GOVERNMENT OF KHYBER PAKHTUNKHWA

Peshawar Development Authority

Request for Proposal (RFP)

For

SOLARIZATION AND DIGITIZATION OF PDA COMMERCIAL COMPLEX PHASE-V AND TUBWELLS IN HAYATABAD TOWNSHIP AND REGI MODEL TOWN ON JV MODE

PESHAWAR DEVELOPMENT AUTHORITY (PDA)

Contents

Abbreviations

AC - Alternating Current
BIPV - Building Integrated Photovoltaics
BOS - Balance of System (refers to all components of a PV system other than the solar panels)
CdTe - Cadmium Telluride (another type of thin-film solar cell material)
CIGS - Copper Indium Gallium Selenide (a type of thin-film solar cell material)
DC/AC - Direct Current to Alternating Current (refers to the process of converting DC power from solar panels to AC power for use in electrical grids)
DC - Direct Current
DER - Distributed Energy Resource
EPC - Engineering, Procurement, and Construction
FIT - Feed-in Tariff
GW - Gigawatt
I-V Curve - Current-Voltage Curve (a graphical representation of the electrical characteristics of a solar panel)
JV - Joint Venture
KWh - Kilowatt-hour
KWp - Kilowatt peak (refers to the maximum power output of a solar panel or system)
LCOE - Levelized Cost of Electricity
MW - Megawatt
MPPT - Maximum Power Point Tracking (a technology used to optimize the power output of solar panels)
NEM - Net Energy Metering
O&M - Operations and Maintenance
PDA-Peshawar Development Authority
PV - Photovoltaic
PVDC - Photovoltaic Direct Current
PVAC - Photovoltaic Alternating Current
RE - Renewable Energy
REC - Renewable Energy Certificate
ROI - Return on Investment

Glossary of Terms

Capitalized terms used in this RFP shall bear the meaning ascribed to them in the following glossary or in the body of this RFP or in the JV mode appended with this RFP. In absence of availability of definitions in the foregoing references, the capitalized terms shall be interpreted in accordance with the NEPRA Act, 1997, NEPRA Grid Code, AEDB Act or any relevant electricity law, rule, or regulations prevalent in Pakistan, as amended or re-enacted from time to time, in that order.

Base Date: As defined in the RFP.

Bid/Proposal: The Technical and Financial Proposal submitted by a Bidder in response to this RFP

Bidder/Contractor: Who submits or intends to submit a proposal in response to this RFP. A Bidder can be an entity or a lead partner in a Consortium/Joint Venture that submits a Proposal in accordance with this RFP.

Calendar: The calendar with tentative key dates for the bidding process provided in the proposal.

Commercial Operations Date (COD): Commercial Operation date defined by bidder.

Consents, Clearances and Permits: All authorizations, licenses, approvals, registrations, permits, waivers, privileges, acknowledgements, agreements, or concessions required to be obtained or provided by any concerned authority for the purpose of setting up of the generation facilities and /or to supply and deliver energy under the JV.

Consortium or Joint Venture (JV): A group of companies or entities that has collectively submitted bid and other documents in response to the Request for Proposal.

CISNR, UET Peshawar / Consultant: Centre for Intelligent Systems and Networks Research, University of Engineering and Technology, Peshawar

Contractor: A Successful Bidder whose JV becomes effective and operative in accordance with its terms.

Evaluation Committee: As defined in the RFP.

Financing Term Sheet: A duly signed indicative offer containing terms & conditions for arrangement of long-term financing, issued by a reputable Bank/Financial Institution in favour of the Bidder for undertaking the Project.

JV: Joint Venture, to be executed between the Successful Bidder and PDA.

JV Tenure: In years starting from the Commercial Operations Date as agreed in the contract agreement.

LOA: Letter of Award issued to the Successful Bidder.

NEPRA: National Electric Power Regulatory Authority

PDA or Client: Peshawar Development Authority (PDA), Peshawar.

PESCO: Peshawar Electric Supply Company (PESCO).

Performance Security: As defined and as per format provided in the JV.

Proposal Period: The contract period quoted by bidder in financial proposal.

Proposal Price: The base fixed price per month the bidder will receive from PDA as per the terms of this RFP.

Proposal Security: Security amount submitted as described in this RFP.

Proposals: As defined in the RFP.

Project Period: A period of project operations quoted by bidder in financial proposal in years, after achievement of COD.

Premises: Rooftop or area earmarked for installation of solar power system**.**

Point of Injection: Localized near transformer (LV side; 400 V) of each site before metering point of building.

PKR: Pakistani Rupee.

Solar power: As defined in JV, having a nominal rated capacity to be established at the Premises and having minimum specifications as defined in Annex - B of this RFP.

Solar power system Value: The initial value of Solar power system in PKR, specified by the Bidder in the Technical Bid, to be used for calculation of termination amount, in case of termination of JV, as provided in section. *24+ of the JV under heading “EARLY TERMINATION AND BUYOUT IN CASE OF DEFAULT”.

RFP: This Request for Proposal issued by the PDA, including all Sections and attachments hereto.

Successful Bidder: The first ranked Bidder who has been awarded an LOA by PDA pursuant to this RFP.

1. Disclaimer Notice

This Request for Proposal (RFP) is provided for use in preparing and submitting the Business proposals in connection with the competitive bidding process for Supply, Installation, Commissioning, Management and Operation of Solar power system for PDA building Complex and Tubewells at Hayatabad Township and Regi Model Town having total capacity of around 8 M-Watts. The system is to be designed, financed, and installed by the Successful Bidder, under Joint Venture (JV). This RFP is being issued by PDA in consultation with the Centre for Intelligent Systems and Networks Research (CISNR), UET Peshawar, solely for use by ESCOs (Energy service companies)/contractors/JV Firms interested in Solarization and digitization/automation of PDA Building and Tubewell sites under a JV with PDA. The operation, maintenance and security of the solar power system and tubewells for agreed project duration will be responsibility of bidder. The bidder will also ensure the operation and Maintenance of Backup Generators at PDA Complex to ensure uninterrupted supply of electricity. The assumptions, assessments, statements, and information contained in this RFP may or may not be complete, accurate, adequate, or correct for the purposes of Bidders. 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 Bidders are required to undertake their independent assessment of sites and shall seek independent professional advice on any or all aspects of this RFP. No decision should be based solely on the information provided in this RFP. Neither any of these entities (Client and consultant), nor their employees, personnel, agents, consultants, advisors, and contractors etc. will be liable to reimburse or compensate the bidder for any costs, fees, damages, or expenses incurred by him in evaluating or acting upon this RFP or otherwise in connection with this transaction as contemplated herein. All information submitted in response to this RFP becomes the property of the PDA and PDA does not accept any responsibility for maintaining the confidentiality of the material including any trade secrets or proprietary data submitted. The Proposals submitted in response to this RFP shall be on the full understanding and agreement of all terms of the RFP and as such submission shall be deemed acceptable to all the terms and conditions stated in this RFP. Any Proposal in response to this RFP shall be construed based on the understanding that the Bidder has done complete and careful examination of the RFP, has visited sites of Dand has independently verified and satisfied itself regarding all the information received (whether written or oral) from PDA. This RFP does not constitute a guarantee or commitment of any manner on the part of the PDA or CISNR UET Peshawar the Consultant that the Bidder shall be selected or agreement for purchase will be concluded. Any Proposal submitted will be regarded as an offer by the Bidder and does not constitute or imply the acceptance of any Proposal by PDA. PDA is under no obligation to award a contract to any Bidder because of this RFP. PDA reserves right in its full discretion, to modify this RFP and/or its terms and conditions at any time, or to revoke the bidding process at any stage with the intimation to all parties, in each case with cogent reasons and without incurring any liability to reimburse or compensate any Bidder for any costs, taxes, expenses or damages incurred by any Bidder in such event. Nothing contained in any other provision of this Proposal, nor any statements made orally or in writing by any person or party shall have the effect of negating or suspending any of the disclaimers set forth in this disclaimer.

12th of August 2024

Director Projects

Peshawar Development Authority,
infodg.pda@kp.gov.pk

2. About PDA:

The Peshawar Development Authority is dedicated to embracing sustainable energy solutions as part of its commitment to reducing carbon emissions and operational expenses. With this overarching vision in mind, we are proposing the implementation of a solar power system for the PDA complex and operations of the water supply tubewell network representing the major expense in the annual budget of the PDA.

This innovative system will leverage the abundant solar energy available in the region to generate electricity. By harnessing the power of the sun, we aim to significantly decrease our reliance on traditional energy sources, consequently lowering our carbon footprint and contributing to environmental preservation efforts.

Another major cost that can be nullified by achieving even better quality of service and operational efficiency is by introducing digitization in the operation of tube wells. This will provide autonomous seamless operation with a central control and monitoring prospect having intelligent protection by interrupting / intruding into operations in case of saving the abnormal damages to machinery and excessive heating.

Moreover, the installation of these systems aligns perfectly with our goal of adopting eco-friendly practices and promoting sustainability within our organization. Not only will it enable us to reduce our environmental impact, but it will also lead to substantial long-term cost savings by minimizing our dependence on conventional electricity sources.

By integrating solar energy into our operations, we are not only embracing modern technology but also demonstrating our firm commitment to building a greener, more sustainable future for Peshawar and its residents. This initiative serves as a testament to our dedication to responsible stewardship of resources and our proactive approach towards addressing environmental challenges.

Initiate and maintain a continuous process of comprehensive development planning for the Authority area with the objective of preparing and implementing master plan.

Periodically update such master plan and co-ordinate its implementation by the Authority and Government agencies within the Authority area.

Develop, operate and maintain water-supply, sewerage, solid waste and drainage systems within the Authority area.

Prepare and ensure compliance of the Annual Development Program for the Authority area with priorities, established in the master plan, after its preparation and evaluate performance under the Annual Development Program at the end of each year.

Establish, maintain and periodically revise as necessary, planning controls and building regulations for the Authority area to–Provide appropriate urban design and protect public safety; and ensure compliance with the master plan after its preparation.

Prepare, implement and enforce, in consultation with other relevant departments of Government, schemes and **schemes for environmental improvements**, urban renewal including slum improvement and redevelopment, solid waste disposal, transportation and traffic, health and education facilities and preservation of objects or places of historical, archaeological, scientific, cultural and recreational importance.

3. Objectives of the Project:

The main objective of the project is to transform PDA on an energy transition, adaptation and sustainability platform. Renewable integration and digitization will pave ways for PDA towards a

sustainable and climate friendly institution. PDA will stand tall with its efforts to not only incorporate energy efficiency via digitization bringing transparency in its operation but also will become the first public sector institution going all greener in terms of energy utilization. Contractors are encouraged to come up with the best optimal solutions for the task at hand. With a sanctioned load of around 8 M-Watts, representing the maximum authorized power from the utility company, careful consideration must be given to matching the solar system capacity accordingly. To accurately calculate the total consumption and cost of electricity for PDA, the electrical bills of the site have been analysed, providing detailed information on monthly consumption, energy charges, and other billing components. This analysis enables a precise determination of the total annual consumption and associated costs. The project comprises of not only RE Integration but also implementation of digitization and automation of tubewell sites making them operator less. This will increase reliability, schedule compliance and reduced maintenance cost with added advantage of reduction in electricity theft. The decision for PDA energy transition signifies a sizable step towards establishing a sustainable future. By harnessing solar power, the institution can reduce its dependence on traditional fossil fuels, decrease its carbon footprint, and contribute to a climate friendly environment. Additionally, the adoption of solar power system offers the potential for long-term cost savings, ensuring a reliable and cost-effective energy supply. The precise calculation of total consumption and cost of electricity from the electrical bill provides a solid foundation for determining the feasibility and benefits of solar energy implementation. By embracing solar power system, PDA demonstrates its commitment to sustainable energy practices and takes a proactive step towards a greener and sustainable future.

4. Scope of Work:

PDA intends to solarize its main complex building at Phase 5 Hayatabad, Peshawar and 116 (92 + 24) Tubewell Sites across Hayatabad Township and Regi Model Town, with a grid-tied solar system utilizing available space on rooftop and Parking compound of PDA complex Building and space available on Tubewell sites, through private investment in JV Model. PDA intends to handover operations of tubewells for automation and digitization. The purpose of the process is to provide renewable energy based cost-effective solutions to PDA through solar energy and digitized secure operation for sustainable growth and future.

The objective of this RFP is to solicit offers from interested firms/bidders for Supply, Installation, Commissioning, Management and Operation of Solar power system for PDA building Complex and Tubewells at Hayatabad Township and Regi Model Town under a JV arrangement. The scope of work also comprises of digitization/automation of tube well sites and making them operator less. The Proposals received from bidders will be evaluated based on the evaluation criteria given under this RFP. Contract agreement will be signed with the Successful Bidder for supply and delivery of electricity to PDA during the JV Tenure. RFP is being issued to the interested parties companies/ Bidders/Contractors in submitting Proposals for the Solarization and Digitization at the proposed sites.

5. Implementation Scenario:

There are five different implementation cases, represented in the form of Lots/Assignments below, with corresponding specifications and quantifications. Lot No.1 representing the main PDA Commercial complex comprising of a single point supply. Lot No. 2, represents the tubewell feeding the overhead tanks, with Lot No.4 providing water to horticulture sites and finally Lot No. 4 providing water to the community in Hayatabad. Lot No.5 comprises of tube well sites in Regi model town. These Lots are distributed in terms of the use of electricity, thus have dynamics in terms of its operations and will be needing diverse set of proposals.

