 33,994.50 m³/sec. The total width is 1,363.50 m (clear water way is 1,207.1 m) with 46 bays of 18.3 m each and two under sluices consisting of 20 bays of 18.3 m (7 bays on right and 13 bays on left).

2 Bambanwala Headworks

4. The Bambanwala headworks was constructed at the tail RD 133+296 of the Upper Chenab Canal Main (UCCM) near Daska Town which is about 19 km from Gujranwala city. Bambanwala headworks is a trifurcator structure as three number canals viz. Upper Chenab Canal (UCC) Lower (design discharge: 315 m³/s), Bambanwala Ravi Badian Depalpur (BRBD) Canal (design discharge: 153 m³/s) and Nokhar Branch (design discharge: 24.5 m³/s) off-take from this location. BRBD Canal off-takes from left bank while Nokhar branch on right side and UUCL is the frontal part of UCCM.

3 Upper Chenab Canal Lower

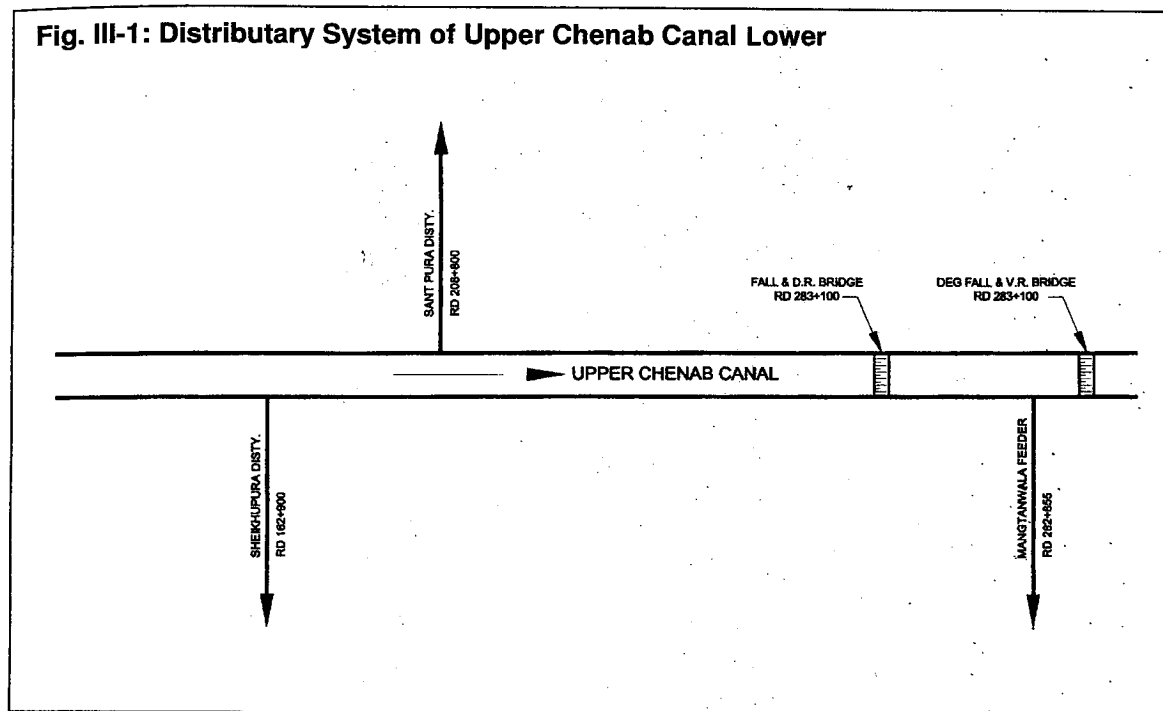
5. The Upper Chenab Canal forms part of the Punjab irrigation system in the Gujranwala, Sheikhupura and Okara districts of Punjab Province. The Upper Chenab canal lower head regulator has design capacity of 315 m³/sec. The canal was primarily link canal and supply water to Balloki headworks canal system.

6. The canal system and its distributaries are shown in Fig. III-1, the designed and approved L-section between RD 200+000 and RD 283+000² in Drwg. AIII-1.

7. The canal is perennial and closed for about one month during December and January for annual maintenance purposes.

² provided by the Punjab Irrigation and Power Department

Fig. III-1: Distributary System of Upper Chenab Canal Lower



8. For the proposed hydro power station, the fall structures of RD 266+000 and RD 283+000 are used.

9. The unregulated fall structure with a gross head of 0.61m at RD 266+000 has a width of 62.20 m with 7 bays each of 7.77 m. A district road bridge passes the fall structure. The basic hydraulic data of RD 266+000 are summarized in Table III-1.

Table III-1: RD 266+000; Basic Hydraulic Data

Description	Unit	Designed (Previous)
U/S Bed level	masl	205.61
U/S FSL	masl	208.66
D/S Bed level	masl	205.00
D/S FSL	masl	208.05
Gross head	m	0.61
D/S Bed width	m	68.28
D/S Full supply depth	m	2.98
D/S Discharge	m ³ /s	230

Fig. III-2: Fall Structure at RD 266+000



10. The unregulated fall structure at RD 283+000 has a width of about 52 m comprising of a fall structure with a gross head of 2.38m, a village road bridge and a canal aqueduct for Skihanwala distributary crossing the canal nearby. A flow gauge is

installed upstream of the fall structure at RD 282+855 and a steel gauge on the downstream pier. The basic hydraulic data are compiled in Table III-2.

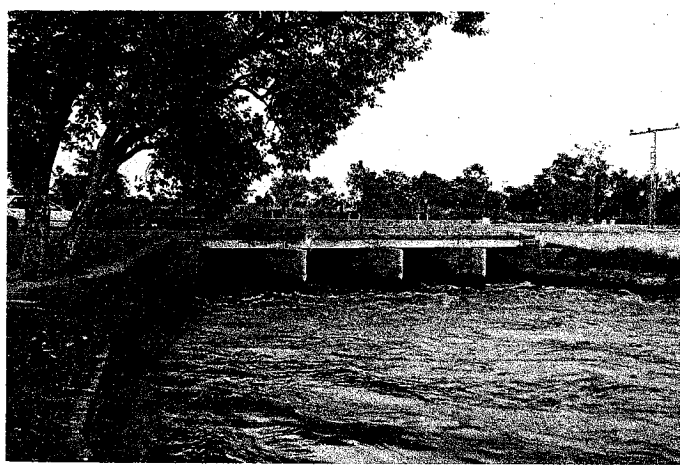
Table III-2: RD 283+000; basic hydraulic data

Description	Unit	Designed (Previous)
U/S Bed level	masl	203.27
U/S FSL	masl	206.87
D/S Bed level	masl	200.84
D/S FSL	masl	203.88
D/S Discharge	m ³ /s	230.
U/S FSL at power house location	masl	206.87
Total gross head at combined fall at powerhouse (full discharge)	m	2.99

Fig. III-3: Fall Structure at RD 283+000



Fig. III-4: Mangtanawala Feeder Headregulator



11. Mangtanwala feeder branch off on the right bank of the canal. Its head regulator at RD 282+855 has a width of about 11.5 m. A village road (3.05.m width) crosses the feeder. The basic hydraulic data are compiled in Table III-3.

Table III-3: Mangtanwala Headregulator at RD 282+855; basic hydraulic data

Description	Unit	Designed (Previous)
U/S Bed level	masl	203.27
U/S FSL	masl	206.26
D/S Bed level	masl	203.72
D/S FSL	masl	205.06
D/S Discharge	m ³ /s	14.00

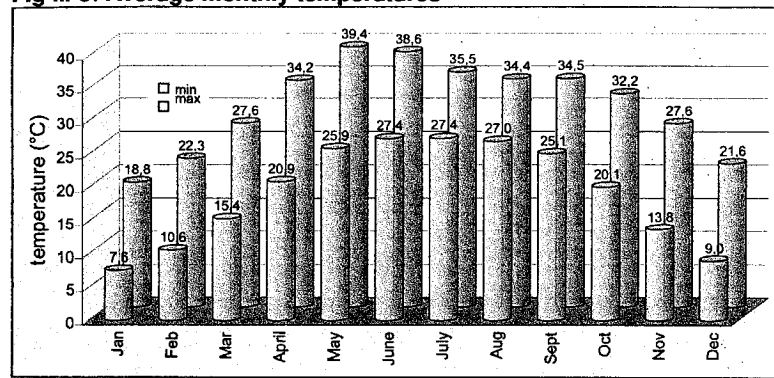
B Climate

12. Meteorological data have been collected from the Pakistan Meteorological Department, Lahore for the Lahore meteorological station which is the station located nearest to the side.

13. The climate of the project area is generally hot and dry in summer and cold in winter. Summer starts in April and continues until September. July and August are the months of summer monsoon. Winter begins in October until February.

1 Temperature

Fig III-5: Average monthly temperatures



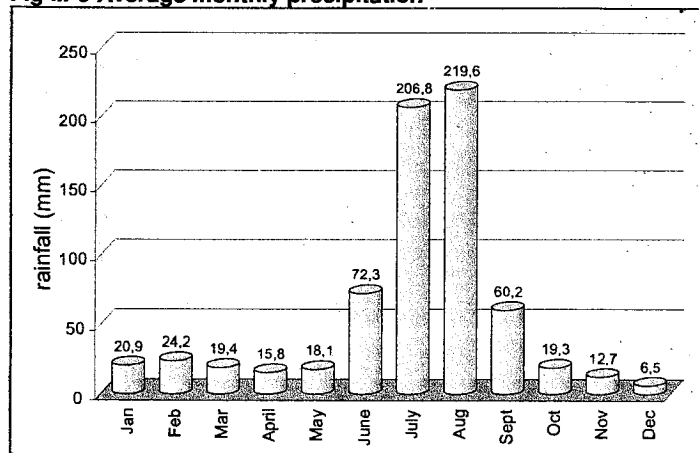
14. The hottest months are May, and June while December and January are the coldest. Based on data of Lahore for the period 1994 through 2002 (Fig. III-5), the temperatures vary between 7.6°C and 27°C (minimum mean)

and 18°C and 40°C (maximum mean).

