



**Government of Sindh**

**Energy Department**

## **Request for Proposals (RFP)**

**For the Development and Implementation of**

### **20 MW "Waste-to-Energy" Power Plant**

**Based on Municipal Solid Waste and Agricultural waste**



**27<sup>th</sup> January 2014**

**Government of Sindh**

**Energy Department**

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**20 MW "Waste-to-Energy" Power Plant**

**Based on Municipal waste and Agro waste**

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**NOTICE FOR INVITING APPLICATIONS FROM PROSPECTIVE BOOT**  
**CONTRACTORS FOR THE ISSUE OF REQUEST FOR PROPOSAL**  
**FOR DEVELOPMENT AND IMPLEMENTATION OF 20 MW “WASTE-TO-ENERGY” (ALTERNATE AND**  
**RENEWABLE ENERGY) POWER-PLANT BASED ON AGRO WASTE/ MUNICIPAL WASTE AT KHAIRPUR**  
**SPECIAL ECONOMIC ZONE**

**Introduction**

Given the context of acute shortage of electricity in the Province, Energy Department, Government of Sindh endeavours to explore new avenues for generating electricity through renewable /alternate resources. In this regard Energy Department in collaboration with Public Private Partnership (PPP) Unit, Finance Department (GoS) invites Technical Proposals from reputable international and domestic developers /consortia / or Joint Ventures who have necessary technical competence, experience/expertise and financial strength for development, , operation and maintenance of power plant(s) on a long term basis under PPP Mode.

The envisioned PPP Procurement structure is a Built-Own-Operate-Transfer (BOOT). The offers shall be based on Two Stage Bidding process as per Sindh Public Procurement Rules (SPPRA).

**Khairpur Special Economic Zone (KSEZ)**

Government of Sindh (GoS) is developing a special economic zone in the district of Khairpur, Sindh, by the name Khairpur Special Economic Zone (KSEZ). The zone is being developed to focus on the industrial development in the Province of Sindh.

**The Project**

Khairpur Waste-to-Energy Power Project located at Khairpur Special Economic Zone (KSEZ) is envisaged to be the first of its kind project utilizing Municipal Solid Waste, Industrial Waste and Agricultural Waste to generate 20MW (Approx.) electricity. The Power plant shall be based on Municipal Waste and Agro Waste collected from Khairpur, Sukkur – Urban and surrounding areas.

**Scope of Work**

The selected bidder will be responsible for:

- i. Detailed Design, Finance, Engineering, Development /Construction, Completion, Testing, Commissioning, Ownership, Operation and Maintenance of 20MW Power Plant and all activities incidental thereto.
- ii. Electricity generated by the Power Plant will be sold to the industrial units operating in KSEZ on priority basis and any surplus will be sold to Sukkur Electric Power Company (SEPCO).
- iii. Collection of revenue receipts, including but not limited to, tariff charges from KSEZ industrial consumers and SEPCO.
- iv. Transfer the Project and its related assets to the GoS upon completion of the concession period

**Technical Proposals**

The Technical Bids shall be evaluated based on Bidders past experience, technical proposal and methodology. The firms shall have registration with Pakistan Engineering Council or an equivalent international body/authority acceptable to the GoS, and having experience of handling similar projects in the past in Pakistan or abroad. They will be required to prove their financial strength

for satisfactorily and timely handling of the project on BOOT basis.

All requirements, terms and conditions of the project will be agreed during clarification with the technically qualified bidders. The RFP shall be issued from **27th January 2014** and will be available on [www.pppunitsindh.gov.pk](http://www.pppunitsindh.gov.pk) and [www.pprasindh.gov.pk](http://www.pprasindh.gov.pk).

#### **Bid Submission Deadline**

The proposals are to be delivered in a sealed envelope no later than **31st March 2014 by 12:00pm**.

#### **Address for Submission of Proposals**

**Secretary,**

Energy Department, Government of Sindh,

7th Floor Lakson Square Building No. 3, Near Press Cub, Karachi.

**Opening of Proposals:** Same day within one hour of submission deadline.

#### **Bid Security**

Bid Security in an amount equal to at least 1% of the proposed project cost (as set out by the Bidders in the Bid), in Pakistani Rupees shall be submitted along with the Financial Proposal in Stage-2. The bid security shall remain valid for a period of one hundred and twenty (120) days beyond the Proposal Deadline.

#### **Bid Validity**

The Bid shall remain valid and open for acceptance for a period of one hundred and twenty (120) days from the Proposal Deadline. In exceptional circumstance, prior to expiry of the original bid validity period, the GoS may request Bidders to grant a specified extension in the period of validity. This request and the response thereto shall be made in writing or through fax or email.

A Bidder may refuse the afore-stated GoS request and can claim for return of its Bid Security; which shall subsequently make his bid ineligible for further processing. A Bidder agreeing to the GoS's request will extend the validity of its Bid Security correspondingly.

#### **Pre-bid Meetings**

First Pre-bid Meeting will be held on Friday, 14th February 2014 at 12:00pm. Dates of subsequent pre-bid meetings will be communicated thereafter.

Venue of Pre-bid Meetings: Committee Room, 1st Floor, A.K. Lodhi Complex, New Finance Building, Sindh Secretariat No. 6, Shahrah-e-Kamal Atta Turk, Karachi.

#### **Financial Bids:**

Date & time of SUBMISSION OF FINANCIAL BIDS, shall be announced later after the Technical Bids have been evaluated: **ONLY THOSE BIDDERS SHALL BE INVITED TO SUBMIT FINANCIAL BIDS WHOSE TECHNICAL PROPOSALS HAVE BEEN DECLARED RESPONSIVE.**

#### **Terms & Conditions:**

1. Conditional tenders and the tender without bid security shall be rejected.
2. All events, terms and conditions shall be as per RFP.
3. Energy Department GoS, reserves the right to accept or reject any or all the offers without assigning any reason.

## **DISCLAIMER**

The information contained in this RFP or subsequently provided to Bidder(s), whether verbally or in documentary or any other form, by or on behalf of the Authority or any of its employees or advisers, is provided to Bidder(s) on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided.

This RFP is not an agreement and is neither an offer by the Authority to the recipients or any other person. The purpose of this RFP is to provide Bidders with information that may be useful to them in the formulation of their Technical Proposals and Bids pursuant to this RFP.

This RFP has been prepared by the Authority with the assistance of its advisers Jaffri and Associates Consulting Engineers (Pvt) Ltd.

This RFP, the Bidding Documents and any information subsequently provided by or on behalf of the Authority includes or will include statements which reflect various assumptions and assessments arrived at by the Authority in relation to the Project. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require. This RFP and the Bidding Documents may not be appropriate for all persons, and it is not possible for the Authority, its employees or advisors to consider the investment objectives, financial situation and particular needs of each person who reads or uses this RFP or the Bidding Documents. The assumptions, assessments, statements and information contained in this RFP, the Bidding Documents or (if any) the Revised Bidding Documents, especially the Feasibility Report, may not be complete, accurate, adequate or correct. Each Bidder should, therefore, conduct its own investigations and analysis; and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this RFP, the Bidding Documents and in any information subsequently provided by or on behalf of the Authority, and obtain independent advice from appropriate sources.

Information provided in this RFP, the Bidding Documents and any information subsequently provided by or on behalf of the Authority is or will be on a wide range of matters, some of which may depend upon interpretation of law. The information so given is not intended to be an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. The Authority, its employees and advisors accept no responsibility for the accuracy or otherwise of any interpretation of or opinion on law expressed herein or therein.

The Authority, its employees and advisors make no representation or warranty and shall have no liability to any person, including any Bidder, under any law, statute, rules or regulations or principles of tort, restitution or unjust enrichment or may under any other theory of law for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this RFP, the Bidding Documents or in any information subsequently provided by or on behalf of the Authority, or otherwise, including the accuracy, adequacy, correctness, reliability or completeness of this RFP, the Bidding Documents or any such information, and any assessment, assumption, statement or information contained herein or therein or deemed to form part of this RFP or arising in any way in connection with participation in this Bid Stage.

The Authority, its employees and advisors also accept no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Bidder upon the statements contained in this RFP, the Bidding Documents or in any information subsequently provided by or on behalf of the Authority.

The Authority may, in its absolute discretion but without being under any obligation to do so, update, amend or supplement the information, assessments or assumptions contained in this RFP, the Bidding Documents and/or any information subsequently provided by or on behalf of the Authority and/or the Project at any time, and shall not be liable to reimburse or compensate any Bidder for costs or expenses incurred or suffered by it in such an event.

The issue of this RFP does not imply that the Authority is bound to appoint the Bidder for the Project, and the Authority reserves the right to reject all or any of the Bidders, Technical Proposals and Bids. Upon written request, the Authority shall communicate to the Bidders the grounds for rejection, but shall not be obliged to justify them.

Each Bidder shall bear its own costs associated with or relating to the preparation and submission of its Technical Proposal and/or Bid including, but not limited to, preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the Authority or any other costs incurred in connection with or relating to its Technical Proposal and/or Bid. All such costs and expenses will remain with the Bidder and the Authority or any of its employees or associates or consultants shall not be liable in any manner whatsoever for the same or for any other costs or expenses incurred by a Bidder in the preparation or submission of its Technical Proposal and/or Bid, regardless of the conduct or outcome of the Bidding Process.

27 January 2014

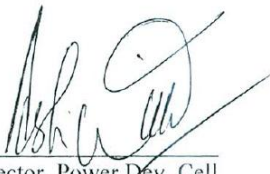
Dear Sirs

**Sub: Request for Proposal for 20MW Waste-to-Energy Power Project**

You are requested to participate in the Bid Stage and submit your Technical Proposal and Bid for the project in accordance with the RFP.

Please note that the Energy Department, Government of Sindh reserves the right to accept or reject any or all Technical Proposals and/or Bids.

Yours faithfully



Director, Power Dev. Cell  
Energy Department  
Government of Sindh

## DEFINITIONS

1. **“Addendum”** – means an amendment or modification to this RFP by EDGOS.
2. **“Agreement Year”** – means a period of 12 consecutive months commencing on each consecutive anniversary of the Commercial Operations Date and ending as of the end of the Day preceding the next anniversary of the Commercial Operations Date, except for the first Agreement Year which shall start on the Commercial Operations Date.
3. **“Available Capacity”** – means the net electric power generating capacity of the Plant at any given time, measured in kW (adjusted to the Reference Site Conditions), at the Delivery Point of the Plant as determined by the most recent Available Capacity Test.
4. **“Bid”** – has the same meanings as the Proposal.
5. **“Bidder”** – means any company or consortium, which submits a proposal against this RFP.
6. **“Commercial Operations Date” or “COD”** – means the Day following the Day on which the Plant is Commissioned in accordance with the PPA.
7. **“Commissioned”** – means the performance by the Plant during Commissioning at or above the criteria for attaining commercial operations specified in Schedule of the PPA, as certified in writing to the Project Company, EDGOS and SEPCO by the Engineer.
8. **“Commissioning”** – for the Plant, means engaging in testing the Plant in accordance with the PPA in order to satisfy the criteria for attaining commercial operations specified therein.
9. **“Consents”** – means all such approvals, consents, authorizations, notifications, concessions, acknowledgments, agreements, licenses, permits, decisions or similar items required to be obtained from any Public Sector Entity by the Project Company for the construction of the Project or for the construction, financing, ownership, operation, and maintenance of the Plant, including without limitation those Consents listed in the IA; provided, however, that in no event shall the Consents include any concessions or exemptions from the Laws of Pakistan unless such concessions or exemptions are expressly granted to the Project Company pursuant to the terms of the IA.
10. **“Contract Capacity”** – means the net electric power generating capacity of the Plant measured in MW at the Delivery Point, adjusted to the Reference Site Conditions that the Bidder proposes in its Proposal to build, own, operate and transfer.
11. **“Contractors”** - means the EPC Contractor and the O&M Contractor and any other direct contractors and any of their direct sub-contractors integrally involved in the Project.
12. **“Control Centre” or “CC”**– KSEZ’s and SEPCO’s Control Centre located in Sukkur, or such other control center designated by SEPCO from time to time (but not more than one at any time) from which SEPCO shall Dispatch the electricity generated from the Plant.
13. **“Day”** – means each 24-hour period beginning and ending at 12:00 midnight PST.

14. **“Deadline for Financial Closing”** – means the date by which the Project Company is required to achieve Financial Closing, which is a Day at the end of a period of [six (4)] months from the issuance of the Letter of Award by EDGOS to the Project Company, which can be extended as described in Section A, Article 7 (d).
15. **“Deadline for Submission of Proposals”** – means the date and time when Proposals are due in response to this RFP, which is [12:00] hours local time in Karachi, Pakistan, 31 March 2014.
16. **“Delivery Point”** – means the location at the [11]kV side of the generator transformer at which the Net Energy Output is measured and delivered by the Project Company to KSZ and/or SEPCO as described in the PPA.
17. **“Dollars” or “USD”** – means the lawful currency of the United States of America.
18. **“Engineer”** – means the independent consulting engineer or engineering firm of international repute appointed by agreement of the Project Company for the purpose of monitoring the construction of the Plant and for certifying the successful performance of any tests carried out hereunder.
19. **“EPC Contract”** – means the agreement entered into between the Project Company and the EPC Contractor for the design, engineering, procurement, construction, completion, start-up, testing, and Commissioning of the Plant, as amended from time to time.
20. **“EPC Contractor”** – means Name of Construction Contractor and any successor thereto appointed by the Project Company and not objected to by the GOS.
21. **“Exchange Rate”** – means the exchange rate of Rs to USD as announced by the National Bank of Pakistan from time to time as TT&OD selling rate.
22. **“Feasibility Study”** – means the Technical Feasibility Study carried out by Jafri and Associates Consulting Engineers (Pvt) Ltd. for EDGOS.
23. **“Financial Closing”** – means the execution and delivery of all loan agreements evidencing financing for the completion of the Plant and all other parts of the Financing Documents executed at the time of execution of the loan agreements, and the receipt of commitments for such equity as is required by the Project Company to satisfy the requirements of the Lenders and the Letter of Award.
24. **“Financing Documents”** – The loan agreements, notes, indentures, security agreements, guarantees and other documents relating to the construction and permanent financing (including refinancing) of the Plant (or any part thereof).
25. **“GOS”** – means the Government of Sindh.
26. **“Grid System”** – means the transmission or distribution facilities owned by SEPCO and/or KSEZ, including the Project Line, through which the Net Electrical Output of the Complex will be received and transmitted by SEPCO and/or KSEZ to users of electricity and through which electrical energy delivered by SEPCO and/or KSEZ to the Plant, as required.

27. **“GWh”** – means GigaWatt hours.
28. **“Implementation Agreement” or “IA” or “Public Private Partnership Agreement” or “PPP Agreement”** – means the agreement of this name to be entered into by the Project Company and the GOS setting out the guarantees, assurances, support and allocation of risks necessary for the development of the Project, a draft of which is included as Appendix I of Section E.
29. **“Interconnection Facilities”** – has the meanings set forth in the draft PPA (Appendix II: Section E) and described in Section A, Article 5.
30. **“Joule”** – means the energy equivalent as defined in ISO. 1000-1992(E).
31. **“KSEZ”** – Khairpur Special Economic Zone
32. **“kW”** – means Kilowatts.
33. **“kWh”** – means Kilowatt-hours.
34. **“Laws of Pakistan”** – means all laws, statutes, regulations, statutory revision, orders, execution orders, decrees, judicial decisions, and notifications of all kinds of Pakistan, whether of the national, provincial, or municipal levels, issued by any executive, legislative, or administrative entity, as any of them may be amended from time to time.
35. **“Lead Bidder”** – means the Bidder itself if it is a single firm, or the member of the Bidder if it is a consortium established during the prequalification process, who has been duly authorized by the other members of the consortium to submit the Proposal and act on behalf of the consortium until selection of the Successful Bidder and establishment of the Project Company.
36. **“Lenders”** – means the entities potentially providing the construction and long-term debt financing for the Project pursuant to the Financing Documents.
37. **“Letter of Award” or “LOA”** – means the letter of this name to be issued by EDGOS to the Successful Bidder at the end of bidding process for the implementation of the project.
38. **“Levelized Tariff Charge” or “LTC”** – means the value in Rs per kWh referred to in and calculated according to the guidelines provided by NEPRA.
39. **“Local Index”** – means the index used for adjusting local or Rupee components of the Tariff Charges, which is the Pakistan Wholesale Price Index (WPI) for manufacturing as notified by the Pakistan Bureau of Statistics.
40. **“Main Sponsor”** – has the same meanings as the Lead Bidder.
41. **“MW”** – means Megawatts.
42. **“MWh”** – means Megawatt-hours.
43. **“NEPRA”** – means the National Electric Power Regulatory Authority.
44. **“Net Energy Output”** – means the net electrical energy delivered by the Plant to SEPCO during a given period of time measured in kWh at the Delivery Point.

45. **“Non-recourse Financing”** – means the debt or other financing, the recourse for which shall be exclusively to the Project Company.
46. **“Notification”** – means the notification issued by EDGOS to the Shortlisted Bidders.
47. **“NTDC”** – means the National Transmission and Despatch Company and its successors and permitted assigns.
48. **“NSUSC”** – means Northern Sindh Urban Services Corporation
49. **“O&M”** – means operation and maintenance.
50. **“O&M Agreement”** – means an agreement to be entered into between the Project Company and the O&M Contractor for the operation and maintenance of the Plant, as may be amended from time to time.
51. **“O&M Contractor”** – means [Name of O&M Contractor] and any successor thereto appointed by Project Company and reasonably acceptable to SEPCO and KSEZ [and not objected to by the GOS].
52. **“Performance Guarantee”** – means the irrevocable and unconditional direct-pay letter of credit to be furnished by the Successful Bidder in favour of EDGOS from a bank in Pakistan acceptable to EDGOS, prior to the issuance of the LOA, which will guarantee that the Successful Bidder or the Project Company will achieve the Financial Closing on or before the Deadline for Financial Closing, execute the Project Agreements within six (6) months of the issue of the LOA and achieve other milestones on or before certain specified dates.
53. **“Plant Functional Specifications”** – means that section (C) of this RFP that specifies the functional requirements of the Plant.
54. **“Power Purchase Agreement or “PPA”** – means the agreement, dated \_\_ \_\_\_\_, 20\_\_, entered into between SEPCO and/or KSEZ and the Project Company for the purchase and sale of electric power generated by the Plant, as amended from time to time.. However, it must be noted that this draft PPA has not been provided to, or discussed with, SEPCO and/or KSEZ and thereby any and all terms hereunder are subject to negotiation/change. Please note that the GOS would provide all possible facilitation to the SPV in subsequent negotiation/finalization of this PPA.”
55. **“EDGOS”** – means the Energy Department Government of Sindh and its successors and permitted assigns.
56. **“Pre-Bid Meeting”** – means the meeting as described in Section B, Article IB 20.
57. **“Project”** – means (a) the development, design, engineering, manufacture, financing, insurance, construction, permitting, completion, testing, Commissioning, ownership, operation and maintenance of the Plant and all activities incidental thereto; (b) the development, design, engineering, manufacture, financing, insurance, construction, permitting, completion, testing, commissioning, ownership, operation and maintenance of the Plant and all activities incidental thereto; and (c) the development, design, engineering, manufacture, financing, insurance,

construction, permitting, completion, testing, Commissioning and ownership of the Interconnection Facilities and Transmission Facilities and their transfer to SEPCO and/or KSEZ and all activities incidental thereto.

- 58. **“Project Agreements”** – means, collectively, the Power Purchase Agreement, Implementation Agreement and Waste Supply Agreement.
- 59. **“Project Company”** – means the company to be established by the Successful Bidder and duly incorporated under the Laws of Pakistan for the implementation and management of the Project, and its successors and permitted assigns.
- 60. **“Project Implementation Schedule”** – means the schedule for implementation of the Project which is to be provided by the bidder.
- 61. **“Proposal”** – means the Bidder's written offer for the Project, submitted in response to this RFP, based on the covenants, terms and conditions as contained in this RFP.
- 62. **“Proposal Opening”** – means the session held to open the Proposals as described in Section B, Article 26.
- 63. **“Proposal Security”** – means the irrevocable and unconditional bank guarantee payable upon presentation to a bank in Pakistan (acceptable to EDGOS) for a sum equivalent to at least 1% of total project cost estimated by the bidder in its Proposal which will be submitted by a Bidder with the Financial Proposal on or before the Deadline for Submission of Financial Proposals.
- 64. **“Proposal Validity Period”** – means the period as described in Section B, Article IB 18.
- 65. **“Prudent Utility Practices”** – means those practices, methods and procedures conforming to safety and legal requirements which are attained by exercising that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced generator of electricity engaged in the same type of undertaking under the same or similar circumstances to those pertaining in Pakistan. Prudent Utility Practices are not limited to optimum practices, methods or acts to the exclusion of all others, but rather are a spectrum of possible practices, methods and acts which could have been expected to accomplish the desired result at reasonable cost consistent with reliability and safety.
- 66. **“Required Commercial Operation Date”** – means with respect to the Plant, the date which is [twenty four (24)] months after the Financial Closing, which date may be extended in accordance with the PPA.
- 67. **“Responsive Bidder”** – means any Bidder whose Proposal has been determined to be a Responsive Proposal.
- 68. **“Responsive Proposal”** – means any Proposal which has been determined to be substantially responsive to the requirements of the RFP in accordance with Section B, Article IB 22.

69. **“Request for Proposal” or “RFP”** – means, this Request for Proposals with all Appendices, Exhibits and Attachments hereto, and any future amendments or modifications thereto through Addendum issued by EDGOS.
70. **“Rupee” or “Rs”** – means the lawful currency of Pakistan.
71. **“SEPCO”** – means Sukkur Electric Power Company.
72. **“Site”** – means the land, water-ways, roads, wells and any rights acquired or to be acquired by the Project Company for the purposes of the Plant on, through, above or below the ground on which all or on any part of the Plant is to be built, (including, without limitation, any working areas required by the Project Company and the Contractors, villages, townships and camps for the accommodation of the employees of the Project Company and the Contractors, and all rights of way and access from public highways and, where applicable, railway and seaward access).
73. **“Successful Bidder”** – means the Bidder who has been selected by EDGOS under this bidding process to develop the Project.
74. **“Tariff Charges”** – mean the price of electricity, as approved by NEPRA, to be charged by the Project Company to SEPCO and/or KSEZ and calculated in accordance with the NEPRA guidelines.
75. **“Third Party Agreements”** – means, collectively, the EPC Contract, the O&M Contract, legal consents, loan commitments, interest rate protection letters, insurance agreements, trust agreements, and such legal documents which are entered into directly between the Project Company and third party entities for the execution of the Project.

## **SECTION A – INFORMATION TO BIDDERS**

### **BASIC INFORMATION**

- This is a BOOT Project
- This would be a two stage bidding (please refer to Articles IB-37 and IB-38 in Section B “Instruction to Bidders”). Also see notice inviting application for the collection of RFP.
- In stage I only Technical Proposal shall be submitted. After stage I, i.e. Technical Proposal has been evaluated in stage II the bidders shall be invited to submit their Financial Proposal and “Revised” Technical Proposals in compliance with the acceptable Technical standard.
- The revised Technical Proposals and Financial Proposals shall be opened in public at date and time to be informed.

### **1. INTRODUCTION**

- 1.1 Government of Sindh (GoS) is developing a special economic zone in the district of Khairpur, Sindh, by the name Khairpur Special Economic Zone (KSEZ). The zone is being developed to focus on the industrial development in the Province of Sindh.
- 1.2 As with every industrial park, the prime feature is a constant, reliable and affordable supply of electricity in addition to other utilities. For this specific purpose, a power plant is to be set up with a capacity to produce 20 MegaWatts of electrical power.
- 1.3 Keeping in view the current energy crises, the ever inflating oil prices, the high cost of electricity production, the world energy markets’ focus on alternate sources of energy, Energy Department, Government of Sindh has decided to install a “20 MW power plant based on Agricultural Waste and Municipal Solid waste”. A preliminary study has been conducted covering technical and financial aspects of the proposed project over the 30 year concession period.