Lot / Assignment No 01

S.No.	*Caption*	*Specifications*	*Qty*
1	Solarization of PDA commercial complex	Supply, Installation, Operation, Maintenance as per criteria given in this RFP and remote monitoring and Smart metering system	1
2	Backup Generator Operation for PDA Commercial Complex	Operation and Maintenance of Generator as per terms given in this RFP	1

Lot / Assignment No 02

S.No.	*Caption*	*Specification*	*Qty*
1	Solarization of Hayatabad Tube Well Stations at Overhead Tanks	Supply, Installation, Operation, Maintenance as per Technical Specs / criteria given in this RFP and remote monitoring and gross smart metering system	12
2	Digital SCADA system for Hayatabad Tubewells	Operation, Automation, Web hosting, Database design, Data Communication	12

Lot / Assignment No 03

S.No.	*Caption*	*Specification*	*Qty*
1	Solarization of Tube Well Stations at horticulture Sites	Supply, Installation, Operation, Maintenance as per Technical Specs / criteria given in this RFP and remote monitoring and gross smart metering system	07
2	Digital SCADA system for Tubewells	Operation, Automation, Web hosting, Database design, Data Communication	07

Lot / Assignment No 04

S.No.	*Caption*	*Specification*	*Qty*
1	Solarization of Hayatabad Tube Well Stations at W&S sites.	Supply, Installation, Operation, Maintenance as per Technical Specs / criteria given in this RFP and remote monitoring and gross smart metering system	76

2	Digital SCADA system for Hayatabad Tubewells	Operation, Automation, Web hosting, Database design, Data Communication	76

Lot / Assignment No 05

S.No.	*Caption*	*Specification*	*Qty*
1	Solarization of Tube Well Stations at Regi model Town	Supply, Installation, Operation, Maintenance as per Technical Specs / criteria given in this RFP and remote monitoring and gross smart metering system	21
2	Digital SCADA system for Regi Model Town Tubewells	Operation, Automation, Web hosting, Database design, Data Communication	21

Note: Interested Bidders shall submit bids for the complete package comprising of separate proposals foreach lot. However, the client can choose to award partial or the complete package to the bidder.

6. TERMS OF REFERENCES (TOR's)

This part of RFP defines detailed TOR's and other guidelines for the submission of the RFP.

a. All the laws, regulations, and policies of the provincial government i.e. Government of Khyber Pakhtunkhwa shall strictly be followed.
b. The EOI should contain all relevant technical details (certificates, NOCs, reports, experience letters/ certificates, affiliation letters, and other necessary documents related to the firms) and financial business proposals.
c. In the case of joint venture JV/Consortium, the partnership deed on required judicial stamp paper duly attested by notary public, shall be attached with the proposal.
d. The PDA may physically verify the project/properties/offices/Banks (whether abroad or in Pakistan) as claimed by the firm/JV in submitted proposal documents.
e. The Business proposals & technical proposal shall be evaluated in parallel.

The technical proposal shall contain the following information about the firm or its JV partner:

f. Detail profile of the firm/JV
g. Supporting documents/details of firm/JV partner for evaluation of credentials for implemented projects of similar nature.
h. Registration with SECP, FBR, and other national or international bodies or relevant authorities
i. Shareholders details
j. Last three years audited financial statements
k. Attested copies of all valid Certificates/NOCs/affiliations/memberships/licenses
l. Interested potential National/International companies/firms/entities/groups, banking companies including joint ventures and consortia, if already operating in Pakistan must be registered with PEC, SECP, FBR, and all other relevant authorities where applicable, may participate in this EOI. International firms are required to set up a joint venture (JV) with an eligible Pakistani counterpart firm as per the criteria given in the Request for Proposal (RFP) document.
m. This invitation is open to all firms, banking and investment companies, JVs, as per terms and conditions mentioned in the RFP document.
n. The rates validity of tender will be up to 3 Months from the date of opening of tender.
o. All pages of the proposal document must be signed and stamped by the bidder.
p. Bidder can visit the site for inspection. PDA will not pay any reimbursement against any visit of vendor to the office/sites. All expenses will be borne by bidder.
q. Bidder shall provide valid manufacturer's warranty(s).
r. The successful bidder shall execute a written agreement just after the award of the work.
s. On finding substandard quality or lower specification as and when noticed during execution, the security deposit shall be forfeited in favour of PDA.
t. The payment shall be subject to satisfaction of all items of work done duly certified by the inspection committee/consultant/client. Findings of the inspection committee will be binding on the contractor.
u. In case of any dispute, the decision of the PDA shall be final
v. Call deposit will be retained for defect liability period.

w. The rates quoted by the bidders must be inclusive of all taxes, duties and installation costs, material Cost, transportation cost, labour cost and storage cost.
x. Bidder will have to maintain and manage the operations of these solar power systems for project period as per bid quoted and agreed in the agreement.
y. The bidder will be responsible for digitization and automated operation of all tubewells using innovative SCADA systems as per given standards and features.
z. The bidder will be responsible for security of all installations and connections on sites.
aa. The bidder will be responsible for security of tubewells and all inventory on sites.
bb. Bidder will have to manage, maintain and operate backup generator for PDA building.
cc. After the project liability period as defined in contract agreement the bidder will transfer the ownership, operation and maintenance of these solar power systems and SCADA systems to Client (PDA) after satisfactory investigation of solar power system health.
dd. The Contract agreement to be signed with the successful Bidder and extendable with mutual consent of both the parties.
ee. The method of submission will be single stage two envelops method.
ff. The Proposals must be delivered in sealed envelopes through registered post/courier service to the office of the Director Projects PDA, Commercial Complex Phase-V, Peshawar, Pakistan on or before 1400hrs PST on 29thof August 2024. Technical bids will be opened publicly on same date at 1430 hrs PST.
gg. Both the technical and financial Proposals should have detailed design, descriptions, costs and expenses on desired JV mode.
hh. The main proposal application should be marked as Expression of interest (EOI) for the Solarization of PDA Commercial Complex Phase-V and Solarization and digitization of tube wells in Hayatabad Township and Regi Model Town.
ii. Incomplete, conditional proposals and those submitted later then the designated time will not be considered.
jj. PDA shall have the right to verify all calculations on which Financial Proposal is based and in case of any inconsistency shall have the right to disqualify the bid.

7. Financial Plan and Payment Terms and Conditions

a. A contract agreement will be signed between PDA and the Successful Bidder. Duration of the agreement shall be the number of years/months as agreed between the bidder and the client, based on operational/financial plan. Regarding payments to the supplier/bidder for services and systems, the bidder may build up his financial proposal on any or all of the following three options:
    i. PDA will pay average monthly bill of each site (as highlighted in Table 1 and 2) to the bidder to carry out the solarization, operations and maintenance of these sites after deduction/adjustment of PESCO bills, all taxes and 1.5% consultant's fee on the gross amount during the tenure of the contract.
    ii. The bidder may come up with his own business/financial proposal as to the mode and volume of deliverables which may be the quantity of electricity produced by system / consumed by the PDA or number of systems installed at the fully protected sites. The number of sites made productive and operational.

iii. The bidder may suggest a cost sharing financial model for execution in JV Mode indicating investment percentage by the bidder as well as PDA may ultimately be leveraged against project duration/ corresponding project payment period.

b. The bidder shall provide details of the Total capacity and project life warranty of the solar power system to be installed on each site. The bidder shall also ensure generator maintenance and operations in case of outages/unavailability of solar or electric supply to the main PDA Complex. The bidder shall install and operate SCADA on all the tube-well sites as per the PDA schedule for the project duration.

8. Eligibility Criteria:

a. The bidder can be an individual firm or a consortium/JV of firms. In the case the firm is a JV, all partners of the JV shall be jointly and severally liable; and one of the partner of the JV shall act as the lead partner who shall have the authority to conduct all businesses for and on behalf of all of the partners of the JV during the bidding process and, in the event the JV is awarded, during JV execution. After the Proposal has been submitted to PDA, the lead partner identified to represent the JV shall not be altered without the prior written consent of PDA. Furthermore, neither the lead partner nor the member entities of the JV can submit another Bid, either in its capacity nor as a lead partner or a member entity of another JV submitting another Proposal. Proposed contractors, subcontractors or suppliers shall have Pakistani nationality and are constituted, incorporated, or registered and operate in conformity with the provisions of the laws of Pakistan.

b. A Bidder shall not have a conflict of interest. Bidders found to have a conflict of interest shall be disqualified. Without limitation to the generality of the foregoing, the Bidder may be considered to have a conflict of interest with one or more parties in this bidding process if a Bidder participates in more than one proposal in this bidding process, either individually or as a partner in a joint venture. This will result in the disqualification of all Proposals in which it is involved. However, this does not limit the participation of a Bidder as a contractor or subcontractor in another proposal or of a firm as a contractor or subcontractor in more than one proposal. In the event of any uncertainty in the interpretation of what is potentially a conflict of interest, Bidders must disclose the condition to the PDA and seek PDA's confirmation on whether such conflict exists. Similarly, the Bidders must disclose in their Proposal their knowledge of the following:

c. "that they are the owners, part-owners, officers, directors, controlling shareholders, or they have key personnel who are family of PDA staff involved in the procurement functions under this Proposal; and all other circumstances

d. that could potentially lead to actual or perceived conflict of interest, collusion, or unfair competition practices. Failure to make such a disclosure may result in the rejection of the Proposal or Proposals affected by the nondisclosure.

e. The bidder shall ensure the following to be eligible:

S.No.	*Eligibility*	*Yes/No*
1	Bid security (**50 million**) (Refundable) in the shape of CDR in favour of "Director General PDA"	
2	Registration with tax Authorities (Copy of NTN / GST Certificate) with active taxpayer status.	
3	Registration with KPPRA	
4	Affidavit on Stamp paper of not having been blacklisted by any Govt. or private entity.	
5	Registration with SECP/Registrar of Firms or any other relevant Government authority.	
6	Pakistan Engineering Council valid certificate and AEDB valid License or shall provide an affidavit that they will provide AEDB license within two months of the award of contract.	
7	Experience of Electrical Works, Supplies, System Installations (e.g. Cables/Panels/Inverters/Switch Gear/ Digital Systems/ Solar power system Services and Maintenance etc) in the last 05 Years. (Copies of Agreement / P.O / Completion Certificate must be attached).	
8	The bidder must provide complete project implementation cost in the financial proposal.	
9	Each Page of the proposals must be signed and stamped.	
10	Valid Manufacturer's Warranty Certificate.	
11	Past three years Audited financial statements showing an annual turnover of at least 100 M PKR each year.	
Note: The proposals which do not fulfil the eligibility criteria shall be treated as non-responsive proposals.		
In case of official holiday on the day of submission, next day will be treated as closing date. Proposal notice has also been posted on KPPRA website (www.kppra.gov.pk) and PDA`s website (www.pda.gkp.pk).		

9. Proposal Evaluation Criteria

a. Pre-qualification will be based on all the criteria given in succeeding paras regarding the Applicant's Business Proposal, Financial Soundness, Experience Record, Personnel Capabilities, Equipment Capabilities and Domestic Content Requirements as demonstrated by the Applicant's responses in the forms provided. Sub- contractor's experience and resources shall not be considered in determining the Applicant's compliance with the qualifying criteria. However, JV/ Consortium experience and resources shall be considered. Failure of an Applicant to provide essential information may result in dis - qualification. The criterion for the evaluation is given below:

b. The bidder shall provide the documentation as per the table above to ensure that all the categories are properly entertained and marked.

. NO.	CATEGORY	WEIGHTAGE/MARKS
1.	General Experience	05
2.	Personnel Capabilities	05
3.	Financial Soundness	05
4.	Financial Business Proposal	35
5.	Equipment Capabilities	05
6.	Energy Parameters	10
7.	Methodology	15
8.	Workplan	10
9.	Timeline	10
	Total:	100

10.Clarification of Bidding Document

a. A prospective bidder requiring any clarification(s) in respect of the Bidding Documents may notify the Employer in writing or by telex or fax at the

Address: Director Projects, PDA Complex, Phase 5, Hayatabad, Peshawar, Pakistan

Phone No: 0092-(091) 9217035

b. Employer/Consultant will examine the request for clarification of the Bidding Documents which it receives before one-week time prior to the deadline for the submission of bids. If needed will issue the clarification / amendment of the Bidding Documents at least 5 days before the date of submission of Bids (without identifying the source of enquiry) to all prospective bidders who have purchased the Bidding Documents.

11.Amendment of Bidding Documents

a. At any time prior (at least 2 days) to the deadline for submission of bids, the PDA may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective bidder, modify the Bidding Documents by issuing addendum.
b. Any addendum thus issued shall be part of the Bidding Documents and shall be communicated in writing to all purchasers of the Bidding Documents. Prospective bidders shall acknowledge receipt of each addendum in writing to the Employer. The bidder shall also confirm in the Form of Bid that the information contained in such addenda have been considered in preparing his bid.

12.Bid Prices

a. The bidder shall fill up the Schedule of Prices (Summary and BOQ) indicating the unit rates and total prices of the Works to be performed under the Contract. Prices on the Schedule of Prices shall be entered keeping in view the instructions contained in the Preamble to the Schedule of Prices. The price shall be FOR destination inclusive of installation, all taxes and project period O&M. The bidder shall fill in rates and prices for all items of the Works described in the Schedule of Prices (BOQ). Items against which no rate or price is entered by a bidder will not be paid for by the Employer when executed and shall be deemed covered by rates and prices for other items in the Schedule of Prices.
b. The bidder's separation of price components in accordance with requirements above, will be solely for the purpose of facilitating the comparison of bids by the Employer/Engineer and will not in any way limit its right to contract on any of the terms offered. Unless otherwise stipulated in the Conditions of Contract, prices quoted by the bidder shall remain fixed during the bidder's performance of the Contract and not subject to variation on any account. When the bidders are required to quote only fixed price(s) a bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.