2 Rainfall

15. Average annual total rainfall at Lahore during the period 1994 through 2002 is 696 mm.

Fig III-6 Average monthly precipitation

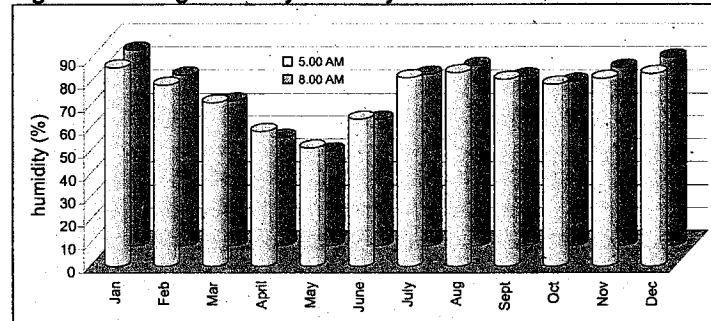


Most of the rainfall occurs during the summer monsoon period (July to August) amounting to 62.0 % of the total annual rainfall. December is the month of minimum rainfall (6.5 mm) and August the month of maximum rainfall (average: 219 mm). The maximum annual rainfall recorded so far (1963 to 2001) is 1,232.50 mm is in the year 1997.

3 Humidity

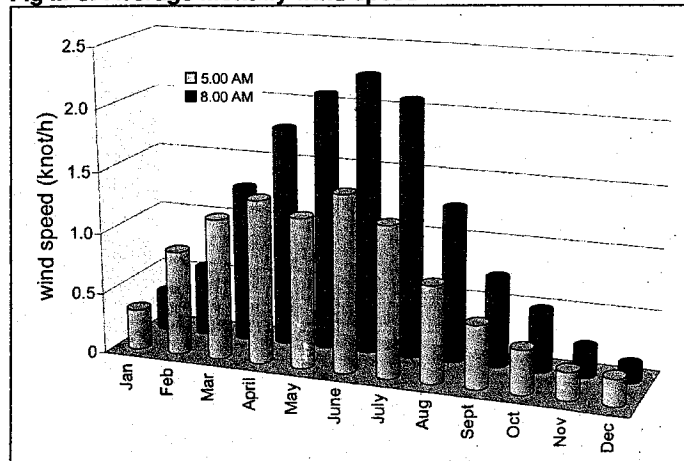
16. Humidity is measured at 05:00am and 08:00am. Average relative humidity values for the years 1994 to 2002 are compiled in Fig. III-7 indicating variation in humidity ranging from between 50% in May to 93% in January.

Fig. III-7: Average monthly humidity



4 Wind Speed

Fig III-8: Average monthly wind speed



17. Average monthly wind speed is calculated by using daily data measured at 05:00am and 08:00am at Lahore Meteorological Station. Fig. III-8 shows the average monthly wind speed measured during the period of 1994 to 2002. The minimum and maximum values are 0.20 knots per hour in December and 2.3 knots per hour in June, respectively.

C Hydrology

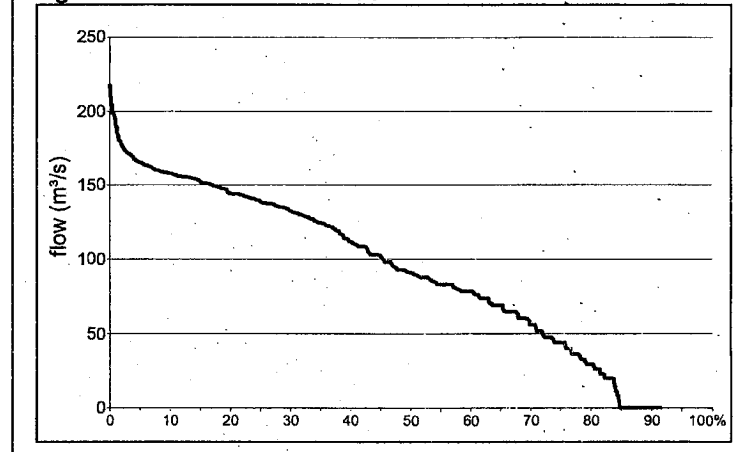
18. Hydrological and power potential studies described in this chapter comprise data collection, canal flow and head estimation and power and energy potential estimation.

19. The proposed DEG OUTFALL Hydropower Project is a run-of-river scheme with powerhouse near RD 282+000. Although a number of project alternatives were considered, however, hydrological analysis remains the same for all alternatives because there is only one outlet between the fall at RD 266+000 and RD 283+000, for which all discharge parameters (head, flow) are kept constant to ensure non-disturbance of irrigation system.

Table III-5: Annual discharge Availability

% of Time	Discharge (m ³ /s)
0	218.0
5	170.0
10	160.1
20	149.4
30	137.5
40	124.2
50	102.9
60	84.9
70	73.7
80	51.9
90	0.0
100	0.0

Fig III-10: Flow and head duration



24. The canal remains usually closed in the month of January due to annual closure period for maintenance. However, during some years flows were also recorded during January. However, for the following calculations flow in January has been considered as being zero. The minimum and maximum discharge recorded in the above-mentioned period is 4.2 m³/s and 218 m³/s, respectively.

3 Head Discharge Curve

25. The discharge rating table (Table III-6) at RD 283+000 was collected from Irrigation and Power Department, Government of Punjab. The discharge rating curve is presented in Fig. III-11.

Table III-6: Discharge Rating Table

Discharge (m ³ /s)	+tail race Water Depth (m)	Discharge (m ³ /s)	+tail race Water Depth (m)	Discharge (m ³ /s)	+tail race Water Depth (m)
0.67	40.14	2.26	189.29	0.76	60.34
1.16	87.99	2.26	195.64	0.30	43.97
0.85	64.70	1.83	141.13	0.61	51.93
0.91	69.18	2.07	129.86	0.24	26.06
1.13	83.14	1.62	135.72	0.21	22.89
1.28	98.22	1.95	146.88	0.91	83.14
1.52	129.83	1.80	129.86	1.01	103.03
1.98	152.72	1.83	135.44	1.98	129.86
2.20	176.83	2.29	183.06	0.64	36.43
2.29	183.03	1.46	118.87	0.40	29.41
2.07	164.62	1.62	135.44	2.68	215.10

26. Head calculation (Annex. III) was conducted by using a constant upstream water level at 206.87 masl at the proposed power house location and variable downstream water levels calculated by applying the results of the rating curve (Fig. III-11). The results are presented in Fig. III-10.

1 Data Sources

20. As all canal water flow is artificially regulated, it does not depend on precipitation or river flow. Therefore the hydrological calculations are based on the discharge measurements in the canal itself only. Discharge data, water level data and discharge rating table were collected from the office of the Executive Engineer, Irrigation and Power Department, Government of Punjab at Sheikhpura. As the main data source, the present discharge measurements at fall RD 283+000 which are officially sanctioned were used. Data from the head regulator were used for quality control. Water level data at RD 266+000 and RD 283+000 were used for head calculation. All data are compiled in Annex III.

21. No sediment or water quality sampling is being performed at Upper Chenab Canal. Hence information regarding particle size and bed load material is not available.

2 Flow Duration Curve

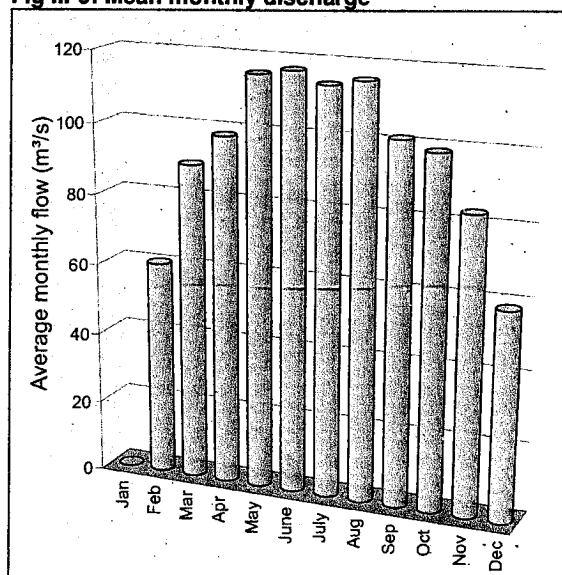
22. Daily stream flows (morning and evening) are available for more than 70 years. For calculation purposes the data series for the period of 1991 – 2004 (15 years) were collected and processed. The data have been summarized as daily, 10 daily mean, mean monthly and annual flows and are compiled in Annex III. The mean monthly and annual flows are presented in Table: III-3 and Fig. III-9 below.

Table: III-4: Monthly and Annual average discharge

Months	Discharge (m ³ /s)
January	0
February	60.5
March	89.5
April	98.3
May	115.6
June	117.2
July	114.0
August	115.8
September	101.4
October	98.7
November	83.3
December	58.8
Average Annual	88.3

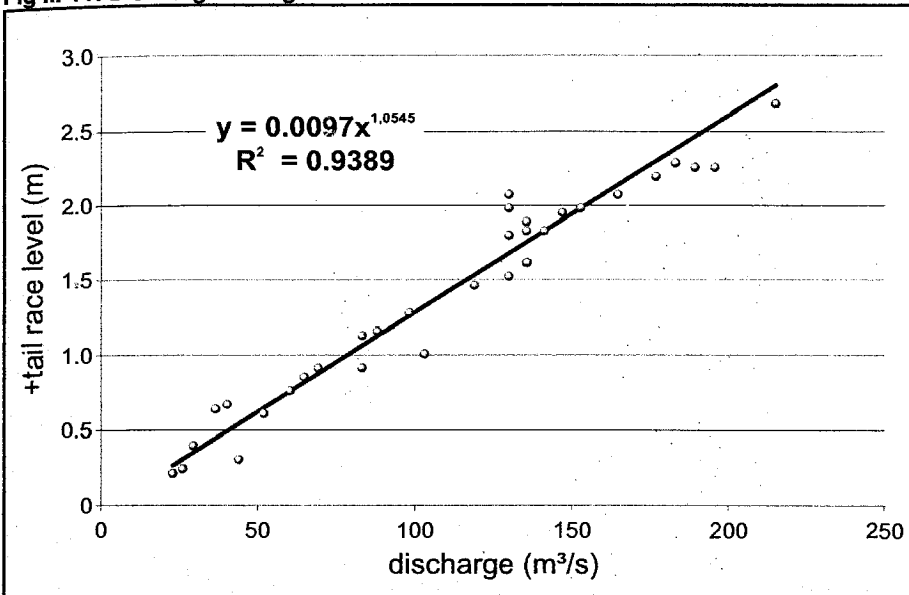
Flow in January in some years above 0

Fig III-9: Mean monthly discharge



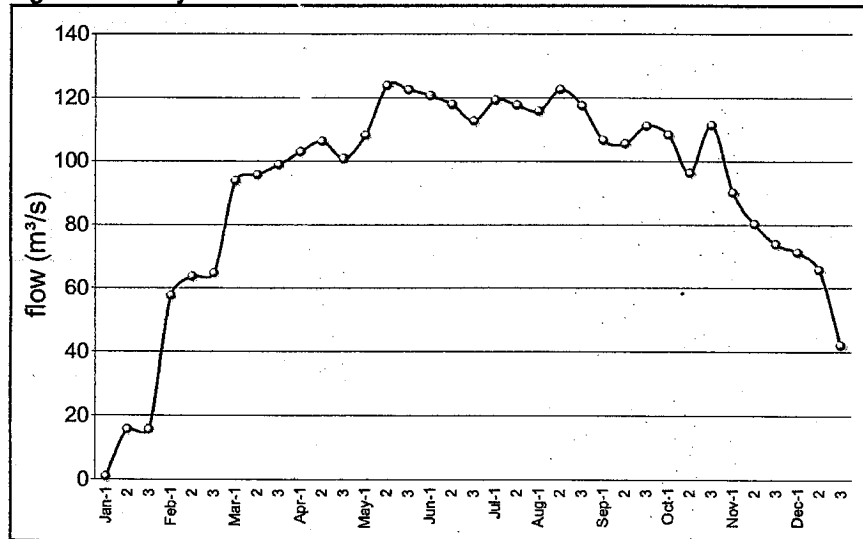
23. The annual availability of discharge expressed in % of time is compiled in Table III-5 and presented as flow-duration curve in in Fig. III-10.