### **2. PROJECT DESCRIPTION**

#### **2.1 General**

The Project comprises, among other things, the following:

- a) Detailed Design, Finance, Engineering, Development /Construction, Completion, Testing, Commissioning, Ownership, Operation and Maintenance of 20MW Power Plant and all activities incidental thereto; and
- b) the sale of Available Capacity and Net Energy Output to Industrial Units operating in Khairpur Special Economic Zone (KSEZ) on priority basis and any surplus to Sukkur Electric Power Company (SEPCO);

#### **2.2 Technical Description of Plant**

The Plant will include the following facilities as further described in Section C, “Plant Functional Specification” (PFS):

- a) The proposed plant is a steam turbine plant with special multi-fuel boilers. These are the most efficient and internationally proven technology which is already in used in developed countries which have already built their power generation based on energy from waste. The biggest examples are in the Scandinavian countries covering Denmark, Norway and Sweden. The United Kingdom, Canada, Malaysia and Australia also have installed power generation capacities on the same technology. The same plant shall be used in KSEZ 20 Mega Watts power plant with design conforming to meet Sindh's EPA guidelines and prudent practices in utility industry world over.
- b) For every power house, once installation cost are ascertained, the main issue of concern is the supply arrangement of feedstock and the relevant cost of procuring and bringing it to the plant site. Studies have been carried out to ascertain the supply sources and heat value of various feed stocks available to run the project. (The BOOT contractor is encouraged to re-assess the figures independently).

Khairpur and adjoining areas are blessed with agricultural lands producing various crops and related waste. Similarly, these localities produce Municipal Solid Waste from the populated areas and households.

After a detailed survey of the availability, heat value and related cost of the feedstock, the following are proposed in initial budgetary feasibility:

80% Agricultural waste (3,015 K cal per kg)  
20% Municipal Solid Waste (1,760 K cal per kg)

The mixture would be passed through a process of "Pelletization" to form combustible pellets that would be used as feed stock in the boilers. The required quantity of proposed mixture is 186,000 Metric Tons per year to produce as against an available supply of ten times the required quantity. (Source: Sukkar Agricultural Department)

To ensure a constant supply, the BOOT contractor will enter into a "Waste Supply Agreement" (WSA) with a local contractor to collect and supply the required agro waste and municipal waste. Northern Sindh Urban Services Corporation Limited (NSUCL) will be a facilitator and party to the agreement's enforcement.

Similarly, a backup fuel supply agreement needs to be entered into with a coal dealer/transporter. This would ensure production of electricity in case if weather conditions like heavy rains etc disrupt agricultural waste and municipal waste collection and delivery beyond the base stock.

- c) Multi Fuel Boilers are designed to burn fuels of various types when ever need arises. E.g. if due to any reason, the plant's feedstock are not available, the same can be run on "Coal". This ensures the plant's continued operations without any unplanned shut downs.
- d) Once the plant is operational, the electricity so produced needs to be sold. The main customers are Industrial Units in KSEZ (priority basis) and SEPCO. During the initial days of plant operations, KSEZ's own requirements would be low as industrial units would be in the construction/setup phase. The major/surplus power produced will be sold to SEPCO, for which a "**Power Purchase Agreement**" (PPA) will be signed with SEPCO at tariff rates determined and approved by NEPRA.

- e) The project is envisaged to produce 5 MW electricity using Municipal Solid Waste (MSW) and Agricultural Waste in the initial stage, for which Waste Supply Agreement will be signed between the developer and Northern Sindh Urban Services Corporation (NSUSC) and/or any third party. In later stages the plant is proposed to further enhance the capacity to proposed 20 MW, as per the requirements and electricity demand of KSEZ.
- f) All required Site support facilities, including, but not limited to, the administration buildings, warehouses, workshops, and storage facilities.
- g) All necessary Site infrastructures such as roads, potable water system, sanitary sewer system, parking areas, lighting, security fencing, etc. Construction of a colony for certain employees of the Project Company, the Contractors is at the discretion of the Bidder. Site Utilities are further discussed in Section C, "Plant Functional Specification" (PFS).
- h) All necessary improvements to insure unimpeded access to the Site(s) to include, but not limited to, road improvements, bridges, culverts, relocation of utilities, etc., and any other logistics support required to implement the Project.

| <b><u>PROJECT DATA SHEET</u></b>                                             |                                                                        |
|------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Procuring Method                                                             | Built – Own – Operate - Transfer                                       |
| Concession Period                                                            | 30 years (including 2 years construction period)                       |
| Issuance of RFP                                                              | 27 <sup>th</sup> January 2014                                          |
| Deadline for submission of Technical Proposal                                | 31 <sup>st</sup> March 2014                                            |
| Bid Validity                                                                 | 120 days                                                               |
| Bid Security (To be submitted with Revised Technical and Financial Proposal) | At least 1% of Project Cost (Valid till 120 days of proposal deadline) |
| Financing Structure                                                          | 25% Equity                                                             |

### **2.3 The Project Company**

- a) The Successful Bidder shall establish the Project Company in Pakistan in accordance with the Laws of Pakistan.
- b) The Project Company, when established, shall assume all the rights and obligations of the Successful Bidder, including but not limited to those in relation to the Letter of Award ("LOA") and the Performance Guarantee.

### **2.4 Project Agreements**

The Project Company shall enter into the Public Private Partnership Agreement/Implementation Agreement ("IA") with GOS, the Power Purchase Agreement ("PPA") with SEPCO and KSEZ, and the Waste Supply Agreement ("WSA") with Northern Sindh

Urban Services Corporation (NSUSC) and also with various agricultural wastes suppliers within six (6) months from the date of issue of the LOA. GoS will facilitate the developer in signing WSA with NSUSC, whereas, developer will be responsible to bring in agricultural waste suppliers as consortium. Industrial Units of KSEZ and SEPCO shall act as the purchasers of the capacity and energy from the Plant. The GOS shall guarantee the payment obligations of SEPCO and KSEZ under the PPA

The RFP includes drafts of the Project Agreements as Appendices I, II and III. These draft Project Agreements shall be finalized between EDGOS, SEPCO and Northern Sindh Urban Services Corporation (NSUSC) and the Successful Bidder prior to the issue of the LOA. The Project Agreements will incorporate several attachments, as outlined in the drafts. These attachments will be prepared at the time of finalization of the drafts and shall be based upon the contents of this RFP and the Successful Bidder's Proposal.

## **2.5 Financing for the Project**

- a) Arrangement for financing for the Project and achievement of Financial Closing by the Deadline for Financial Closing shall be the sole responsibility of the Successful Bidder or the Project Company upon its establishment. The GOS, EDGOS, SEPCO and Northern Sindh Urban Services Corporation (NSUSC) will not be a party to any Financing Documents (except direct agreements to be signed with the Lenders). The GOS, EDGOS, SEPCO or Northern Sindh Urban Services Corporation (NSUSC) shall not be responsible to help or assist the Successful Bidder or the Project Company in negotiations with the Lenders or any other financing institutions to arrange financing or achieve Financial Closing and other related matters such as satisfaction of conditions precedent to loan disbursements, debt servicing, etc. except as provided in the IA and the Direct Agreement.
- b) Financing for the Project shall be in the form of equity and debt. [25]% of the total financing for the Project, inclusive of all contingencies, including cost overruns of any nature, will be in the form of equity and the remainder in debt or subordinated debt.
- c) The Main Sponsor shall be required to hold at least 20% of the equity ownership in the Project, or of the Project Company, at all times until the sixth anniversary of the Commercial Operations Date (COD). The Successful Bidder collectively shall be required to hold at least 51% of the equity ownership in the Project, or of the Project Company, until the sixth anniversary of the COD.
- d) The Bidder is required to provide information about the proposed Main Sponsor and its other members, if the Bidder is a consortium.

## **2.6 Engineering, Procurement and Construction**

- a) The Bidder shall utilize good engineering practices in preparing the design of the Plant. Proposed plant and equipment shall be newly manufactured by reputable manufacturers with sufficient operating experience with regard to the particular units proposed.
- b) The Bidder is required to identify, and provide information on, the EPC Contractor in its Proposal. The EPC Contractor, together with its designated sub-contractors, if relevant, must have proven experience in the engineering, procurement and construction of power plants.

- c) The EDGOS and SEPCO shall have access to the manufacturing and construction works on pre-arranged visits to satisfy itself regarding the quality and anticipated performance of the Plant.

## **2.7 Operation and Maintenance**

- a) The Bidder is required to identify, and provide information on, the O&M Contractor in its Proposal. The O&M Contractor may be the Bidder (or a member of the Bidder's consortium) or a third party.

## **2.8 Continuing Obligations of the Successful Bidder**

- a) The appointment of a Contractor shall not relieve the Successful Bidder or the Project Company from its obligations under the Project Agreements.
- b) None of the provisions of the IA, PPA, WSA nor the provisions of any contracts to be executed between the Successful Bidder (or the Project Company) and any of its Contractors shall be deemed to create any contractual relationship between the GOS, EDGOS and SEPCO [and Northern Sindh Urban Services Corporation (NSUSC) and agricultural wastes suppliers] and any such Contractor.

## **2.9 Despatch of the Plant**

- a. The Plant shall be under the despatch authority of the Control Center (CC) operated by KSEZ and/or SEPCO. Industrial Units of KSEZ have the first right for the dispatch of the plant on priority basis and any surplus will be dispatched to SEPCO.
- b. The CC shall despatch all plants or generating units connected to the Grid System in accordance the criteria for the most economic dispatch (without any bias). This economic despatch criteria or merit order will be based on the marginal cost of generation, transmission losses, system stability and reliability, and other economic considerations
- c. The Bidder shall ensure that the Plant is fully despatchable within the Technical Limits of the [Plant][Units of the Plant]. Maintenance Outages and Scheduled Outages shall be developed and agreed under the PPA.
- d. The Project Company shall assist, within the Technical Limits of the Plant, in mitigating the impact of emergencies at other plants.
- e. The despatch of the [Plant] [Units of the Plant] is to be regulated by the provisions of the PPA and any future Grid Code established by NTDC with the approval of NEPRA.

## **3. LEGAL MATTERS**

Bidders shall conduct their own investigation to verify the legal requirements for the Project;

## **4. LABOR INFORMATION**

Within the laws and practices prevailing in Pakistan, the Successful Bidder is required to use its best effort in employing Pakistani skilled and unskilled labour during the construction, operation and maintenance of the Plant.

- a) However, should the Successful Bidder need to employ non-Pakistani personnel, it may do so in accordance with the labor and immigration laws in effect in Pakistan (concerning residency permits, work permits, visas, etc.).
- b) The Proposal shall provide a plan for staffing the Project Company.

## **5. INTERCONNECTION AND TRANSMISSION FACILITIES**

- a) Interconnection Facilities shall include all facilities and equipment, such as telemetering equipment, transmission lines, transformers, relay and switching equipment, protective devices, safety equipment and associated equipment (but not including the Metering System or the Back-up Metering System) which must be constructed or installed on the Site on KSEZ's and SEPCO's side of the Delivery Point to enable KSEZ and SEPCO to receive Net Electrical Output and Available Capacity and to deliver electricity energy, as required, in accordance with the PPA.
- b) Transmission Facilities shall include all facilities and equipment, such as telemetering equipment, transmission lines, transformers, relay and switching equipment, protective devices, safety equipment and associated equipment which must be constructed or installed between the Interconnection Facilities and the Grid System to enable KSEZ and SEPCO to receive Net Electrical Output and Available Capacity and to deliver electricity energy, as required, in accordance with the PPA. KSEZ retains the first right to purchase the Electrical Output.
- c) KSEZ and SEPCO shall be responsible for the design, procurement, construction, installation, testing and commissioning of the Interconnection Facilities and Transmission Facilities in accordance with the terms of the PPA, and KSEZ and SEPCO shall own, operate and maintain such Interconnection Facilities and Transmission Facilities. Rights and obligations of the parties in relation to these facilities are described in detail in the PPA.
- d) The Project Company shall grant to KSEZ and SEPCO permanent easements and rights-of-way across the Site necessary to construct, install, test, commission, operate, maintain, replace and/or remove the Interconnection Facilities and Transmission Facilities.
- e) The Interconnection Facilities and Transmission Facilities shall be constructed, tested and commissioned in accordance with the PPA.

## **6. ENVIRONMENTAL REQUIREMENTS**

The Project or the Project Company, as the case may, must meet all the requirements of the Sindh Environmental Protection Agency ("SEPA") Act, inter alia, relating to environmental protection, environmental impact and social soundness assessment, and all the requirements of the legislation and environmental guidelines and standards issued under or pursuant to the said Act.

- a) The Project Company will be required to comply with the more stringent of all relevant Sindh's environmental legislation and local environmental guidelines, and any other relevant policies.
- b) The Successful Bidder shall prepare and issue to the EDGOS and KSEZ, for review and approval, the Initial Environment Examination "IEE" Study for the Project prior to Financial Closing. The IEE Study, as a minimum, shall address issues pertaining to impact on environment quality due to spills/sewage etc, noise, visual impact, construction nuisance/dust, social impact (good and

bad), public safety, waste management etc. The Bidder shall meet all requirements of the Laws of Pakistan and shall include all associated costs in the Proposal.

## **7. PROJECT DEVELOPMENT**

- a. Prior to the issue of the LOA, the Successful Bidder shall furnish the Performance Guarantee to the value of 5% of the Project Cost to EDGOS and finalize the draft Project Agreements in accordance with this RFP. After the issue of the LOA, EDGOS shall return the Proposal Security to all the Bidders including the Successful Bidder.
- b. After the issue of the LOA, the Successful Bidder shall establish the Project Company, obtain all necessary Consents and submit IEE Study to EDGOS.
- c. The Project Company shall sign and execute the Project Agreements within four (4) months from the date of issue of the LOA and achieve Financial Closing on or before the Deadline for Financial Closing.
- d. The Performance Guarantee shall secure the obligations of the Successful Bidder or the Project Company to execute the Project Agreements and achieve the Financial Closing within the specified time period. Under normal circumstances, no extension in the Deadline for Financial Closing shall be granted. However, on the request of the Project Company, a one-time extension in the Deadline for Financial Closing of up to a maximum period of six (6) months shall be granted against extending the validity period of the Performance Guarantee.
- e. The Successful Bidder or the Project Company shall have an option to terminate the LOA and all the executed Project Agreements, if any, at any time before the Deadline for Financial Closing as per the terms and conditions of the LOA. The termination option may be executed by forgoing a portion of the Performance Guarantee equal to the total amount of the Performance Guarantee multiplied by the number of months since the issuance of the LOA (rounded up to the next whole number) divided by the total number of months between the issue date of the LOA and the Deadline for Financial Closing.
- f. The Performance Guarantee must always remain valid for a period not less than three (3) months in excess of the then-prevailing the Deadline for Financial Closing. The Performance Guarantee shall be forfeited without any notice, demand, or other legal process if any of these conditions occur:
  - the Successful Bidder or the Project Company fails to sign the Project Agreements within four (4) months of the date of issue of the LOA; or
  - the Successful Bidder or the Project Company fails to achieve the Financial Closing on or before the Deadline for Financial Closing; or
- g. Neither the Successful Bidder nor the Project Company shall have any claims against the GOS or any of its components, organizations or institutions, including but not limited to EDGOS on any grounds whatsoever.
- h. Upto the Financial Closing, the LOA shall govern the Project and supersede all documents and agreements including the Project Agreements. Thereafter, the Project Agreements shall supersede the LOA. If the LOA expires, the Project Agreements and all other agreements with any governmental entity including EDGOS automatically terminate.

- i. On Financial Closing, the Project Company shall execute the Guarantee under the IA guaranteeing the payment obligations of SEPCO and/or KSEZ.
- j. The Project Company shall construct and complete the Interconnection Facilities and Transmission Facilities as described in Article 5 and achieve the Commercial Operations Date ("COD") on or before the Required Commercial Operations Date.
- k. EDGOS shall provide a one-window facility for providing administrative support in the implementation of the Project and will issue the LOA, assist the Successful Bidder or the Project Company in seeking necessary Consents from various governmental agencies, carry out negotiations on and execute the IA.

## **SECTION B - INSTRUCTION TO BIDDERS**

### **A. GENERAL**

#### **IB.1 INTRODUCTION**

- 1.1 To promote industrialization and create employment opportunists in the province of Sindh, and to ensure economical and environmentally friendly sustainable source of power, the Government of Sindh (GoS) wishes to expand investment in the provision of industrial infrastructure and power generation, and other related facilities through the participation of the private sector, on its own or in partnership with the Government.
- 1.2 Government of Sindh plans to build a Power plant of up to 20MW based upon the dual fuels of Municipal Solid Waste and Agro Waste in order to serve the needs of the Special Economic Zone Khairpur and the envisaged Dates and Horticulture Market Project (being undertaken on PPP basis).
- 1.3 Project envisages 20MW being generated through 4 multi-fuel boilers based steam turbines of 5MW each run on a combination of Municipal Solid Waste (MSW), Agriculture Wastes (rise husk, wheat husk, date trimmings, cotton wastage, bagass etc.) and Industrial wastes (fabrics, fibers, plastics etc.). Bio Mass needed to supplement is 100,000 tons per annum having a Gross Calorific value of 3,500 KCAL/kg and it is estimated that as much as 9 times the required quantity is available in Khairpur and adjoining areas. The Power producer i.e. BOOT operator, will be responsible to ensure reliable power supply.
- 1.4 The EDGOS hereby invites the private sector to submit their proposals in respect of a Concession for the construction and operation of the Project which is proposed to be constructed on Build, Own, Operate and Transfer (BOOT) arrangement. The Project Location Map and other relevant details are depicted as Appendices to Project Information.
- 1.5 Concession is offered and will be negotiated and granted, in accordance with the Public Private Partnership (PPP) Act 2010.

#### **IB.2 PURPOSE OF BIDDING INSTRUCTIONS**

- 2.1 This document together with the Annexures/Appendices referred to herein and any future additions and amendments to this document constitute the Bidding Documents, the purposes of which are as under:
  - a) To explain the EDGOS's general requirements in respect of the Project and the Concession, and to provide other information that may be relevant to Bidders;
  - b) To provide guidance in the preparation of Bids, and to explain the criteria and procedures by which the Bids will be assessed; and
  - c) To set out, in outline form, the Government's design and construction requirements in respect of the Project, and the Government's operational, maintenance and other requirements in connection with the Concession.
- 2.2 Nature of project, location of project, all related major/minor structures and the standards shall conform to the standards of design, construction, maintenance and operation requirements as described in the Information to Bidders.
- 2.3 Operations and maintenance of facilities such as tolls/fees/benefits, operating centres, electrical and mechanical installations, buildings and other requirements needed for smooth operations shall be provided by the Concessionaire/Company.

### **IB.3 ELIGIBLE BIDDERS**

3.1 Basic Eligibility Criteria for the project is as follows:

- Registration with Pakistan Engineering Council or an equivalent international body/authority acceptable to the GoS.
- At least 1 Power Projects, having net capacity of atleast 5 MW in the last ten (10) years.

### **IB.4 PROGRAMME**

4.1 EDGOS will, however, give favourable consideration to proposals that achieve an earlier Commercial Operations Date.

4.2 Bidders should note that the Agreements specify Key Dates to be achieved throughout the Construction Phase and penalties to be imposed for delayed completion.

### **IB.5 DISCLAIMER**

5.1 All information, assumptions and projections contained in these Bidding Documents are indicative only and are provided solely to assist in a preliminary assessment of the Project. Nothing in the Bidding Documents or elsewhere shall create any contractual relationship between the EDGOS and any Bidder, nor shall it commit the EDGOS to any policy described in the Bidding Documents or elsewhere and neither the EDGOS nor any of its consultants or advisors will have any liability or responsibility if the information, assumptions and projections contained herein or otherwise in respect of the Project prove to be incorrect. It is the responsibility of the Bidder to verify the information, assumptions and projections contained in the Bidding Documents or otherwise.

### **IB.6 CONFIDENTIALITY**

6.1 The Bidder shall treat the Bidding Documents and, if successful, the subsequent Agreements, and everything contained therein as private and confidential. In particular, the successful Bidder shall not publish any information, drawings or photographs concerning the Project or any Ancillary Facilities, without the express permission of EDGOS.

### **IB.7 BRIBERY AND COLLUSION/INTEGRITY PACT**

7.1 EDGOS shall be entitled to terminate the Concession and recover from the successful Bidder the amount of any loss resulting from such termination if the successful Bidder shall have offered or given to any person any gift or consideration of any kind as an inducement or reward for doing, or forbearing to do, any action in relation to obtaining, or in the execution of the Concession or any other contract with EDGOS, or for showing favour to any person in relation to the Concession or any other contract with EDGOS, or if any of the like acts shall have been done by any person employed by the successful Bidder or acting on its behalf (whether with or without the knowledge of the successful Bidder), or if the successful Bidder shall have come to any agreement with another Bidder or number of Bidders whereby an agreed quotation or estimate shall be offered as a Bid to EDGOS by one or more Bidders.

## **B. BIDDING PROCEDURES**

### **IB.8 CONTENTS OF BIDDING DOCUMENTS**

8.1 THIS STANDARD BIDDING DOCUMENTS, IN ADDITION TO EXPRESSION OF INTEREST, INCLUDES THE FOLLOWING:

1. Instructions to Bidders
2. Bidding Data
3. Project Agreements
4. Specifications-Special Provisions
5. Specifications-Technical Provisions
6. Annexures to Instructions to Bidder
7. Appendices to Concession Contract

### **IB.9 Qualifications Requirements**

9.1 The Contractor's authorised representative and his other professional engineers working at site shall register themselves with the Pakistan Engineering Council or an equivalent international body/authority acceptable to the GoS. The Contractor's authorised representative at site shall be authorised to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the works as per the Contract.

### **IB.10 Cost of Bidding**

10.1 The Bidder shall be responsible for all fees, costs and expenses incurred in preparing and negotiating any proposal submitted by it, and EDGOS shall under no circumstances become liable to reimburse any Bidder for any such fees, costs or expenses regardless of the conduct or outcome of the bidding process.

### **IB.11 Site Visit**

11.1 The Bidders are advised to visit and examine the site of the Works and its surroundings and to obtain for itself on its own responsibility, all information that may be necessary for preparing the Bid and entering into a Project Agreements. The costs incurred in visiting the site shall be at the Bidder's own expense.

### **IB.12 Acceptability of Bid**

12.1 The Bidder is expected to examine carefully all instructions, conditions, forms, terms, specifications and requirements of bid submission. Bids will be at the Bidder's own risk. Bids that are not substantially responsive to the requirements of the Bidding Documents will be rejected, except as provided for under Clause IB 23.

### **IB.13 Clarification of Bidding Documents**

- 13.1 A prospective Bidder requiring any clarification of the Bidding Documents may notify EDGOS in writing or by telex, cable or facsimile at EDGOS's address given in the Information to Bidders.
- 13.2 EDGOS will respond in writing to any requests for clarification that it receives earlier than 21 days prior to the Bid Submission Date. Written copies of the EDGOS's response (including an explanation of the query but without identifying the source of the inquiry) will be sent to all prospective Bidders who have received the Bidding Documents.

### **IB.14 Amendment of Bidding Documents**

- 14.1 At any time prior to the Bid Submission Date, EDGOS may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by amendment.
- 14.2 The amendment will be notified in writing or by telex, cable or facsimile to all prospective Bidders who have received the Bidding Documents, and will be binding upon them.
- 14.3 In order to afford prospective Bidders reasonable time in which to take the amendment into account in preparing their Bids, EDGOS may, at its discretion, extend the deadline for the submission of Bids.

## **C PREPARATION OF BID**

### **IB.15 Documents Comprising the Bid**

- 15.1 The Bid to be prepared by the Bidder shall comprise two stages as follows:

#### **Part-1 Submission of Technical Proposal:**

- a) Bidder's Qualification Information and Technical Proposal as required under the Bidding Documents along with Letter of Technical Proposal;
- b) Project Appreciation Statement;
- c) Statement of Land Requirements;
- d) Statement of Bid Conformity;
- e) Any Other Information as Required by EDGOS as mentioned in the Information to Bidders.
- f) Project GANTT chart with a timeline detailing the critical path of the project
- g) Key team profile including the design and EPC team that'll be used for the project

#### **Part-2 Submission of Financial Proposal:**

- a) Bid Security;
- b) Detailed financial model which shall contain:
- c) Statement of Capital and Operating Costs;

- d) Statement of Revenues;
  - e) Complete financial statements for the project life cycle;
  - f) Tariff sheets as required under the NEPRA guidelines;
  - g) Financial Analysis of the Project;
  - h) Proposed Financial Package along with the Letter of Financial Proposal
  - i) Any Other Information as Required by EDGOS as mentioned in the Information to Bidders.
- 15.2 The Bidding Documents shall themselves be deemed to be part of the Bid.
- 15.3 General guidance relating to the information to be provided by Bidders are given in the Annexures/Appendices.