13.Currencies of Bid

Prices shall be quoted in the following currencies: The prices shall be quoted in the Pak. Rupees. Bids in other currencies will not be acceptable and will be considered non-responsive.

14.Clarification of Bids

To assist in the examination, evaluation and comparison of Bids the Engineer/consultant may, at its discretion, ask the Bidder for a clarification of its Bid. The request for clarification and the response shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

15.Preliminary Examination & Determination of Responsiveness of Bids

Prior to the detailed evaluation of bids:

a. the Engineer/Consultants will examine the Bids to determine whether:
b. The Bid is complete and does not deviate from the scope,
c. Any computational errors have been made,

d. Required sureties have been furnished,
e. The documents have been properly signed,
f. The Bid is valid till required period,
g. The Bid prices are firm during currency of contract if it is a fixed price bid, Completion period offered is within specified limits,
h. The Bidder/Manufacturer is eligible to Bid and possesses requisite experience,
i. The Bid does not deviate from basic technical requirements and the Bids are generally in order.

A bid is likely not to be considered, if:

j. it is unsigned,
k. its validity is less than specified,
l. it is submitted for incomplete scope of work,
m. it indicates completion period later than specified,
n. it indicates that Works and materials to be supplied do not meet eligibility requirements, it indicates that Bid prices do not include the amount of income tax,

A bid will not be considered, if:

o. It is not accompanied with bid security, it is received after the deadline for submission of bids,
p. it is submitted through fax, telex, telegram or email,
q. it indicates that prices quoted are not firm during currency of the contract whereas the bidders are required to quote fixed price(s),
r. the bidder refuses to accept arithmetic correction,
s. it is materially and substantially different from the Conditions/Specifications of the Bidding Documents.

16.Arithmetical errors will be rectified on the following basis:

a. If there is a discrepancy between the unit price and total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If unit price and reevaluated total price is correct and there is a discrepancy between the words and figures the amount in words shall prevail. If there is a discrepancy between the total Bid price entered in Form of Bid and the total shown in Schedule of Prices Summary, the amount stated in the Form of Bid will be corrected by the Employer/Engineer in accordance with the Corrected Schedule of Prices. If the Bidder does not accept the corrected amount of Bid, his Bid shall be rejected, and his Bid Security forfeited.
b. Prior to the detailed evaluation, the Employer/Engineer/Consultant will determine the substantial responsiveness of each Bid to the Bidding Documents. A substantially responsive Bid is one which conforms to all the terms and conditions of the Bidding Documents without material deviations. A material deviation or reservation is one:
    i. which affects in any substantial way the scope, quality or performance of the Works.

ii. which limits in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the bidder's obligations under the Contract; or whose rectification/adoption would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

c. The Employer's/Engineer's determination of a Bid's responsiveness will be based on the contents of the Bid itself without recourse to extrinsic evidence.

d. A Bid determined as substantially non-responsive will be rejected and will not subsequently be made responsive by the Bidder by correction of the non-conformity. Any minor informality or non-conformity or irregularity in a Bid which does not constitute a material deviation may be waived by Employer/Engineer/consultant, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

17. Detailed Evaluation of Bids

The Employer/Engineer/Consultant will evaluate and compare only the bids previously determined to be substantially responsive as per requirements given hereunder.

18. Evaluation and Comparison of Bids

Note: Bids will be evaluated for each item and/or complete scope of work.

a. Basis of best financial bid Comparison:

The bids will be compared based on the best business model, the bidder will be invited to present their business model comprising of both technical and financial component

b. Technical Evaluation:

It will be examined in detail whether the Goods offered by the bidder comply with the Technical Provisions of the Bidding Documents. For this purpose, the bidder's data submitted with the bid will be compared with the specific work data prescribed by the Employer and technical features/criteria of the Goods detailed in the Technical Provisions/Employer requirement. Other technical information submitted within the technical bid regarding the Scope of Work will also be reviewed.

The bidder may be called for presentation of technical and financial business model for evaluation. The contractor shall be liable to provide the evidence of the submitted documents, in case the contractor fails to provide the desired documents, the technical bid of the vendor/contractor will be declared as non-responsive.

c. Commercial Evaluation:

It will be examined in detail whether the bids comply with the commercial/contractual conditions of the Bidding Documents. It is expected that no major deviation/stipulation shall be taken by the bidders.

19. Evaluated Bid Price:

In evaluating the bids, the Employer will determine for each bid in addition to the Bid Price, the following factors (adjustments) in the manner and to the extent indicated below to determine the Evaluated Bid Price:

making any correction for errors hereof. excluding Provisional Sums, if any, but including priced Day work. making an appropriate adjustment for any other acceptable variation or deviation.

a. Evaluation Methods:

Bids indicating completion beyond later than the dates set out in Preamble to Conditions of Contract, shall not be considered and rejected as non-responsive. If the bid of the successful bidder is seriously unbalanced in relation to the Employer's estimate of the cost of work to be performed under the Contract, the Employer may require the bidder to produce detailed price analyses for any or all items of the Schedule of Prices to demonstrate the internal consistency of those prices with the construction methods and schedule proposed.

After evaluation of the price analyses, the Employer may require that the amount of the Performance Security be increased at the expense of the successful bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful bidder under the Contract.

b. One Bid per Bidder:

Each bidder shall submit only one bid either by himself, or as a partner in a joint venture. A bidder who submits or participates in more than one bid will be disqualified and bids submitted by him shall not be considered for evaluation and award.

20. Business Proposals

20.1. Contents of Proposals

The details of transaction structure, bidding procedures, contract terms and technical requirements etc. are prescribed in the proposals, which include the following (collectively, the "Proposals"):

20.1.1. Request for Proposal (RFP)

20.1.2. Supporting Documents, Licenses, Compliance as requested in RFP

20.1.3. Each Bidder shall examine all instructions, terms and conditions, forms, specifications, and other information contained in the Proposals. If the Bidder: Fails to provide all documentation and information required by the Proposals OR Submits a Proposal which is not responsive to or fully compliant with the terms and conditions of the Proposals, such action shall be at the Bidder's risk and PDA or Evaluation Committee may determine that the Proposal is nonresponsive to the RFP and may reject it.

20.2. Pre-Proposal Meeting

20.2.1. PDA will organize a pre-Proposal meeting on (23-08-2024) to discuss any comments the Bidders might have with respect to the transaction structure and the Proposals.

20.3. Bidders' Comments and Clarifications on Proposals

20.3.1. A Bidder requiring any clarification on the Proposals may send a written request for clarification to PDA. Any request for clarification shall be sent by e-mail or through courier to PDA at the contact details provided in the Data Sheet at Annex-A three days before the submission closing date. Any such clarification request shall be addressed a day ahead of the deadline. PDA Peshawar shall endeavour to provide a response to such queries as soon as possible. If similar or repeated queries are made by a Bidder, those queries may be listed as one query and PDA may respond to such query only once.

20.3.2. PDA reserves the right not to consider any such comments or amendments of the Proposals that substantially affect the structure of the Proposals, or the transaction structure shall in no case be taken into consideration.

20.4. Confidentiality

PDA recognizes that certain information contained in Proposals submitted may be confidential and may represent competitive information or business strategy. The Bidders are responsible for highlighting those portions of their Proposal which they consider confidential.

20.5. Due- Diligence

Each Bidder is solely responsible for conducting its own independent research, due diligence, and any other work or investigations and for seeking any other independent advice necessary for the preparation and submission of Proposals and the subsequent supply of electricity. The Bidders are expected to have full understanding of the project including obtaining necessary Consents, Clearances and Permits, whenever and wherever required, for implementation of the project. Bidders may find it useful to visit the site before or on the date of the pre-proposal meeting. Please refer to the contact details in the RFP for this purpose. No representation or warranty, express or implied, is made and no responsibility of any kind is accepted by PDA, Design Expert Consultants or its advisors, employees, consultants, or agents, for the completeness or accuracy of any information contained in the Proposals or the Response to Questions Document or provided during the bidding process or during the term of the JV. PDA, Design Expert Consultants and its advisors, employees, consultants, and agents shall not be liable to any person or entity because of the use of any information contained in the Proposals or the Response to Questions Document or provided during the bidding process or during the JV Tenure. Any Proposal submitted in response to this RFP will be submitted upon a full understanding and agreement of terms of this RFP and, therefore, the submission of Proposals in response to this RFP would be deemed as acceptance of the said terms.

21. PROPOSAL PREPARATION

21.1. Content of Proposals

Bidders must prepare and submit their Proposals in full compliance with the requirements of this RFP together with the submission of the documents, forms and instruments required for submission under this RFP. Each Bidder shall submit the following documents (together with the "Bid"):

21.2. Business Proposal

Bidders are requested to submit the required Technical and Financial Proposal clearly mentioning all installation, supplies, specifications, drawings, costs included project timelines and the methodology. The Proposal shall be written in English language. The authorized representative of the Bidder appointed pursuant to the Bidder's Power of Attorney (the **Bidder's Attorney)** shall complete and sign the Technical and Financial Proposals and initial/sign each page thereof.

21.3. Technical Proposal Documents

Each Bidder shall submit a technical proposal (the "**Technical Document**") containing information required under this RFP and by attaching the following documents (collectively, the "Technical Documents"):

No	Description	Relevant Annexes
1.	Technical Proposal	
2.	Power of Attorney	
3.	Technical data Sheets and Catalogues	
4.	Integrity Pact	
5.	Proposal Security Bond	
6.	Additional Documents	

21.3.1. The Technical Documents are self-explanatory. However, the Bidders may seek clarifications in the Pre-Proposal Conference if required.

21.3.2. The Power-of-Attorney is to be duly stamped and notarized.

21.3.3. Each Technical Proposal shall be prepared in conformity with the requirements specified in this RFP and must adhere to the formats wherever prescribed.

21.3.4. Each Bidder may submit any supporting information or documentation (other than mentioned above), that may assist the Evaluation Committee in the evaluation process and the same may be annexed to the Technical Proposal.

21.3.5. The Additional Documents to be provided under the Technical Proposal will also include applicable documents as mentioned above, depending upon the structure of the Bidder (i-e JV/Consortium or otherwise).

22. Financial Proposal Documents

22.1. The Financial Proposal shall not be made conditional about any matter in any manner.

22.2. The Financial / Business Proposal must contain detailed financing plan

Financial Proposal

22.3. The Financial Proposal shall be inclusive of all taxes.

22.4. The Summary of Financial Proposal shall be submitted on the Bidder's letterhead signed by the Bidder's Attorney and details may be attached therewith.

23. Sealing and Marking of the Proposals

23.1. The bids will be submitted on Single Stage Two Envelops basis. Each Bidder shall submit one original technical proposal and one original financial proposal and the number of copies of technical proposal as indicated in the "Proposal Data Sheet" (Annex A). Each Technical Proposal shall be in a separate envelope indicating the Proposal as original or copy clearly marked as "ORIGINAL" and "COPY", as appropriate. All copies of the Technical Proposal shall be placed in a sealed envelope/box clearly marked "TECHNICAL BID" (the "Technical Proposal Envelope") and the Financial Proposal in the sealed envelope clearly marked "FINANCIAL BID" (the "Financial Proposal

Envelope"). These two envelopes and/or boxes, in turn, shall be sealed in an outer envelope/box bearing the address and information indicated in the RFP.

23.2. Each Bidder can submit only one Proposal.

23.3. Each page of the Technical and Financial Proposal shall be initialled/signed by the Bidder's Attorney. In case of any inconsistency between original and copy, the original will prevail.

23.4. The inner envelopes/boxes shall each indicate the name and address of the Bidder so that the Proposal can be returned unopened in case it is declared "late".

23.5. If the outer envelope/box is not sealed and marked as required above, PDA will assume no responsibility for the Bid's misplacement or premature opening. Both the Technical and Financial Proposal Envelops shall each indicate the name and address of the Bidder.

24. Instructions to Bidders:

24.1. Minimum Capacity of the Solar system

The capacity of Solar power system to be offered shall be proposed in business proposal individually for each component i.e., the DC capacity of Solar PV Modules. PV to Inverter ratio must not be less than 1:1.5. The responsibility of the contractor shall be to supply uninterrupted electricity power to all the listed sites.

24.2. Guaranteed Operation

The contractor with whom JV is executed, shall at minimum deliver daily operations as per schedule agreed upon in contract agreement. In case of failure to deliver the Guaranteed Operation, the contractor shall have to formally share valid uncontrollable reasons to justify failure to meet agreed operational efficiency and take timely approvals for this to claim monthly bill or pay liquidated damages for the energy shortfall. The liquidated damages for the shortfall in operational hours shall be calculated and recovered on Monthly basis.

24.3. Grid Connectivity/ Net metering

The grid connectivity, Net metering, interconnectivity, and associated facilities will be provided by the contractor. The contractor shall be responsible to process the case for NOC from PESCO in favour of concerned Directorate PDA. The expenses for this will be covered by bidder. The Contractor will be solely responsible for connectivity with the Grid for all the listed sites. The cost of the interconnection and related equipment (Poles, cables, changeover etc as per NTDC/WAPDA specifications) will be the responsibility of the Contractor.