Fig III-11: Discharge Rating Curve



27. The 10-day mean discharge values are presented in Fig. III-12.

Fig III-12: 10-day. Mean values



D Power and Energy Calculations

28. The power and energy calculations are based on the following formula:

• POWER

$$P = Q \times H \times g \times \eta / 1000$$

with:

P	=	Power (MW)
Q	=	Discharge (m ³ /s)
H	=	Available gross head (m)
g	=	Acceleration due to gravity (9.81 m/sec ²)
η	=	Efficiency coefficient (%)

• ENERGY

$$E = P \times T$$

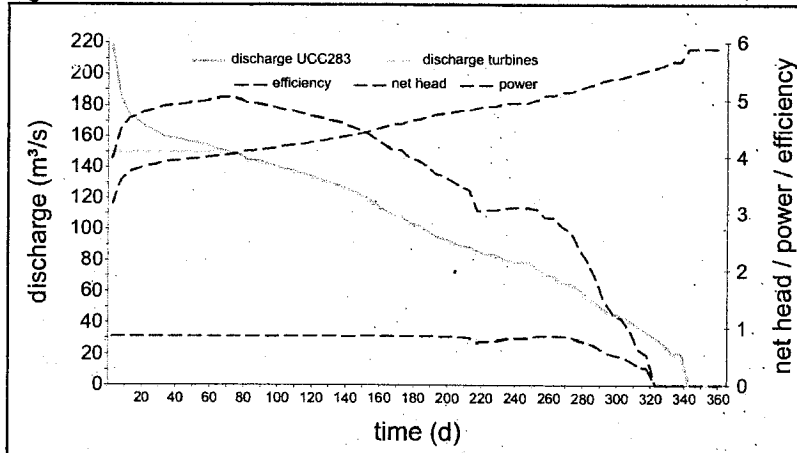
with:

E	=	Energy (MWh)
P	=	Power (MW)
T	=	Time (h)

29. Considering the only little fluctuations in water discharge, design discharge was set to 150 m³/sec. This represents a full load time of 75 days or 22% respectively. Turbine 1 operates in total 345 days (95%) of which 250 days (60%) are full load days. Turbine 2 operates in total for 220 days (60%) of which 70 days (19%) are at full capacity.

30. Full load efficiency was estimated at being 85%. For part load operation respective part load efficiencies (resulting from decreasing efficiencies of turbines) have been adopted for each of the turbines. The resulting power and energy estimations are presented in Table III-7 and Fig. III-13.

Fig III-13: Power Generation



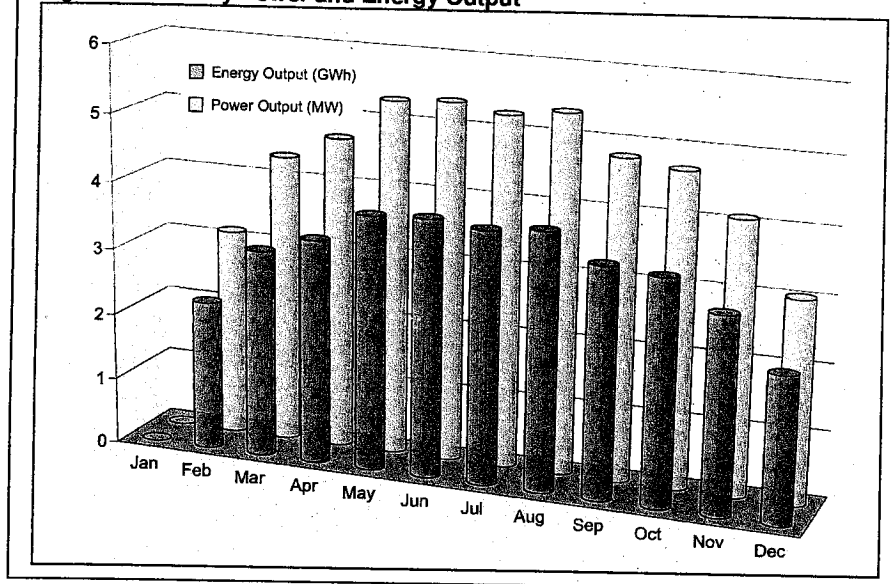
31. Monthly power and energy output calculations are based on the monthly average discharge values and are presented in Figure III-13.

DEG OUTFALL Hydropower Feasibility Study

Table III-7: Power Generation

Power-generation (Final Design)												
date		15.08.2005						discharge (2 Kaplan turbines)		150,0 m³/s		
river		UCC 283; DEG Outfall						residual flow (river)		0,0 m³/s		
location		RD 283+000						head loss (100% opening)		0,2 m		
time	interval	discharge	Eta1 (summ.)	Q t1	Eta2 (summ.)	Q t2	h.w.l.	l.w.l.	head loss	H	power	generation
[d]	[d]	[m³/s]	[%]	[m³/s]	[%]	[m³/s]	[m loc.]	[m loc.]	[m]	[m net.]	[MW]	[kWh]
5	5	218,0	0,85	75,0	0,85	75,0	206,87	203,49	0,20	3,18	3,975	477,054
10	5	186,0	0,85	75,0	0,85	75,0	206,87	203,08	0,20	3,59	4,487	538,400
15	5	174,0	0,85	75,0	0,85	75,0	206,87	202,93	0,20	3,74	4,677	561,261
20	5	170,0	0,85	75,0	0,85	75,0	206,87	202,88	0,20	3,79	4,741	568,883
25	5	165,8	0,85	75,0	0,85	75,0	206,87	202,83	0,20	3,84	4,807	576,815
30	5	163,6	0,85	75,0	0,85	75,0	206,87	202,80	0,20	3,87	4,842	581,043
35	5	160,1	0,85	75,0	0,85	75,0	206,87	202,75	0,20	3,92	4,897	587,656
40	5	158,9	0,85	75,0	0,85	75,0	206,87	202,74	0,20	3,93	4,917	589,981
45	5	158,0	0,85	75,0	0,85	75,0	206,87	202,73	0,20	3,94	4,930	591,606
50	5	156,2	0,85	75,0	0,85	75,0	206,87	202,71	0,20	3,96	4,958	594,949
55	5	155,6	0,85	75,0	0,85	75,0	206,87	202,70	0,20	3,97	4,968	596,155
60	5	154,5	0,85	75,0	0,85	75,0	206,87	202,68	0,20	3,99	4,986	598,320
65	5	152,2	0,85	75,0	0,85	75,0	206,87	202,65	0,20	4,02	5,022	602,657
70	5	150,9	0,85	75,0	0,85	75,0	206,87	202,64	0,20	4,03	5,041	604,937
75	5	149,4	0,85	75,0	0,85	74,4	206,87	202,62	0,20	4,05	5,045	605,421
80	5	147,6	0,85	75,0	0,85	72,6	206,87	202,60	0,20	4,07	5,012	601,391
85	5	144,1	0,85	75,0	0,85	69,1	206,87	202,55	0,20	4,12	4,947	593,627
90	5	143,8	0,85	75,0	0,85	68,8	206,87	202,55	0,20	4,12	4,941	592,955
95	5	142,3	0,85	75,0	0,85	67,3	206,87	202,53	0,20	4,14	4,911	589,338
100	5	140,9	0,85	75,0	0,85	65,9	206,87	202,51	0,20	4,16	4,883	585,963
105	5	138,5	0,85	75,0	0,85	63,5	206,87	202,48	0,20	4,19	4,836	580,269
110	5	137,5	0,85	75,0	0,85	62,5	206,87	202,47	0,20	4,20	4,815	577,838
115	5	136,0	0,85	75,0	0,85	61,0	206,87	202,45	0,20	4,22	4,782	573,856
120	5	134,5	0,85	75,0	0,85	59,5	206,87	202,43	0,20	4,24	4,752	570,246
125	5	132,3	0,85	75,0	0,85	57,3	206,87	202,41	0,20	4,26	4,704	564,477
130	5	130,5	0,85	75,0	0,85	55,5	206,87	202,38	0,20	4,29	4,665	559,762
135	5	128,5	0,85	75,0	0,85	53,5	206,87	202,36	0,19	4,32	4,630	555,580
140	5	126,9	0,85	75,0	0,85	51,9	206,87	202,34	0,19	4,34	4,594	551,314
145	5	124,2	0,85	75,0	0,85	49,2	206,87	202,31	0,19	4,37	4,531	543,728
150	5	122,2	0,85	75,0	0,85	47,2	206,87	202,28	0,19	4,40	4,484	538,031
155	5	119,4	0,85	75,0	0,85	44,4	206,87	202,25	0,19	4,43	4,415	529,834
160	5	115,3	0,85	75,0	0,85	40,3	206,87	202,19	0,19	4,49	4,312	517,489
165	5	111,4	0,85	75,0	0,85	36,4	206,87	202,15	0,19	4,53	4,212	505,484
170	5	108,1	0,85	75,0	0,85	33,1	206,87	202,11	0,19	4,57	4,124	494,917
175	5	108,0	0,85	75,0	0,85	33,0	206,87	202,10	0,19	4,58	4,120	494,430
180	5	102,9	0,85	75,0	0,85	27,9	206,87	202,04	0,19	4,64	3,981	477,696
185	5	101,4	0,85	75,0	0,85	26,4	206,87	202,02	0,19	4,66	3,938	472,588
190	5	98,1	0,85	75,0	0,85	23,1	206,87	201,98	0,19	4,70	3,843	461,175
195	5	94,1	0,85	75,0	0,83	19,1	206,87	201,93	0,19	4,75	3,707	444,859
200	5	92,8	0,85	75,0	0,82	17,8	206,87	201,92	0,19	4,76	3,661	439,330
205	5	90,9	0,85	75,0	0,77	15,9	206,87	201,89	0,19	4,79	3,567	428,072
210	5	88,7	0,85	75,0	0,73	13,7	206,87	201,87	0,19	4,81	3,482	417,838
215	5	87,9	0,85	75,0	0,65	12,9	206,87	201,86	0,19	4,82	3,413	409,511
220	5	84,9	0,85	75,0	0,00	9,9	206,87	201,82	0,19	4,86	3,039	364,678
225	5	83,1	0,85	75,0	0,00	8,1	206,87	201,80	0,18	4,89	3,059	367,087
230	5	83,1	0,85	75,0	0,00	8,1	206,87	201,80	0,18	4,89	3,059	367,087
235	5	80,1	0,85	75,0	0,00	5,1	206,87	201,76	0,18	4,93	3,082	369,786
240	5	78,3	0,85	75,0	0,00	3,3	206,87	201,74	0,18	4,95	3,095	371,422
245	5	78,3	0,85	75,0	0,00	3,3	206,87	201,74	0,18	4,95	3,095	371,437
250	5	78,3	0,85	75,0	0,00	3,3	206,87	201,74	0,18	4,95	3,095	371,422
255	5	73,7	0,85	73,7	0,00	0,0	206,87	201,68	0,18	5,01	3,075	368,953
260	5	69,1	0,85	69,1	0,00	0,0	206,87	201,63	0,17	5,07	2,922	350,627
265	5	69,1	0,85	69,1	0,00	0,0	206,87	201,63	0,17	5,07	2,922	350,627
270	5	64,6	0,85	64,6	0,00	0,0	206,87	201,58	0,17	5,12	2,762	331,419
275	5	63,9	0,83	63,9	0,00	0,0	206,87	201,57	0,17	5,13	2,672	320,585
280	5	60,3	0,78	60,3	0,00	0,0	206,87	201,52	0,16	5,19	2,392	287,064
285	5	56,0	0,75	56,0	0,00	0,0	206,87	201,47	0,16	5,24	2,159	259,091
290	5	51,9	0,68	51,9	0,00	0,0	206,87	201,42	0,16	5,29	1,829	219,522
295	5	47,5	0,58	47,5	0,00	0,0	206,87	201,37	0,16	5,34	1,444	173,274
300	5	44,7	0,52	44,7	0,00	0,0	206,87	201,34	0,16	5,37	1,224	146,905
305	5	43,9	0,50	43,9	0,00	0,0	206,87	201,33	0,16	5,38	1,159	139,096
310	5	40,1	0,44	40,1	0,00	0,0	206,87	201,28	0,15	5,44	0,941	112,896
315	5	36,4	0,32	36,4	0,00	0,0	206,87	201,24	0,15	5,48	0,626	75,108
320	5	32,8	0,30	32,8	0,00	0,0	206,87	201,20	0,15	5,52	0,533	63,995
325	5	29,4	0,00	29,4	0,00	0,0	206,87	201,16	0,15	5,56	0,000	0
330	5	26,0	0,00	26,0	0,00	0,0	206,87	201,12	0,14	5,61	0,000	0
335	5	19,8	0,00	19,8	0,00	0,0	206,87	201,05	0,14	5,68	0,000	0
340	5	19,8	0,00	19,8	0,00	0,0	206,87	201,05	0,14	5,68	0,000	0
345	5	0,0	0,00	0,0	0,00	0,0	206,87	200,84	0,14	5,89	0,000	0
350	5	0,0	0,45	0,0	0,00	0,0	206,87	200,84	0,14	5,89	0,000	0
355	5	0,0	0,20	0,0	0,00	0,0	206,87	200,84	0,14	5,89	0,000	0
360	5	0,0	0,00	0,0	0,00	0,0	206,87	200,84	0,14	5,89	0,000	0
365	5	0,0	0,00	0,0	0,00	0,0	206,87	200,84	0,14	5,89	0,000	0
max power generation (kWh):											29.128.797	
realistic power generation (97%)											28.254.933	