#### **IB.16 Language of Bid**

- 16.1 The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the EDGOS, shall be written in English. Supporting documents and printed literature furnished by the Bidder with the Bid may be in Urdu or other languages, provided they are accompanied by an appropriate translation of pertinent passages in the above stated language. For the purpose of interpretation of the Bid, the English language shall prevail.

#### **IB.17 Currency of Bid**

- 17.1 All monetary values quoted in the Bid shall be in the equivalent Pakistan Rupees. Levelized Tariff shall be quoted in both Pakistan Rupees and US cents.

#### **IB.18 Bid Validity**

- 18.1 The Bid shall remain valid and open for acceptance for a period as stated in the Information to Bidders (Project Data Sheet) from the Bid Submission Date. In exceptional circumstances, prior to expiry of the original bid validity period, EDGOS may request Bidders to grant a specified extension in the period of validity. However, the period of extension should not exceed the original period of bid validity. The request and the responses thereto shall be made in writing or by cable, electronic mail or facsimile. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder agreeing to the request will not be required nor permitted to modify its bid, but will be required to extend the validity of its Bid Security correspondingly.

## **IB.19 Bid Security**

- 19.1 The Revised Technical and Financial Bid shall be accompanied by a Bid Security as stated in the Information to Bidders (Project data Sheet).
- 19.2 The Bid Security shall be denominated in the currency of the bid, or in US Dollars, and shall be in the form of an irrevocable letter of credit or a guarantee from a schedule bank in the Islamic Republic of Pakistan or a bank of a country abroad acceptable to EDGOS.
- 19.3 The format of the bank guarantee shall be in accordance with the Sample Bid Security included in these Bidding Documents. No other formats shall be accepted.
- 19.4 Any Bid not accompanied by the required Bid Security, or accompanied by a Bid Security in an amount less than that required, will be rejected by EDGOS as non-responsive.
- 19.5 The Bid Securities of all participating Bidders will be discharged / returned as promptly as possible after the successful Bidder has signed the Implementation Agreement and has provided the required performance security as per Information to Bidders in favour of the EDGOS.
- 19.6 The Bid Security may be forfeited:
- a) If a Bidder withdraws its Bid during the period of bid validity; or
  - b) In the case of a successful Bidder, if it fails within the specified times to
    - i. Furnish the necessary Performance Security for Construction Phase
    - ii. Sign the Implementation Agreement; or
  - c) Achieve Financial Close. In case of default.

## **IB.20 Pre-bid Meeting**

- 20.1 The Bidders or their authorised representatives are advised to attend a pre-bid meeting.
- 20.2 The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage. The Bidders are requested to submit any substantive questions in writing or by cable, telex or facsimile to reach the EDGOS not later than one week before the meeting.
- 20.3 Minutes of the meeting, including copies of the questions raised and responses given, will be furnished expeditiously to all those attending the meeting (and to other prospective Bidders on request), and shall form an integral part of the Bidding Documents, in the form of Addenda.

## **IB.21 Conformity with the Bidding Documents**

- 21.1 The Bidder must submit a Conforming (Bona Fide) Bid that conforms in all respects with the requirements of the Bidding Documents. In addition, the Bidder may submit one or more Alternative Conforming (Bona Fide) Bids and/or one or more Non-Conforming Bids, if it so wishes.

## **IB.22 Conforming (Bona Fide) Bids**

- 22.1 A Conforming Bid is a bid that conforms in full, both in engineering and operational terms with EDGOS's Conforming Scheme, and in financial, organisational and obligation terms with the General Conditions of Concession Contract, except for minor departures that do not materially affect the design, construction method or operational characteristics of the Project or the financial, organisational or obligation regime under which the Concession will be conducted. All such minor departures, if they exist, must be clearly identified and fully described in the Bid, and in particular the financial, programming and any other practical implications of a departure must be explained. If the Bid contains no deviations from the Conforming Scheme a positive statement to this effect must be made.
- 22.2 EDGOS shall determine whether a Bid is a Conforming (Bona Fide) Bid. However, EDGOS's decision may be reviewed and bidder's grievances/complaints, that may occur prior to the entry into force of the procurement contract, shall be addressed by the committee constituted by EDGOS comprising odd number of persons with proper powers and authorizations.
- 22.3 If more than one Conforming (Bona Fide) Bid (e.g. involving different financial and commercial terms) is to be submitted, each must be clearly numbered according to the Bidder's preference.

## **IB.23 Non-Conforming Bids**

- 23.1 Alternative designs and alternative proposals in relation to financial, organisational and obligation aspects, which differ in whole or part from the requirements of the Bidding Documents, may be considered by EDGOS, at its own discretion. Such Bids will only be considered if they are accompanied by a Conforming (Bona Fide) Bid.
- 23.2 In addition, Non-Conforming Bids will only be eligible for consideration if they:
- a) are on the basis of design, build, operate and transfer arrangements; and
  - b) do not involve any significant delay in the execution of the Works.
- 23.3 If a Non-Conforming Bid is submitted, it must be clearly identified as such and, in cases where more than one Non-Conforming Bid is to be submitted, each must be clearly numbered according to the Bidder's preference.
- 23.4 For EDGOS to examine a Non-Conforming Bid the Bidder must demonstrate with full supporting evidence that the proposal is well researched and is technically feasible, that the proposed Work Programme is well researched and that there are engineering, financial, programming and/or operational advantages over the proposals set out in the Bidding Documents.

## **IB.24 Format and Signing of Bids**

- 24.1 The Bidder shall prepare, in separate volumes, five (5) copies of the documents comprising Part 1 and Part 2 of the Bid, as described in Clause IB 16.1, clearly marked and numbered 'Part 1' and 'Part 2' and 'Original Bid' and 'First (to Fifth) Copy of Bid' as appropriate. In the event of any discrepancy between them, the original shall govern.
- 24.2 The original and copies of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorised to bind the Bidder to the offer. Proof of authorisation shall be furnished in the form of a written Power-of-Attorney, which shall accompany the Bid. All pages of the Bid, except for un-amended printed material, shall be initialed by the person or persons signing the Bid.
- 24.3 The complete Bid shall be without alterations, interlineations or erasures, except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

## **D SUBMISSION AND OPENING OF BIDS**

### **IB.25 Sealing and Marking of Bids**

- 25.1 The Bidder shall seal the Technical Proposal and Financial Proposal, in pursuant to Clauses IB 16.1 and 25.1 in separate envelopes, which must bear the signature of the Bidder's authorised representative.
- 25.2 The original and 5 (five) copies of Part-1 of the Bid shall be sealed into an envelope and shall be:
- a) addressed to EDGOS; and
  - b) bear the following identification:
    - i. PART-1 (TECHNICAL PROPOSAL)
    - ii. BID FOR [mention name of the Project]
    - iii. REF. No [mention the same number as on Notice for Expression of Interest]
    - iv. The Words "DO NOT OPEN BEFORE [mention date and time of Bid Opening for Technical Proposal]"
- 25.3 The original and 5 (five) copies of Part-2 Financial Proposal of the Bid shall be sealed into an envelope and shall:
- a) be addressed to EDGOS; and
  - b) bear the following identification:
    - i. PART 2 (FINANCIAL PROPOSAL)
    - ii. BID FOR [mention name of the Project]

- iii. REF. No [mention the same number as on Notice for Expression of Interest]
  - iv. The Words “DO NOT OPEN BEFORE [mention date and time of Bid Opening for Financial Proposal]”
- 25.4 The envelopes shall also indicate the name and address of the Bidder to enable the Bid to be returned unopened in case it is declared ‘late’.
- 25.5 If the envelope is not sealed and marked as instructed above, EDGOS will assume no responsibility for the misplacement or premature opening of the Bid. Any Bid that is opened prematurely will be rejected by EDGOS and returned to the Bidder.

#### **IB.26 Bid Submission Date**

- 26.1 Bids for Part-1 and Part-2 for Technical and Financial Proposals, must be received by EDGOS at the address specified in the Information to Bidders not later than the date (s) and time (s) specified in the Information to bidders in accordance with type of Bidding procedure as mentioned in the Information to Bidders.
- 26.2 EDGOS may, at its discretion, extend the deadline for the submission of Bids through the issue of an Amendment in accordance with Clause 14, in which case all rights and obligations of EDGOS and the Bidders previously subject to the deadline will thereafter be subjected to the deadline as extended.

#### **IB.27 Late Bids**

- 27.1 Any Bid received by EDGOS after the specified Bid Submission Date and Time will be returned unopened to the Bidder.

#### **IB.28 Modifications and Withdrawal of Bids**

- 28.1 The Bidder may modify and withdraw its Bid after submission, provided that written notice of the modification or withdrawal is received by EDGOS prior to the prescribed deadline for submission of Bids.
- 28.2 The Bidder’s modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provision for the submission of Bids. A withdrawal notice may also be sent by telex, cable or facsimile but followed by a signed confirmation copy, postmarked not later than the deadline for submission of Bids.
- 28.3 No Bid may be modified subsequent to the deadline for submission of Bids.
- 28.4 No Bid may be withdrawn in the interval between the Bid Submission Date and the expiration of the period of Bid Validity. Withdrawal of a Bid during this interval may result in the forfeiture of the Bid Security.

- 28.5 Subsequent to the expiration of the period of validity of Bids prescribed by EDGOS, a Bidder that has not been notified by EDGOS of the award of a Concession may withdraw its Bid without penalty.

#### **IB.29 Opening of Bids**

- 29.1 EDGOS will open the Bids in two stages, Stage-1 Technical Proposal and Stage-2 Financial Proposal in the presence of Bidders' representatives. The Bidders' representatives who are present shall sign a register evidencing their attendance.
- 29.2 EDGOS will examine the Bids to determine whether they are complete, whether the requisite Bid Securities have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order.
- 29.3 The Bidder's names, bid modifications or withdrawals (if any), the presence of the requisite Bid Security and such other details as EDGOS at its discretion may consider appropriate, will be announced at the Bid Opening.
- 29.4 EDGOS shall prepare minutes of the Bid Opening for its own records.

#### **IB.30 Confidentiality**

- 30.1 After the Bid Opening, information relating to the examination, clarification, evaluation and comparison of Bids and recommendations concerning the award of a Concession shall not be disclosed to Bidders, or other persons not officially concerned with such process, until the award of the Concession is announced.
- 30.2 Any effort by a Bidder to influence EDGOS in the process of examination, clarification, comparison and evaluation of Bids, or decisions concerning award of a Concession, may result in the rejection of that Bidder's Bid(s).

### **E. ASSESSMENT OF BIDS**

#### **Technical and Financial Evaluation Committee (TFEC)**

The Proposals will be evaluated by a TFEC constituted in accordance with the applicable laws. The TFEC will select such Bidder as the Preferred Bidder, who quoted the lowest Levelized Tariff over 30 years Concession term provided that it technically qualifies and its Bid is a Compliant Proposal.

The Bids shall be opened within one hour of the Proposal Deadline as stated in Information to Bidders. The evaluation of the Proposals shall commence within one hour of the Proposal Deadline. Both technical and financial proposals will be evaluated by TFEC. Any proposal not in strict conformity with the format prescribed in this RFP will be disqualified. The Proposals shall be evaluated based on criteria set out in this RFP and the Preferred Bidder will be responsible for all activities incidental and ancillary to the successful completion of the Project.

### **IB.31 Determination of Conformity**

- 31.1 Prior to the detailed evaluation of Bids, TFEC will determine whether each Conforming (Bona Fide) Bid is substantially responsive to the requirements of the Bidding Documents.
- 31.2 For the purpose of this Clause, a substantially responsive Bid is one that conforms to all the terms, conditions and specifications of the Bidding Documents without material deviation or reservation. A material deviation or reservation is one that affects in any substantial way, relative to the requirements of the Bidding Documents.
- 31.3 A Conforming (Bona Fide) Bid determined to be substantially non-responsive will be rejected by TFEC and may not subsequently be made responsive by the Bidder by correction of the non-conformity;
- 31.4 Any Financial proposal not containing a valid and enforceable bid security with a value equal to at least 1% of the project costs would be declared non-conforming and would be rejected right away.
- 31.5 TFEC may accept any non-material deviation or reservation provided that the acceptance thereof does not prejudice or affect the relative ranking order of any Bidder in the evaluation of Bids.

### **IB.32 Consideration of Non-Conforming Bids**

- 32.1 TFEC may, at its discretion, take forward any Non-Conforming Bid for evaluation, provided that such Bids are determined by TFEC to satisfy all the requirements of Clause IB 23.

### **IB.33 Clarification of Bids**

- 33.1 To assist in the examination, evaluation and comparison of Bids, TFEC may ask Bidders individually for clarification of any element of their Bid(s). The request for clarification and the response shall be in writing or cable, telex or facsimile, but no change in the financial aspects or substance of the Bid shall be sought, offered or permitted except as required to confirm the correction of arithmetical errors discovered by TFEC during the evaluation of the Bids.
- 33.2 Bidders will be obliged to respond promptly to all requests for clarification and to provide all clarifications requested within the period mentioned in the requests failing which the Bid may be rejected.

### **IB.34 Correction of Arithmetical Errors**

- 34.1 Bids determined to be substantially responsive and, subject to the discretion of TFEC, Non-Conforming Bids that are determined to satisfy the requirements of Clause IB 23 will be checked by TFEC for any arithmetical errors in computation and summation.
- 34.2 Errors will be corrected by TFEC as follows:

- a) Where there is a discrepancy between amounts in figures and in words, the amount in words will govern; and
- b) Where there is a discrepancy between the unit monetary values and the total amount derived from either summation or through the multiplication of the unit monetary value by a factoring value, the unit monetary value as quoted will normally govern unless in the opinion of TFEC there is an obviously gross misplacement of the decimal point in the unit monetary value, in which event the total amount as quoted will govern.

34.3 If a Bidder does not accept the correction of errors as above, its Bid will be rejected.

#### **IB.35 Presentation by the Bidders**

35.1 To assist the evaluation of Bids, each Bidder will be required to present its Technical Proposals to TFEC in a meeting to be arranged at time and date as stated in Information to Bidders. These meetings must be attended by the Bidder and its engineers/consultants. The main purpose of these meetings will be:

- a) to provide the Bidder with the opportunity to present the details and merits of the technical and operational aspects of its Bid to TFEC; and
- b) To allow TFEC to seek clarification on any technical and operational matters.

35.2 No commercial aspects of the Bid will be discussed at these presentations and no negotiations will take place.

35.3 The Technical Scope of the Project will be discussed and Updated during the course of meeting.

## **F DETAILED BID EVALUATION**

#### **IB.36 Two Stages Process**

36.1 The detailed evaluation of the Bids will be carried out as a Two-Stage process with scores being assigned to each Bid during each Stage of the evaluation. Those Bids that, in the view of EDGOS, fail to satisfy minimum requirements during the Stage-1 of the evaluation will not be taken forward to Stage-2 of the evaluation process.

#### **IB.37 Stage- 1 - Bidder's Capability and Technical Proposal**

37.1 The aim of the Stage-1 evaluation will be to determine the ability of the Bidder to finance, construct and manage the Project, and to evaluate the level of competence shown by the Bidder, in terms of its understanding of the engineering, operational and maintenance aspects of the Project.

37.2 The assessment will consider the Bidder's previous experience in projects of this complexity and magnitude. Particular credit will be given to those Bidders who have in-house experience in the engineering design, financing, construction and management of public sector infrastructure projects, and particular emphasis will be placed on the

robustness of the proposed Works Programme, the Project Appreciation Statement and the appropriateness of the proposed operating and maintenance regimes that will be employed during the Concession Period.

37.3 Also of importance will be the financial strength of the Bidder and its shareholders, together with their potential ability to arrange an appropriate financing package in support of the Project.

37.4 In the case of Non-Conforming Bids subject to Sub Clause IB 24.1 the relative technical advantages and disadvantages of any non-conformity will be assessed separately, to be used to off-set any financial disadvantage or advantage that may be gained by the Bidder in the evaluation of the Part- 2 submission.

37.5 The Technical Proposals are opened at the date and time specified in the Information to Bidders. The Technical Proposals shall be evaluated and discussed with the Bidders.

Any deficiencies, extraneous provisions and unsatisfactory technical features shall be pointed out to the Bidders whose comments are carefully evaluated during a post bid meeting at the date and time set by EDGOS. The Bidders shall be allowed to revise or adjust their Technical Proposals to meet the requirements of EDGOS so that all Technical Proposals conform to the same acceptable technical standard and meet the technical solution required by EDGOS. Bids of the Bidders who are unable or unwilling to bring their bids to conform to the acceptable technical standard shall be rejected as non conforming bids.

After the evaluation of Technical Proposals as above, the second stage is to invite Bidders to submit Financial Proposals and Revised Technical Proposals in compliance with the acceptable technical standard. The Revised Technical Proposals and Price Proposals are opened in public at date and time informed by EDGOS.

#### **IB.38 Stage- 2 - The Financial Proposal**

38.1 The Revised Technical Proposals and Financial Proposals are opened at the date and time informed by EDGOS. [In setting the date EDGOS should allow sufficient time for Bidders to incorporate the changes involved in the Technical Proposals and prepare Financial Proposals.]

The Financial Proposals and Revised Technical Proposals are evaluated by TFEC and its advisers in strict confidence. Subject to Sub-Clause 31.1,

38.2 In the case of Non-Conforming Bids, subject to Sub-Clauses IB 24.1 and 38.4, any additional financial benefit that results from non-conformity will be balanced against any consequent financial, economic, environmental or other disadvantage to EDGOS or the community as a whole. Any technical implications of non-conformity will also be considered in this adjustment process.

#### **IB.39 Assessment Process**

39.1 The TFEC shall carry out its evaluation, applying the evaluation criteria and point system specified below. Each responsive technical proposal shall be attributed a score out of a total of 100 points. The minimum technical score required to qualify is 70 marks.

- 39.2 After complete evaluation of technical proposals, the financial proposals of the bidder technically qualifying the criteria shall be evaluated. This qualification shall be based on the bidder achieving a technical score equal or higher than 70.
- 39.3 The evaluation criterion is principally based on the factors considered of critical importance to the project by Energy Department, Government of Sindh. Evaluation will be done on a scale upto one hundred (100) points. The applicant securing a minimum of 70 marks will qualify for issuance of shall be eligible for resubmission of technical and financial proposal

| <b>SHORTLISTING OF PARTNER COMPANY FOR KHAIRPUR WASTE TO ENERGY PROJECT</b> |                                                                            |                  |                  |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------|------------------|
|                                                                             |                                                                            | <b>Scoring %</b> | <b>MAX MARKS</b> |
| <b>QC1</b>                                                                  | <b>Nature of Business of Applicant company</b>                             |                  | <b>15</b>        |
|                                                                             | <b>Applicant Company is</b>                                                | <b>5</b>         |                  |
|                                                                             | i. Part of a group of companies                                            | 5                |                  |
|                                                                             | ii. Partnership concern                                                    | 3                |                  |
|                                                                             | iii. Proprietorship                                                        | 0                |                  |
|                                                                             | <b>Primary Industry of the Applicant Company</b>                           | <b>10</b>        |                  |
|                                                                             | i. Power Generation                                                        | 10               |                  |
|                                                                             | ii. Engineering Design/Manufacturing (Mechanical/Civil/Electrical)         | 8                |                  |
|                                                                             | iii. EPC Contracts                                                         | 7                |                  |
|                                                                             | iv. Other                                                                  | 3                |                  |
| <b>QC2</b>                                                                  | <b>Major Experience;</b>                                                   |                  | <b>50</b>        |
|                                                                             | <b>Total Power Projects Experience</b>                                     | <b>15</b>        |                  |
|                                                                             | i. 50 MW and above                                                         | 15               |                  |
|                                                                             | ii. 20 MW and above                                                        | 10               |                  |
|                                                                             | iii. 5 MW and above                                                        | 7                |                  |
|                                                                             | <b>Major experience of Applicant Company in;</b>                           | <b>10</b>        |                  |
|                                                                             | i. Configurations of Bio-Waste, Bio Mass Power Plants                      | 10               |                  |
|                                                                             | ii. Coal based Combined Cycle Power Plant                                  | 8                |                  |
|                                                                             | iii. Gas or Oil based Combined Cycle Power Plant                           | 5                |                  |
|                                                                             | <b>Experience/Association with Power Plant Machinery Manufacturer;</b>     | <b>5</b>         |                  |
|                                                                             | i. Buyer/Seller relationship/experience only                               | 5                |                  |
|                                                                             | ii. Same Group Company OR Technical Partner                                | 3                |                  |
|                                                                             | iii. Principal/Agent relationship                                          | 1                |                  |
|                                                                             | <b>Design and construction of low head power turbines</b>                  | <b>5</b>         |                  |
|                                                                             | <b>Experience of retrofitting hydropower turbines would be beneficial.</b> | <b>5</b>         |                  |
| <b>QC3</b>                                                                  | <b>Major Experience as;</b>                                                | <b>10</b>        |                  |
|                                                                             | i. Lead Project Developer                                                  | 10               |                  |
|                                                                             | ii. Shareholder of 15% or more                                             | 8                |                  |
|                                                                             | iii. Lead Construction Contractor / Lead Operations Manager                | 6                |                  |
|                                                                             | <b>Financial status of the Company with supporting documents</b>           |                  | <b>25</b>        |

|            |                                                                    |                                               |           |            |
|------------|--------------------------------------------------------------------|-----------------------------------------------|-----------|------------|
|            | i.                                                                 | Equity Size or Net Worth                      | <b>10</b> |            |
|            | a)                                                                 | USD 10 Mn or more                             | 10        |            |
|            | b)                                                                 | USD 7.5 Mn or more but less than USD 10 Mn    | 8         |            |
|            | c)                                                                 | USD 5 Mn or more but less than USD 7.5 Mn     | 5         |            |
|            | ii.                                                                | Business Volume;                              | <b>10</b> |            |
|            | a)                                                                 | Annual Business Turnover of USD 50 Mn or more | 10        |            |
|            | b)                                                                 | Annual Business Turnover of USD 40 Mn or more | 15        |            |
|            | c)                                                                 | Annual Business Turnover of USD 25 Mn or more | 10        |            |
|            | iii.                                                               | Debt/Equity Ratio for last 3 years            | <b>5</b>  |            |
|            | a)                                                                 | 50:50 or below for each year                  | 5         |            |
|            | b)                                                                 | 60:40 or below for each year                  | 3         |            |
|            | c)                                                                 | 70:30 or below for each year                  | 1         |            |
|            | d)                                                                 | above 70:30                                   | 0         |            |
| <b>QC4</b> | <b>Methodology for the Development of the Project/Presentation</b> |                                               | <b>10</b> | <b>10</b>  |
|            | Excellent                                                          |                                               | 10        |            |
|            | Good                                                               |                                               | 6         |            |
|            | Average                                                            |                                               | 3         |            |
|            | <b>Total</b>                                                       |                                               |           | <b>100</b> |

- 39.4 In Stage -2; The TFEC will select that Bidder as the Preferred Bidder, who quoted the lowest levelized tariff over 30 years Concession term provided that it technically qualifies.

#### **IB.40 Award of Concession Contract**

- 40.1 Subsequent to the detailed evaluation of the Financial Proposals and Revised Technical Proposals, EDGOS will award the Concession Contract to the successful Bidder, on the basis defined in Article 39.4.
- 40.2 Based on the evaluation criteria, TFEC will rank all Responsive Proposals and will notify all the Responsive Bidders of their ratings for the Project. The three or more best ranked Bidders shall be declared as Shortlisted Bidders.
- 40.3 A clarification meeting will be held with the first-ranked Shortlisted Bidder to confirm, clarify, and finalize any assumptions used during the evaluation process. EDGOS may, if it deems necessary, invite the second- and subsequently ranked Shortlisted Bidders for clarification.
- 40.4 EDGOS will invite the first-ranked Shortlisted Bidder to finalize the Project Agreements. In the event that the Agreements cannot be finalized, the second-ranked Shortlisted Bidder will be invited to begin negotiations and so on.
- 40.5 Upon receiving clarifications of Proposals and reaching an agreement on the draft Project Agreements, the relevant Shortlisted Bidder will be required to furnish the Performance Guarantee and pay Legal Expenses and Feasibility Study Cost

- 40.6 Once the requirements mentioned in Article 41.5 above are fulfilled, the relevant Shortlisted Bidder shall be declared as the Successful Bidder. A Letter of Award (“LOA”) will be issued by EDGOS, at this time, to the Successful Bidder for the Project.
- 40.7 Provided that an effective Performance Guarantee has been received by the EDGOS; within thirty (30) Days after the issue of the LOA to the Successful Bidder, the EDGOS shall return the Proposal Securities to the preferred Bidder and other Shortlisted Bidders.