24.4. Solar system

The Bidder will be responsible to ensure standards compliance as mentioned in technical specification for design, financing, supply, construction, maintenance, and operation of the solar power system throughout the JV Tenure. Dynamic reactive power compensator should be installed on each site. It is the responsibility of bidder to evaluate the site allocated space for solar power system before submitting their proposal.

24.5. Structure

An Elevated structure as per standards mentioned in technical

specifications will be responsibility of Bidder. Any damages to building or Civil works while installation or operation of solar power system will be responsibility of bidder. Civil work for installation of structure will be the responsibility of bidder.

24.6. Autonomous Operation of Tubewells and Remote Monitoring

PDA intends to leverage digital inclusion into its tubewell operations by automating the tubewell. The bidder will be responsible for operation of these tubewells as per schedule mentioned in table 5. The automation system specific technical details are mentioned in the technical specification section.

24.7. Security

After signing of JV agreement contractor will be responsible for security, maintenance and operation of its system installed. The tubewells will be handed over to bidder for operations. The bidders will report formally any issue in operations of these tubewells that may impact schedule of operation.

24.8. Energy Quality:

Bidder will be responsible to make all necessary arrangements and provide necessary protective equipment and appliances with solar power system to ensure smooth, reliable and uninterrupted supply of electricity. CISNR project Engineer will inspect the sites after installation for quality assurance.

24.9. Site Visit

Representatives of Bidders/Companies/Contractors are encouraged to visit the site through prior coordination with CISNR and PDA. The site can be inspected during working hours 08:30 AM to 04:00 PM Monday to Friday with prior coordination.

24.10. Monitoring and Maintenance:

A remote monitoring system will be implemented backed by SCADA digital system with remote web interface by bidder to track the performance of the solar power system in real-time, enabling proactive maintenance and troubleshooting. CISNR will monitor the performance and evaluate the service quality and generation from time to time during project life span.

24.11. Maintenance Schedule:

Regular maintenance visits will be shared at time of bidding by bidder to inspect the system, clean the solar panels, and address any potential issues to ensure optimal performance and longevity.

24.12. **Training:**

PDA staff will be trained on system operation, maintenance procedures, and safety protocols by bidder to ensure efficient management of the solar power system.

24.13. Digital Smart Screens:

Digital Smart LED Screens shall be installed at Director Projects, Deputy Director W&S and Deputy Director Electrical office for live monitoring of the system and tubewells operations.

24.14. Project Timeline:

Bidder shall clearly mention proposed project timeframe in its business proposal along with all the costs and expenses inclusive of all taxes.

24.15. Project Execution

Bidder shall immediately start implementations after signing of agreement with PDA.

24.16. Execution Timeline:

Bidder shall clearly provide detailed proper plan of installations and Commissioning along with business proposals and other supporting documents.

24.17. JV / Consortium

In the case of JV/Consortium, the proposal shall contain a legally enforceable JV/Consortium Agreement duly executed by all the members of the JV/Consortium, designating one of the members to be the Lead Member. In the absence of duly executed JV/Consortium Agreement, the Proposal will not be considered for evaluation and will be rejected.
Each member of the JV/Consortium is required to confirm the validity of the JV/Consortium Agreement on its letterhead as at the date of submission of the Proposal.
The JV/Consortium Agreement shall not be amended without the prior written approval of PDA.

24.18. Additional Requirements for JV / Consortium

The Lead Member shall designate one person to represent the JV/Consortium in its dealings with PDA. The person designated by the Lead member shall be authorized through a board resolution to perform all tasks including but not limited to providing information, responding to enquiries, signing of the Proposal on behalf of the JV/Consortium etc. Additionally, the Proposal shall also contain Power of Attorney in original in the favour of the Lead Member issued by each member of the JV/Consortium.

24.19. Representative of the Bidder

The Bidders should designate one person to represent the company or the JV/Consortium in its dealings with PDA. The person so designated shall be duly authorized through a Board resolution to perform all tasks including but not limited to providing information, responding to enquiries, signing a Proposal on behalf of the Bidder or the Consortium etc.

24.20. Fraud and Corruption

Anticorruption policy prevailing in Pakistan requires that Bidders, suppliers, and contractors observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the PDA defines, for the purposes of this provision, the terms set forth below as follows:
“corrupt and fraudulent practice” means the offering, giving, receiving, or soliciting, of anything of value to influence the action of a public official or the contractor in the procurement process or in contract execution to the detriment of the procuring agency; or misrepresentation of facts in order to influence a procurement process or the execution of a contract, collusive practices among bidders (prior to or after proposal submission) designed to establish Proposal prices at artificial, non-competitive levels and to deprive the procuring agency of the benefits of free and open competition and any request for, or solicitation of anything of value to any

public official during the exercise of his duty.
"Coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to achieve a wrongful gain or to cause a wrongful loss to another party.
"Collusive practice" means by arrangement between two or more parties to the procurement process or contract execution, designed to achieve with or without the knowledge of the procuring agency to establish prices at artificial, non-competitive levels for any wrongful gain.
"Integrity violation" means any act which violates anticorruption policy including corrupt, fraudulent, coercive, or collusive practice, abuse, and obstructive practice.
"obstructive practice" by harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in a procurement process, or affect the execution of a contract or deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements before investigators in order to materially impede an investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or acts intended to materially impede the exercise of inspection and audit rights; will reject a Proposal for award if it determines that the Bidder recommended for award of the Project has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the JV, will sanction/impose remedial actions on a firm or an individual, at any time in accordance with applicable laws and anticorruption policy including declaring ineligible, either indefinitely or for a stated period of time, to participate as a contractor, nominated subcontractor, consultant, manufacturer or supplier, or service provider; or in any other capacity, if it at any time PDA determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices or other integrity violations; and will have the right to inspect accounts and records and other documents relating to the Proposal submission and JV performance and to have them audited by auditors appointed by PDA.

24.21. Eligible Bidders

In the case the firm is a JV, all partners to the JV shall be jointly and severally liable; and the one partner of the JV shall act as the lead partner who shall have the authority to conduct all business for and on behalf of all of the partners of the JV during the bidding process and, in the event the JV is awarded the JV, during JV execution.
After the Proposal has been submitted to PDA, the lead partner identified to represent the JV shall not be altered without the prior written consent of PDA. Furthermore, neither the lead partner nor the member entities of the JV can submit another Bid, either in its capacity nor as a lead partner or a member entity of another JV submitting another Proposal.
Proposed contractors, subcontractors, or suppliers for any part of the Solar power system including related services shall have a nationality of an eligible

country. Proposed contractors, subcontractors or suppliers shall be deemed to have the nationality of a country if they are national or are constituted, incorporated, or registered and operate in conformity with the provisions of the laws of that country.

A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. Without limitation to the generality of the foregoing, a Bidder may be considered to have a conflict of interest with one or more parties in this bidding process if a Bidder participates in more than one proposal in this bidding process, either individually or as a partner in a joint venture. This will result in the disqualification of all Proposals in which it is involved. However, this does not limit the participation of a Bidder as a contractor or subcontractor in another proposal or of a firm as a contractor or subcontractor in more than one proposal. In the event of any uncertainty in the interpretation of what is potentially a conflict of interest, Bidders must disclose the condition to the PDA and seek PDA Peshawar's confirmation on whether such conflict exists.

Similarly, the Bidders must disclose in their Proposal their knowledge of the following:

that they are owners, part-owners, officers, directors, controlling shareholders, or they have key personnel who are family of PDA staff involved in the procurement functions and/or the Government receiving services under this Proposal; and all other circumstances that could potentially lead to actual or perceived conflict of interest, collusion, or unfair competition practices. Failure to make such a disclosure may result in the rejection of the Proposal or Proposals affected by the nondisclosure.

24.22. Eligible Solar power system and Services

The solar power systems and services to be supplied under the JV shall have their origin in Eligible source Countries as defined above and all expenditures under the JV will be limited to such solar power system and services. For purposes of above, "origin" means the place where the solar power system, or component parts thereof are mined, grown, produced, or manufactured, and from which the services are provided. Solar power system components are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that is substantially in its basic characteristics or in purpose or utility from its components.

24.23. Integrity Pact

Each Bidder shall be required to provide an integrity pact as part of its Proposal.

24.24. Proposal Costs

All costs associated with the preparation and submission of the Proposal and the Bidder's participation in the bidding process including, without limitation, all costs and expenses related to participation in preproposal conference, preparation and submission of the Proposals, the provision of any additional information, conducting due diligence of PDA site visits, engagement of consultants, advisors and contractors etc. and in discussion with the PDA Consultant or their advisors or

consultants, the provision of any additional information, preparation of questions or requests for clarification to PDA preparation of Bidders' questions during the clarification process and discussions on the JV, if any (the "Proposal Costs") shall, in each case, be borne exclusively by the Bidder. PDA, CISNR consultant or their advisors or consultants shall not be responsible or liable to pay any Proposal Cost of any Bidder, regardless of the conduct or outcome of the bidding process.

24.25. Force Majeure

Neither Party shall be liable to each other or to the others, for loss or damage caused by non-performance, or a delay in the performance, of its obligations under this Agreement to the extent that the same resulted from circumstances due to force majeure including inter-alias, strikes, labour disturbances, embargoes, riots, fires, floods, war, hurricane, shortage of materials, Act of God and acts of State of Public Authorities, or other causes beyond the reasonable control of the Party/ Parties.

For the purposes of this RFP, "Force Majeure" means an event which is beyond the reasonable control of a Party, and which makes a Party's performance of its obligations under this MoU impossible or so impractical that it may be considered impossible under the circumstances. which are deemed to include but not be limited to, war, riot, strike, lock-out, flood, terrorism or other natural catastrophe or national or local Government regulation or any other cause beyond the reasonable control of the respective Party.

Neither Party to this RFP shall be held responsible for the fulfilment of any obligations under this MoU if such fulfilment is hindered or prevented by any circumstances of Force Majeure, provided the Party delayed notifies the other Party without delay in writing of the beginning and end of any such circumstances. The Party delayed shall use every endeavour to minimize the hindrance or prevention of such fulfilment. Upon the ending of such circumstance, the delayed Party shall without delay resume the fulfilment of its obligations including any obligations the performance of which was interrupted thereby.

24.26. Backup Diesel Generator

Bidder will operate and manage the operations of backup generator at PDA complex Peshawar. All the charges shall be included in the bid price quoted in proposal.

24.27. Backup Diesel Generator Maintenance

Bidder will maintain the backup generators at PDA Complex Peshawar for a period proposed for project execution. All the charges shall be included in the bid price quoted in proposal.

24.28. Training

Upon the successful operation of the solarization system, the Contractor is responsible for providing comprehensive training to the Client. This training

shall cover the effective utilization, maintenance, and troubleshooting of the solarization system. The Contractor must allocate and maintain a dedicated training section, equipped with the necessary resources and materials, to facilitate the training sessions for the PDA Peshawar staff. The training should be designed to ensure that the PDA Peshawar staff gains a thorough understanding of the solarization system's operation and upkeep, enabling them to manage and utilize the system efficiently. PDA managerial staff shall also be provided with trainings on how to operate SCADA for energy management and tube well operations.

25. DATA SHEET

PROJECT TITLE	**SOLARIZATION OF PDA (PDA COMPLEX AND TUBEWELLS AT HAYATABAD AND REGI MODEL TOWN)**
RFP DATE	12th August 2024
PRE-BID CONFERENCE	23rd August 2024 at 2:00 PM in the Committee Room
VALIDITY OF BID	Three Months from Bid Submission Deadline
COPIES OF BID REQUIRED	01 Original and 02 sets of copies. 1 soft copy of technical bid in DVD or USB.
BID SUBMISSION ADDRESS	Director Projects, PDA Complex, Peshawar
BID SUBMISSION DEADLINE	02:00 PM 29th August 2024
TECHNICAL BID OPENING	02:30 PM 29th August 2024
BID OPENING VENUE	Office of the Chairman Procurement Committee, PDA Complex
CONTACT DETAILS OF PDA PESHAWAR FOR CLARIFICATIONS ON THE BID DOCUMENTS SOUGHT BY THE PROSPECTIVE BIDDERS	**Deputy Director (PDA)** 0334 8296522 **Project Director CISNR** 091 9222104

26. Technical Data Sheet:

The following tables present details of the PESCO meters installed at PDA Tubewell Sites and PDA Complex Building. Table 1 and 2provides the account/reference number, sanctioned load, total annual consumption (kWh), and total energy consumption payments of PDA Complex and tubewells. Table 2 comprises of the account/reference number, and total energy consumption payments per month for one complete year. Detailed data can be obtained from PDA Peshawar for each site.