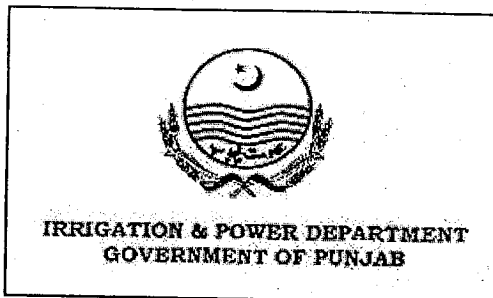
Fig III-14: Monthly Power and Energy Output



E Conclusions

32. Summarizing the above mentioned results the following may be concluded:

- The minimum and maximum head is 2.99 m (full discharge) and 5.89 m (zero discharge) in combination of two falls
- The power calculation is based on 1 single regulated and one double regulated Kaplan turbine
- The minimum and maximum discharge taken for power calculations are 13 m³/s (double regulated turbine) and 32 m³/s (single regulated turbine) and 150 m³/s respectively
- The maximum power output is 5,022 kW at a net head of 4.02 m for combined falls
- The average annual energy generation during the year 1983-2004 is 29,129 GWh for combined falls alternative.

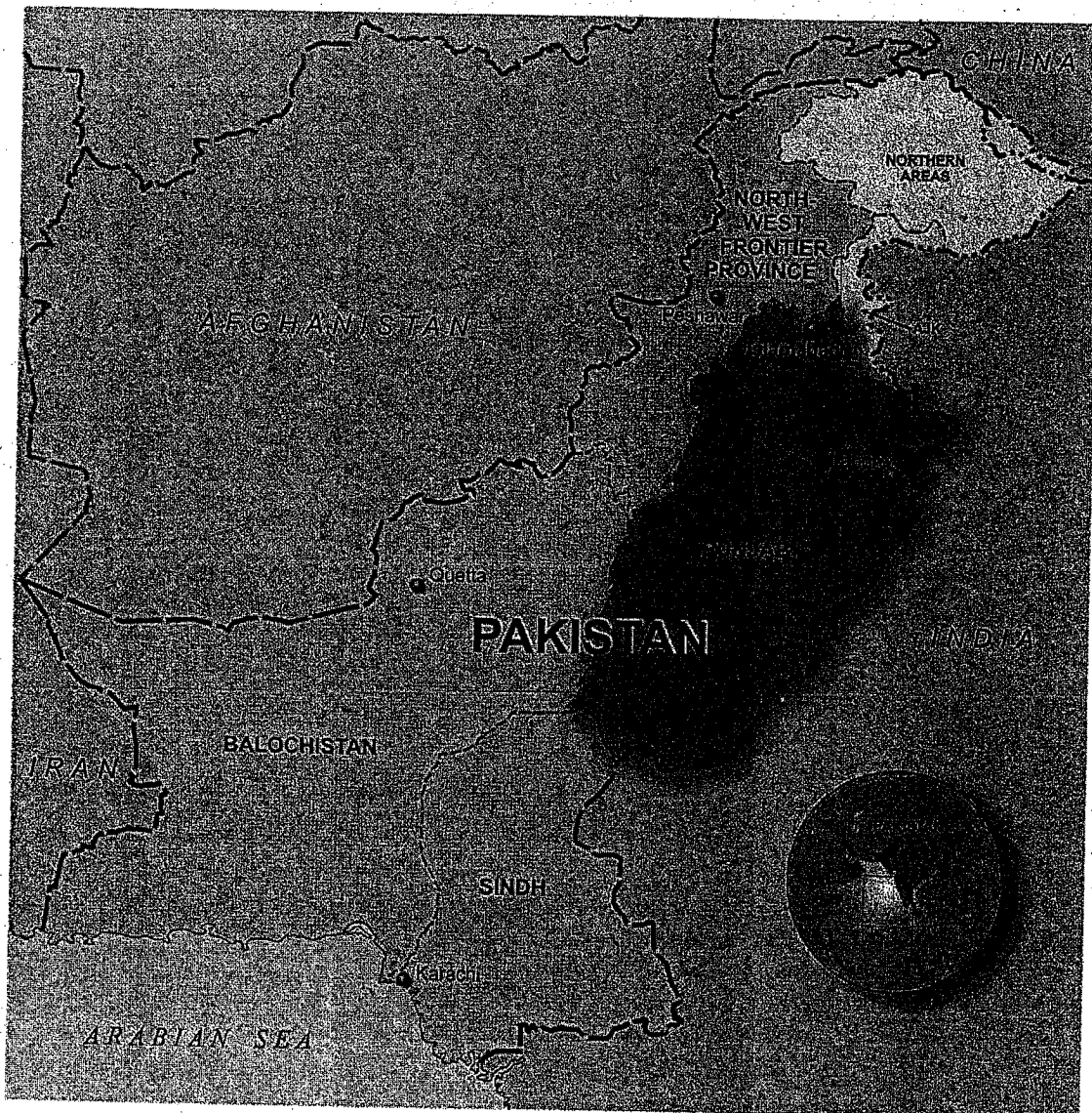


7
ADB TA No. 4425-PAK

Renewable Energy Development Project

(TAR 34339-01)

DEG OUTFALL HPP FEASIBILITY STUDY



Volume 3: Environment Assessment

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Photographs:
DR Derek Ratcliff

LIST OF ACRONYMS

CURRENCY EQUIVALENTS

Currency Unit Pak Rupee (Rs)
US\$1.00 = Rs.60.00

ABBREVIATIONS

ADB	Asian Development Bank
EA	Environmental Assessment
EO	Environmental Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
FD	Forest Department
GWh	Giga Watt hour
GoP	Government of Pakistan
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Agency for Technical Cooperation)
HEPO	Hydro Electric Planning Organization
HHs	House Holds
IA	Implementing Agency
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
I&PD	Irrigation and Power Department of Punjab
I&PD	Irrigation and Power Department
kV	Kilo volt
MW	Mega Watt
NO _x	Oxides of Nitrogen
NWFP	North Western Frontier Province
O&M	Operation and Maintenance
PHED	Public Health Engineering Department
PMU	Project Management Unit
RoW	Right of Way
SCHP	Sheikhupura Canal Hydropower Project
SIEE	Summary Initial Environmental Examination
SO _x	Oxides of Sulfur
TA	Technical Assistance
WAPDA	Water and Power Development Authority

WEIGHTS AND MEASURES

ac	acre
ft	Feet/Foot
ha	hectare
km	kilometre
m	meter
m ³	cubic meter
m ²	square meter
s	seconds

EXECUTIVE SUMMARY

Objectives and Approach

The potential of Sheikhpura Canal Hydropower Project (SCHP) was first identified in studies undertaken by Water and Power Development Authority (WAPDA) in 1988 and 1992. A Feasibility Study of SCHP was undertaken in 2003 by Hydro Electricity Planning Organisation (HEPO), of WAPDA and this included an Environmental Assessment (EA) of the project. The Irrigation and Power Department of Punjab (I&PD) has been trying to obtain Provincial and Federal Governments' approval and funding, but the project remained pending because of non-availability of reliable funding.