## **G. INFORMATION TO BE PROVIDED BY BIDDERS**

### **IB.41 Information to be Provided by the Bidders**

- 41.1 This section sets out, for the information and guidance of Bidders, EDGOS’s minimum requirements in terms of the contents of the Bid. It is emphasised that these are minimum requirements that may be supplemented by more detailed information, as deemed necessary by the Bidder.
- 41.2 Bidders should note that the information and guidance provided in this Section has been prepared to assist them in completing their submissions. EDGOS reserves the right to request any further information and clarification that it may deem necessary to carry out the detailed evaluation of Bids.
- 41.3 The Bid shall be presented in two parts, namely Part-1 and Part-2. The minimum contents of each Part are to be as follows:

### **IB.42 Part-1 Submission**

#### **42.1 General**

The Part-1 submission should be divided into sections, which should set out the minimum information indicated in the following sections.

#### **42.2 Bid Security**

The Bid Security should comply with the requirements of Clauses IB 19.

#### **42.3 Bidder’s Capability Statement**

The Bidder’s Capability Statement will set out minimum information concerning the financial and corporate structure, experience and financial standing of the Bidder’s organisation or consortium as given in the following paragraphs.

#### **42.4 CONSTITUTION OR LEGAL STATUS**

Copies of original documents defining the constitution or legal status and place of registration of the company or firm or, in the case of a joint venture, of each party thereto constituting the Bidder will be submitted.

## **42.5 CORPORATE STRUCTURE**

Where the Bidder is a joint venture of two or more companies or firms, a statement signed by all parties to the joint venture of the proposed administrative arrangements for the management and execution of the Concession, the duties, responsibilities and share of each party, the authorised representative of the joint venture, and an undertaking that the parties are jointly and severally liable to the EDGOS for the performance of the Concession.

## **42.6 RELEVANT EXPERIENCE**

Details of the experience and past performance of the Bidder (or of each party to a joint venture) on projects of a similar nature within the past five years, and details of current projects in hand and other contractual commitments have to be submitted.

## **42.7 ORGANISATIONAL STRUCTURE**

A chart indicating the basic organisational structure(s) of the Bidder specifying the responsibilities of each organisational unit of the proposed Concession Company is required.

## **42.8 KEY PROJECT PERSONNEL**

The qualifications and experience of the key personnel proposed for administration and execution of the Concession, during the design, construction and operating phases of the Concession.

## **42.9 AUDITED ACCOUNTS**

42.9.1 Bidders shall provide audited accounts for a minimum of the latest 5 years, together with the most recently published interim accounts (if available), an estimated financial projection for the next two years, and an authority from the Bidder (or authorised representative of a joint venture) to seek references from the Bidder's bankers for the:

- a) Proposed Concession Company (where available);
- b) Each proposed shareholder of the proposed Concession Company;
- c) The parent (and, if any, ultimate parent) company of each proposed shareholder of the proposed Concession Company;
- d) Proposed consultants; and
- e) Proposed contractors

together with a statement giving details of any off-balance sheet liabilities including contingent liabilities.

42.9.2 In the absence of audited accounts, a statement detailing the financial strength of the institutions and/or individuals involved should be provided.

## **42.10 SHAREHOLDERS**

42.10.1 Bidders shall provide in each Bid details of shareholders, their respective shareholdings, their respective capital contributions and the proposed capital structure of the Concession Company.

#### **42.11 Project Appreciation Statement**

- 42.11.1 Specifications and drawings describing the design and layout of the EDGOS's Conforming Scheme are included within these Bidding Documents. These are provided for the Bidders' guidance and information.
- 42.11.2 In considering these proposals the Bidder should note that the EGOS, its Consultants and its advisors will take no responsibility for the accuracy or practicality of the proposals, and that it is the Bidders' responsibility to verify or replace the information, assumptions and projections that are contained within these Bidding Documents and elsewhere; In the event that errors or omissions are found, to correct and supplement data as appropriate.
- 42.11.3 In order to demonstrate their understanding of the form, scope and complexity of the Project, Bidders shall prepare a 'Project Appreciation Statement' setting out the construction, operation and maintenance philosophy that is to be adopted for each significant element of the Project. This statement will include, but not be limited to, details of:
- a) The construction method and operations management and maintenance of the project;
  - b) The construction methods to be adopted in the construction of all major components of the Infrastructure/Facility.
  - c) The construction material requirements of the Project and their availability, the location of borrow pits and spoil areas and the implications of importing any raw or finished materials;
  - d) The machinery, Plant and labour needs of the Project and the requirement for associated working and accommodation areas;
  - e) Any particular problems that might be experienced during construction and the measures to be taken to overcome these; such problems might include poor soil conditions, contaminated land and flood susceptibility during the monsoon season;
  - f) Complete details of Collection, sorting and pelleting of waste;
  - g) The operational methodology to be adopted; including tolls/fees/charges collection procedures, monitoring procedures and other service provision; and
  - h) The proposed maintenance regime including the organisational system that will be adopted for routine maintenance and repair, longer-term inspection, monitoring and rectification of identified defects and normal deterioration of Infrastructure/Facility.

#### **42.12 Statement of Proposed Technical Changes to the Conforming Scheme**

- 42.12.1 In the event that the Bidder shall conclude, as a result of its 'Project Appreciation Statement', or otherwise, that it wishes to modify the proposals contained in the Conforming Scheme, either materially or otherwise, the Bidder shall provide supporting drawings and calculations to justify the proposed deviations from the Conforming Scheme.
- 42.12.2 Such deviations shall be designed and evaluated, by the Bidder, in sufficient detail as to indicate, as a minimum:
- a) Any changes in the layout, line and level for the Infrastructure/Facility or its ancillary features;
  - b) Any changes in the land requirements for the proposal;

- c) Any changes in the choice of materials; and
  - d) Any consequential changes in terms of the design life, operational characteristics and maintenance needs of the facility.
- 42.12.3 The results of these studies shall be included, by the Bidder, in a 'Statement of Proposed Technical Changes to the Conforming Scheme'.
- 42.12.4 In the event that the Bidder should decide to adopt the Conforming Scheme, without amendment, a statement to this effect should be given.

#### **42.13 Statement of Land Requirements**

The Bidder shall provide statement of additional land requirements (if any). All cost relating to land requirements, shifting of utilities, resettlement issues etc. shall be borne by the Bidder. EDGOS shall however provide all possible assistance in this regard except financial.

#### **42.14 WORK PROGRAMME**

- 42.14.1 The Bidder shall provide a detailed Work Programme, showing in quarterly intervals the anticipated start-up and construction schedule to achieve the Commercial Operation Date specified in Clause IB 4.
- 42.14.2 In preparing this Work Programme, Bidders are advised that it will be a condition of the Concession Agreement that specified sections of the Project are completed according the agreed schedule and the project is completed, commissioned, and operational on the agreed date. Failure to meet these specified targets will result in the imposition of penalties on the Concession Company.

#### **42.15 Statement of Bid Conformity**

- 42.15.1 The Bidder shall submit a Statement of Bid Conformity, stating whether or not the Bid conforms to all the requirements of the Bidding Documents. The requirements for bid conformity are set out in Clauses IB 22 and 23. This statement shall include a list of all non-material departures from the Bidding Documents together with any areas of significant non-conformity.
- 42.15.2 Bidders should note when preparing their submissions that all deviations from the Bidding Documents should be listed. Such deviations may include, but not be limited to:
- a) Any changes to the layout, form or scope of the Conforming Scheme;
  - b) Any changes to the Land Requirements Plan; and
  - c) Any proposed changes to the Form of Concession Contract Agreement.

### **IB.43 Part-2 Submission**

#### **43.1 General**

The Part-2 Submission should be divided into sections as set out below and each section should provide, as a minimum, the information indicated in the following sections:

#### **43.2 Statement of Capital and Operating Costs**

The Bidder's Statement of Capital and Operating Costs should provide the following minimum information, set out in the format indicated below.

### **43.3 Capital Costs**

- 43.3.1 A Breakdown of capital/construction costs on a quarterly basis, divided into the appropriate sections is to be provided by the Bidder for each section of the Project.
- 43.3.2 In addition, information should be provided regarding design, consultancy and project management fees, contingency costs and insurance costs.
- 43.3.3 The construction costs set out in the Bidder's submission should not include financing costs (such as capitalised interest, etc.).
- 43.3.4 All capital cost estimates should make due allowance for any incentives that may be available to the Concession Company.

### **43.4 Operation and Maintenance Costs**

- 43.4.1 The Bidder shall provide details of estimated Operation and Maintenance Costs during the first and each subsequent year of operation. The following minimum information should be provided:

- a) Cost of fuel, including sorting, mixing, and making ready to use in the boiler, including transportation loading and unloading;
- b) Removal of unwanted component of the municipal solid wastes, agro/waste, etc., including transportation loading and unloading;
- c) Removal of bi-products of the combustion (e.g. ash, and other residues), including transportation loading and unloading;
- d) Tolls/benefits/fees etc. collection costs;
- e) Routine monitoring, and allied service costs;
- f) Other administration costs;
- g) Costs associated with routine inspection and maintenance programmes; and
- h) The anticipated cost of periodic maintenance programmes.

General Design Criteria, Operational & Maintenance Requirements are attached at **Appendices to Bid.**

- 43.4.2 All operation and maintenance costs should make due allowance for any incentives that may be available to the Concession Company.
- 43.4.3 All operation and maintenance costs should be quoted. All assumptions regarding future inflation and the applicable method used for such calculations must be clearly stated.

### **43.5 Statement of Revenues**

The Statement of Revenues shall include, but not be limited to, information regarding each of the following.

### **43.6 Operating Capacity**

The Bidder is to state in detail the operational capacity.

### **43.7 Levelized Tariff**

The Bidder shall state in its Bid the Levelized Tariff in both PKR and US cents.

### **43.8 Revenues**

The Bidder shall set out in tabular form the expected revenues, on a yearly basis throughout the period of the Concession. The submission should clearly indicate the expected revenue from the generation sources, and should be accompanied by sufficient supporting documentation to allow EDGOS to verify the viability of the overall financial proposal.

### **43.9 Financial Analysis of the Project**

The Bidder shall provide a detailed forecast annual balance sheet, as well as profit and loss and cash flow projections for the Project for the duration of the Concession Period. In presenting this information the Bidder shall clearly set out each of the following:

#### **43.10 The Proposed Financial Package**

43.10.1 Each element of the financial package shall be clearly identified. The information provided shall include, but not be limited to:

- a) The proposed level of equity to be provided, the source of such equity, the proposed 'draw-down profile' for this equity and the rate of return that is required on this equity; and
- b) The level of senior debt that will be sought, and the source(s), form(s), anticipated interest rate(s) and repayment profile(s) for such loan(s).
- c) The proposed tariff structure shall be constructed based on a model normally required by NEPRA whilst determining the tariff.

43.10.2 Particular merit will be given, during the evaluation process to those Bidders whose submissions minimise the need for public sector financing.

43.10.3 It must contain complete information requested in Appendix-A (Section D).

#### **43.13 Other Information**

Any other information that is needed to provide a clear understanding of the Bidder's financial analysis should be included in this section of the submission.

#### **43.14 Letter of Financial Proposal**

A definitive summary of the key elements of the Bid shall be provided by the Bidder. This statement shall include the following information:

- a) The Concession Company's equity commitment;
- b) Levelized Tariff in both PKR and US cents.
- c) Schedule of amendments that will be sought prior to the signing of a Concession Agreement (if any);
- d) Schedule of land requirements; and
- e) Schedule of any other conditions that are attached to the Bid (if any).
- f)

## **H. MISCELLANEOUS**

### **IB.44 Bidders to be Careful**

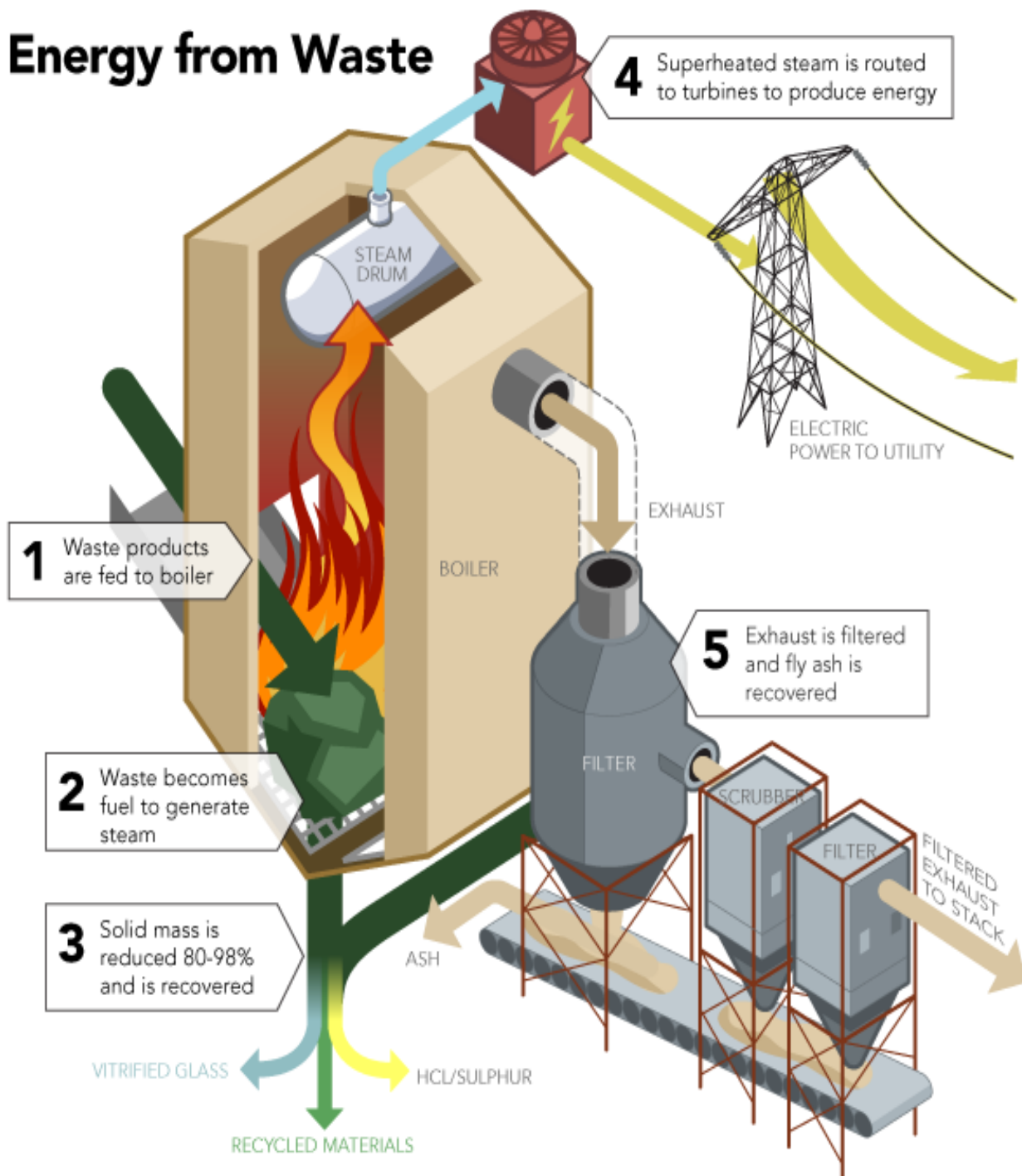
- 44.1 Bidder should take care of local Laws, statutes, regulations, Government investment policies in order to make the bids complying with regulations of Pakistan.
- 44.2 EDGOS shall not assume any responsibility and shall stand indemnified against any or all information provided in the Bidding Documents as far as the Project data and figures are concerned. The Bidders are instructed to carry out their own detailed studies to confirm the Project viability and submit the bids accordingly. The Project documents merely provide information which is deemed useful by EDGOS for the Bidders to initiate study of the Project. It may be further understood that EDGOS is providing this information with best of intents and has tried its best to provide as correct as possible information.
- 44.3 If there arises any further need of addition to the existing Bidding Documents, the same shall be attended through addendum. All such addenda shall form part of the Bidding Documents.
- 44.4 The documents as mentioned in this Bidding Documents shall form the integral part of the overall Agreement and all the conditions contained shall prevail, unless specifically amended or changed or added or deleted through mutual agreement of EDGOS and the successful Bidder.

## SECTION C: “PLANT FUNCTIONAL SPECIFICATIONS” (PFS)

- **Power Plant based on Agricultural and Municipal Solid Waste**

The main concept of power generation circles around rotating the turbines which in turn runs the generators thus producing electricity. Around the world, a wide variety of forces are used to undertake the task of rotating the turbines. It includes:

- Burning furnace oil/ diesel / natural gas to heat water forming super heated steam which is passed through the turbine chamber thus rotating the turbines.
- Using the flow of water in Dams, Streams, Rivers etc to rotate the turbines
- Using wind energy to rotate the turbines
- Using tidal energy to rotate the turbines
- Using alternate fuel sources to burn instead of conventional fuels to produce super heated steam and rotate the turbine.



The proposed project is based on using agricultural waste plus municipal solid waste processed through latest technology to maximize the heat content and form pellets etc that are burned in the boilers to produce super heated steam which rotates the turbine thus moving the generators and producing electricity. The process concept is diagrammatically described below.

1. The feedstock is fed to the boiler comprising of agricultural and municipal solid waste
2. The waste burns instead of conventional fuels to heat water to a super heated steam form
3. Solid mass is reduced to a level of up to 90% and is recovered as a saleable by-product.
4. The super heated steam from the boiler goes to rotate the turbine and thus running the generators to produce electricity which is connected and transferred to customers/grid.
5. The exhaust from the boiler goes to a filter plant which separates and recovers the ash.

The above description gives rise to the following points:

- **The Power Plant- Technology, Design and Cost**

The proposed plant is a steam turbine plant with special multi-fuel boilers. These are the most efficient and internationally proven technology which is already in used in developed countries which have already built their power generation based on energy from waste. The biggest examples are in the Scandinavian countries covering Denmark, Norway and Sweden. The United Kingdom, Canada, Malaysia and Australia also have installed power generation capacities on the same technology. The same plant shall be used in KSEZ 20 Mega Watts power plant with design conforming to meet World Bank's, Pakistan's EPA guidelines and prudent practices in utility industry world over.

Multi Fuel Boilers are designed to burn fuels of various types when ever need arises. e.g. if due to any reason, the plant's feedstock are not available, the same can be run on "Coal". This ensures the plant's continued operations without any unplanned shut downs.

In the initial feasibility studies, the budgetary cost of the proposed power plant from three different and reliable technology providers range up to Rs. 3.6 billion including project development, cost of land, EPC, cost of funds during construction phase, working capital and other related expenses.

- **The Feedstock Supply Chain**

For every power house, once installation cost are ascertained, the main issue of concern is the supply arrangement of feedstock and the relevant cost of procuring and bringing it to the plant site.

Studies have been carried out to ascertain the supply sources and heat value of various feed stocks available to run the project. (The BOOT contractor is encouraged to re-assess the figures independently).

Khairpur and adjoining areas are blessed with agricultural lands producing various crops and related waste. Similarly, these localities produce Municipal Solid Waste from the populated areas and households.

After a detailed survey of the availability, heat value and related cost of the feedstock, the following are proposed in initial budgetary feasibility:

80% Agricultural waste (3,015 K cal per kg)

20% Municipal Solid Waste (1,760 K cal per kg)

The mixture would be passed through a process of “Pelletization” to form combustible pellets that would be used as feed stock in the boilers.

The required quantity of proposed mixture is 186,000 Metric Tons per year to produce as against an available supply of ten times the required quantity. (Source: Sukkar Agricultural Department)

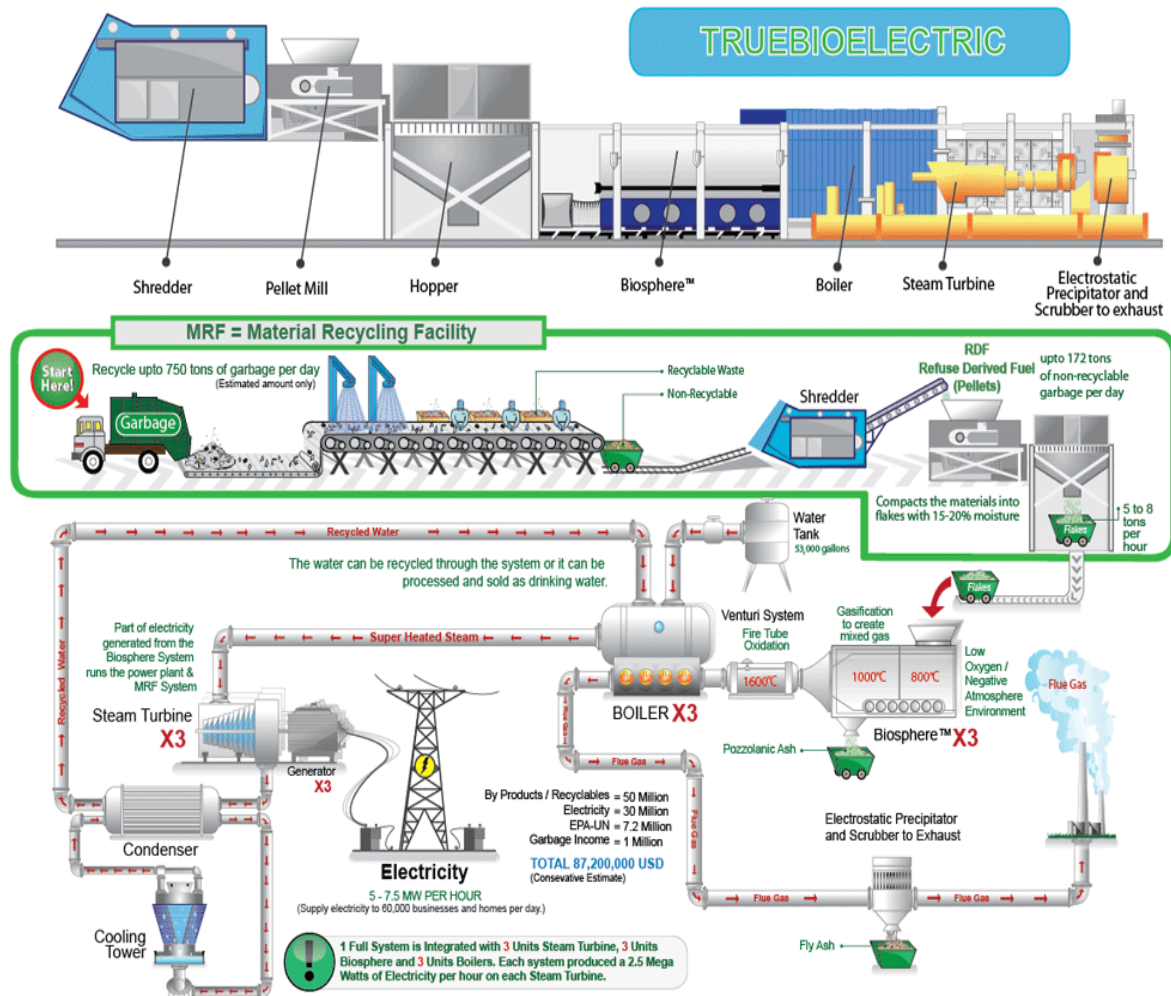
To ensure a constant supply, the BOOT contractor will enter into a “Waste Supply Agreement” (WSA) with a local contractor to collect and supply the required agro waste and municipal waste. Northern Sindh Urban Services Corporation Limited (NSUCL) will be a facilitator and party to the agreement’s enforcement. An estimated budgeted figure would be Rs. 2,060 per Metric Ton of the mixture proposed.