Table 1: Sanctioned Load and Annual Bill of PDA Complex

S.NO.	REFERENCE NO.	SANCTIONED LOAD	ANNUAL BILL (PKR)
1	31262140009300	400	29,796,474
2	31262140009200	400	23,605,584

Table 2: Sanctioned Load and Annual Bill of Hayatabad Tubewells

S.No.	Reference No.	Sanctioned Load	Annual Bill in PKR
1	31262140091800	45	12,061,704
2	31262140016400	46	9,019,924
3	31262140091100	59	25,992,523
4	31262140015900	46	4,364,930
5	31262140000700	92	7,607,392
6	31262140000600	75	7,306,659
7	31262140000500	75	9,772,849
8	31262140000400	75	19,416,348
9	31262140019300	60	9,177,485
10	31262140030500	47	7,778,169
11	31262140096700	45	7,334,571
12	31262140100700	45	12,098,917
13	31262140009500	45	12,369,658
14	31262140155105	45	10,098,435
15	31262140063417	45	8,223,313
16	31262140501100	45	10,219,513
17	31262140019400	60	8,598,087
18	31262140127451	45	7,032,971
19	31262140091700	45	8,423,809
20	31262140096500	45	8,899,716
21	31262140096400	45	4,827,439
22	31262140144351	60	11,696,672
23	31262140144342	45	8,154,445
24	31262140144343	45	8,055,973
25	31262140116100	56	10,105,388
26	31262140105900	45	9,385,313
27	31262140016100	45	7,975,631
28	31262140155103	45	7,843,804
29	31262140020200	60	6,745,309
30	31262140016000	45	8,634,955
31	31262140020500	60	6,590,063
32	31262140026000	45	7,385,469
33	31262140030600	47	6,282,106
34	31262140091600	45	2,952,191
35	31262140009400	45	6,474,111
36	31262140127452	45	10,060,364
37	31262140261260	45	3,647,051

38	31262140501250	40	2,666,031
39	31262140025200	46	3,341,749
40	31262140155102	45	9,956,330
41	31262140009206	45	10,183,566
42	31262160012100	45	15,545,143
43	31262160012000	45	17,593,917
44	31262160020400	60	5,762,318
45	31262160011600	45	9,758,532
46	31262160010800	60	14,089,301
47	31262160010700	45	14,904,876
48	31262160025400	46	18,059,722
49	31262160025500	46	1,512,907
50	31262160701043	40	12,683,433
51	31262160701044	40	10,675,220
52	31262160701045	40	17,038,158
53	31262160031300	47	8,586,189
54	31262160030200	47	6,589,720
55	31262160092100	45	10,419,874
56	31262160016100	45	13,924,879
57	31262160016000	45	8,504,498
58	31262160097800	45	15,632,990
59	31262160016500	45	9,925,968
60	31262160054606	45	13,984,298
61	31262160054708	45	8,546,335
62	31262140166707	45	9,441,503
63	31262140155104	45	7,802,390
64	31262140011800	45	9,141,964
65	31262140127450	45	6,827,556
66	31262140127448	45	7,169,508
67	31262140127447	45	6,352,015
68	31262140019200	60	7,589,501
69	31262140019500	60	5,035,606
70	31262140030700	47	7,414,245
71	31262140030800	47	8,406,041
72	31262140026100	45	7,798,816
73	31262140096600	45	7,420,807
74	31262140100800	45	8,164,708
75	31262160017900	45	17,976,223
76	31262160016300	45	23,718,441

77	31262160025100	46	10,951,886
78	31262160025300	46	11,065,019
79	31262160025600	46	7,665,051
80	31262160091900	45	7,019,026
81	31262140261154	15	3,577,989
82	31262140260592	15	5,137,426
83	31262140261252	15	4,595,231
84	31262140503553	15	2,988,062
85	31262140503552	15	505,294
86	31262140261250	45	2,015,854

Note: The missing Tube well data is since they are new installations, thus their consumption may be calculated based on the connected load on site, and from the pump capacity.

Table 3: Monthly and Total Annual Consumption in KWH

Serial	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	ANNUAL
31262140091800	18736	20648	20538	18899	19494	17563	18616	18172	16907	17635	17732	19036	223976
31262140016400	15208	15994	15594	15209	14729	13790	13633	14265	12329	9275	11266	16655	167947
31262140091100	41721	42788	43449	42582	43347	36289	36448	35736	38107	41251	37426	44382	483526
31262140015900	7164	7543	7568	7064	6659	6151	6203	5648	5875	6288	6131	7451	79745
31262140000700	12190	13192	12624	10046	10992	14741	10657	11076	10616	11144	11228	12812	141318
31262140000600	11832	12710	11473	10798	11278	10646	11105	10369	10484	11351	10786	12980	135812
31262140000500	17526	19762	16168	15079	17547	15867	13647	10990	12477	13876	13906	15512	182357
31262140000400	34057	26573	25768	32880	31539	29437	27445	24015	25406	27235	25227	29756	339338
31262140019300	15598	13407	15230	15061	14559	13568	13839	12765	12928	14112	13553	16104	170724
31262140030500	13145	14392	13231	12031	12719	11234	11277	10828	10147	11293	10892	13708	144897
31262140096700	11859	12446	12582	11982	10837	11057	11422	10575	9518	11438	10321	12300	136337
31262140100700	19740	19902	20014	19451	19318	18379	17248	14613	17253	19267	18550	21456	225191
31262140009500	20396	21521	21882	19616	19595	18149	19122	16619	17243	18847	17442	19659	230091
31262140155105	17533	18991	18188	16710	15596	12590	13859	14623	13721	15380	14051	17202	188444
31262140063417	13348	14290	14641	13008	12459	11108	11664	12212	11618	12378	11742	14648	153116
31262140501100	16634	18960	17516	16267	15154	11681	11913	10106	9162	14994	14659	18005	175051
31262140019400	14832	15677	15527	13887	13067	11575	12141	12341	11317	13123	12240	14648	160375
31262140127451	11096	12731	12195	11300	10238	9003	10240	10919	10493	10763	9878	11954	130810
31262140091700	11683	12693	14088	13698	13235	11899	12315	13213	12594	12920	11982	15823	156143
31262140096500	14662	15456	15454	14092	13354	12147	12554	13439	12851	13737	13056	14872	165674
31262140144351	17125	18091	18044	18007	19296	17659	16898	15731	16512	19969	20056	19754	217142
31262140144342	13368	14169	13231	12769	12509	11738	11359	11666	10953	13183	12347	14485	151777
31262140144343	12870	13452	12142	12390	13555	12645	12744	11800	10390	12230	11660	13575	149453
31262140116100	17884	18638	19445	17037	15563	12856	13854	13203	12507	15052	14090	18991	189120
31262140105900	14751	16154	17055	15891	12032	11290	14896	15134	17392	12036	11460	16446	174537
31262140016100	13511	14842	12650	11290	12588	12412	13274	11750	10601	11625	10649	12913	148105
31262140155103	14278	15919	13462	14362	13527	11281	10483	14539	12036	12110	11297		143294
31262140020200	11160	11755	11479	10915	10751	10039	9592	9583	9202	10525	9023	11428	125452
31262140016000	13525	14716	15678	14182	14645	11223	12530	11455	11853	11925	13333	15846	160911
31262140020500	10933	11415	10449	10476	10439	9627	8887	9684	9017	10808	10309	10550	122594
31262140026000	12149	12756	12753	12148	10865	10530	10853	9966	9828	11348	11223	13124	137543
31262140030600	10466	10784	10913	9951	10007	9066	9200	9136	8603	9122	8138	11524	116910
31262140091600	4721	4785	4830	4680	4093	3745	3681	4456	5140	4127	5578	5220	55056
31262140009400	11165	11379	12002	10708	10675	10523	9205	9714	6765	9176	8641	10680	120633
31262140127452	18543	18916	17564	16278	15578	14477	15154	13710	12962	15308	13882	15275	187647
31262140261260	9892	10302	9332	8400	7453	7536	8261	7242	6881	8001	6854	4162	94316
31262140025200	8703	11089	8984	3494	6686	4350	3211	2872	2076	3645	3572	4736	63418
31262140155102	16371	17248	17089	16562	16897	15128	16664	14606	12466	14060	13166	14540	184797
31262140009206	19680	17660	18980	13960	18080	11335	14639	13503	13650	16073	15876	16962	190398
31262160012100	28761	30733	24458	25380	24379	21851	21975	21705	21876	22841	22441	23589	289989
31262160012000	14846	15026	13637	27804	29170	30139	32432	40363	24011	33965	24199	34495	320087
31262160020400	11533	13178	9240	8871	8391	7737	7723	7791	7277	8109	8096	10029	107975
31262160011600	15786	17314	17933	17041	15455	14561	13380	14239	13135	13051	13856	16246	181997
31262160010800	24252	25486	22939	22525	23292	20477	17651	16541	16599	26627	20404	25862	262655
31262160010700	25207	25603	25268	22564	24555	21811	22096	22753	22562	19465	21104	24200	277188
31262160025400	27446	29807	30454	27861	26712	24816	26501	27598	27780	30304	27043	29008	335330
31262160701043	24144	25194	25271	21470	19801	15091	16412	16556	17228	18964	17672	19867	237670
31262160701044	18727	21104	20012	16765	16100	15295	15009	14923	13857	15116	15103	17394	199405
31262160701045	25967	26470	28680	25109	23077	22960	24747	28719	27046	26990	26778	29877	316420
31262160031300	15762	15158	14437	13992	13609	12527	12252	12197	12143	12339	11023	12645	158084
31262160030200	13882	14886	14039	8707	9412	9046	8734	8593	8116	8702	8035	11741	123893
31262160092100	17701	12937	17989	16881	15204	14686	15136	16017	13756	15507	14318	16934	187066
31262160016100	24726	26863	23811	22354	21109	19651	20443	18259	18836	20245	19744	21897	257938
31262160016000	16987	16758	12361	12077	12199	11661	11848	11477	11808	12906	12753	14315	157150
31262160097800	25480	27284	25746	26072	19445	23563	20575	21734	21936	22538	20085	16964	271422
31262160016500	17640	22045	18340	11863	14579	14274	14458	13657	11765	13859	14528	18797	185805
31262160054606	18835	24164	23817	19202	18111	17227	16868	13438	10766	15032	17825	20295	215580
31262160054708	13812	15729	15979	13273	13057	11677	12761	14126	11754	12270	11403	13154	158995
31262140166707	17302	18032	16737	15351	14303	13233	13306	13660	13363	12843	12160	15834	176124
31262140155104	12263	13703	12576	12483	12663	11856	12098	10523	11828	12225	10350	12307	144875
31262140011800	13682	16558	16404	15448	15432	13472	13661	12885	11984	13339	12927	14192	169984
31262140127450	11853	12204	12041	11521	11739	10324	10193	9349	8391	9651	9819	10081	127166
31262140127448	11392	11533	9997	12729	11861	11563	11498	10668	10335	10277	10264	10550	132667
31262140127447	12667	13573	12582	11093	9904	8204	9188	9417	8509	4524	8781	10797	119239
31262140019200	12498	13379	12639	11971	11520	10833	10995	9696	12291	10123	12068	13446	141459
31262140030700	12157	13396	12160	10570	11869	11174	11738	11286	10548	11257	10669	10788	137612
31262140030800	15357	15331	14480	13996	14062	12541	12416	11275	11966	10317	11697	13363	156801
31262140026100	12059	13953	12537	12301	12204	11116	12893	10564	11127	12063	11245	12677	144739
31262140096600	12652	13299	13208	12326	12278	11065	11015	10592	9076	10726	10422	11549	138208
31262140100800	11345	13972	12979	11770	13038	11292	11447	10665	9843	16239	16344	18520	157454
31262160017900	25890	27870	27577	27542	27555	26855	28201	27124	25980	30209	26487	29353	330643
31262160016300	27904	31567	36146	34283	34963	26340	31586	28649	30051	36173	33125	35673	386460
31262160025100	9266	9194	6496	5875	7699	11125	11936	12144	12639	12844	12546	16586	128350
31262160025300	13549	16710	15120	12048	13142	13464	13934	13375	12480	13027	12214	14374	163437
31262160025600	13024	14521	13021	13899	11038	10182	11377	11021	9821	8694	8155	10748	135501
31262160091900	10303	10176	11009	10564	10690	9966	9893	9204	8356	9951	9643	11934	121689
31262140261154	4999	5216	4756	4852	4751	4302	4161	4516	4156	4582	4520	5585	56396
	1231711	1303672	1256688	1183593	1169323	1072291	1093270	1069573	1024875	1124524	1073068	1234840	13837428