The Government of Pakistan has requested loan funding from ADB for a number of renewable energy projects. ADB is making loan preparations and a PPTA is being conducted in cooperation with the provincial power cells in Punjab and NWFP and AEDB as Executing Agency (EA). The SCHP is one of the locations to be reviewed by the project team for the preparation of the ensuing loan. The other canal sites reviewed in Punjab under this same TA are close to the settlements of Okara, Pakpattan, Gujranwala, and Marala. I&PD as the Implementing Agency (IA) will be responsible for all the sites.

SCHP is a small (5 MW) hydropower scheme, which is placed in an existing irrigation canal. Under ADB guidelines SCHP is a Category B project, and, as such is subject to an Initial Environmental Examination (IEE). The project also requires an IEE under the Environmental Assessment requirements of the Government of Pakistan. A resettlement plan investigation was also undertaken as part of the TA.

The project consists of a temporary diversion canal on the left bank of the canal. Upstream and downstream cofferdams are constructed to enclose the area in which the powerhouse is to be built. When the powerhouse is completed, the cofferdams are removed and the diversion canal is filled in and returned to its original land use. The project uses the fall at this canal to provide a head of 4.2 m to produce an instantaneous power output of 5 MW, and electricity production of 29.2 GWh/year.

Environmental impacts

The WAPDA and HEPO 2003 feasibility studies investigated a left bank permanent diversion of the canal nearly a kilometre in length and taking land both up and downstream of an existing fall. The powerhouse was designed for construction in the new canal immediately adjacent to the existing fall. Alternative alignments and designs have been examined in this TA for the project. The earlier left bank diversion alternative has been abandoned; it involved permanent and temporary loss of 8 ha of private land including a large house and grave yard immediately down stream of the existing fall. The temporary canal diversion now proposed for the project is confined to the upstream of the existing canal fall and the land now used for the diversion is unoccupied and within the existing I&PD owned land or Right of Way (RoW) of the existing canal. Other supporting activities for construction and the operations phase of the project can be accommodated inside the existing RoW along the canal. No

resettlement is involved and there is no resettlement plan and the environmental impacts of the project, are minimal.

There will be limited impacts from construction of the diversion canal, cofferdams, a camp for permanent staff and a temporary camp for construction labour. All these facilities can be accommodated in the extensive RoW areas.

Environmental mitigation

The only mitigation measured identified are during the construction phase and a detailed EMP is included in the IEE for the construction phase of the project.

Conclusions

The Project has very little environmental impact and the impacts identified are only during the construction phase. The limited impacts can be successfully mitigated by implementing the EMP attached to the IEE. The IEE and EMP are adequate to ensure compliance with ADB and GOP environmental safeguards. On the basis of this IEE, there is no need for a full environmental impact assessment. However I&PD, the Implementing Agency, (IE) will need to strengthen its capabilities to implement and monitor the measures in the EMP. This has been designed into the project by requiring the employment of an Environment Officer (EO) in I&PD and the appointment of an environmental specialist at a cost of PRs 207,000 or US\$3,450 including 15% contingencies.

I INTRODUCTION

A Purpose and Scope of Environmental Report

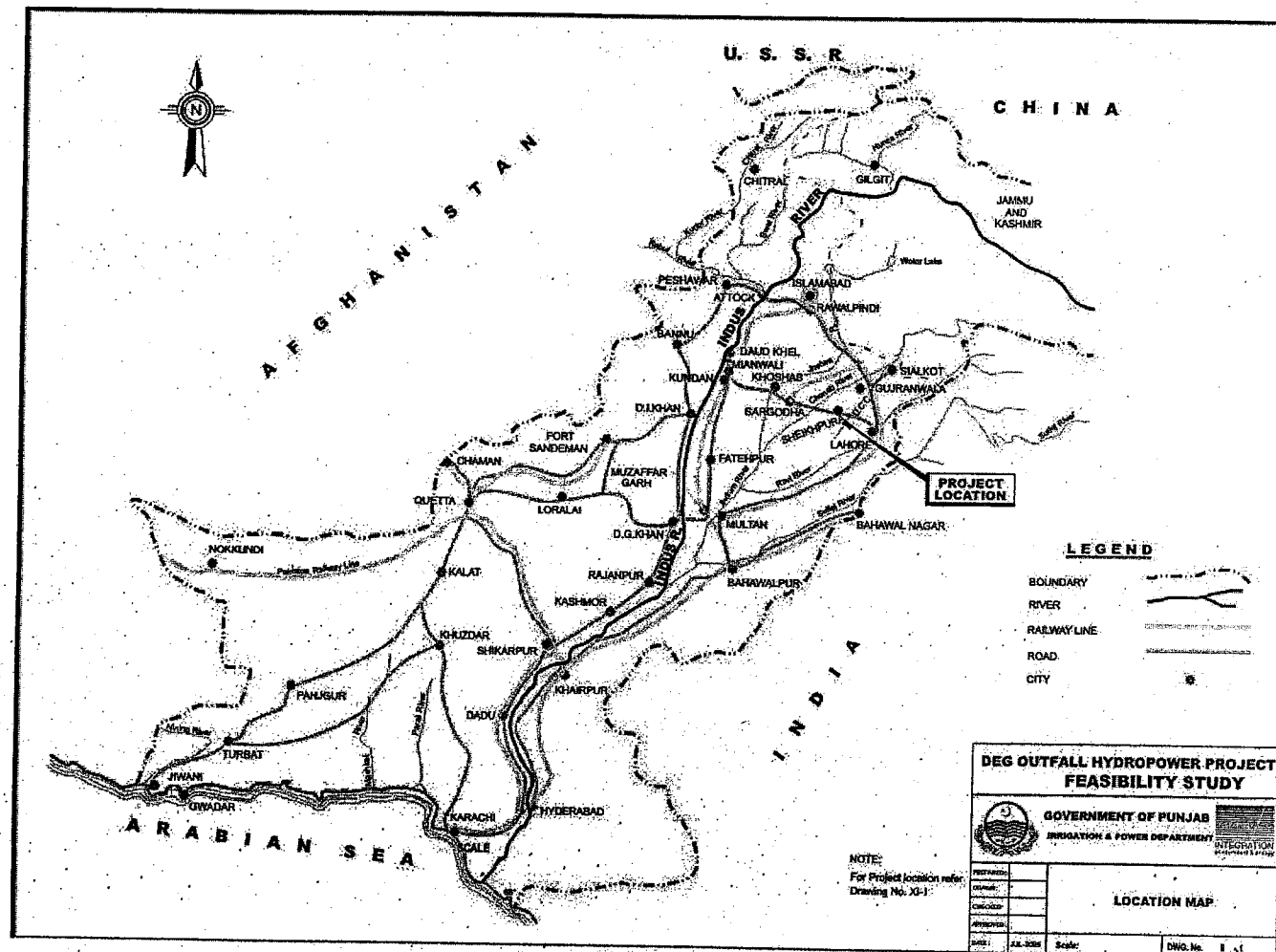
1. This environment examination is undertaken as part of the overall feasibility study for the Sheikhpura Canal Hydropower Project (SCHP) also known as Deg Outfall Hydro Power Project and is designed to meet the requirements for environmental assessment (EA) under the guidelines of ADB. I&PD (Irrigation and Power Department) Punjab will also submit this report for review and approval by the Pakistan Environmental Protection Agency (EPA) under the Environmental Assessment (EA) laws of Pakistan.
2. SCHP is one of a number of small low head projects, which have been examined by WAPDA in the past. SCHP is intended to augment the national power supply and distribution systems in Punjab. At the same time the project will help supply Pakistan's overall energy needs.
3. Large power projects are implemented by WAPDA, and, smaller projects up to 50 MW, are generally undertaken at Provincial level. In this case the I&PD of Punjab Province will be responsible. I&PD will be the Implementing Agency (IA) for the project and is also the proponent as specified under the environmental requirements of ADB and the Pakistan Environment Protection Agency (EPA).
4. The project makes use of the existing water flow and fall in an established irrigation canal system. It will not change the water flow characteristics and hydrological regime of the area. This study looks at the potential impacts of construction and operation of the project on the Upper Chenab Lower Canal and the adjoining area of its influence.
5. SCHP can easily be linked to the existing national grid system by upgrading of the 11kV line, which supplies houses along the canal system. The line will be upgraded using the same alignment and pole positions and there will be no environmental impact.
6. This Initial Environment Examination (IEE), along with a resettlement report, is part of an ADB-TA to examine a number of small hydropower projects¹ in Punjab and NWFP. The work was completed with approximately three weeks of input from international and local consultants.
7. An IEE was conducted as part of the overall feasibility report for SCHP in November 2003 by Hydro Electric Planning Organization (HEPO) a subsidiary of WAPDA. The information contained therein has been incorporated in this report, where appropriate. Information was also gathered during short field visits by I&PD staff and the consultants in August and September 2005. Stakeholders meetings were held with local community leaders, affected individuals and with government agencies at Islamabad, Lahore and at site specific locations. Field staff working in the area were

¹ The projects investigated are close to Sheikhpura, Pakpattan, Gujranwalla, Marala and Okara