Similarly, a backup fuel supply agreement needs to be entered into with a coal dealer/transporter. This would ensure production of electricity in case if weather conditions like heavy rains etc disrupt agricultural waste and municipal waste collection and delivery beyond the base stock.

- **Calorific Value of Feedstock**

During the preliminary feasibility carried out, various samples of agricultural and municipal solid waste were collected from different potential supply sources and sent to PCSIR Laboratory complex in Karachi to ascertain the heat content. Based on the results, the mixture proposed for the plant will have an estimated heat value of 2,760 Kcal/kg of mixed waste i.e. 80:20.

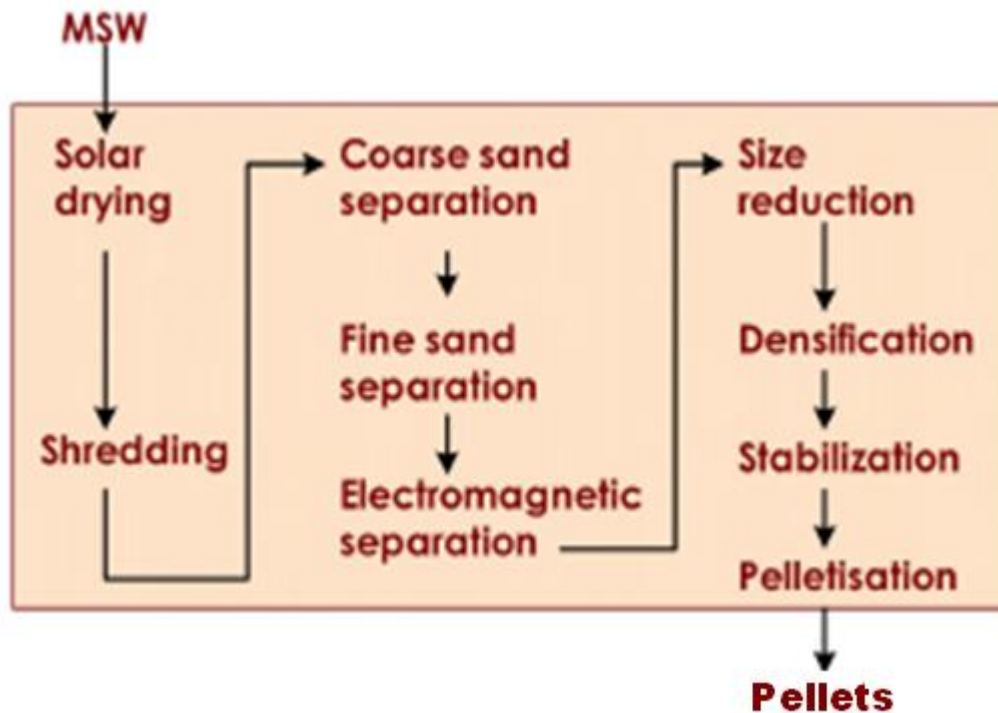
### **A Diagrammatical Illustration of Plant’s Process**



## Pelletization or Briquetting

Once the required mix of waste is available at plant site, it will be processed through the Pelletization process to convert the rather large volume of waste to smaller, condensed and heavier pellets.

These pellets are fed to the boilers where they are burned to heat the water forming super heated steam which is sent to the turbines.



The above diagram shows the process of Pelletization from MSW only. In our proposed mixture, agricultural waste will be added to it at the “Size Reduction” stage. Similarly other fuel types e.g. coal can be added at the same stage. The end result is fuel pellets, ready to burn in the boilers.

### **General Characteristics of Pellets**

The net calorific value of the Pellets obtained by this method is 5000-6000 BTU/lb<sub>m</sub> with a variation of +15% from batch to batch. The pellets have low ash fusion temperature, high dust content, variable moisture, calorific value and density.

- Calorific Value: 5400 Btu/lb (say 3000 Kcal/kg)
- High Volatile Matter (65%)
- Emission characteristics of PELLETS are superior compared to coal with less NOX, SOX, CO & CO<sub>2</sub>
- Bio fertilizer and fly ash are the useful by-products.

### **Electricity Sale and Power Purchase Agreement (PPA)**

Once the plant is operational, the electricity so produced needs to be sold. The main customers are:

1. Industrial Units in KSEZ
2. SEPCO

During the initial days of plant operations, KSEZ’s own requirements would be low as industrial units would be in the construction/setup phase. The major/surplus power produced will be sold to SEPCO, for which a “**Power Purchase Agreement**” (PPA) will be signed with SEPCO at tariff rates determined and approved by NEPRA and Alternate Energy Development Board (AEDB).

A “**Memorandum of Understanding**” (MoU) will be signed between SEPCO, KSEZ, NIP and Commissioner Khairpur; outlining the terms and conditions and general acceptance of the PPA to be signed later on under the “Alternate and Renewable Energy Policy 2011”.

### **Government Policy and Guarantee of Payments**

**“The Alternate and Renewable Energy Policy 2011” issued by Government of Pakistan, Chapter IV clause 4.1.1. Guaranteed Market: Mandatory Purchase of Electricity. “It shall be mandatory for NTDC/CPPA/DISCOs to buy all electricity offered to them by Alternate and Renewable Energy (ARE) projects established pursuant to the ARE Policy 2011 at rates determined by NEPRA”.**

The above extract from GoP policy, ensures that every unit of electricity so produced from renewable and alternate source of energy will be purchased by the relevant body of power transmission and distribution in the locality, which in this case is SEPCO.

### **Additional Revenue Stream**

The by-products of the process include:

1. Steam
2. Agricultural Ash
3. Pieces of Glass and metals etc
4. Hydrochloric Acid, Sulphur etc
5. Nitrogen

Super heated steam will generate additional revenue stream through its sale to adjacent industrial units primarily the “Date Market”. Agricultural plus Municipal Waste Ash can be sold and used to make Compost. Other by-products can be sold as when produced/recovered. This will generate additional stream of revenue thus contributing towards the projects viability. Some additional cost will have to be incurred for piping used to transfer steam to the customers.

### **Financial & Economic Analysis (Budgetary Figures subject to Improvement)**

The initial feasibility has been undertaken by Jafri and Associates Consulting Engineers (Pvt) Ltd. for EDGOS.. The minimum equity requirement is 25%; hence, the same is taken for feasibility purposes.

Total Units of Electricity produced and to be sold during the year are 124,830,000 units @ 75% load factor.

Once the BOOT operator is engaged and actual negotiation are undertaken with the EPC contractor and feedstock suppliers, the returns should be more attractive. In addition to the stated figures, other revenue streams from project by-products’ sales also add to project economics and make it more attractive.

During the financial close phase, the BOOT operator can take advantage of Carbon credits and Concessional financing for alternate and renewable energy projects with the help of Alternate Energy Development Board representing GoP.

## **DESCRIPTION, CONCEPTUAL DESIGN, FUNCTIONAL SPECIFICATIONS & PARAMETERS**

### **PLANT CAPACITY**

#### **20 MW CAPTIVE POWER PROJECT**

##### **General Plant Layout**

To provide easy access to the trucks transporting the Fuel to the Plant site independent access shall be provided to the Power Plant from the main Road. This access shall be only for the trucks carrying the Fuel.

The access to the Plant room for carrying personnel and equipment shall be through the KSEZ main gates with suitable security checks.

The Plant room shall be designed keeping the local conditions in view. The foundations for heavy equipment shall be designed for the applicable bearing capacity and the high water level.

Detailed design shall be the responsibility of the BOO operator with due vetting of the Civil Engineering Consultants.

The RFP shall however provide the indicative layout of the plant to establish the design criteria. Currently it is estimated that 10 acres of land shall be needed. The largish area is needed to provide storage space for the incoming sorted MSW and area to prepare the pellets and the area to store the prepared pellets. (If the BOO operator opts for this technology). It is proposed to carry a stock of 2 weeks supply of all ingredients plus 2 weeks supply of the pellets, also Coal for standby purposes as also the F.O. tanks for special emergency needs.

##### **Steam Turbines**

The type of turbines proposed for the (K.S.E.Z.) Power plant is the condensing turbine. These power-only utility turbines exhaust directly to condensers that maintain vacuum conditions at the discharge of the turbine. An array of tubes, cooled by the cooling tower water, condenses the steam into water.

The cooling water condenses the steam turbine exhaust steam in the condenser creating the condenser vacuum. As a small amount of air leaks into the system when it is below atmospheric pressure, a relatively small compressor removes non-condensable gases from the condenser. Non-condensable gases include both air and a small amount of the corrosion byproduct of the water-iron reaction, hydrogen.

The condensing turbine processes result in maximum power and electrical generation efficiency from the steam supply and boiler fuel. The power output of condensing turbines is sensitive to ambient conditions.

##### **Steam, Condensate and Feedwater System**

During normal operation, the turbines receive steam from their respective boilers. After expansion in the turbine, the remaining steam heat content at the turbine outlet is given up directly in a water-cooled surface condenser.

In emergencies and during start-up, the steam produced by the boilers shall be supplied directly to the turbine condenser through the by-pass reducing and desuper heating stations.

The feed water is supplied to the boilers by the feed water pumps, which shall be arranged individually for each boiler.

For redundancy reasons, auxiliary components such as pumping stations (feed water pumps, condensate return pumps, etc.) shall be designed on the (n-1) principle, i.e. in case of outage of one unit the remaining unit(s) must be able to provide 100% duty of the power block.

### **Electrical Generators**

The generators shall be designed for continuous operation. The system shall be sufficiently robust to withstand without harm, all normal conditions of operation, as well as transient conditions such as system faults, load rejection and mal-synchronization, since this will eventually be feeding into the SEPCO grid.

The generator shall be capable of supplying their rated power within the power factor range of 0.8 lagging and 0.95 leading.

### **Fluidized Bed Boilers**

Among the different fluidized bed boilers which are currently being used in the power generation industry, most of them are either bubbling (BFB) or circulating fluidized bed (CFB) boilers. New developments include the multi circulating fluidized bed (MCFB) and the cylindrical multi-inlet cyclone (CYMIC). However, conventional CFB boilers are widely used. In fluidized bed combustion, the primary combustion air from

the bottom of the furnace is injected with such a high velocity that the material inside the furnace becomes a seething mass of particles and bubbles. This seething mass consists of both the fuel and of granular inert material (such as sand). When starting up the boiler, this inert material is heated to the ignition point of the fuel at which point the fuel is fed from above the bubbling bed. A steady combustion takes place in which the fuel (because of the fluidity of the system) is rapidly mixed throughout the bed. There is a high heat transfer because of the intimate contact of fuel and inert material. This permits combustion to take place with a minimum of excess air and at a low combustion temperature.

### **Circulating Fluidized Bed Boilers**

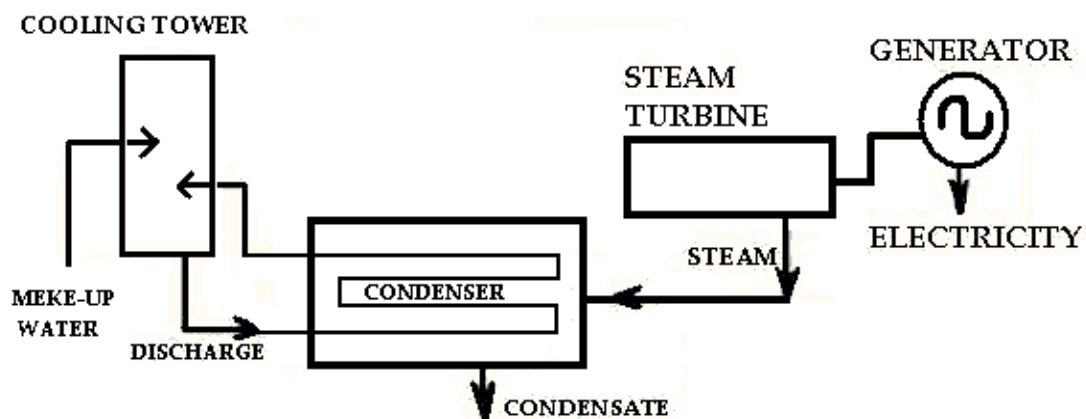
With circulating fluidized bed boilers, the particles escape the furnace area with the fluid gases. The primary air velocity is increased to about 4-12 m/s, as a result of which more and more of the particles are entrained in the gas stream and leave the vessel. By a cyclone, the fuel particles and the inert bed materials are separated from the flue gas and fed back into the furnace. The difference with the cyclone in the bubbling fluidized bed systems is in its relative size and in the rate at which solids are cycled back to the base of the bed. In a bubbling bed unit the cyclone system is relatively small, and it only deals with an insignificant part of total solids inventory in a bubbling bed arrangement. In the CFB mode, the gas solid separator is as striking in physical appearance as the main reaction vessel itself and the return leg can contain even more solids than the riser. At CFB gas velocities, it is not possible to use in-bed heat recovery tubes similar to those employed in bubbling bed combustors; membrane walls are used instead.

In general, because of the usage of inert medium and the relatively low amount of fuel compared to the total bed mass, fluidized bed boilers will be very flexible with respect to moisture content, ash content, and size of the fuel.

Limestone is used as the bed medium instead of sand for emission control. As a result of the high residence time of the fuel the carbon burnout efficiency will be generally very high resulting in high overall boiler efficiencies. Boiler efficiencies of recently built fluidized bed plants are up to 89 % LHV. When comparing boiler efficiencies, one has to realize that fluidized bed boilers generally will have higher fan power requirements. In competition with bubbling fluidized beds, the CFB boiler demonstrates superior carbon burnout efficiency because of longer residence times. Unburned carbon losses can be kept lower than 2 %. This is the result of the type of particle reinjection. Therefore, high carbon burnout with circulating fluidized bed systems does not require high temperatures, as it does in pulverized-fuel-based technologies.

Other advantages of CFB are improved absorption of sulphur dioxide and other acid gases, use of less prepared fuel and sorbent, and elimination of the feeding problems associated with either under bed or over bed feeding systems. Circulating fluidized bed

(CFB) boilers offer increased operational flexibility because of the ability to fire a range of fuels in the same unit. Fuels fired can include waste and low grade fuels which cannot be fired in conventional units. In-furnace capture of sulfur dioxide by limestone addition, and low NO<sub>x</sub> emissions resulting from low operating furnace temperature (850-900°C) and staged combustion, make CFB units an environmentally friendly means to generate steam.



TYPICAL CLOSED-CYCLE COOLING SYSTEM

### Water Supply

*Water supply is needed for firefighting drinking general use in addition to the Cooling System. For the Power Plant a small quantity of Demine water would also be required.*

## **Water Requirement**

According to Consultant's estimates the makeup water requirement utilizing closed loop cooling system with wet cooling towers for heat dissipation would be around 0.6 cusses or 390,000 GPM for closed cycle operation.

## **Source of Water Supply**

The Power Plant shall need water year round and round the clock. Therefore it is proposed to use ground water.

Availability of surface water through Rohri Canal that flows close by cannot be assured for the whole year. The water availability from the Dams is getting unreliable on account of anticipated droughts.

Groundwater quality in the area is generally good and fresh groundwater can be developed on long-term basis.

## **Water Treatment**

Water from the Tube wells shall be supplied to the raw water storage tanks with a storage capacity of one week. Adequate storage capacity (dead storage) will also be provided to serve the fire fighting system. Service water is taken directly from this storage facility without any further treatment.

The needed de-mineralized water would be provided by treating the water in a reverse osmosis (RO) plant Then it is suitable for further treatment in a demineralization water plant (DWP) for use as make-up water for the boilers.

The raw water would be treated in the cooling water make-up treatment plant, in which the cooling water will be de-alkalized and the organic impurities would be eliminated.

The cooling water treatment plant would be operated as a flocculation / precipitation /sedimentation process. Lime and flocculating agents shall be dosed. The produced sludge shall be de-watered to a quality accepted for external disposal.

The treated water shall be suitably stored.

At least 24 hours of storage capacity shall be provided.

For satisfactory cooling tower operation, the cooling water would need to be conditioned. The following would be adopted.

- \* Hardness stabilizing agent
- \* Dosing biocide to prevent biological growth in the cooling tower;
- \* Corrosion inhibitor dosing.

The well water used for drinking water supply is filtered further treatment if any shall be carried out when the BOOT operator undertakes detailed investigations.

## **ELECTRICAL EQUIPMENT, I&C EQUIPMENT WITH REDUNDANCY**

### **GENERAL**

The power plant shall be capable of exporting the power that can be generated by the power units operating in parallel. The output of the power plant and the power units shall be the maximum achievable over the complete ambient range specified and shall not be constrained by the sizing of electrical equipment, including generators, plant systems and auxiliaries.

The plant shall be designed for the minimum number of operating and maintenance staff consistent with high operational reliability and economy.

It is envisaged that the power/energy produced shall be sold to SEPCO for further distribution to its customers. The evacuation of power to SEPCO shall be at 11 KV level through 11 KV inter-connection between power plant busbar and SEPCO facilities.

The power export shall be measured at the out-going circuit from 11 KV bus bar of the power plant. SEPCO shall/may have the facility to distribute some power locally and to transmit balance power through 132 KV transmission line to its grid network. For transmitting power SEPCO may build a step-up 11/132 KV grid station near or within the power plant premises.

### **Power Plant Lay-out**

The power plant lay-out shall be designed to ensure ease of operation and maintenance with full consideration of environmental impact specially pollution, noise, corrosion to the structures and safety.

Access around all equipment shall allow effective inspection, maintenance and removal and over-hauling of equipment.

### **Plant Start-Up**

The plant shall be designed to ensure trouble-free start-Ups.

A black Start capability shall be provided.

It shall be possible to start any one unit using the black start generator. A suitable capacity (say 1000 kW) auto-start diesel generating set shall be provided as black start. Sufficient redundancy shall be provided to ensure that the failure of one black start generator shall not prevent the plant from being restart.

### **Plant Availability & Reliability**

The plant shall be designed so as to achieve high economy, availability and reliability. Out-age of any one component should not restrict features consistent with the requirement including redundancy of equipment.

### **Operation & Control**

Control and supervision of the plant shall be carried out remotely from Central Control Room (CCR)/DCS. Full supervisory and control functions shall be provided for the safe and efficient operation of the plant units. The power units shall normally be auto-synchronized.

Remote manual synchronization shall also be possible, as back-up. The UPS system shall be fed by two (2) numbers full capacity inverters with electronic change-over Unit.

The UPS shall feed the instrumentation and control systems and all other essential loads.

The power plant shall be capable of being safely run-down in case of total loss of power/power rejection and the turbine placed on turning gear. During this period the essential services shall be carried out through standby dc drives.

The 110 Volts DC and 24 Volts DC system shall be fed by rectifiers with full capacity standby batteries with 100% redundancy.

### **Safety & Protection**

Independent protection shall be provided as follows:-

- Protection of equipment group from drive control level.
- Steam turbine shall have own hardware.
- Boiler shall have failsafe and type approved PLC system.

### **Codes & Standards**

The equipment shall comply with the latest issues of the relevant standards and recommendations of IEC, VDE, BS, DIN etc and WAPDA standards.

Electrical equipment and installation including their erection and testing shall conform to good Engineering Practices, applicable codes and regulations and in particular, but without limitation, shall comply with the requirements of clauses relating to codes and standards.

All Components of the plant, generators, switch-gears, transformers and other electrical equipment and system shall be capable of operating at its rated current continuously without over heating at all the site conditions and shall take into account of the temperature rise of equipment from other sources and without assistance from forced cooled ventilation or Air-Conditioning plant.

Electrical equipment shall be construed to withstand the specified maximum short circuit current and durations without the temperature exceeding the value permitted for the related class of insulation. The equipment shall be considered being operated at maximum permissible current prior to the inception of short circuit current.

The final temperature attained as a result of the passage of short circuit current shall not cause permanent damage or deterioration sufficient to reduce the normal operating rating below those specified.

Anti-Condensation heaters shall be provided for all cubicles, panels. Illumination lamps shall also be provided for all cubicles and panels.

### **System Frequency, Voltage and Short Circuit Rating**

The nominal AC system frequency is 50 Hz and nominal ratings shall be as follows:-

- 11 KV for the generator busbar.

- 400/230V for the station internal Low Voltage distribution system. Maximum allowable continuous voltage variation shall be + 5%. The short circuit rating of the system shall be designed as 50 KA for 3 seconds.
- 230 or 400V for the station ac distribution system from a rectifier inverter supply. DC system voltage shall be 110 Volts.

All AC equipment except as specified otherwise shall be capable of continuous operations at a voltage level in the range of 90% to 110% of the nominal voltage and short time operation at 80% of the nominal voltage during motor starting without deterioration.

All electrical equipment shall be designed so as to withstand abnormal system voltage as required by the appropriate standards.

### **Earthing System Design**

The earthing system shall be designed to IEEE 80 and the calculations shall be submitted for approval. The conductor of main grounding system will be of copper with minimum section of 180 mm square. The maximum resistance to the earth of power plant shall be determined to provide safe installation by limiting step and touch potentials and earth potential rise, the resistance to earth of any part of the earthing system shall not exceed 0.5 ohms.

The earthing copper grid or rod system below the full area of the foundation of the Power Plant shall be provided and this shall be connected to a welded reinforcing bar grid in the base concrete floor.

The earthing system of each building (secondary earthing system) shall be inter-connected to form a composite grid for the Site.

All electrical equipment and metallic Structures shall be connected to primary or secondary earthing system.

If required for control and instrumentation equipment, a separate earthing system shall be installed.

Transformers and switchgears shall be provided with two or more earth terminals and each shall be connected to the primary/secondary earthing system.

The earthing conductors used shall be adequate to with stand without any damage /deterioration the maximum system fault current for at least three (3) seconds.

### **Lighting System**

The general lighting shall also be provided through out the plant and associated buildings. The design of the lightning system shall be such that a failure of a single circuit will not cause any area without light. All relevant standards in this connection shall be followed.

Emergency lighting shall also be provided through out the plant. The stand-by emergency lighting for DCS/CCR shall be 25% of normal, supplied from the dc system via inverters.

All buildings/rooms and boiler area shall be provided with small power outlets. The small power outlets shall generally consist of supplies to sockets used generally for portable equipment.

### **Cables & Support Installations**

Power and control cables shall be of copper. Medium voltage cable 15 KV level will be of copper conductor with XLPE insulation, protective sheath and PVC external jacket.

LV cable will be of copper conductor with PVC insulation, protective sheath and PVC jacket.

Control Cable will be of Copper Conductor with PVC insulation and protective sheath.

All cables shall be suitable for service at maximum design load and minimum voltage conditions and shall be capable of sustaining maximum fault current without damage.

Cables, within the plant, shall be installed on cable trays or racks in a manner that shall prevent the cable being damaged and to minimize the occurrence and spread of fire. Over-heating of cable shall be monitored.

All cables near fire hazardous area will be flame retardant type.

### **Fire Detection, Alarm & Fighting System**

A set of fire detection and alarm system shall be installed for the power plant. The system shall consist of the central alarm panel, the local alarm panel, fire detectors etc. The system shall cover other auxiliary buildings as well.

The fire detection and alarming equipment shall be made-up of intelligent smoke detectors, intelligent, heat detectors, explosion proof smoke detectors, linear heat detectors, inflammable gas detectors.

The intelligent smoke detectors will mainly be used in control room/DCS, distribution room, electronic equipment room, meeting room, workshops etc.

The intelligent heat detectors will mainly be used for turbine bearings.

The explosion proof smoke detector will mainly be used in battery room.

The linear heat detectors will mainly be used for cable trays, transformers air pre-heaters, boiler burners.

Automatic spray system control panel shall drive the spray extinguishing system automatically.

Other forms of firefighting equipment and systems, appropriate for the equipment installed, shall also be installed to ensure that all the safety and security requirements are met as per the latest prevailing standards.

### **Power Generators**

There will be four (4) generating units of 5 MW each delivering gross 20 MW loads at 11 KV to a common 11 KV busbar. It will be 3 phase, 50 Hz. The generators shall be capable of supplying their rated power within the power factor range of 0.8 lagging and 0.95 leading.

The generator shall be designed for continuous operation. The system shall be sufficiently robust to withstand without harm all normal conditions of operation as well as such as system faults, load rejection and mal-synchronization since this will eventually be feeding into the SEPCO grid.

The generator shall conform to IEC standards. The armature and field windings of the generator shall be designed with insulation system that are proven class "F" material.

The temperature detectors shall be installed in the generator to permit the measurement of the winding temperatures. The temperature rise limits shall be as per IEC standards.