Table 4: Annual Bill Payment in PKR

serial	Jul23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Annual
31262140091800	778061	1056099	1045092	973690	1017748	976825	1057566	1058974	1052197	1041354	962376	1041722	12061704
31262140016400	630886	819393	795208	782320	769012	768321	776691	831310	767769	575030	616757	887227	9019924
31262140091100	1728291	2191556	2214534	2186302	2262021	2031167	2095822	2091952	2325682	2396569	2039345	2429282	25992523
31262140015900	296898	386586	385553	363588	347916	343726	439721	332869	363414	366481	332848	405330	4364930
31262140000700	506062	675677	643545	522060	574367	798741	604603	667206	652087	655692	609082	698270	7607392
31262140000600	491693	650400	586170	558168	588611	589723	629162	607620	648813	662572	586062	707665	7306659
31262140000500	726780	1009975	827514	783530	915000	875249	791141	668711	775740	800171	752107	846931	9772849
31262140000400	1403233	1374733	1329438	1675090	2824248	1641610	1572773	1433034	1576723	1584724	1373684	1627058	19416348
31262140019300	645602	692819	777933	769790	760048	756304	786515	750514	801272	823003	735586	878099	9177485
31262140030500	545490	736906	675126	622369	663957	624607	645074	635145	632362	662160	590348	744625	7778169
31262140096700	492777	638170	640903	616017	566333	615277	643406	620766	600190	668385	559075	673272	7334571
31262140100700	821625	1023467	1020986	999401	1008399	1021025	985971	874509	1059168	1107292	1005319	1171755	12098917
31262140009500	846231	1103212	1114231	1010812	1023607	1009731	1084223	979720	1074241	1096653	948687	1078310	12369658
31262140155105	726443	971772	927134	862397	815072	711723	792600	843842	843520	901080	763679	939173	10098435
31262140063417	554397	732001	745004	670340	651181	621641	663820	707912	713645	727774	638691	796907	8223313
31262140501100	684056	1188327	892445	840489	791899	663109	689821	599241	585386	854366	1451701	978673	10219513
31262140019400	615343	801600	791255	716489	683040	648982	691445	717274	701643	768057	663123	799836	8598087
31262140127451	461410	649708	620502	582964	535176	506588	579368	627952	642088	634562	539710	652943	7032971
31262140091700	488624	650057	714861	701133	691045	665050	701261	765294	770857	762349	654219	859059	8423809
31262140096500	607715	791380	787362	726151	697845	679305	714200	778623	786486	807016	709941	813692	8899716
31262140096400	662535	790560	313067	270602	240345	215894	226011	586192	533259	62299	926262	413	4827439
31262140144351	709309	925590	919330	924533	1006329	978549	967765	929957	1016932	1151037	1079766	1087575	11696672
31262140144342	555683	725618	675510	658310	653098	653350	648291	682332	675815	767321	667371	791746	8154445
31262140144343	535039	690030	620951	638171	706670	698873	725004	694331	657471	717527	630392	741514	8055973
31262140116100	738271	951499	989724	877808	813962	726665	792181	769921	779055	875428	761607	1029267	10105388
31262140105900	607817	825597	866463	816273	630244	641526	828863	863952	1046961	726593	643618	887406	9385313
31262140016100	562386	758553	647107	586739	656907	682829	747698	690422	673082	685132	579456	705320	7975631
31262140155103	584271	810926	688472	740402	705848	635506	727602	832330	725993	727065	617361	48028	7843804
31262140020200	464575	603090	585306	562005	561363	558761	548359	562638	568184	614175	491713	625140	6745309
31262140016000	564721	750795	796445	729092	764709	631852	719247	668359	733327	699339	720748	856321	8634955
31262140020500	454482	584563	534123	539669	544742	535861	510384	565777	552497	629779	556784	581402	6590063
31262140026000	506283	655129	649835	624830	567862	588629	614119	585609	611904	660072	606188	715009	7385469
31262140030600	435138	553270	556198	512504	522623	504945	524465	533674	533133	537127	444502	624527	6282106
31262140091600	195952	244652	246321	240453	213934	210652	210277	256647	303411	244882	302139	282871	2952191
31262140009400	463711	582710	611104	551037	557681	583036	527977	572199	435638	543349	464042	581627	6474111
31262140127452	765760	969999	898108	840943	813846	807728	859476	805561	814025	891958	752505	840455	10060364
31262140261260	240753	354847	330004	299268	284258	313351	345324	322658	337299	352547	276934	189808	3647051
31262140501250	507619	24767	491799	413	4932	413	303792	413	49330	413	745838	536302	2666031
31262140025200	364219	570041	458034	194721	349983	237628	198603	175850	136901	210105	189412	256252	3341749
31262140155102	681310	884183	870935	851574	881826	842423	943981	856616	800276	830933	714270	798003	9956330
31262140009206	815811	906456	969896	724100	943892	636838	845031	777643	846246	931351	856665	929637	10183566
31262160012100	1190489	1570059	1255697	1313672	1272204	1222097	1255051	1269567	1343854	1338135	1219554	1294764	15545143
31262160012000	625217	778328	698083	1401433	1514818	1659471	1819109	2304348	1544218	2036797	1316501	1895594	17593917
31262160020400	477071	671566	475542	464092	438269	432300	440219	455136	450469	475560	437916	544178	5762318
31262160011600	649614	881682	911544	875327	807661	814844	767144	834085	808434	775258	751757	881182	9758532
31262160010800	1012787	1310511	1173010	1162277	1215277	1140678	1026165	988128	1027819	1509058	1097834	1425757	14089301
31262160010700	1046056	1313673	1289504	1164436	1281689	1209800	1262165	1324965	1381264	1165069	1153554	1312701	14904876
31262160025400	1134417	1524698	1549096	1434140	1395681	1384429	1500449	1598267	1694842	1768391	1474395	1600917	18059722
31262160025500	489564	530302	165754	59874	35629	28425	36474	43576	26900	29259	27615	39535	1512907
31262160701043	995410	1288192	1287817	1109663	1035864	858340	945094	959897	1050881	1102495	960385	1089395	12683433
31262160701044	773952	1075157	1019139	869382	841997	851796	854521	874339	860312	888812	817872	947941	10675220
31262160701045	1075278	1355988	1459064	1291687	1206879	1278459	1392047	1647752	1641288	1599039	1458401	1632276	17038158
31262160031300	652866	779687	739112	720618	810549	698591	699825	714762	746400	725618	603722	694439	8586189
31262160030200	572529	759877	716241	459459	493336	499393	497470	504751	503409	511686	437609	633960	6589720
31262160092100	732433	672350	917611	858585	894708	1083011	856724	929112	856009	915914	777435	925982	10419874
31262160016100	1023176	1373470	1216827	1156630	1202809	1097344	1159904	1074845	1169775	1180363	1071608	1198128	13924879
31262160016000	700505	858522	638857	629422	736656	646854	672067	671887	725259	751525	690971	781973	8504498
31262160097800	1055819	1395077	1313545	1340820	1117681	2258920	1158626	1280332	1335380	1322225	1099406	955159	15632990
31262160016500	722314	1119623	934815	629565	762556	781193	818621	801654	744708	814757	781496	1014666	9925968
31262160054606	770754	3706260	1206954	995743	947788	960552	960442	805947	711762	875732	946566	1095798	13984298
31262160054708	571713	800605	811783	686318	682737	652026	723457	812546	729995	733157	621831	720167	8546335
31262140166707	718765	926660	855186	793444	747525	740035	757708	796203	819917	760858	665885	859317	9441503
31262140155104	508153	697674	641304	643264	660751	658412	687254	622314	728402	709847	568291	676724	7802390
31262140011800	565719	841852	832516	795246	805746	752745	781562	756365	749694	782679	700448	777392	9141964
31262140127450	491805	625178	614214	592795	612718	575699	584248	551756	530151	566436	529659	552897	6827556
31262140127448	477198	596005	512627	651006	618058	644155	652323	628428	644179	607315	558899	579315	7169508
31262140127447	522986	693232	642298	574460	518088	464521	523343	543940	528045	294758	477032	569312	6352015
31262140019200	518526	684375	644816	617362	601677	603654	624652	572914	743788	593498	657598	726641	7589501
31262140030700	504508	685210	620608	548312	619497	616197	664772	659127	657480	662909	580299	595326	7414245
31262140030800	636472	786064	740534	721164	733994	699330	710513	665911	738373	612963	637559	723164	8406041
31262140026100	501792	714127	639029	634795	636998	619487	726128	620500	697823	701488	611662	694987	7798816
31262140096600	524204	680676	673141	634705	641142	616940	629378	621711	573345	630701	562754	632110	7420807
31262140100800	443681	676788	627360	592156	653359	605755	631753	608195	615404	892946	842494	974817	8164708
31262160017900	1088332	1433473	1404542	1414492	1537910	1488704	1592460	1584102	1613478	1760597	1439967	1618166	17976223
31262160016300	1207101	1654958	1855955	1778730	1950408	3948361	1828826	1685548	1883843	2115164	1817671	1991876	23718441
31262160025100	385326	472512	336320	308298	401186	4586036	654700	704394	770090	752109	683180	897735	10951886
31262160025300	563482	852894	768971	627896	786724	2899797	784525	782324	778289	768967	665688	785462	11065019
31262160025600	543218	741447	664561	714742	576934	576995	642058	639718	1007364	525361	449448	583205	7665051
31262160091900	422149	523004	560650	541503	557986	553710	563626	542132	1003473	581513	520551	648729	7019026
31262140261154	206946	267428	243153	512834	269374	240080	238302	262833	255190	269375	244801	567673	3577989
31262140261252	235731	300417	289264	17033	323695	379921	493603	461139	410471	480765	352655	850537	4595231
31262140261250	18946	201706	233891	204054	161884	156728	162899	95554	161090	113278	116755	389069	2015854
	52824266	71128020	65434463	61687981	63722021	70219798	63539840	63626553	65466889	66456099	60989637	69517418	774612985

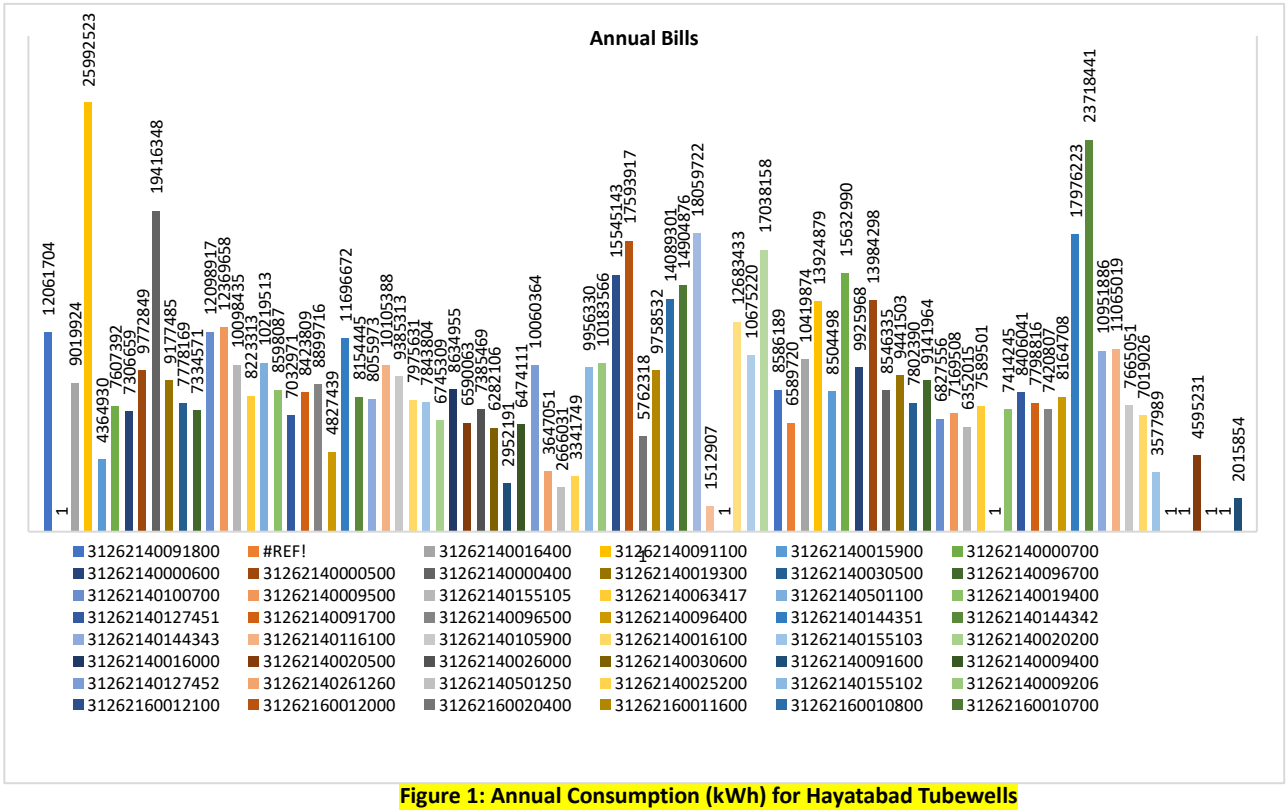

Figure 1: Annual Consumption (kWh) for Hayatabad Tubewells

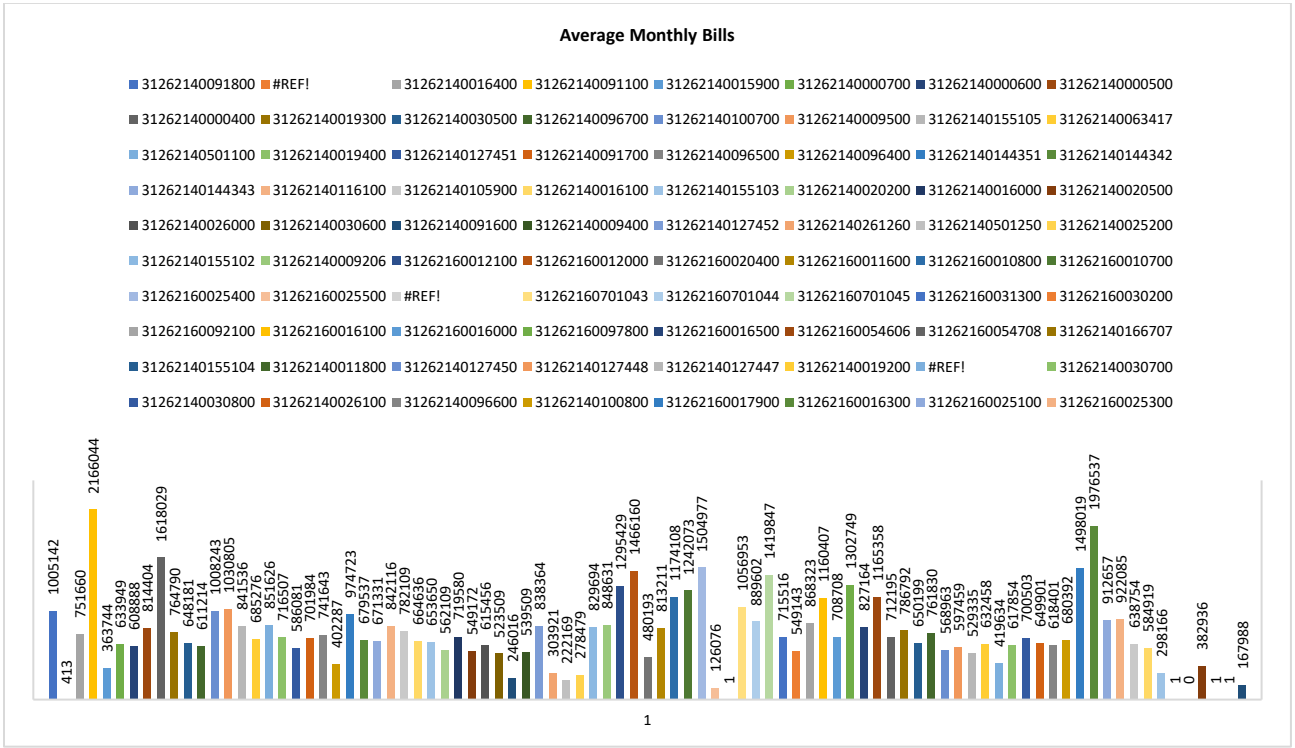

Figure 2: Average Monthly Consumption (kWh) for Hayatabad Tubewells

27. Schedule of Operation:

Schedule of operation for tubewells can be obtained from PDA. A tentative schedule of operations is attached below for Hayatabad Tubewells.