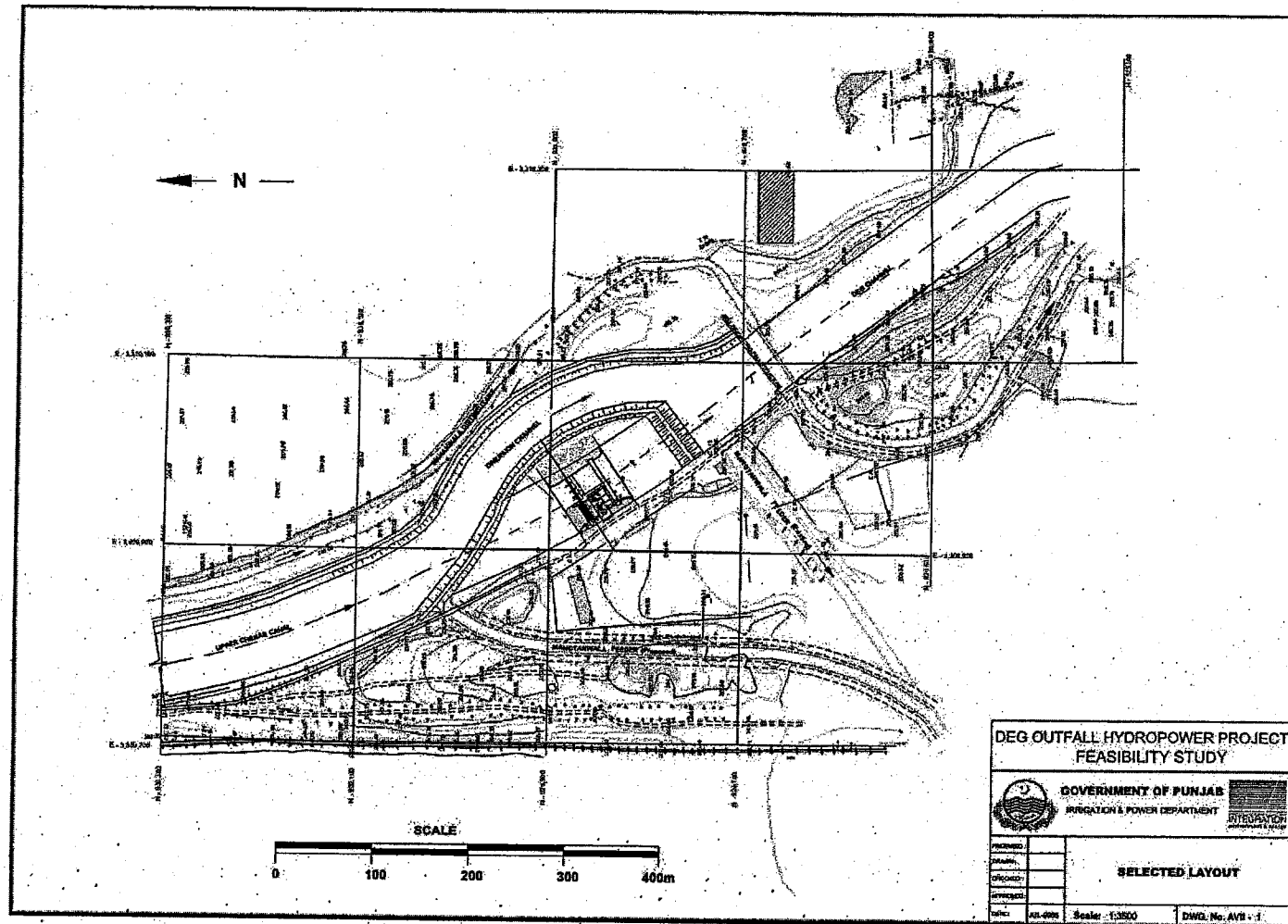
also interviewed. A full list of those persons and organizations contacted is provided in Annex 1.

8. The adverse impacts of these low head hydropower projects investigated in the TA will be relatively few. The preferred design for all the projects is similar with a powerhouse constructed directly in the existing canal bed. A temporary diversion canal maintains the flow of water in the Canal system for general irrigation purposes during project construction. Additionally an extensive Right of Way exists along all the main canal systems, having been acquired for the original construction of the Irrigation Canals many years ago. Therefore, the impacts of the above mentioned Hydropower Projects reviewed under this TA are very similar with only temporary land acquisition and a very small number of affected households, if any. In addition the Implementing Agency (I&PD) is the same and institutional requirements will not change from project to project. For these reasons several chapters of the IEE reports for these hydropower projects in Punjab will be similar or the same.

Map 1 Location Plan Sheikhpura



Map 2 Project Site: Sheikhpura



II DESCRIPTION OF THE PROJECT

A Type of and Category of the Project

9. This project, because of its relatively small size of 5 MW, is classified as a Category "B" project, in accordance with ADB *Guidelines for environmental assessment, 2003*. An Initial Environmental Assessment (IEE) is required to determine if there are significant impacts and if a more detailed impact assessment is necessary.

B Government Approval Requirements

10. The Government of Pakistan has exactly the same environmental assessment requirement as ADB for hydro projects of less than 50 MW. An IEE submission is required to the Punjab Provincial EPA by I&PD. A full scale Environmental Impact Assessment (EIA) is mandatory only for projects bigger than 50 MW.

C Location and General Description

11. The Upper Chenab Lower Canal offtakes from the Upper Chenab Canal which in turn is an offtake from the Marala barrage, constructed in 1968 across the river Chenab. The SCHP project is located on the Upper Chenab Canal Lower (UCCL) about 6 km downstream of the main road between Lahore and Sheikhpura (see Map 1). The downstream section below the powerhouse is known as the Deg canal. There is a dirt track road along the canal linking the site to the main road and Lahore is 33 kms away.

12. The preferred site for the project is approximately 200 m upstream of an existing fall structure and road bridge (see Map 2 and photos).

13. The main elements of the project and construction are as follows:

- Construction of a temporary diversion canal 40 m wide and 400 m long on the left bank of the canal (see Map 2),
- Construction of temporary cofferdams upstream and down stream of the proposed dam location,
- Construction of the powerhouse in parallel with a spillway in the area between the cofferdams and existing banks or the canal,
- Demolition of the fall approximately 200m downstream and lowering of the bed in the existing canal between the powerhouse and the destroyed fall to achieve necessary head for power generation,
- Removal of the cofferdams once the powerhouse is complete to allow water to flow back again into the bed of the existing canal and through the new powerhouse and spillway. Sealing off and filling of the diversion canal and renovation of the land and the existing road on the left bank,
- Construction of a 525 m diversion of the Mangtanwala Feeder canal upstream of the new powerhouse to allow irrigation water to continue to supply the right bank feeder.

14. The upstream canal banks are remodelled, raised and protected with stone plastering and geo-textile and a 4 m wide road is constructed at the crest of the left bank embankments. The design discharge of the powerhouse is $230\text{m}^3/\text{s}$. Access for construction will be via the upgrading of the 6 km long existing road on the left bank of the canal. All access roads will be sealed prior to completion of the project. Throughout the construction stages unhampered canal flow for irrigation purposes will be ensured in the canal; this involves the diversion of the Mangtanwala feeder which is transferred upstream of the new dam as the existing feeder will be at a lower level following completion of the project.

D. Construction Schedule

15. From the beginning of construction to the commissioning of the project is estimated to take approximately 48 months. The various construction phases of the project are discussed in relation to mitigation measures (see B.2. Construction Activities). Construction scheduling is dependent on the one month closure of the canal system in January/February. It is vital that the diversion canal work is finished well in advance of the closure so that cofferdams can be constructed in the dry period. Only once the diversion canal is completed will work on the powerhouse commence.

III. DESCRIPTION OF THE ENVIRONMENT

A. Provincial Context

16. Punjab forms part of Indus Basin Watershed System. The landscape of the whole Province has been so changed by human activity that hardly any of the original habitat of thorn forests, swamps and riverine plantations remains. The irrigated plains of Punjab today constitute the largest canal system in the world and with the conversion of habitat to agriculture, a number of highly distinctive agro-ecosystems exist and the Forestry Master Plan of 1992 identifies nine such zones.

17. Various protected areas are spread across the Punjab province but none are close to the project area.

B Physical Environment

18. The project is located in a plain area and the average elevation of the project district is barely 150 m above sea level.

19. The area falls in the moist temperate zone and receives rains in the summer monsoon. Some residual precipitation is also received in the winter months through western Mediterranean winds. The area gets nearly 205.5 mm^2 precipitation/annum, with maximum in July of 87.7 and minimum in November of 2.6 mm. The lowest and highest values of mean monthly maximum temperature are 5.9°C and 42°C during the months of January and June respectively.

² Bahawainaga rainfall records between 1963 & 2001

20. The soils of the project are characterised as alluvium deposits of sandy-loam and sandy-silt. These soils are generally well drained and exhibit no signs of water logging and salinity.

21. The UCCL delivers a uniform irrigation water flow for 11 months of the year. The local population of the project area uses water from the canal for a number of purposes like washing, bathing and drinking. Canal water for drinking purposes has been reported in the lower reaches of the system where soils are not well drained and considerable problems of water logging and salinity persist. Most of the house-holds (HH) in the immediate project area have local hand pumps for their every day needs. The proposed project will, neither bring any changes to the existing hydrological regime, nor will it affect the local communities' day-to-day canal water usage other than some potential reduction in water quality during the construction phase. A significant load of suspended solids is carried by canal water in the shape of silt for which no sampling data is available³.

22. According to "Seismo-Tectonic Map of Pakistan", the project area belongs to one of the least active earthquake zones of the country, Zone "0". According to seismic history of the region, deep earthquakes have been reported with negligible damages.

23. This is an alluvial area and aggregate and sand has to be imported from external sources.

C. Ecological Resources

1. Wildlife

24. Because of extensive cultivations, high population and human activities, there is little wildlife in the project area. However, the local population as well as the Wildlife Department have reported some fauna. The following is the wildlife profile of Sheikhpura District, in general:

- **Mammals:** Common mammals reported from the project area are wild-bore, hyaena (*Hyaena striata*), red Indian foxes (*Vulpes bengalensis*), porcupines and jackals (*Canis aureus*). Until a few years ago the wolf (*Canis palfies*) was also found in riverain forests, but the species has almost become extinct due to loss of forests.
- **Birds:** The commonly found birds of the area are hawk (*Accipiter badius cenchroides*), kite (*Milvus migrans govinda*), parrot (*Paleornis torquata*), partridge (*Evancolinus pondoceraianus mecranesis*) and common crow (*Corvidae splendoris*). A large variety of waterfowls and migratory birds also visit the region because of the barrages and wetlands in the area.
- **Reptiles:** Because of hot and humid climate of the region, some population of reptiles have also been reported from the project area. Reptilian and amphibian fauna is not well documented. However, local people have reported that snakes and lizards are common in the region.

³ Ibid, Sediments, paragraph 7.2.1.7.

25. Wild-bore are reported to be inflicting serious crop damages, mainly to sugarcane and potatoes crops. Some degree of illegal hunting, poaching and trapping has been reported from the project area.

2 Forest Resources

26. The entire Sheikhpura District has no natural forests, mainly due to vast agricultural activities. However, according to an old provincial notification, the trees along canals, provincial highways and rural roads are the responsibility of forest department, which fall in the category of reserved forests.

27. The canal segments of the project have some trees, particularly in the downstream sector of the left bank of the project. The trees in the area are rosewood, *Sheesham* (*Dilbergia sisoo*) and are mostly diseased due to some fungal attack⁴. The dominant tree species in this zone are *Sheesham* (*Dilbergia sisoo*), *Keekar* (*Acacia arabica*), *Peeloo* (*Salvadora persica*), *Bohar* (*Ficus religiosa*), *Gaz* (*Tamarix indica*), *Nim* (*Azadirachta indica*), *Eucalyptus* and *Mesquite* (*Prosopis juliflora*), the last two being exotic species and mesquite has suppressed endemic species to a great extent. The endemic species of *Peeloo* and *Bohar* are reported to be endangered, as the forest department is not propagating the same, and similarly the wild berry (*Zizyphus numularia*) has almost become extinct.