Stator core shall be built from segmented laminations of low loss, high permeability, high silicon content electrical steel.

The construction should be such as to restrict and minimize eddy current losses.

The generator ventilation and lubrication system shall be in accordance with proven engineering practice and complying with the requirements of latest IEC standards.

The generators shall be fitted with excitation system appropriate for this type of generators. Suitable grounding of generator body and neutral shall be provided. NGR can be provided if required by the manufacturer. The output shall be maintained by AVR of suitable accuracy.

### **Generator protection Provisions**

The generator protection system will include provisions of:

- Over-Voltage
- Under frequency and over frequency
- Over fluxing
- Over-load
- Differential
- Stator earth fault
- Negative phase sequence alarm and trip
- Field failure
- Reverse power
- Over temperature – rotor & stator
- Low forward power interlock (to prevent over-speed).
- Rotor earth fault
- Circuit Breaker failure

Protection equipment shall be mounted on panels in the DCS.

### **Medium Voltage Metal-Clad Switchgear 11 KV**

KSEZ 20 MW power plant shall consist of four (4) units of generators each having a capacity of 5 MW. Each unit would be connected to a common bus-bar of 11 KV Voltage through 11 KV Generator circuit breaker. Thus there will be four (4) in feeds, synchronized to the 11 KV common bus-bar.

The power produced at KSEZ shall be fed to SEPCO through one 11 KV common out-going circuit breaker from the common 11 KV bus-bar having a gross capacity of 20 MW.

The export of power to SEPCO shall be measured at the outgoing CB from the KSEZ 11 KV common bus-bar. This arrangement is depicted in the attached single line diagram. The outgoing CB shall have all measuring arrangement for power and energy. Each 5 MW unit 11 KV, 50Hz will be connected to common 11KV bus-bar of 2500 A capacity through 12 KV, 630 A, 25 KA circuit breaker, S-F6 or Vacuum type, equipped with relevant current and potential transformers.

The common bus-bar 11 KV panel shall also consist of two (2) switches for station transformers, each having a capacity of 2000 KVA with 100% redundancy.

The first station transformer, 2000 KVA, 11.0/0.4 KV, shall feed the Auxiliaries of generator unit-1 and unit-2. The transformer secondary shall be connected to "0.4 KV Common bus-bar No.1"

through ACB whereas outgoing circuits from, 0.4 KV bus shall be through MCB's of appropriate rating.

The secondary of the second station transformer shall be connected to "0.4 KV common bus No. 2" through ACB of appropriate rating. Bus No.2 shall feed auxiliaries of unit 3 and unit 4. Common 0.4 KV bus No.1 and bus No.2 shall be coupled through ACB to enable transference of auxiliary load in case of shut-down/ break-down of one of the station.

Supply to battery charger may be provided from common bus No.1, where as diesel generator set for Black Start may be connected to common bus No.2 through change-over switch.

As stated the power produced at KSEZ-20 MW is envisaged to be exported to SEPCO through one 11 KV common out-going circuit from 11 KV panel of power plant. SEPCO has the option to establish its own 11 KV switchgear room for distributing this power to its customers of Khairpur industrial Zone and other neighbouring area. SEPCO also has an option to establish its own grid station, take supply on 11 KV from KSEZ plant and then transmit power, in excess of local requirement, to its 132 KV network by putting up step-up 11/132 KV transformer and 132 KV transmission line up to their network.

### **Technical Requirements of MV Switchgear**

The MV 11 KV switchgear shall be air-insulated, factory built, type tested, metal enclosed.

The switchgear shall be of the free-standing, self supporting, dead front design with all high voltage equipment installed inside metallic and earthed enclosures suitably divided into individual compartments, at least for the

- Bus-bar Systems
- Circuit Breaker
- Cable Connection (PT,CT and Cable termination)
- Low Voltage Compartment.

Partitions between feeder bays or panels are required to avoid fault spreading from one feeder bay or panel to the other one and to the outside. The switchgear shall be of front access during operation and maintenance.

The panel enclosure including doors and covers as well as partition walls shall be made of sheet-steel and steel frames all galvanized. The same will be bolted together. The front doors, rear covers and end walls shall be powder-coated with resistant epoxy resin.

Compartments shall be arranged in such away so as to ensure continuity of service, when any one compartment of a panel is opened for maintenance. The exception will be bus- bar compartment.

The design shall provide for maximum level of reliability, ease of operation and maintenance and maximum flexibility. The possibility of field repairs and exchange of enclosure parts shall be taken into account. The panels shall be constructed identically to ensure that the equipment switchgear parts can be inter-changed including circuit breaker trucks or earthing trucks.

The switchgear shall offer a max degree of safety for the operators under all normal and fault conditions. It must not be possible accidentally, i.e. without the use of tools, to touch live parts of the switchgear or perform operations that lead to arcing faults.

For mechanical protection of the switchgear elements, panels with a minimum of protection class IP41 are required.

All high voltage carrying parts shall be totally protected against contact with live parts.

Should internal arcing occur, the release of the pressurized air or gas by suitable pressure relieve air into the atmosphere must occur in such a way that personnel standing at the operating position of the switchgear will not be injured. Furthermore, no part of the enclosure or any loose parts shall not fly off the switchgear in such an event and no holes shall burn through enclosures. All earthing connections must remain operational during and after an arc fault. The switchgear panels shall be type tested under conditions of arcing due to an internal fault is line with IEC provisions.

The spring charge and spring charge mechanical indicator to be provided on the front face of the panel.

Power cable access shall be from bottom.

Power Cable entry shall be from bottom.

Control cable entry shall be from bottom.

The switchgear panel shall be dust proof, rodent and vermin proof and provision shall be made against condensation particularly if load is switched off.

For each out-going/incoming cable feeder an indicative or capacitive voltage detector with cable live indication shall be provided, indicating any reverse voltage, i.e. at least by means of voltage transformers plus lamps (including lamp test facilities).

There shall be Synchronizing provision for each generator incoming feed with the 11KV common bus- bar.

### **Busbar & Busbar Compartment**

The bus-bar compartment shall house the three (3) phase bus-bars, horizontal, along with the bus support insulators, feeder connections and bushings with fixed contacts. Bus bars shall be made from electrolytic drawn copper. They shall be rated for the continuous current of the switchgear under the site conditions and shall be braced for the maximum peak short circuit current or the minimum of 2.5 times the rated symmetrical short circuit current which-ever is higher. Rounded edges shall be used to reduce the number of potential arc points.

The copper bus-bar shall be separated, suitable for air insulation for rated voltage upto 12 KV, and all live parts shall be suitably protected when a breaker truck is drawn out.

The arrangement of the bus-bars shall be such that the top circuit breaker terminals are connected to the bus-bars and the bottom terminals are connected to the live side of the feeder.

Bus-bars and their enclosures shall take thermal expansion of the entire switchboard into account. Suitable mounting facilities and compensators shall be provided where necessary.

During installation, the bus-bars shall be easily accessible either from rear, if rear access is permissible, or from top, if access to switchgear is only from front. The access shall be made by unbolting the rear or top covers.

### **Circuit Breaker Compartment**

This compartment shall house circuit breaker, vacuum or SF-6 type, with totally enclosed and maintenance free contact systems are preferable.

The air insulated type switchgear shall be provided with draw able three phase circuit breaker, mounted on trucks, which shall permit, by means of a movement of the truck, without using any external device, that the feeder and the circuit breaker be rendered voltage free by means of an air gap.

The auxiliary circuit (interlocking control of the circuit breaker, motor supply voltage) shall be provided, suitably inter-locked with the circuit breaker truck movement, by means of multi-contact, low voltage plugs of an approved type.

The main contacts must make the electrical contacts when the C.B. is pushed in.

The bus-bar system shall be protected, automatically, if the CB is in draw-out position, and shall be lockable if work at the in-feed cable becomes necessary.

The breaker operating mechanism shall be of the electric DC motor operated, stored energy type, with provision for manual operation in case of control power failure. All breakers must be electrically trip free and have anti pumping circuits. After loss of control power, the spring of the operating mechanism shall be capable of performing a sequence of OFF-ON-OFF operations with rated data.

All breakers shall be suitable for remote control including a manually operable local trip push-button.

Manual, mechanical On-Switching shall be prevented if inter-locking conditions exists. Mechanical indicators shall be provided to show the ON/OFF position of the breaker contacts. Operation counter shall be provided.

Maintenance intervals of CB shall not be less than 25 full rated short circuits, 10,000 rated current interruptions or ten (10) years, whichever comes first. Easy replacement of the breaker interrupter must be possible.

Breaker (trucks) of the same rating and control scheme shall be completely interchangeable with in the switchgear installation.

### **Connection Compartment**

The connection compartment shall house combination of the following components as per scope of supply/data sheet.

- Instrument transformers
- Earth Bus-bars
- Earthing Switch with making capacity.

Cable termination can be accessed from front.

It shall be possible to test the cables from front by operating the shutters in the switching device compartment. When the shutter for cable testing is opened, it shall be possible to keep the bus side shutter closed. Hence it will be necessary to have an independent pad lockable operating mechanism for busbar and cable side shutters. This will ensure personal and operational safety.

### **Low Voltage Compartment**

The low voltage compartment shall be located at the front above the switching device compartment and will be completely separated from the rest of the panel.

The electrical connections between the with-drawable unit and the fixed part of the panel shall be made with flexible wires and a fixed mounted low voltage plug connection.

The protection relays (applicable in VCB/SF-6 panels, station transformer panels and bus-bar voltage measuring panel), meters and indicating lamps shall be mounted flush on the low voltage chamber door. The auxiliary low voltage equipment as well as control terminals shall be mounted inside the compartment on an equipment plate or rail mounting system.

### **LV-Wiring**

All Secondary circuits are wired with PVC insulated flexible copper wires, with a minimum cross section of 1.5sq.mm. The wiring is laid in plastic trunking and in flexible PVC conduit for Cross-over of wiring to door-mounted components.

### **Terminals**

All terminals shall be of "non hygroscopic" material. The terminals have a minimum rating of at least 1.5 of operating intensity.

### **Inter-Locking System**

Electrical and mechanical inter-locking, which shall at least fulfil the conditions as listed below shall be provided. The final interlocking scheme shall be proposed by the contractor and shall be subject to approval by the EDGOS.

- a. The inter-lock system must positively prevent an operator from reaching or creating intentionally a dangerous or potentially dangerous condition. Systems that can be by passed without the use of tools and/or force are not acceptable.
- b. All necessary electrical interlocks shall be provided as specified, particularly for the incoming feeders and the bus tie breaker, if any.
- c. When the manual emergency crank for the breaker is in use, it shall be impossible to control the breaker electricity.
- d. All breakers for remote control shall have a key operated switch, allowing the selection of LOCAL-REMOTE operation modes as detailed below.
- e. The inter-locking of the draw-able CB Trucks of air insulated switchgear type shall provide at least the following in addition:

- I. Interlocking for the "SERVICE POSITION"
  - It must be impossible to disconnect the low voltage plug device.
  - While pushing in the truck, its final position must be definite.
  - It must be impossible to move the truck, if the CB is closed.
  - It must be impossible to move a truck, if it is included in an interlock system just blocking.
  
- II. Inter-locking when moving the CB between Service and Test position.
  - It must be impossible to disconnect the low voltage plug device.
  - It must be impossible to close the CB and no movement is allowed if the CB is closed.
  - It must be impossible to close the earthing switch mounted in the panel.
  - No movement into service position if the earthing switch is closed.
  
- III. Inter-locking for the "TEST POSITION"
  - When drawing out the truck, reaching of "test position" has to be definite by stop.
  - It must be impossible to move the truck to "service position", if the CB is closed.
  - It must be impossible to move the truck to "service Position", if the earthing switch mounted in the panel is closed.
  - It must be impossible to move the truck to "service position" if it is included in an interlock system just blocking.
  - The bus-bar and cable shutters shall be closed in the test position.
  
- IV. Inter-locking for the "Isolated Position"
  - It must be impossible to move the truck directly to service position.
  - When pushing in the truck, reaching of "isolated position" has to be definite by stop.

Further movement-out only after low voltage plug has been released.

### **Earthing Switch, Earthing Truck/ Trolley and Testing Plug**

- I. Manually operated earthing switches shall be provided in each switchgear panel to allow earthing of the line side/generator side terminal. Grounding switches shall be designed to withstand the rated and fault current of the largest breaker interrupter element that can be fitted into the switchgear panel.
 

Mechanical inter-locking with circuit breaker truck shall be provided. This shall comprise the earthing only to be closed in the event that the circuit breaker is in draw-out position and suitable padlock facilities and pad locks. Additional electric interlocking shall also be provided.
  
- II. For each bus-bar section one 3-phase earthing truck/trolley for earthing the relevant bus-bar section shall be provided. The earthing device shall be fully and securely interlocked to prevent incidental opening of the earthing connection or to prevent incidental closing of related bus-bar infeeds.

- III. 3 phase test plugs shall be provided, fully insulated for test voltages usually applied to switchgear and cables. Terminals of the test plugs shall be arranged to receive flexible copper conductors upto 120 mm<sup>2</sup> single core, as normally used for current injection tests.

One complete 3-phase set of test plugs shall be supplied for each bus-bar section.

The earthing devices shall be supplied with racks or in cases, and with extensive operational instructions suitably fixed.

### **Scope of Supply**

- (i) Incoming generator panel (4 Nos)
- (ii) Station transformer panels (2 Nos.)
- (iii) Out-going panel (1 Nos)

The switchgear panels shall be equipped as follows:-

Bus-bar compartment: Air insulated 2500 A copper.

#### **Incoming panels (4Nos), each comprising of:-**

- Vacuum /SF-6 circuit breaker 630 A, 25 KA, 12 KV withdrawable type, mounted on trolley/trucks.
- Motor charged spring operated mechanism totally enclosed with the switchgear in operation condition.
- Earthing switch with padlocked arrangement with feedback signal.
- Connection facility for 1x300mm<sup>2</sup>, XLPE, 15 KV rated, copper cable per phase.
- Closing/tripping and under voltage coil, shunt trip with emergency.
- Hand operation arrangement.
- Necessary auxiliary contacts.
- Current Transformers.
- Potential transformers.
- Surge Arrestors.
- Potential transformer 11kV/110V, 100VA for voltage matching between incoming and common busbar/synchronizing arrangement.
- Low Voltage compartment to be equipped with.
- Voltmeter
- Indication lights, RED/OFF, Green/ON Yellow/TRIP
- Necessary Indicators\

#### **(ii) Station transformer panel (2Nos), comprising of**

- Vacuum /SF-6 circuit breaker 630 A, 25 KA, 12 KV with-drawable type, mounted on trolley/trucks.
- Motor charged spring operated mechanism totally enclosed with the switchgear in operation condition.
- Earthing switch with padlocked arrangement with feedback signal.
- Connection facility for 1x300mm<sup>2</sup>, XLPE, 15 KV rated copper cable per phase.
- Closing/tripping and under voltage coil, shunt trip with emergency.
- Hand operation arrangement.
- Necessary auxiliary contacts.

- Current Transformers.
- Potential transformers.
- Surge Arrestors.
- Potential transformer 11kV/110V, 100VA for voltage matching between incoming and common busbar/synchronizing arrangement.
- Low Voltage compartment to be equipped with.
  - Voltmeter
  - Indication lights, RED/OFF, Green/ON Yellow/TRIP
  - Necessary Indicators
- 

Please see attached Data Sheet for further details.

### **Outgoing Panel (1Nos) comprising of:-**

- SF-6/Vacuum circuit breaker 2500A, 25 KA, 12 KV with-drawable type; mounted on trolley/trucks.
- Motor charged spring operated mechanism totally enclosed switchgear in operation condition.
- Earthing switch with padlocked arrangement and with feedback signal.
- Connection facility for 4x300mm<sup>2</sup>, XLPE, 15 KV rated; copper cable per phase or aluminum cable of equivalent size to delivers full load of 20 MW to SEPCO.
- Closing/tripping and under voltage coils, shunt trip with emergency.
- Hand operation arrangement.
- Necessary auxiliary contacts.
- Surge Arrestors.
- Current Transformers.
- Potential transformers.
- Potential transformer 11 KV/ 110V, 100 VA for voltage matching and synchronizing arrangements.
- Low Voltage compartment to be equipped with Complete metering arrangement (as per SEPCO standard specifications) meters including:
  - Ammeter
  - Voltmeter
  - Watt meter
  - Var meter
  - Power factor meter
  - Energy meter KVA, h & KWH.
  - Frequency meter
  - Indication lights, RED/OFF, Green/ON Yellow/TRIP
  - Necessary Indicators

### **Low Voltage & MCC Board**

Low voltage station boards shall be factory built and tested as per applicable IEC, VDE or BS standards for indoor installation. It shall be designed as free standing type, metal enclosed cubicles with front doors for floor mounting, rubber profile, gaskets and appropriate fasteners. Sheet steel shall be 2mm thick with pre-treated and finished with anticorrosion paint.

|                                                                 |                                     |
|-----------------------------------------------------------------|-------------------------------------|
| - Type                                                          | SF-6/Vacuum                         |
| - Rated current at ambient temp                                 | 2500 A                              |
| - Rated short circuit breaking current (symmetrical rms) 3 sec. | 25kA                                |
| - Short circuit making current                                  | 63kA                                |
| - Rated cable charging breaking                                 | 50A                                 |
| - Current                                                       |                                     |
| - Rated operating sequence                                      | o-t-co-t'-co with t 0.3 sec t'3 sec |
| - Closing time                                                  | 80 ms                               |
| - Opening time                                                  | 60 ms                               |
| - Life duration of contacts                                     | 20,000 ops                          |
| - Auxiliary contacts (NO/NC)                                    | 10/10                               |
| - Voltage                                                       | 110 V DC                            |
| - Operating mechanism                                           |                                     |
| - For closing                                                   | spring                              |
| - For opening                                                   | spring                              |
| - Trip coils                                                    | 2 Nos.                              |

### 3. Circuit Breaker (Gent. to Bus Bar), Incoming

- Rated current at ambient temp 630 A
- Other rating as per item 2 above.

### 4. High speed earthing switch

- Rated short making current 63kA
- Rated short time 3 seconds with stand current 25kA
- Rated peak short circuit withstand current 95 kA
- Operating temp mechanism IEC 109

### 5. Current transformer (outgoing) 11kV

- Applicable standards IEC 185
- Rated primary current
- Protection and metering 2500-1250A
- Bus-bar protection 2500 A
- Rated secondary current 5A
- Measuring cores:
- No of cores 1.
- Accuracy class 0.2
- Burden 30 VA
- Protection cores
- No of cores 3.
- Accuracy class
- Core 1 5 P20
- Core 2 5 P20
- Core 3 x
- Burden
- Core 1 30 VA
- Core 2 30 VA
- Core 3 V<sub>kp</sub>>500
- Rated frequency 50
- Steady state frequency range 47.5 to 52 HZ.
- Transient frequency range for <10sec. -25% +18%

### 6. Current transformer (Gen-breaker) 11kV

- Applicable standards IEC 185
- Rated primary current
- Protection & metering 800-400 A
- Bus-bar protection 2500 A
- Rated Secondary current 5A
- No of Cores 1
- Accuracy 0.2
- Burdan 30 VA

|                      |            |
|----------------------|------------|
| - Protection cores   |            |
| No of Cores          | 2          |
| Accuracy core1/core2 | 5P20/x     |
| Burdan Core1/core2   | 30/Vkp>500 |

## 7. Voltage trsf.

|                        |                |
|------------------------|----------------|
| Rated primary Vol.     | $11/\sqrt{3}$  |
| Rated Sec. Vol.        | $100/\sqrt{3}$ |
| Rated Ter. Vol         | $100/\sqrt{3}$ |
| Rated Burden           | 100 VA         |
| Accuracy Class         | 0.5            |
| Impulse withstand vol. | 95 kV          |

## 8. Surge arrester, Heavy duty

|                                              |       |
|----------------------------------------------|-------|
| Rated arrester vol.                          | 15 kV |
| Short circuit rating 3 sec.                  | 25KA  |
| High impulse current                         | 65KA  |
| Insulation of arrester, external assembly    |       |
| Bill (1.2/50 us full wave)                   |       |
| (rated lightning impulse with stand voltage) | 95KV  |
| Power frequency withstands vol.              | 38KV. |

## 9. Circuit Breaker for station transformer

- Rating same as per item 3 above.

## PARTICULARS OF SYSTEM AND INSTALLATION

|                                         |        |
|-----------------------------------------|--------|
| Power cable access from                 | Bottom |
| Power cable entry from                  | Bottom |
| Control Cable entry from                | Bottom |
| Control Vol. for CB operating mechanism | 110 DC |
| Control Vol. for CB Closing solenoid    | 110 DC |
| Control Vol. for CB shunt trip solenoid | 110 DC |
| Control Vol for protection/metering     | 110 DC |
| Degree of protection of enclosure       | P41    |
| Degree of protection of partition       | IP22.  |

|                                                |                               |
|------------------------------------------------|-------------------------------|
| Design ambient temp. range                     | -5° to 45C                    |
| Max. operating condition range                 | 10° to 55°C                   |
| Max. Humidity                                  | 90%                           |
| Operating (Nominal) voltage                    | 11 kV                         |
| Transient voltage range (on operating voltage) | +25%<6 second                 |
| System voltage Maximum continuous              | 12 kV                         |
| Installation                                   | Indoor                        |
| Number of Phases                               | 3                             |
| Number of Bus-bar (conductor-copper)           | single bus-bar system, 2500A. |
| Impulse withstand voltage                      | 75kV                          |
| Power frequency withstand voltage (1 min)      | 28kV                          |
| Short time with stand current (3 sec)          | 25 kA                         |
| Design duration of Symmetrical                 |                               |
| Short circuit current (min) duration           | 3 Sec                         |
| Rated peak short circuit with stand current    | 63 KA                         |

### **POSSIBLE ARRANGEMENT OF SEPCO STEP-UP 11KV/132 KV GRID STATION TO UTILIZE KESZ POWER**

As stated earlier the power produced at KSEZ-20 MW is envisaged to be exported to SEPCO through one 11 kV common out going circuit from 11KV panel of power plant. SEPCO has the option to establish its own 11 KV switchgear room for distributing this power to its customers of neighboring area. SEPCO also has an option to establish its own grid station, take supply on 11kV from KSEZ plant and then transmit power, in excess of local requirement, to its 132 kV network by putting up step-up 11/132 kV transformer and 132 kV transmission line up to their network.

If SEPCO decides to establish a step-up grid station 11/132 kV, the configuration of this grid station will be as per SEPCO/WAPDA planning. However a possible arrangement or indicative single line diagram having a transformation capacity of 25/32.5 MVA, ONAN/ONAF, 11/132 kV is attached for reference only.

The transmission line shall be brought up to the Power Plant by SEPCO at its own cost; metering for Power sold shall be at the Power Plant Grid Station Gantry).

**Ref. from Alternative and Renewable Energy Policy 2011.**

### **Guaranteed Market: Mandatory Purchase of Electricity**

It shall be mandatory for NTDC/ CPPA/ DISCOs to buy all the electricity offered to them by ARE projects established pursuant to the ARE Policy 2011 at rates determined by NEPRA.

### **Grid Connection, Off-take Voltage and Interface**

Electricity shall be purchased from ARE power projects at 220 kV at the outgoing bus bar of the power station of the project company if the power station is located within 70 km of an existing 220 kV transmission line, or at 132 kV if it is within 50 km of an existing 132 kV transmission line, or at 11 kV if it is within 5 km of an existing 11 kV distribution feeder, or at 400 V if it is within 1 km of a 400 V distribution feeder. The minimum average power to be supplied in each case would be 1,250 kW/km, 250 kW/km, 100 kW/km, and 20 kW/km, respectively. ARE-IPPs may also undertake to lay a new transmission line for connection with the main grid. The power purchase tariff determination will be adjusted accordingly for each of these options. The construction of transmission lines for evacuation of power from ARE IPPs set up for connection to the utility grid should be the responsibility of the power purchaser, unless the ARE-IPP, of its own choice, undertakes to install such infrastructure on a mutually agreed upon transmission charge with the power purchaser.