Table 5: Schedule of Hayatabad Tubewells

S.No.	*Site Name*	*Total Running Hours and Shifts*
1	9 B-1 Near PEC office	9.30 hours, 3 shifts
2	FIA Tube Well	10 hours, 3 shifts
3	8-D-4	12 hours, 3 shift
4	Shama Market	12 hours, 3 shift
5	7-D4-Phase 1	20 hours, 3 shits
6	P2	4 hours, 3 shift
7	P1 New T.W	4 hours, 3 shift
8	N1	4 hours, 3 shift
9	P2 T.W Turbine	4 hours, 3 shift
10	P1 Tank	4 hours, 3 shift
11	C2, Overhead Tank	9.5 hours, 3 shift
12	Khyber Park T.W	10 hours, 3 shifts
13	C3 Old Afghan Market	10 hours, 3 shifts
14	C3 Old Afghan Market New T.W	10 hours, 3 shifts
15	C4 People Market	10 hours, 3 shifts
16	C2 Phase 5 Tatara Market	7 hours, 2 shifts
17	D5 New Tubewell (Chaman)	12 hours, 3 shift
18	D4 T.W 06	12 hours, 3 shift
19	D2 Near Zarghoni Masjid	12 hours, 3 shift
20	E3 Street 17	12 hours, 3 shift
21	E1 New TubewellDongaGali	12 hours, 3 shift
22	E2 Mehran Quarter	12 hours, 3 shift
23	D5 Shumali Market TW 5	12 hours, 3 shift
24	D2 New Tubewell Street 51	12 hours, 3 shift
25	D2 New Tubewell Street 51	2 hours
26	K2 old T.W 17	3 hours, 3 shift
27	K3 TW 18 Yousafzai Market	4 hours, 3 shift
28	N4 TW 25	4 hours, 3 shift
29	N3	4 hours, 3 shift
30	N2 Park	4 hours, 3 shift
31	N2 TW 23	4 hours, 3 shift
32	K3 Old TW 19	4 hours, 3 shift
33	E3 Street 13 TW 2	12 hours, 3 shift
34	H3 Overhead Tank New TW 12	12 hours, 3 shift
35	H3 TW 13 old	
36	G1 old	12 hours, 3 shift

37	G1 New	12 hours, 3 shift
38	J2 overhead Tank	12 hours, 3 shift
39	G3 Abu hanifa Market	12 hours, 3 shift
40	G3 old Shalman Park	12 hours, 3 shift
41	G4 Horticulture TW Shalman Park	12 hours, 3 shift
42	G4 Shalman Park old	12 hours, 3 shift
43	K4 Madeena Family Park	3.5 hours 3 shift
44	L1 TW 21	3 hours, 3 shift
45	K1 Qurtaba University Street 2	3.5 hours 3 shift
46	K5 Street 2 TW 20	3.5 hours 3 shift
47	L2 New Khattak Market	3.5 hours 3 shift
48	L2Old Khattak Market	3.5 hours 3 shift
49	L3	3.5 hours 3 shift
50	K6 Park	3.5 hours 3 shift
51	K3 New	3.5 hours 3 shift
52	F5 Shershah Market	20 hours, 3 shift
53	F4 New TW	4 hours, 3 shift
54	F5	4 hours, 3 shift
55	F3	4 hours, 4 shift
56	F3	4 hours, 3 shift
57	F3 Bus Stand	4 hours, 3 shift
58	F3 Street 6	4 hours, 3 shift
59	F2 New	4 hours, 3 shift
60	F2 Govt College Old Tw	4 hours, 3 shift
61	F1 Shalman Park	4 hours, 3 shift
62	F8 New TW (Masjid)	4 hours, 3 shift
63	F8 Old TW	4 hours, 3 shift
64	F8 Bangash Tank TW	4 hours, 3 shift
65	F9 Nawab Market	4 hours, 3 shift
66	H1 Tariq Market Khalid bin waleed	12 hours, 3 shift
67	J3 TW 14 old	12 hours, 3 shift
68	J3 Street 9 Bihari Colony	12 hours, 3 shift
69	J5 Street 10	12 hours, 3 shift
70	J4 Zahid Market	12 hours, 3 shift
71	Sports complex ASP office	12 hours, 3 shift
72	Sector E4 Street 4 Naeem Ullah Market	11 hours, 3 shift
73	Tatara Thana E4	13 hours, 3 shift
74	E5 Tank 03 Near Madina Masjid	22 hours, 3 shift
75	E5 Tank 2	22 hours, 3 shift
76	E7 Tank 1 Street 7	20 hours, 3 shift
77	E7 Court Park	12 hours, 3 shift
78	E6	12 hours, 3 shift
79	E7 Behram Market	9 hours, 3 shift
80	Jinnah Park	3 hours, 3 shift

81	F9 Street 22	4 hours, 3 shift
82	F9 New TW	4 hours, 3 shift
83	F8 Dheriwala	4 hours, 3 shift
84	F7 Masjid Noor	4 hours, 3 shift

27.1. Connected Loads:

Connected load for each site can be obtained from PDA and will be the responsibility of bidder to evaluate and verify. A tentative data for connected load of operations is given below:

Table 6: Connected Load at PDA Complex

S.NO.	REFERENCE NO.	SITE NAME	TOTAL CONNECTED LOAD (W)
1	31262140009300	PDA Complex Building (Block A)	500,000
2	31262140009200	PDA Complex Building (Block B)	500,000

Table 7: Connected Load at Hayatabad Tubewells

S.No.	Site Name	Address	Total Connected Load (W)
1	9 B-1 Near PEC office	Phase 5	45340
2	FIA Tube Well	Phase 5	60590
3	8-D-4	Phase 1 Shama Market	46220
4	Shama Market	Phase 1	60010
5	7-D4-Phase 1	Super Market Phase 1	44910
6	7-D4-Phase 1	Super Market Phase 1	59860
7	P2	Phase 4	60010
8	P1 New T.W	Phase 4	60118
9	N1	Phase 4	59854
10	P2 T.W Turbine	Phase 4	74615
11	P1 Tank	Phase 4	45132
12	C2, Overhead Tank	Phase 5	45690
13	Khyber Park T.W	Phase 5	30080
14	C3 Old Afghan Market	Phase 5	45810
15	C3 Old Afghan Market New T.W	Phase 5	59990
16	C4 People Market	Phase 5	60470
17	C2 Phase 5 Tatara Market	Phase 5	30330
18	D5 New Tubewell (Chaman)	Phase 1	60130
19	D4 T.W 06	Phase 1	60750
20	D2 Near Zarghoni Masjid	Phase 1	59920

21	E3 Street 17	Phase 1	60750
22	E1 New Tubewell Donga Gali	Phase1	46008
23	E2 Mehran Quarter	Phase 1	60870
24	D5 Shumali Market TW 5	Phase 1	45800
25	D2 New Tubewell Street 51	Phase 1	38130
26	D2 New Tubewell Street 51	Phase 1	0
27	K2 old T.W 17	Phase 3	37462
28	K3 TW 18 Yousafzai Market	Phase 3	44934
29	N4 TW 25	Phase 4	44946
30	N3	Phase 4	59854
31	N2 Park	Phase 4	44946
32	N2 TW 23	Phase 4	44934
33	K3 Old TW 19	Phase 3	44934
34	E3 Street 13 TW 2	Phase 1	46490
35	H3 Overhead Tank New TW 12	Phase 2	46320
36	H3 TW 13 old	Phase 2	44760
37	G1 old	Phase 2	46920
38	G1 New	Phase 2	60740
39	J2 overhead Tank	Phase 2	45750
40	G3 Abu hanifa Market	Phase 2	45880
41	G3 old Shalman Park	Phase 2	45920
42	G4 Horticulture TW Shalman Park	Phase 2	26720
43	G4 Shalman Park old	Phase 2	38460
44	K4 Madeena Family Park	Phase 4	38298
45	L1 TW 21	Phase 3	44922
46	K1 QurtabaUniversity Street 2	Phase 3	44934
47	K5 Street 2 TW 20	Phase 3	44922
48	L2 New Khattak Market	Phase 3	45082
49	L2Old Khattak Market	Phase 3	44934
50	L3	Phase 3	37462
51	K6 Park	Phase 3	30052
52	K3 New	Phase 3	59692
53	F5 Shershah Market	Phase 6	44922
54	F4 New TW	Phase 6	59878
55	F5	Phase 6	59866
56	F3	Phase 6	59854
57	F3	Phase 6	60078
58	F3 Bus Stand	Phase 6	59878
59	F3 Street 6	Phase 6	37474
60	F2 New	Phase 6	59870
61	F2 Govt College Old Tw	Phase 6	29840

62	F1 Shalman Park	Phase 6	44982
63	F8 New TW (Masjid)	Phase 6	59842
64	F8 Old TW	Phase 6	59854
65	F8 Bangash Tank TW	Phase 6	59692
66	F9 Nawab Market	Phase 6	44970
67	H1 Tariq Market Khalid bin Waleed	Phase 2	44970
68	J3 TW 14 old	Phase 2	48400
69	J3 Street 9 Bihari Colony	Phase 2	47070
70	J5 Street 10	Phase 2	46960
71	J4 Zahid Market	Phase 2	46170
72	Sports complex ASP office	Phase 2	46350
73	Sector E4 Street 4 Naeem Ullah Market	Phase 7	61390
74	Tatara Thana E4	Phase 7	47440
75	E5 Tank 03 Near Madina Masjid	Phase 7	46140
76	E5 Tank 2	Phase 7	47100
77	E7 Tank 1 Street 7	Phase 7	61020
78	E7 Court Park	Phase 7	45920
79	E6	Phase 7	60760
80	E7 Behram Market	Phase 7	44928
81	E8 Anas ibn malik masjid	Phase 7	60280
82	Jinnah Park	Phase 7	26350
83	F9 Street 22	Phase 6	37686
84	F9 Street 22	Phase 6	59680
85	F9 New TW	Phase 6	60016
86	F8 Dheriwala	Phase 6	44964
87	F7 Masjid Noor	Phase 6	44904

Table 8: Connected Load for 15 Regi Model Town Tubewells

Tubewell No	Load in (W)
4A2	22380
abc	44760
4C1	44760
4C3	44760
4D1	44760
4D2	44760
4D3	44760
3A1	37300
3B1	44760
3B2	44760
3B3	55950
3C1	44760
park wala	29840
IC2	44760
ID2	29840

27.2. Tubewells Capacity:

Capacities for each site of PDA tube wells is provided in table 9 and 10 and will be the responsibility of bidder to evaluate and verify.

Table 9: Tubewell Capacity Hayatabad

Sr. no.	Capacity of Tubewells (HP)	Qty.	Total Capacity (HP)
1	35	2	70
2	40	1	40
3	50	5	250
4	60	58	3,480
5	80	25	2,000
6	100	1	100
		Grand Total	**5,940**

Table10: Tubewell Capacity Regi Model Town

S.NO	TUBEWELL NO	CAPACITY (HP)
1	4A**2**	30
2	abc	60
3	4C1	60
4	4C3	60
5	4D1	60
6	4D2	60
7	4D3	60
8	3A1	50
9	3B1	60
10	3B2	60
11	3B3	75
12	3C1	60
13	Central Park	40
14	IC2	60
15	ID2	40

27.3. Technical Specification:

All equipment in the PV system should be new and free from defects. No refurbished material or equipment shall be used for constructing the system. Each PV module, inverter, and transformer etc., shall have a unique serial number and shall be clearly and indelibly displayed inside and outside the

inverter cabinet. The PV modules should clearly show the flash test and electronic database with all flash data results on the back side, and they should be fully traceable regarding the manufacturing facility and the main components (glass, EVA, aluminium frame, etc.). The main equipment suppliers (PV modules, inverters, cables, generator, and mounting structures) shall be certified to ISO 9001, ISO 14001, and ISO 18001. The IEC 61215 or IEC 61646 or IEC 61208 and IEC 61730 certificates must be provided with the full certification reports. All components shall be capable of withstanding all climatic and electrical induced loads during the operational design life as specified in the relevant IEC standards. The system equipment warranty shall include, as a minimum, 10-15 years of defects warranty. The manufacturer shall provide a linear warranty for the output power of the module, indicating the expected annual degradation for the first 25 years. The system equipment should not contain irregularities, visual spots or blemishes affecting the module performance or system reliability.