28. Local farmers are practicing a small degree of farm-forestry in the project area to meet their fuel-wood and other day-to-day needs. The common species in such plantations are *Poplar* (*Populus alba*), *Eucalyptus*, *Keekar* (*Acacia arabica*), mulberry (*Morus alba*) and *Jamun* (*Syzygium cumini*).

3 Fish Resources

29. It is reported by the Fisheries Department that the main fish species found in Pakpattan Canal are *Gulfam* (*Cyprinus carpio*), *Rahoo* (*Lebeorohita* sp) and *Mohri* (*Crhinus miragata*). It has also been stated that no methodical fish surveys have been conducted by the Department of fresh water streams and canals, in the recent past. Because of the construction of several barrages on the river network, migratory species like *Khagga*, *Bam* and *Pamphlait* have almost become extinct in Punjab waters and *Soal* and *Shangri* are considered to be highly endangered.

30. Currently, the main concentration of Fisheries Department is upon development of private fish farms. It has been reported that there are approximately 400 – 500 acres of such farms, which meet the growing demand for fish.

⁴ This viral attack is throughout South Asia, commonly known as "Sheesham Die Back". A considerable amount of research work is underway to find the causes of this infection and its remedial measures, with no coordination amongst other countries of the region.

D. Socio-Economical and Cultural Environment

31. The project area has a reasonably well developed communication infrastructure. It is 25 km by sealed road to Sialkot and a further 117km to Lahore.

32. Mudhekay village is situated 1.5 km to the west of SHPP. This village is dominantly an agricultural village, falling within the rice-belt of the lower Rechna doab of Punjab Province. The villagers' dominant source of income is from wheat and rice crop farming. The village farmlands are situated on both sides of UCCM and Deg Nullah.

33. Mudhekay is a semi-remote village of Sheikhpura district. It is a medium-sized compact village with few subsidiary hamlets. It consists of about 450 households and an estimated population of 3,600 persons, with an average household size of 8.0 persons. Almost all the population is native Punjabi. The relatively small household size (8.0) indicates a dominant nuclear family trend in the village. Reportedly, the villagers used to have larger extended families in the past but they have moved towards nuclear family system since the 1960s because of economic reasons and wide-spread modernization.

34. The adult population of Mudhekay village is not very well educated; male literacy rate is 30% and for females it is 10%. However, the literacy rate for children is far higher, at over 67% for boys and 33% for girls. Only 60% of boys and 20% of girls are in higher education at schools and colleges in Sheikhpura and other towns. The village has two Government Primary Schools, one for boys and one for girls. Only a few rich families can afford to send their children for college education in Lahore city.

35. Mudhekav is a relatively backward village by Pakistani standards, being situated in a semi-remote area of the district. However, the village has a dirt access road, domestic electrification, individual handpumps for drinking water, and a small dispensary and two traditional birth attendants. The streets are partially brick-paved with no side-drains for domestic wastewater disposal, and 80% of houses have washrooms mostly for the women.

36. The village has only four shops selling groceries, candies and basic medicines. To buy manufactured goods, like cloth, shoes, etc., the villagers go to Sheikhpura and Lahore. The traditional artisans continue serving the villagers with their specialized skills at their homes and/or by moving door to door. They include a carpenter, black-smith, barber, shoe-mender, musician, etc.

37. The village has a total land area of 10,000 ha of which 8.0 ha are built up, while the remainder is farmland. The village practices a wheat-rice rotation of cropping pattern and barseem, maize and millets are grown as fodder crops.

38. About 96% of the villagers own some or more land, while the remainder are traditional artisans (carpenter, black-smith, barber, musician, etc.) and landless labour. A majority of the landowners are self-cultivators. Average farm-size is small and 90% of farming households have below the minimum economic unit of 5.0 ha and depend at least partially on various off-farm income sources to meet their living needs. They work mostly as labourers in the construction and industrial sectors, and/or operate small businesses. Table 1 indicates the small farm sizes in the area.

Table 1 Percentage Distribution of Mudhekay Village Farmers by Farm-Size

No	Type of Farmer	Farm-Size (ha)	Landowners (%)	Tenants (%)
1	Small Farmers	Upto 2.0	50.0	10.0
2	Medium Farmers	2.1 - 5.0	40.0	75.0
3	Large Farmers	Above 5.0	10.0	15.0
Total			100.0	100.0

39. The village has a considerable population of livestock. Water buffaloes and cows produce milk and milk products, especially butter-oil (desi ghee) which is sold in Sheikhpura and Lahore on a daily basis. Small flocks of goat and sheep are kept for meat production. Approximately 60% of village households keep 6 to 12 buffaloes and 2 to 6 cows, and 20% households keep 12 to 25 goats and sheep mainly for commercial meat production purposes. Poultry is very common and an essential activity of the women and most household keeps 10 to 30 hens for egg and meat production.

40. The Table below gives the income distribution at Mudhekay Village

Table 2 Household Income Distribution of Mudhekay Village by Tenure Status

No	Poverty Status	Average Monthly Income (Rs)	Percentage of Households (%)		
			Landowners	Tenants	Others
1	Poor / Very Poor	Up to 5000	8.0	10.0	15.0
2	Average Type	5000 - 10000	90.0	85.0	75.0
3	Better Off / Rich	Above 10000	2.0	5.0	10.0
Total			100.0	100.0	100.0

Source: Resettlement Study Fieldwork – Key Informant Interviews and Group Discussions.

IV CONSIDERATION OF ALTERNATIVES

41. This TA Feasibility studied various alternative solutions for the project. These alternatives consisted of the examination of:

- different left bank diversions,
- use of the existing fall and upstream locations,
- different designs for the powerhouse,
- placing the powerhouse in the existing canal or inside a new diversion canal.

42. The design investigated in the 2003 HEPO study was for the powerhouse to be constructed inside a 900 m permanent left bank diversion of the main canal. Placing the canal inside the existing canal rather than a diversion canal reduces the amount of permanent land required for the project as the diversion canal can be returned to its original state after completion of the powerhouse construction. A right bank location would have impacts on existing factory building and housing and this has not been considered. The alternative upstream temporary diversion option, avoids extensive mitigation which would be necessary with in the HEPO feasibility option.

Table 3 Avoidance of Impacts at Sheikhpura HPP

No	Potentially Affected Assets	Unit	HEPO Design	Upstream Temporary Diversion	Avoidance of Impacts
1	Private Large House	Number	1		1
2	Private Tenant's House	Number	1		1
3	Family Graveyard (Small)	Number	1		1
4	Private Land (Orchard+Built-Up)	Hectares	0.50		0.5
5	Private Fruit Orchard (Trees)	Number	158		158
6	Private Wood Plantation (Trees)	Number	263		263
7	Sikhanwala Distributary & Aquaduct	Number	1		1
8	Canal Bridge on Distr. Aquaduct	Number	1		1
9	Number of Landowners	Number	1		1
10	Number of Lease Tenants	Number	2		2
11	Number of Affected Farm Labour	Number	3		3
12	Number of Security Guard	Number	1		1

Note: Taken from Resettlement Report

V SCREENING OF ENVIRONMENTAL IMPACTS

43. The ADB checklist for hydropower projects was used to screen for any potential impact. The checklist is attached in Annex 1 of this document. Impacts, which were determined as having environmental implications, are considered further and where significant impacts occur mitigation has been provided for.

A. Project Impacts and Mitigation Measures

1 Positive Impacts

44. The project will provide electrical power to the wider population. The electricity generated will supply the national grid along with other hydropower projects in the region and will benefit the people of Punjab and the country as a whole. Mains power will mean cooking and domestic heating for those who can afford it and will reduce the pressure on the use of timber and other fossil fuels for heating, cooking and other purposes.

45. The project will also provide unskilled jobs during the construction phase and a limited number of jobs in operations. This will be a bonus for the men of the area, many of who are used to having to travel down country for employment.

46. Hydropower is a clean and renewable source of energy and avoids contributions to pollution loads, which would result from the alternative use of thermal electricity generation. Hence, it is environment friendly. Thermal power generation plants are known for a large variety of toxic emissions i.e. carbon dioxide (CO₂), particulate matter (PM), sulphur dioxide (SO₂), carbon monoxide (CO) and Oxides of Nitrogen (NO_x) etc. The following table provides a comparative analysis of estimated emissions of CO₂ from a power station generating the same amount of energy as the Sheikhpura project over a 30-year period using oil, gas & coal as a fuel source.

Between 0.26 and 0.36 ton of carbon dioxide is saved over the 30 years of the project by using hydropower rather than fossil fuels.

Table 4 Comparative Analysis of CO₂ Emission using Oil, Gas and Coal for Generation

Fuel Source	Oil	Gas	Coal
Grams CO ₂ /kwh	297	232	410
Total Saving (million ton CO ₂)	0.26	0.20	0.36

Note: Assumes generation of 29.2 GWh per year over a 30 year project life = 876.00 GWh.

2 Loss of Land and Compensation

47. The design of the project has been changed so that the powerhouse is now to be directly in the diversion canal. The length of the diversion canal has also been reduced from more than 900 metres to a 400 metre long diversion. Any associated land for construction activities, temporary land for a construction camp and permanent housing for I&PD permanent housing can easily be made available in the existing I&PD RoW either side of the proposed powerhouse location. An 98 m RoW is available on the left bank of the existing canal and on the right bank the RoW is 262 m. This means there is no requirement for any land acquisition.

Table 5: Estimated Cost of EMP Implementation for SCHP, Punjab

No	Description of Expense	Unit	Quantity	Avg. Rate (Rs.)	Total Amount (Rs.)	(US\$)
1	Environment Specialist (Package)	Man-Days	30	5,000	150,000	2,500
2	Environment Monitoring Evaluation	Man-Days	5	6,000	30,000	500
Sub-Total Environmental Expense					180,000	3,000
3	Contingencies (15%)				27,000	450
TOTAL ESTIMATED COSTS					207,000	3,450

3 Loss of Trees and Tree Planting Programme

48. There are some trees affected by the project and these are in the existing I&PD RoW. Adopting the upstream location rather than the original site saves more than 260 trees, which would have been destroyed to build the diversion canal. Only about 10 trees will now be affected in the RoW and this loss will be compensated for with a tree-planting programme, which will be implemented by I&PD using its own management resources or through the Forestry Department, or a private consultant. Planting will take place in the I&PD RoW, along the canal banks, the banks of the newly diverted Mangtanwala feeder canal, and to renovate the diversion canal when it is backfilled. Allowance is made for two acres of plantation for re-afforestation. The costs of planting and raising of trees for a one-acre plantation is estimated at PRs. 5,364.00 as indicated in the Table below. The cost of two acres plantation is included in the Table 7 Proposed Mitigation Costs.