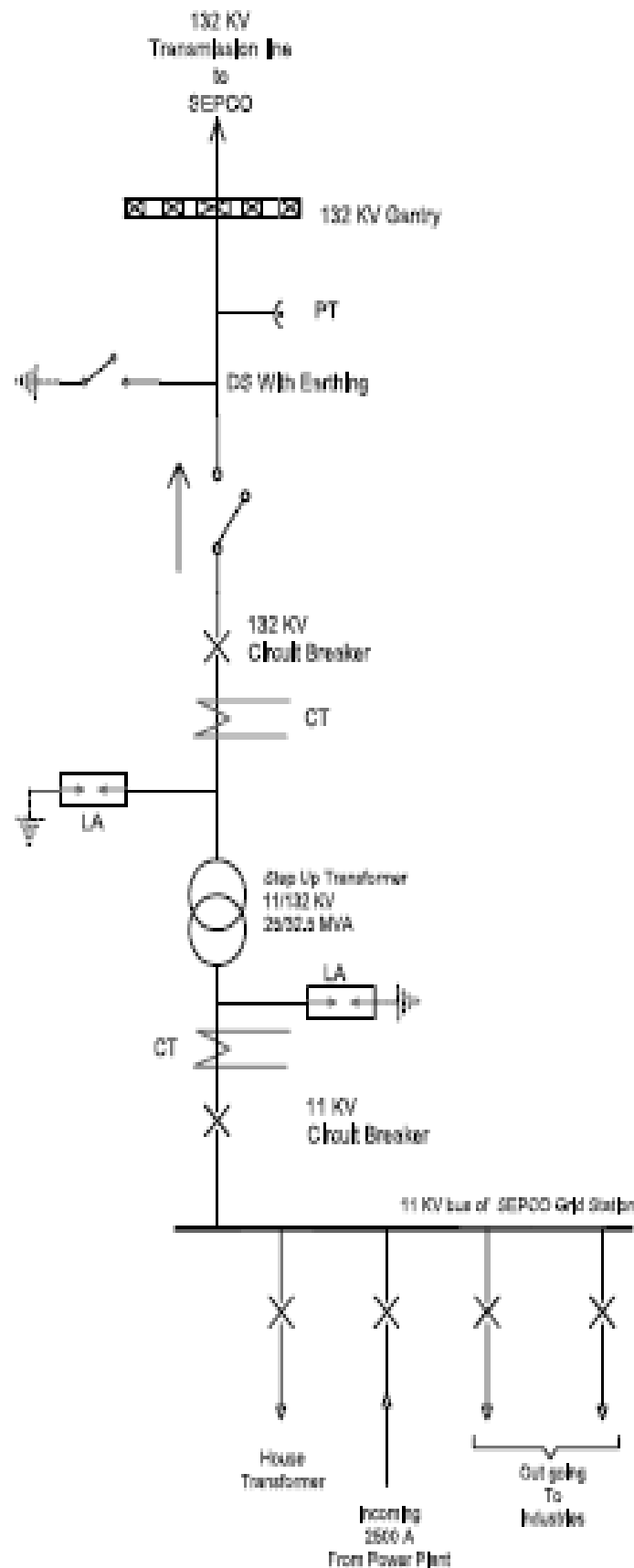
The net energy available for sale shall be determined after taking into account electrical efficiency, auxiliary loads, transformation efficiency, plant availability and other similar considerations, including for anticipated maintenance and outages. However, once EPAs are entered into, technical parameters shall not be varied except with the consent of the power purchaser.

The Grid Station shall be constructed in consultation with SEPCO to WAPDA specifications. Estimated cost for the Grid Station is included in the Project Capital Cost.

### Indicating single Line Diagram







|                                                                                                                                                   |                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>JAFRI AND ASSOCIATES</b><br>CONSULTING ENGINEERS<br>1st Floor, 100ft Road, P.O. Box 425, Model Town, Lahore<br>PAFISTAN (042) 3501204, 3501205 |                    |
| <b>KSEEP-30 MW Khajpur<br/>         MDW Agro-Waste Based Power Plant</b>                                                                          |                    |
| <b>Single Line Diagram</b><br>Showing possible arrangement of<br>SEPCO Step Up 11/132 KV Grid<br>Station to utilize KSEEP Power                   |                    |
| DRAWN BY<br>DATE                                                                                                                                  | CHECKED BY<br>DATE |
| APPROVED BY<br>DATE                                                                                                                               | DATE               |

## **CIVIL WORKS**

### **Seismic Design and Wind Loads**

The influence of the seismic activities on the plant shall be taken into account and seismic design of the structures shall be in accordance with the local codes requirements.

Wind loading for the structural analysis of all buildings and structures shall be based on wind speed as per meteorological data.

### **Concrete Works including reservoir and structural steel works**

All concrete and structural steel works and their design shall be in accordance with the American Concrete Institute (ACI), American Institute of Steel Construction (AISC) or as chosen by the BOO Operator duly approved by the Civil Consultants.

### **Steel Works**

Turbine Hall for Steam Turbines

The following main items would be installed in the turbine hall:

Turbine generators, lubrication oil facilities and all ancillary plant items. The turbine building shall consist of a steel structure with insulated trapezoidal metal sandwich panels for external walls and roofs.

The building shall have an overhead travelling crane.

Boilers would be suitable for outdoor Installation. \

The load bearing capacity of the soil at the proposed site would be in accordance with the recommendations of the geo-technical study to be carried out at the identified locations for the plant and equipments by the BOO Operator.

The feed water pumps, feed water storage tank(s) and generator(s) would also be located in the turbine hall.

### **Switchgear Buildings**

The switchgear buildings shall be erected for 11 KV Switchgear and Control Room.

The sizes of switchgear building and the switchyard have to be determined by the selected BOO Operator.

### **Workshop, Store and Garage Building**

This building would be one storey building served by an overhead travelling crane of sufficient capacity. The building would consist of a steel structure with insulated trapezoidal metal sandwich panels for external walls and roof. The floor would be of reinforced concrete with an oil proof and hardwearing surface treatment. Sanitary facilities and offices shall be provided in the building.

### **Outdoor Storage**

The outdoor storage would be situated adjacent to the workshop and store buildings

### **Pump Houses**

In this area the following shall be located.

- Central compressed air station
- Fire fighting pump house and foam station; and,

This would be simple single storey buildings of column and beam construction with block walls. Floor and foundation block for pumps and compressor shall be RCC.

### **Offices and Admin Buildings**

The Building complex shall contain offices for the Plant Manager and all support staff. Facility for library and committee rooms shall be provided. Sufficient facilities for staff and offices First Aid room and a small dispensary shall be provided.

The Building will be self sufficient having toilets shower rooms, changing and locker areas, in and out time clocks for the officers and staff.

The office and Admin Block shall be provided with split A/C Units.

### **Storm Water Drainage System**

The storm water system shall consist of underground pipes and open ditches, including all necessary gutters, gullies, traps, catch pits, manholes, etc. for the collection and discharge of the clean storm water from the surface of the plant site.

The KSEZ site is lower than the main road. However its level is the same as fields surrounding it.

Nevertheless for safety reasons it would be advisable to raise the level of the whole Plant area say by 1 foot over and above the final proposed level of the KSEZ site.

The Plant room Building floor itself should be raised by 3 feet over and above this level (i.e. 4 feet above the final ground level of the KSEZ).

The drain from the Power Plant shall be connected to the Storm Water drains of the KSEZ Project with suitable locks to ensure that under pressure there is no reverse flow. The effluent shall pass through a suitable effluent treatment facility to meet the NEQS requirements.

### **ENVIRONMENT & SOCIAL IMPACT ASSESSMENT (ESIA)**

Any Industrial facility more so a Power Generation Plant needs to satisfy the laws of the land in respect of Environment and Social Impact Assessment. This aspect shall have to be fulfilled by the BOO Operator.

The laws limit the emission in the exhaust and in the Waste Water.

The methodology to be adopted to fulfill the requirement shall be submitted to the SEPA by the BOOT operator and NOC obtained well in advance of the COD.

### **COST OF ADMINISTRATION**

Number of people to be engaged for the project Administration is slightly on the high side because the facility is estimate to operate round the clock and around the year. The payment level has been kept a little on the positive side and the additional numbers shall allow for absenteeism and attrition. The costs have been considered assuming what would be estimated by the BOO operate.

All these costs would go into the tariff formation which eventually has to be approved by NEPRA.

## **CARBON CREDIT-VOLUNTARY UNITS OR THOSE SOLD THROUGH RIGOROUSLY VALIDATED CLEAN DEVELOPMENT MECHANISM (CDM).**

A carbon credit is a generic term for any tradable certificate or permit representing the right to emit one tonne of carbon dioxide or the mass of another greenhouse gas with a carbon dioxide equivalent (tCO<sub>2</sub>e) equivalent to one tonne of carbon dioxide.

Carbon credits and carbon markets are a component of national and international attempts to mitigate the growth in concentrations of greenhouse gases (GHGs). One carbon credit is equal to one metric tonne of carbon dioxide, or in some markets, carbon dioxide equivalent gases. Carbon trading is an application of an emissions trading approach. Greenhouse gas emissions are capped and then markets are used to allocate the emissions among the group of regulated sources.

The goal is to allow market mechanisms to drive industrial and commercial processes in the direction of low emissions or less carbon intensive approaches than those used when there is no cost to emitting carbon dioxide and other GHGs into the atmosphere. Since GHG mitigation projects generate credits, this approach can be used to finance carbon reduction schemes between trading partners and around the world.

There are also many companies that sell carbon credits to commercial and individual customers who are interested in lowering their carbon on a voluntary basis. These carbon off setters purchase the credits from an investment fund or a carbon development company that has aggregated the credits from individual projects. Buyers and sellers can also use an exchange platform to trade, such as the Carbon Trade Exchange, which is like a stock exchange for carbon credits. The quality of the credits is based in part on the validation process and sophistication of the fund or development company that acted as the sponsor to the carbon project. This is reflected in their price; voluntary units typically have less value than the units sold through the rigorously validated Clean Development Mechanism.

The proposed KSEZ MSW based project does qualify for Carbon Credit but **additionally** has to be proven and certified. The following should explain it.

It is important for any carbon credit (offset) to prove a concept called **additionally**. The concept of additionally addresses the question of whether the project would have happened anyway, even in the absence of revenue from carbon credits. Only carbon credits from projects that are "additional to" the business-as-usual scenario represent a net environmental benefit. Carbon projects that yield strong financial returns even in the absence of revenue from carbon credits; or that are compelled by regulations; or that represent common practice in an industry are usually not considered additional, although a full determination of **additionally** requires specialist.

It is generally agreed that voluntary carbon offset projects must also prove **additionally** in order to ensure the legitimacy of the environmental stewardship claims resulting from the retirement of the carbon credit (offset). According the World Resources Institute/world Business council for Sustainable Development (WRI/WBCSD); "GHG emission trading programs operate by capping the emissions of a fixed number of individual facilities or sources. Under these programs, the tradable 'offset credits' are issued for project-based GHG reductions that occur at sources not covered by the program. Each offset credit allows facilities whose emissions are capped to emit more, in direct proportion to the GHG reductions represented by the credit. The idea is to achieve a zero net increase in GHG emissions, because each tone of increased emissions is 'offset' by project-based GHG reductions. The difficulty is that many projects that reduce GHG emissions (relative to historical levels) would happen regardless of the existence of a GHG program and without any concern for climate change mitigation. If a project 'would have happened anyway,' then issuing offset credits for its GHG reductions will actually allow a positive net increase in GHG emissions, undermining the

emissions target of the GHG program. Additionally, it is thus critical to the success and integrity of GHG programs that recognize project-based GHG reductions.”

Therefore if Carbon Credit is to be claimed; a firm specializing in the validation process has to be engaged to make out a case for the CDM Executive Board and follow it up.

For the purposes of this Feasibility Report benefit of Carbon Credit has not been considered.

## **Other Information**

### **Meteorological Conditions**

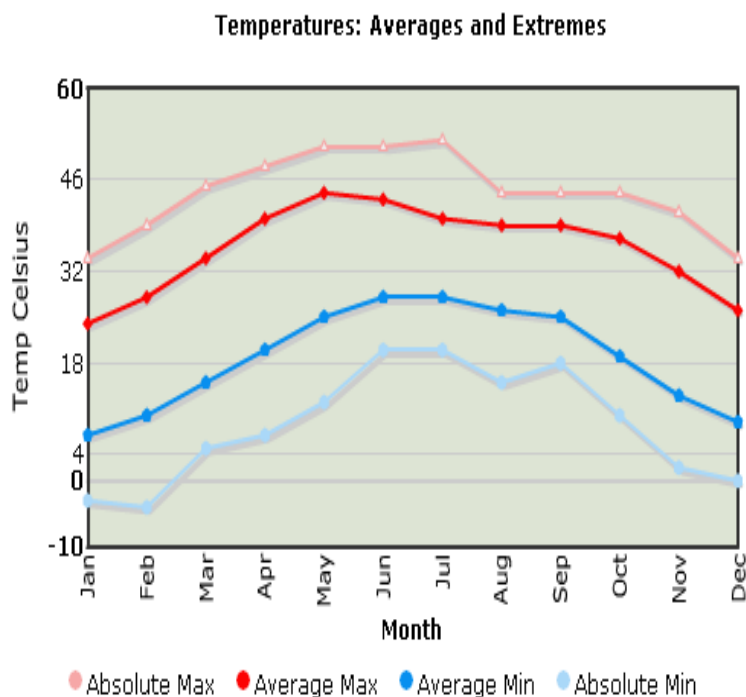
The information presented below gives detailed historical monthly average weather conditions along with exceptional weather occurrences. To maintain relevance to current weather trends the displayed information has been calculated using data collected over the past two decades. The climate profile is taken from closest available data source to Khairpur.

### **Yearly Trends: Weather Averages & Extremes**

The following charts show yearly weather trends with information on monthly weather averages and extremes.

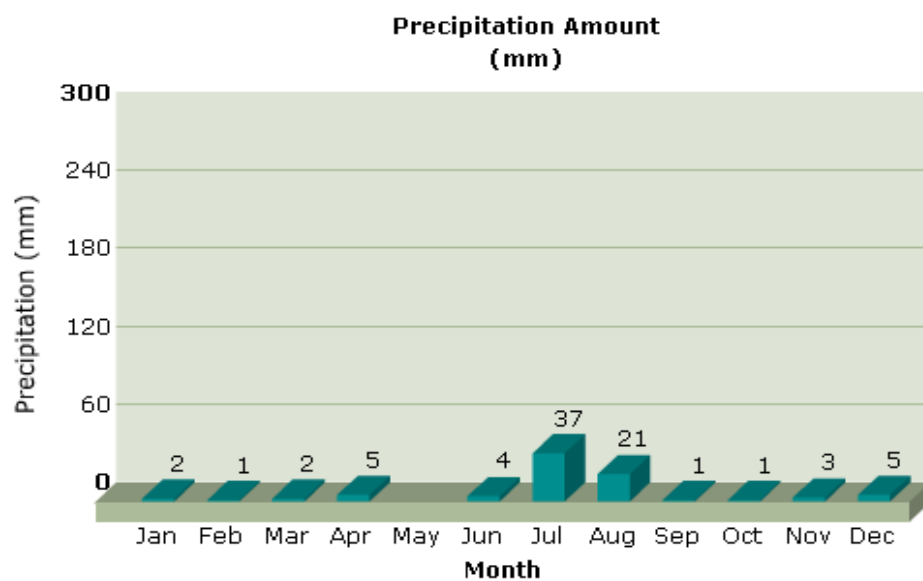
#### **Temperature**

The chart below plots the average high and low temperature for each month of the year. It also shows the maximum and minimum recorded



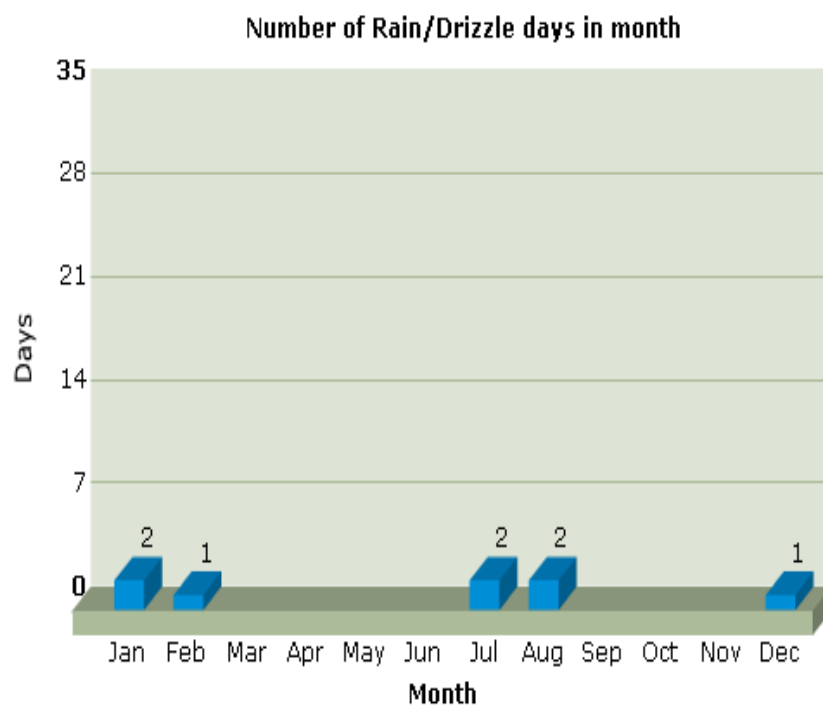
### Precipitation Amount

The chart below plots the average monthly precipitation amount.



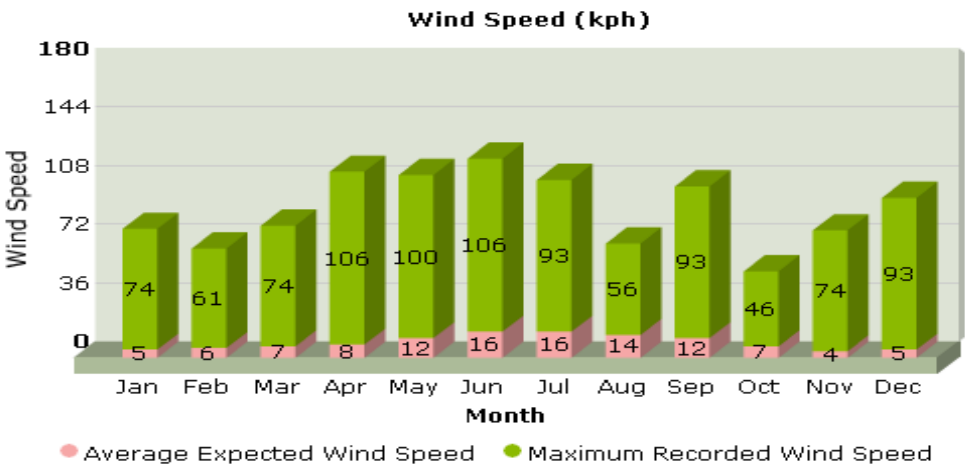
### Rain days

The chart below plots the average number of days in any month that you can expect to see rain falling.



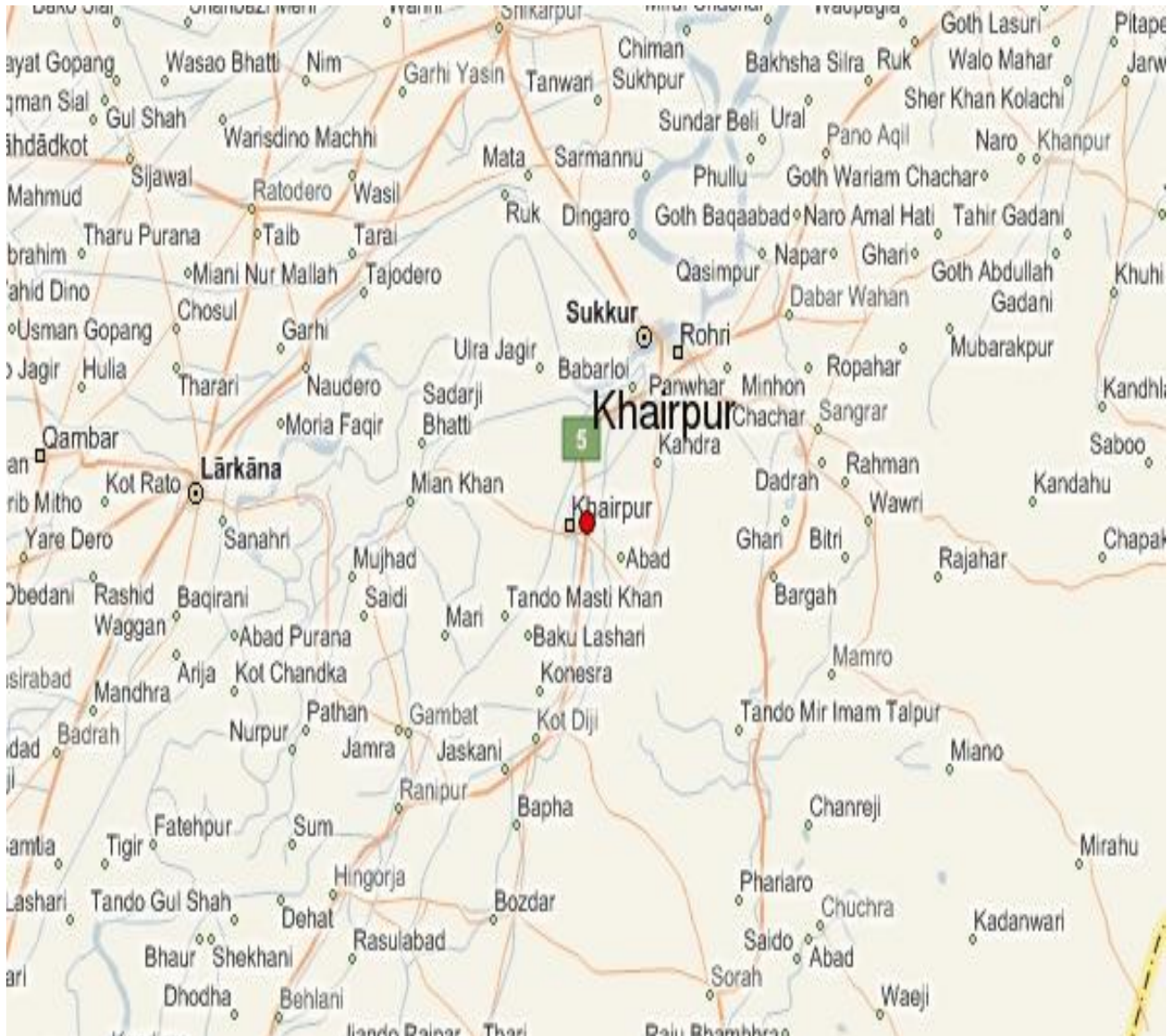
**Wind Speed**

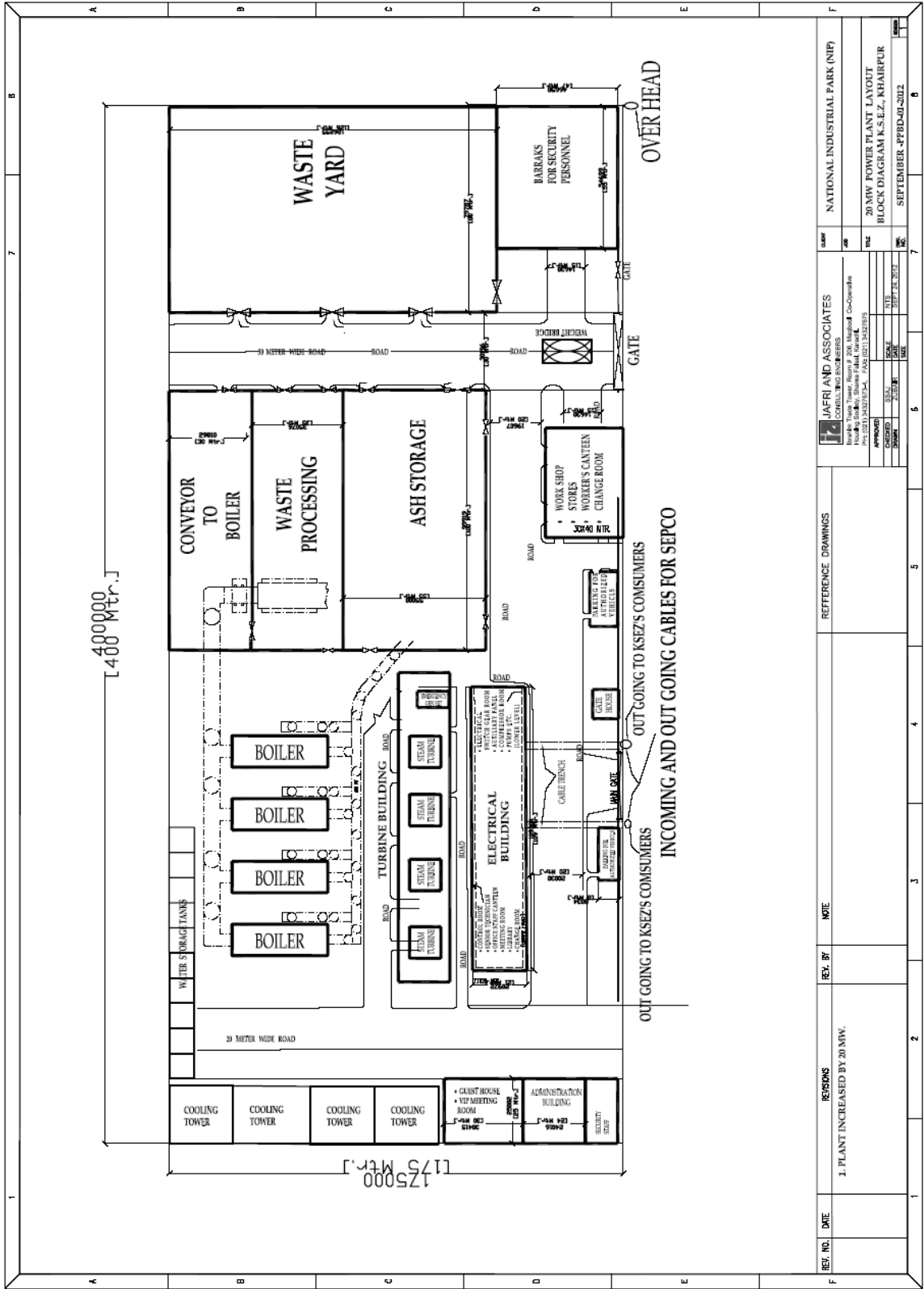
The chart below plots the average daily wind speed you can expect for any month. It also shows the maximum recorded sustained wind speed for each month.



## **APPENDICES TO PROJECT INFORMATION**

### **PROJECT LOCATION MAP**





| REV. NO. | DATE | REVISIONS                    | REV. BY | NOTE | REFERENCE DRAWINGS | CLIENT                                                                                  | PROJECT                                                     |
|----------|------|------------------------------|---------|------|--------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------|
| 1        |      | 1. PLANT INCREASED BY 20 MW. |         |      |                    | IAFRI AND ASSOCIATES<br>CONSULTING ENGINEERS<br>B-10, T-10, Sector 10, Gurgaon, Haryana | NATIONAL INDUSTRIAL PARK (NIP)                              |
| 2        |      |                              |         |      |                    | APPROVED<br>DATE: 20/09/2012                                                            | 20 MW POWER PLANT LAYOUT<br>BLOCK DIAGRAM K.S.E.Z., KHARPUR |
| 3        |      |                              |         |      |                    | CHECKED<br>DATE: 20/09/2012                                                             | SEPTEMBER -2012                                             |
| 4        |      |                              |         |      |                    | DRAWN<br>DATE: 20/09/2012                                                               |                                                             |
| 5        |      |                              |         |      |                    |                                                                                         |                                                             |
| 6        |      |                              |         |      |                    |                                                                                         |                                                             |
| 7        |      |                              |         |      |                    |                                                                                         |                                                             |
| 8        |      |                              |         |      |                    |                                                                                         |                                                             |
| 9        |      |                              |         |      |                    |                                                                                         |                                                             |
| 10       |      |                              |         |      |                    |                                                                                         |                                                             |





## **Ancillary Facilities**

**[To be provided by the EDGOS and/or KSEZ]**

The EDGOS and KSEZ shall provide the following minimum facilities unless otherwise agreed:

1. Electrical connection for the construction period.
2. Water connection for the construction period.
3. Water connection for the project consumption at an agreed cost per gallon.
4. General security (plant security shall be the responsibility of the BOOT Contractor).
5. Assistance in dealing with local government departments including SEPCO.

### **General:**

If any facility other than those described above is required BOOT Contractor shall have to ask for it specifically in proposal.

## **SECTION D ANNEXURES AND PROPOSAL FORMS**

### **APPENDIX A – MAIN COMPONENTS OF THE FINANCING PLAN AND THE FINANCIAL MODEL**

| SECTION                                                                                                                                                                                                                                                                                                                                                               | TITLE                       | CONTENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>This Appendix summarizes the instructions to be followed by Bidders in developing their financing plan and financial model.</b>                                                                                                                                                                                                                                    |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>A.1</b>                                                                                                                                                                                                                                                                                                                                                            | <b>Financing plan</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Bidders must provide a detailed description of the proposed financial structure and financing instruments for the undertaking of the Concession. They must demonstrate that the proposed financing and financial projections are sufficient to cover all of the needs of the Concession during its term (including design, construction, operation, and maintenance). |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| A.1.1                                                                                                                                                                                                                                                                                                                                                                 | General Information         | <ol style="list-style-type: none"><li>1 The financing plan must include a description of the proposed financial structure, as well as the financing sources and instruments and the terms and conditions of the latter. The GoS expects that the financing plan will be at a sufficiently advanced state of development to provide a very high level of confidence with respect to the likelihood of its realization following the announcement of the Preferred Bidder. The proportion and source of Equity, Loans (bank, bond or other), and other Financing Instruments must be established.</li><li>2 In order to minimize the risk at Financial Close, and to comply with the proposed schedule, the latter will not accept a financing plan under which the Bidder proposes to rely on a best efforts underwriting arrangement to implement the Initial Financing. As a result, any financial proposal that is submitted on this basis will be judged to be non-compliant. Financing for the Project shall be in the form of equity and debt. [25]% of the total financing for the Project, inclusive of all contingencies, including cost overruns of any nature, will be in the form of equity and the remainder in debt or subordinated debt. The Main Sponsor shall be required to hold at least 20% of the equity ownership in the Project, or of the Project Company, at all times until the sixth anniversary of the Commercial Operations Date (COD). The Successful Bidder collectively shall be required to hold at least 51% of the equity ownership in the Project, or of the Project Company, until the sixth anniversary of the COD.</li></ol> |
| A.1.2                                                                                                                                                                                                                                                                                                                                                                 | Financing conditions –Loans | <p>With respect to Loans (bank, bond, or any other type), the financial proposal must include a description of the following elements:</p> <ul style="list-style-type: none"><li>• the type and purpose of the Loan</li><li>• the amount of the financing and the currency</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

- the detailed capital draw-down schedule
- the principal repayment schedule should be equal amortisation on a 7 year loan with 2 years of grace period and 5 years of repayment
- For local financing the rate assumed should be benchmark rate at 10% with a spread of 3%; leading to the interests on local financing rate of 13%.
- engagement fees, underwriting fees, commitment fees, breakage costs and other expenses should be included at a reasonable rate
- guarantees required
- insurance or performance and payment guarantees required
- reserve account and escrow account requirements (debt service, maintenance, etc.);
- financial ratios to be maintained and other requirements and restrictive clauses;
- events of default
- step-in rights
- hedging strategies proposed for mitigating the risks of interest rate, inflation, and exchange rate fluctuations, where applicable
- conditions precedent
- requirements pertaining to the due diligence review (The due diligence review should have been completed before submission of the Proposals)
- any other restrictions, requirements, or conditions that could significantly influence the capacity of the Bidder to finalize the financing or to use the committed funds after the Financial Close
- Interest During Construction (IDC) should be included as the part of project cost, provided that the developer completes the construction within the scheduled time of 2 years. In case of delay in implementation, the IDC above 2 years will be borne by the concessionaire. The concessionaire shall also use equity initially to fund the project costs once equity has been used up than it should rely on debt.

A.1.3 Implementation of Financing

A Bidder must present the timetable that it plans to follow in order to affect Financial Close of the Concession by the deadline established further to its selection as the Preferred Bidder.

A.1.5 Robustness of the financing plan

The Bidder must provide a description of the robustness of its financing plan, including details concerning the management of principal risks (e.g.: interest rates, inflation, revenues, construction schedule, capital expenditures, operations, regular maintenance, etc.), among other things.

A.1.6 Summary of the Financial Bid Offer

A summary of the key elements of the Bid shall be provided by the Bidder. This statement shall include the following

information:

- The Concession Company's equity commitment
- Levelized Tariff in both PKR and Us cents over the concession period of 30 years. A schedule of amendments that will be sought prior to the signing of a Concession Agreement (if any)
- A schedule of land requirements (if any) that are envisaged
- A schedule of any other conditions that are attached to the Bid (if any)

## **A.2 Financial model**

### **A.2.1 General information**

Bidders must submit electronic (on CD) and hard copies of the complete and operational financial model used in preparing the Proposal. This financial model must be accompanied by an assumptions book and an instruction booklet. Each Bidder is free to develop its financial model at its discretion, insofar as the model meets the criteria presented in this Section.

### **A.2.2 Structure of the financial model**

- 1 The model must meet the following criteria:
  - the financial model must be prepared on a monthly or quarterly basis during the period ending at the Completion Date, and on an annual or semi-annual, thereafter
  - the financial model must be properly constructed, and must have a professional appearance
  - the financial model must be produced using Microsoft Excel 2007 or a later version
  - every sheet must be formatted in such a way that the printed information is clear and legible
  - the financial model must be presented in nominal PKR, without decimals. Levelized Tariff should be quoted in both PKR and US cents.
  - the financial model must cover the entire term of the Concession Agreement
  - the cells that contain manual inputs must be shown in blue
  - no sheet or cell may be hidden, and the file must not be password-protected
  - calculations must be sufficiently disaggregated that they can be followed logically on screen or on paper without having to examine the content of each cell
  - a limited number of nested formulas ("if") must be used
  - if the financial model contains circular references, it must include a description of the locations of these references and the reasons why they are present. In addition, the circular references must be resolved, that is, the software must find a solution
- 2 the conditions attached to the financing instruments

|       |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                      | <p>must be those that are presented</p> <p>3 Bidders must use the following inputs in developing their financial models:</p> <ul style="list-style-type: none"> <li>• the construction start date for the financial model must be six months after Financial Close.</li> <li>• the discount rate applied to arrive at the levelized tariff is 10%</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| A.2.3 | Outputs required     | <p>The financial model must contain at least the following output sheets:</p> <ul style="list-style-type: none"> <li>• the Sources and Uses of Funds of the Concession</li> <li>• complete financial statements, including a balance sheet, an income statement, a statement of retained earnings, and a statement of cash flows. These financial statements must be prepared in accordance with International Financial Reporting Standards</li> <li>• a summary sheet that contains the following elements: <ul style="list-style-type: none"> <li>– financial ratios, as requested by the Lenders, which indicate the capital structure established in the financial plan, notably debt service coverage ratios, including the minimum ratio, the average ratio, and the ratio calculated over the term of the loan</li> <li>– Equity internal rate of (after-tax) return (“Equity IRR”)</li> <li>– Project internal rate of (after-tax) return (“Project IRR”)</li> </ul> </li> </ul> |
| A.2.4 | Flexibility required | <p>The financial model must allow sensitivity analyses to be carried out using the following elements (but not limited to):</p> <ul style="list-style-type: none"> <li>• variation in the rate of inflation during the construction period</li> <li>• variation in the rate of inflation during the period of operation</li> <li>• variation in interest rates (expressed in basis points)</li> <li>• variation (expressed in percentages) in capital expenditures and in costs of operations and regular maintenance</li> <li>• variation (expressed in percentages) in annuity payments</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                      |
| A.2.5 | Assumptions book     | <p>The assumptions book must set out the following elements in sufficient detail to allow users to obtain a clear understanding of the financial model:</p> <ul style="list-style-type: none"> <li>• Details of Capital and construction costs (including all assumptions in respect of future inflation and the applicable method used for such calculations):</li> <li>• Design, consultancy and project management fees, contingency costs and Insurance costs. The Bidder</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|       |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                  | <p>shall assume the insurance cost to be 1% of the total project cost, which insurance costs will be actualized at the time of Financial Close. Operations and Maintenance costs (including all assumptions in respect of future inflation and the applicable method used for such calculations) for the following categories:</p> <ul style="list-style-type: none"> <li>– Costs associated with routine inspection and maintenance programmes</li> </ul> <p>Consumer Price Index to be used for indexation is to be assumed at 10% for uniformity between different bidders' model and O&amp;M costs for the first year of full O&amp;M (year 3 after construction completion) should not be more than 1% of the project construction costs</p> <p>Exchange Rate for converting PKR to US\$, and vice versa should be assumed at PKR/US\$ 106.</p> |
| A.2.6 | Instruction book | <p>The instruction booklet must explain the various functionalities of the financial model in sufficient detail to allow users to maneuver it effectively. More specifically, the instruction booklet must include:</p> <ul style="list-style-type: none"> <li>• instructions pertaining to the method for changing inputs</li> <li>• instructions pertaining to the method for running the model after making changes to the inputs</li> <li>• instructions pertaining to the method for printing the sheets contained in the model</li> <li>• a summary of the sheets contained in the model and the information therein</li> <li>• details concerning complex and/or unusual formulas</li> <li>• instructions pertaining to the method for performing sensitivity analyses</li> </ul>                                                             |

## **TECHNICAL PROPOSAL**

### **Appendix-01**

#### **Project Conceptual Design, Design Criteria & Technical Details and Implementation Schedule**

**[To be completed by the Bidder]**

**Appendix-02**

**Method of Performing the Work**

**[To be completed by the Bidder]**

**Appendix-03**

**Construction Camps and Housing Facilities**

**[To be completed by the Bidder]**

#### **Appendix-04**

##### **List of Proposed Contractors/Subcontractors**

**[To be completed by the Bidder]**

**Appendix-05**

**Organization Chart for the Supervisory Staff & Labour**

**[To be completed by the Bidder]**

**Appendix-06**

**Operation and Maintenance Methods**

**[To be completed by the Bidder]**

**Appendix-07**

**Funding/Financial Arrangements**

**[To be completed by the Bidder]**

## **Appendix-08**

### **Integrity Pact**

[To be filled and signed by the Bidder]

#### **DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC.**

#### **PAYABLE BY THE SUPPLIERS OF GOODS, SERVICES & WORKS IN**

#### **CONTRACTS WORTH RS. 10.00 MILLION OR MORE**

Contract No. \_\_\_\_\_ Dated \_\_\_\_\_

Contract Value: \_\_\_\_\_

Contract Title: \_\_\_\_\_

..... [Name of Supplier] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Sindh (GoS) or any administrative subdivision or agency thereof or any other entity owned or controlled by GoS through any corrupt business practice.

Without limiting the generality of the foregoing, [name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fees etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultation fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoS, except that which has been expressly declared pursuant hereto.

[name of Supplier] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoS and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

[name of Supplier] accepts full responsibility and strict liability for making any false declaration, not making full disclosure, misrepresenting facts or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right, interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other rights and remedies available to GoS under any law, contract or other instrument, be voidable at the option of GoS.

Notwithstanding any rights and remedies exercised by GoS in this regard, [name of Supplier] agrees to indemnify GoS for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoS in an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by [name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoS.

Name of Buyer: .....

Signature: .....

[Seal]

Name of Seller/Supplier: .....

Signature: .....

[Seal]

## **FORMS**

### **Form-01(a)**

Letter of Technical Proposal

Bid Reference No: \_\_\_\_\_

[should be same as mentioned on Notice for Expression of Interest]

Name of Project/Infrastructure/Facility: \_\_\_\_\_

[mention name of the Project/Infrastructure/Facility]

To: \_\_\_\_\_

[Bidder to insert name and address of the EDGOS]

\_\_\_\_\_

\_\_\_\_\_

Gentleman,

1. Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, general design criteria, operation/maintenance requirements and Addenda Nos. \_\_\_\_\_ (if any) for Detailed Design, Finance, Engineering, Development /Construction, Completion, Testing, Commissioning, Ownership, Operation and Maintenance of 20MW Power Plant and all activities incidental thereto; of the above-named Works, we, the undersigned, offer our Technical Proposal to design, execute, complete and operate/maintain such Works in conformity with the Conditions of Contract, general design criteria, operation/maintenance requirements and Addenda (if any).

2. We understand that all the Annexures/Appendices attached hereto form part of this Financial Proposal.

3. As security for due performance of the undertakings and obligations of this Bid, we submit herewith a Bid Security in the amount of Rupees \_\_\_\_\_ (Rs. \_\_\_\_\_) drawn in your favour or made payable to you and valid for a period of \_\_\_\_\_ days beginning from the date Bids are opened.

4. We agree to abide by this Bid for the period of \_\_\_\_\_ days from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period or any extended period as per Bidding Documents.

5. Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

6. Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

7. We do hereby declare that the Technical Proposal is made without any collusion, comparison of figures or arrangement with any other bidder for the Works.

8. We understand that you are not bound to accept the Technical Proposals you may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_

Signature: \_\_\_\_\_

in the capacity of \_\_\_\_\_ duly authorized to sign Bids for and on behalf of

\_\_\_\_\_

(Name of Bidder in Block Capitals)

(Seal)

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Witness:

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Address. \_\_\_\_\_

Occupation \_\_\_\_\_

## Form-01(b)

### Letter of Financial Proposal

Bid Reference No: \_\_\_\_\_  
[should be same as mentioned on Notice for Expression of Interest]

Name of Project/Infrastructure/Facility: \_\_\_\_\_  
[mention name of the Project/Infrastructure/Facility]

To: \_\_\_\_\_

\_\_\_\_\_

Gentleman,

1. Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, general design criteria, operation/maintenance requirements, our Technical Proposal and Addenda Nos. \_\_\_\_\_ (if any) for designing, execution and operation/maintenance of the above-named Works, we, the undersigned, offer our Financial Proposal to design, execute, complete and operate/maintain such Works in conformity with the Conditions of Contract, general design criteria, operation/maintenance requirements, our Technical proposal and Addenda (if any), for the sum of Rs. \_\_\_\_\_ (Rupees

\_\_\_\_\_ ) or such other sum as may be ascertained in accordance with the said conditions.

2. We understand that all the Annexures/Appendices attached hereto form part of this Bid.

3. As security for due performance of the undertakings and obligations of this Bid, we submit herewith a Bid Security in the amount of Rupees \_\_\_\_\_ (Rs. \_\_\_\_\_) drawn in your favour or made payable to you and valid for a period of \_\_\_\_\_ days beginning from the date Bids are opened.

4. We undertake, if our Bid is accepted, to commence the Works and to complete the whole of the Works comprised in the Contract within the time stated in Appendix-A to Bid.

5. We agree to abide by this Bid for the period of \_\_\_\_\_ days from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

6. Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

7. We do hereby declare that the Financial Proposal is made without any collusion, comparison of figures or arrangement with any other bidder for the Works.

8. We understand that you are not bound to accept the lowest or any Financial Proposal you may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_

Signature: \_\_\_\_\_

in the capacity of \_\_\_\_\_ duly authorized to sign Bids for and on behalf of

\_\_\_\_\_

(Name of Bidder in Block Capitals)

(Seal)

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Witness:

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Address. \_\_\_\_\_

Occupation \_\_\_\_\_

## Form 02

### BID SECURITY

#### (Bank Guarantee)

Security Executed on \_\_\_\_\_  
[Date]

Valid upto \_\_\_\_\_  
[Date]

Name of Surety (Bank) with Address: \_\_\_\_\_  
[Scheduled Bank in Pakistan]

Name and Address of Principal (Bidder) \_\_\_\_\_

Penal Sum of Security Rupees \_\_\_\_\_ (Rs. \_\_\_\_\_)  
[Amount in words] [Amount in figures]

Bid Reference No. \_\_\_\_\_

[should be same as mentioned on Notice for Expression of Interest]

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal (Bidder) we, the Surety above named, are held and firmly bound unto [mention name and address of the EDGOS] (hereinafter called the 'EDGOS') in the sum stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Bidder has submitted the accompanying Bid dated \_\_\_\_\_ for Bid Reference No. \_\_\_\_\_ for \_\_\_\_\_ [mention Particulars of Bid] to the said EDGOS; and

WHEREAS, the EDGOS has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum from a Scheduled Bank in Pakistan or from a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan, to the EDGOS, conditioned as under:

(1) that the Bid Security shall remain in force up to and including the date 28 days after the deadline for validity of bids as stated in the Instructions to Bidders or as it may be extended by the EDGOS, notice of which extension(s) to the Surety is hereby waived;

that the Bid Security of unsuccessful Bidders will be returned by the EDGOS after expiry of its validity or upon signing of the Contract Agreement by the successful Bidder and providing the Performance Security; and

that in the event of failure of the successful Bidder to execute the proposed Contract Agreement for such work and furnish the required Performance Security, the entire said sum be paid immediately to the said EDGOS pursuant to Clause 20.6 of the Instruction to Bidders for the successful Bidder's failure to perform.

that in the event of a Bidder withdraws its bid during the period of bid validity, the entire said sum be paid immediately to the said EDGOS pursuant to Clause 20.6 of the Instruction to Bidders.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefore, on the prescribed form presented to him for signature enter into a formal Contract with the said EDGOS in accordance with his Bid as accepted and furnish within [insert period for furnishing the Performance Security] days of being requested to do so, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said EDGOS for the faithful performance and proper fulfillment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified for its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT the Surety shall forthwith pay the EDGOS the said sum upon first written demand of the EDGOS (without cavil or argument) and without requiring the EDGOS to prove or to show grounds or reasons for such demand, notice of which shall be sent by the EDGOS by registered post duly addressed to the Surety at its address given above.

PROVIDED ALSO THAT the EDGOS shall be the sole and final judge for deciding whether the Principal (Bidder) has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security within the time stated above, or has defaulted in fulfilling said requirements and the Surety shall pay without objection the said sum upon demand from the EDGOS forthwith and without any reference to the Principal (Bidder) or any other person.

IN WITNESS WHEREOF, the above bounden Surety has executed the instrument under its seal on the date indicated above, the name and seal of the Surety being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

|                            |                            |
|----------------------------|----------------------------|
| WITNESS:                   | SURETY (Bank)              |
|                            | Signature                  |
| 1.                         | Name                       |
|                            | Title                      |
| Corporate Secretary (Seal) | Corporate Guarantor (Seal) |
| 2.                         |                            |

\_\_\_\_\_  
Name, Title & Address

## Form-03

### Performance Security for Construction Phase

#### (Bank Guarantee)

Guarantee No. \_\_\_\_\_

Executed on \_\_\_\_\_

Expiry date \_\_\_\_\_

[Letter by the Guarantor to the EDGOS]

Name of Guarantor (Bank) with address: \_\_\_\_\_  
[Scheduled Bank in Pakistan]

Name of Principal (Company) with address: \_\_\_\_\_

Penal Sum of Security [to be express in words and figures] \_\_\_\_\_

Letter of Acceptance No. \_\_\_\_\_ Dated \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the \_\_\_\_\_ (hereinafter called the EDGOS) in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said EDGOS, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has accepted the EDGOS's above said Letter of Acceptance for [name and number of the Contract] for the [name of the Project].

NOW THEREFORE, if the Principal (Company) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the EDGOS, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of relevant Clauses of Conditions of Contract are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, \_\_\_\_\_ (the Guarantor), waiving all objections and defenses under the Contract, do hereby irrevocably and independently guarantee to pay to the EDGOS without delay upon the EDGOS's first written demand without cavil or arguments and without requiring the EDGOS to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the EDGOS's written declaration that the Principal has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to EDGOS's designated Bank & Account Number.

PROVIDED ALSO THAT the EDGOS shall be the sole and final judge for deciding whether the Principal (Company) has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated

above upon first written demand from the EDGOS forthwith and without any reference to the Principal or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

\_\_\_\_\_  
Guarantor (Bank)

Witness:

1. \_\_\_\_\_

\_\_\_\_\_  
Corporate Secretary (Seal)

2. \_\_\_\_\_

\_\_\_\_\_  
Name, Title & Address

Signature \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
Corporate Guarantor (Seal)

## **Section E: Draft Agreements**

(Draft Project Agreements including Implementation Agreement, Power Purchase Agreement and Waste Supply Agreement will be provided at the pre-bid meeting)