Table 6 Table Cost Estimates for Raising One Acre Tree Plantations

#	Particulars	Work Days	Amount (Rs)
1	Digging of 435 pits, 10x10 ft spacing, 1.5 ft deep, @ Rs. 100/cft for 625.50/cft	6.5	650.00
2	Planting of 435 saplings, including carriage and wing walls around pits, @ 50 plants/day	8.70	870.00
3	Procurement of 435 plants @ Rs 5/plant		2,175.00
	i. Sub-Total		3,695.00
4	Beating up of 30 % failures in the 2 nd year, 131 plants	52	
a	Re-opening of 131 pits, 1.5 ft deep, 196.5 cft @ Rs. 100/cft	1.96	196.00
b	Planting of 131 saplings, including carriage and wing walls around pits @ 50 plants/day	2.62	262.00
c	Procurement of 131 plants @ Rs 5/plant		655.00
	ii. Sub-Total		1,113.00
5	Beating up of 15 % failures in the 3 rd year, 65 plants		
a	Re-opening of 65 pits, 1.5 ft deep, 98 cft @ Rs. 100/cft	1	100.00
b	Planting of 65 saplings, including carriage and wing walls around pits @ 50 plants/day		131.00
c	Procurement of 65 plants @ Rs 5/plant		325.00
	iii. Sub-Total		556.00
	Total		5,364.00

B. Construction Impacts

1 Materials

49. The project will require various materials for construction with potential for destruction and damage of quarry and sand extraction areas. This is an alluvial area and the project must import stone, sand and aggregate from quarries at some distance. The source for riprap or coarse aggregate is approximately 130km in the Kirana Hills and at Taxila 300km away. Fine aggregates are available in river bed deposits at Sutlej river and sand from the Chenab (close by) and Lawrence pur. Cement, steel and bricks are available at local markets near the site. Materials will be sourced from these already established quarries.

2 Construction Activities

50. Construction of the project involves the excavation and movement of materials for:

- Excavation of the temporary diversion canal on the left bank and raising of the upstream and downstream banks of the headrace portion of the existing canal,
- Making of temporary cofferdams up and down stream of the proposed powerhouse site in the bed of the existing canal,
- Removal of the cofferdams when the powerhouse and spill way are complete,
- Filling and renovation of the temporary diversion canal,
- Deepening of the existing canal between the powerhouse and the existing downstream fall in the canal to obtain the desired fall at the powerhouse.

- Construction of the realigned Mangtanwala feeder canal

To minimise environmental impacts and avoid any need for disposal of earthwork materials or the importation and unnecessary storage of earth, the project will maximise the reuse of excavated materials. Excavated spoil from the diversion canal will be used for raising of embankments of the upstream headrace section in the existing canal and will in part be stored for use in the construction of the upstream and downstream cofferdams. The material from the cofferdams will then be re-used to back fill the diversion canal when the powerhouse is completed. In this way there will be negligible waste material and minimal need to dispose of materials. Most of the construction activity will be contained inside the outer embankment of the temporary diversion canal.

51. The 1.0 m deep topsoil of the 0.2 ha farmlands to be affected by the project will be removed and stockpiled prior to excavation proper. At the end of the construction phase the topsoil will be re-used for topping before returning the land to the respective landowners.

52. The land in the I&PD RoW is approximately 98m on the left bank; this land inside the Sikhanwala Distributary is unused and available for construction activities such as aggregate processing and batching plant (see Map). On the right bank there is a RoW of 262 m going back towards an old bed of the old Deg outfall.

53. Mitigation for all identified potential impacts during the construction phase of the project is included in the Table 8 Environmental Management Plan (EMP).

3. Access and Traffic

54. The embankment top on either side of the new diversion canal will be used as an access and service road during construction. Access to the diversion canal will be from the existing road (3.5 km long) along the left bank from the main Lahore Sheikhpura Road. The narrow bridge parallel to the downstream fall will be retained along with parallel Sikhanwala distributary viaduct (see Map). No cross canal bridges are affected by the project.

55. The dirt road on the right hand bank is unaffected. There is very little traffic on the roads along the canal and there will be minimal disruption to any existing traffic. Existing temporary roads for the project will be sealed on completion of the project.

4. Construction Site and Camp Impacts

56. The construction camp has the potential for environmental impacts in terms of solid and wastewater emissions. With batching plant and material storage there will be associated dust problems. Conditions requiring the contractor to suppress any dust hazards by the use of water spraying of roads during dry periods will be included in contracts.

57. The contractor will require a temporary work-force camp for up to 50 labourers. There will be some degree of negative social impact from the labour camp but there is no significant population in the immediate area or encroaching into the RoW. Maximum use of local labour will be encouraged with contractors required to give preference to local people.

58. The construction camp and residential colony for I&PD staff can be located on vacant land in the existing RoW on the left bank. Clauses will be included by I&PD in sub-contracts to ensure dedicated water supply; solid waste and sewage disposal facilities are provided for construction labour camps and for the I&PD residential colony.

5. Impacts on Water Quantity and Quality

59. Various activities of the population rely directly on the canal system for yearlong activities (washing, bathing, drinking purposes and livestock). Irrigation water for crops is required throughout the year. The project will not change irrigation flows during operations, and similarly, during construction, the project is designed to ensure that irrigation flows in the canal system are not impeded. There is a likelihood of increased sediment and turbidity during these times if such work is undertaken while the canal is flowing. Local people use the local left bank upstream offtake feeder for washing clothes and bathing (not the main canal) and there should be no impact.

60. Maximum use will be made of the one month down time in the canal system to build the cofferdams and deepen the canal. This will minimise the need to work in the water to construct dams and remove material to deepen the canal bed below the powerhouse.

61. Nevertheless, measures can be taken for local population to have temporary access to water usage during the project construction phase. Ground water wells are required for dewatering inside the construction pit for the powerhouse and potable water will be available. Standpipes can be provided if necessary during the construction period.

6 Fish Impacts

62. As there are a series of existing falls on the canal and because water flow in the canal system is completely closed off for a minimum of one month each year there are no significant fish populations in the river and there are no significant impacts to fish either in the construction or operation phase of the project.

C Impacts and Mitigation of Transmission Lines

63. Upon its commissioning, the powerhouse will be connected to the national grid by an 11 kVA overhead transmission line. The line will be 7 km long and will pass along the RoW on the upstream canal and partly along the Sheikhpura road. No private land will need to be acquired.

64. The transmission line does not pass through any protected area, ecological reserve or wildlife habitat. No demolition of structures will be required. The environmental impacts of the transmission line will be minimal, but will be subjected to an EA with mitigation by WAPDA prior to construction.

VI. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN AND INSTITUTIONAL REQUIREMENTS

65. Project mitigation measures and costing are indicated in the Table 7 Proposed Mitigation Costs.

Table 7 Proposed Mitigation Costs

#	Mitigation Measure	Total (Rs)	Total \$US
1	Environment Expertise	180,000	3,000
2	Plantation of endemic tree species along canal, road and the rehabilitated temporary diversion canal	10,728	179
3	Sub-Total	190,728	3,179
4	Contingencies (15%)	28,609	477
5	Total Estimated Costs	219,337	3,656

Exchange Rate: US \$ 1.00 = Rs. 60.00

66. The EMP is developed in Table 8 Environmental Management Plan. Supervision and implementation of the EMP will be undertaken by I&PD in conjunction with a proposed implementation specialist.

67. I&PD will also obtain approvals from EPA Punjab and then monitor the project and forward monitoring reports on a regular basis to the Provincial EPA as per the requirements of the Federal EPA regulations. This IEE and the EMP can form the basis of a submission for environmental approval to the EPA Punjab.

68. I&PD will ensure that conditions are included in project construction contract documents. It will also ensure that during the construction phase, environmental mitigation measures, as per the EMP, are effective and are implemented. The EMP implementation will be coordinated with concerned Government Agencies.

69. I&PD has engineering and support staff, but has no specific capacity or qualified personnel in the environment field. To handle its general environmental and land compensation responsibilities, I&PD will develop the necessary capacity and allocate manpower to specifically implement the Sheikhupura IEE environmental management plan requirements.

70. An Environment Officer (EO) will be employed by I&PD. This person will work in close cooperation with the respective field-based office on the day-to-day activities of EMP implementation. ToR for this position is attached in Annex 3.

71. As I&PD does not yet have the expertise and capacity required for implementing the IEE, it will have to depend on additional external technical assistance and will, therefore, hire additional expertise in the form of:

- a part time Implementation Consultant who will be directly hired by I&PD, to provide technical assistance in implementation of the IEE and ;
- Another part-time Consultant (External Monitoring) who will be hired to conduct the external monitoring and evaluation of the effectiveness of implementation of the EMP.

72. The Implementation Consultant (ToR in Annex 3) will carry out an internal on-the-job training and an institutional capacity building for I&PD in general and for the officer appointed as ERO. In this way I&PD will acquire the necessary expertise to carry out the implementation of EMPs by itself in future. The cost of the Implementation Consultant is included in Table 5: Estimated Cost of EMP Implementation for SCHP, Punjab.

VII. CONCLUSION, FINDINGS AND RECOMMENDATIONS

73. The Sheikhpura project site is on an existing canal system in Punjab, which has been in operation for many years. The proposed hydropower project uses the existing fall in the canal to provide a head of 4 m to produce an instantaneous power output of 5 MW, and electricity production of 29.2 GWh/year.. The project uses a temporary diversion canal (400 m long and 75m wide) on the left bank of the canal to divert the existing waters of the existing canal, while a powerhouse is constructed in the middle of the existing canal bed. Upstream and downstream cofferdams are built to allow the powerhouse to be constructed. The diversion canal is filled in, levelled and returned to alternative land use when construction work on the powerhouse is complete and the water again flows in the original canal.

74. The Resettlement Report indicates that there are no resettlement issues following the adoption of a shorter temporary diversion rather than the scheme preferred in the earlier feasibility study. All the project construction activity takes place within the existing way-leave reserve in Government ownership (I&PD). There are no identified impacts affecting either archaeological sites or wildlife. Because of the existing falls in the canal system and, because of the annual closure regime of the canal system, there are no significant fisheries and the project will have no impact on fish. The impacts identified in this IEE are construction related activities, some loss of trees, and a temporary loss of water quality during construction.

75. This project has very little environmental impact; those impacts identified will be adequately addressed by the mitigation and environmental management plan, which I&PD is committed to implement. Therefore, a full EIA is not required for the Sheikhpura project.

76. It is important, however, that I&PD as the Implementing Agency develops its internal capacity to implement and monitor the measures in the EMP. This has been designed into the project by requiring the appointment of an Environmental Officer in I&PD and the appointment of an environmental external specialist and the hiring of an independent monitor.