27.4. Structure:

The detailed specifications of each component of the PV system are given in the following sub-sections.

The PV solar panel mounting metallic structure should be fixed mount L2 or L3 structure where required with 12 Gauge thickness, mounted on concrete base 6 inches above ground level. The tilt angle should set to year-round compromise (Equal to latitude).

The entire mechanical structure should be hot dipped galvanized, and powder coated for longer life of the structure. Structure should be hot dip galvanised up to 90 microns.

The Surface azimuth angle of PV Module 180 and the Tilt angle (slope) of PV

Module should be according to the site location.

The mounting structure must be engineered for wind resistance and safety as per geographical location of site.

Module should be fixed with the frame through SS bolts. The bolts should be tightened at the required angle.

The Nuts, Bolts & Washers for modules & Mounting structures must be stainless steel material with appropriate gauge.

Shading shall be avoided all over the year (around) from 30 minutes after the sunrise to 30 minutes before sunset (For installation purpose only).

To allow regular cleaning of the solar modules, they should be easily accessible for personnel (For installation purpose only) and shall be provided by the supplier

27.5. SOLAR PANEL

The PV modules are one of the crucial components of a PV system and thus its quality and selection is of paramount importance. PV modules should comply to the following requirements:

AEDB's regulations for PV modules

Requisite standards compliance

Performance and efficiency requirements

Guarantees and warranties required.

Pre-shipment and post-shipment inspection and testing

The modules tier-1, class A shall be protected by high transmission tempered glass covered with anodized aluminium alloy frames. Serially connected cells shall be terminated to IP 65 junction boxes at bottom with multi-strand copper cables. Positive and negative terminals shall be terminated with MC4 connectors and Y connectors for making module interconnections. Following further compliance shall be incorporated:

The provided PV Module should be of best quality available in market. The PV module should have over nineteen percent (19%) cell efficiency.

The PV module(s) shall contain Mono crystalline (PERC) silicon solar cells.

The PV module have an ability to Works well with high-voltage input Inverters/ charge controller.

The PV Panel must have clear anodized aluminium frame with Anti-reflection cover glass.

The power output of the module(s) under STC should be at optimum level

The operating voltage corresponding to the power output must be mentioned.

The open circuit voltage of the PV modules under STC must be mentioned.

The terminal box on the module should have a provision for opening for replacing the cable, if required and it should be waterproof

The Solar Panel shell meet the requirement set in IEC 61215:2000, IEC61730, IEC TS 62941.

A specification sheet containing the following details should be laminated on module to be clearly visible from front/back side.

Name of the manufacturer or distinctive logo.

Model or Type No.

Serial number

Year of manufacturing

Peak Watt Ratting

Voltage and Current at Peak Power

Open Circuit Voltage

Short Circuit Current

Maximum input voltages

Limited performance guarantees: panel power, in standard conditions, should not be less than 90% of nominal power for first 10-years of operation and at least 80% for the 20 years of operation with 12-year product warranty and 25- year linear power warranty.

Solar panel should have to pack for safe transportation on non-metallic roads.

Note: Bidder should justify the specs with appropriate lab test reports/certifications from the principal manufacturer

27.6. INVERTER

The inverter unit design shall allow for fully rated operation at the expected environmental conditions at the site. The inverters shall use a control algorithm to maximize energy output via tracking of the maximum power point of the PV array. The inverters' nominal efficiency shall be no less than 97.5% (European Efficiency). The maximum inverter operating voltage should be 1500 VDC.

Inverter protective characteristics shall include the following:

Overload
Short circuit
High DC bus voltage
High/low AC voltage
Loss/restoration of AC voltage
High/low grid frequency
Insulation resistance monitoring
Internal faults
High internal temperature
Automatic thermal protective control system

The following requirements apply:

The grid-connected inverters shall comply with UL 1741and IP65 standard.

Power generated from the solar system during the daytime is utilized fully by powering all building loads and feeding excess power to the grid if grid is available. In cases, where solar power is not sufficient due to more demand or cloud cover etc. the building loads should be served by drawing power from the grid. The inverter should always give preference to the Solar Power and will use Grid power only when the Solar Power is insufficient to meet the load requirement.

The output of the inverter must synchronize automatically its AC output to the exact AC voltage and frequency of the grid.

Inverter equipped with array ground fault detection option.

Grid voltage should also be continuously monitored and in the event of voltage going below a pre-set value and above a pre-set value, the solar system should be disconnected from the grid within the set time. Both over voltage and under voltage relays should have adjustable voltage (50% to 130%) and time settings (0 to 5 seconds).

Metal Oxide Visitors (MOVs) should also be provided on DC and AC side of the inverter.

The inverter control unit should be so designed to operate the PV system near its maximum Power Point (MPP), the operating point where the combined values of the current and voltage of the solar modules result in a maximum power output.

The inverter should be a pure sine way inverter for a grid interactive PV system.

The degree of protection of the outdoor inverter panel should be at least IP-65.

Typical technical features of the suggested inverters must mention as per following sequence.

Continuous output power rating (1.1 times for 60seconds)

Nominal AC output voltage and frequency

Accuracy of AC voltage control ±1%

Accuracy of frequency control ±0.5%

Grid Frequency Control range +/- 3 Hz

Maximum Input DC Voltage range

MPPT Range DC

Ambient temperature -10 deg C to +55 deg C

Humidity 95 % non- condensing

Protection of Enclosure IP-65 (minimum)

Grid Voltage tolerance -20 % and + 15 %

Power factors control 0.95 inductive to 0.95 capacitive

No-load losses < 1% of rated power

Inverter efficiency (minimum) plus 97%

Liquid crystal display should at least be provided on the inverters front panel or on separate data logging/display device to display the following:

DC Input Voltage

DC Input current

AC Power output(kW)

Current time and date

Time active

Time disabled

Time Idle

Temperatures (C)

Converter status

Following should also be displayed like Protective function limits, over voltage, AC under voltage, over frequency, under frequency, ground fault, PV starting voltage, PV stopping voltage, over voltage delay, under voltage delay over frequency, ground fault delay, PV starting delay, PV stopping delay.

Nuts & bolts and the inverter enclosure should have to be adequately protected taking into consideration the atmosphere and weather prevailing in the area.

Dimension and weight of the inverter should be indicated by the bidder in the offer.

All doors, covers, panels and cable exits should be gasketed or otherwise designed to limit the entry of dust and moisture. All doors should be equipped with locks.

To be proven by the technical brochure for the equipment:

The inverter manufacturer must have:
Minimum manufacturing experience of 5 years
Annual production capacity in the last 3 years is not less than 1000 MWhr per year.
Declarations duly signed and stamped by the manufacturer must be submitted.

Inverters must be manufactured in factories certified in accordance with:
ISO 9001 - Quality Management Systems.
ISO 14001 - Environmental Management Systems.
Certificates or declarations duly signed and stamped by the manufacturer must be submitted. No certifications in progress shall be accepted.

27.6.1. OPERATION MODE:

Night or sleep mode: where the Inverter is almost completely turned off, with just the timer and control system still in operation, losses shall be less than 2 W per 5 kW.

Standby mode: where the control system continuously monitors the output of the solar generator until pre-set value is exceeded (typically 10 W).

Operational of MPP tracking mode: the control system continuously adjusts the voltage of the generator to optimize the power available. The power conditioner should automatically re-enter standby mode input power reduces below the standby mode threshold. Front panel should provide display of status of the inverter.

27.6.2. SYNCHRONIZING EQUIPMENT

Solar PV systems should be provided with synchronizing equipment having three inputs for comparison i.e. grid supply vs. solar output, DG output vs solar output to connect the Solar PV systems in synchronism with grid or DG. In case of grid failure, solar PV system should be disconnected from the grid and out of synchronization for a period DG supply is not restored. PV system should be synchronized with the DG supply after DG is started.

27.6.3. PROTECTIONS AND CONTROL

PV system software and control system should be equipped with islanding protection as described above. In addition to disconnection from the grid (islanding protection i.e. on no supply), under and over voltage conditions, PV systems should be provided with adequate rating fuses, fuses on inverter input side (DC) as well as output side (AC) side for overload and short circuit protection and disconnecting switches to isolate the DC and AC system for maintenances are needed. Fuses of adequate rating should also be provided in each solar array module to protect them against short circuit.

A manual disconnect switch and change over switch beside automatic disconnection to grid should also be provided at utility end to isolate the grid connection by the utility personal to carry out any maintenance. This switch should be locked by the utility personal.

27.6.4. INTEGRATION OF PV POWER WITH GRID:

The output power from Solar PV system would be fed to the Hybrid inverter which feed some portion to battery bank for backup in case of grid failure and major portion converts DC produced by SPV array to AC and feeds it into the main electricity grid after synchronization. In case of grid failure, or low or high voltage, solar PV system shall be out of synchronization and shall be disconnected from the grid and feed power to the load as PV-Battery backup hybrid system. Once the DG set comes into service. PV system shall again be synchronized with DG supply and load requirement would be met to the extent of availability of power.

27.6.5. HARMONICS STANDARD:

As per the standard of IEEE 519, the permissible individual harmonics level shall be less than 3% (for both voltage and current harmonics) and Total Harmonics Distortion (THD) for both voltage and current harmonics of the system shall be less than 5%.

27.6.6. Lightning Protection

Lightning protection should be provided as per IEC 62305 standard. The protection against induced high voltages shall be provided using metal oxide varistors (MOVs) and suitable earthing such that induced transients find an alternate route to earth.
A lightning protection system shall be provided for each inverter and array of photovoltaic modules. Each lightning protection system shall be bonded to the main earthing system according to IEC 62305 (1-4), IEC 61173 and IEC 60099. Protective equipment and its installation shall comply with IEC 60255.

27.6.7. Surge Protection

Internal surge protection shall consist of three MOV type surge-arrestors connected from +ve and –ve terminals to earth (via Y arrangement).
Surge protection shall be provided on the DC side and the AC side of the solar system.
The DC surge protection devices (SPDs) shall be installed in the DC distribution box adjacent to the solar grid inverter.
The AC SPDs shall be installed in the AC main distribution board adjacent to the solar grid inverter.
The SPDs earthing terminal shall be connected to earth through the above-mentioned dedicated earthing system.
The SPDs shall be of type 2 as per IEC 60364-5-53

27.6.8. EARTHING MATERIAL:

Earthing is essential for the protection of the equipment & manpower. Two main groundings must be used for power equipment protection are:

➢ DC Earthing.

➢ AC Earthing.

DC and AC earthing should be installed separately where required as per standard

In case of equipment earth all the non-current carrying metal parts are bonded together and connected to earth to prevent shock to the manpower& also the protection of the equipment in case of any accidental contact.

To prevent the damage due to lightning the terminal of the lightning protection must be earthed separately. The provision for lightning & surge protection of the solar PV power source is required to be made as per standard.

In case the solar PV Array could not be installed close to the equipment to be powered when a separate earth should be provided for solar PV Panel.

Earth resistance shall not be more than 3 ohms. It shall be ensured that all the earths are bonded together to make them at the same potential.

The Earthing conductor rating shall be rated for the maximum short circuit current. & shall be 1.56 times the short circuit current. The area of cross-section shall not be less than 2.5 sq. mm in any case.

The array structure of the PV modules shall be grounded properly using adequate numbers of earthing pits. All metal casing/ shielding of the solar power system shall be thoroughly grounded to ensure safety of the power solar power system.

27.6.9. Earthing Protection

Each array structure of the PV yard should be grounded/ earthed properly as per IS: 3043 1987. In addition, the lighting arrester/masts should also be earthed inside the array field. Earth resistance

shall be tested in presence of the representative of department as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly.
Earth resistance shall not be more than 5 ohms. It shall be ensured that all the earthing points are bonded together to make them at the same potential.
A minimum of two separate dedicated and interconnected earth electrodes must be used for the earthing of the solar PV system support structure.
The earth electrodes shall have a precast concrete enclosure with a removable lid for inspection and maintenance. The entire earthing system shall comprise noncorrosive components.
Bidder shall maintain Earthing throughout the project tenure and shall be inspected from time to time by CISNR, project Engineer.

27.6.10. Cables and Hardware:

Power cables of adequate rating as per IEC standard shall be required for interconnection of:

Modules/panels within array

Array & Hybrid Inverter

Charge Controller & Battery

Automatic Distribution Box & Loads

The cable shall be A grade, heavy duty, stranded flexible copper conductor, PVC type A insulated, galvanized steel wire/strip armoured, flame retardant low smoke (FRLS) extruded PVC type ST-1 outer sheathed. The cables shall, in general conform to IS-1554 P+I & other relevant standards.

External cables should be specifically adapted to outdoor exposure (see IEC 60811). Especially the outer insulation must be sunlight (UV)-resistant, weatherproof and designed for underground installation. Preferably rubber coated and PE-coated cables shall be used.

The temperature resistance of all interconnecting wires and cables should be > 75° C. The minimum acceptable cross-section of the wire in each of the following sub-circuits is as in ISO IEC prescription:

Notwithstanding the ISO /IEC requirements, all wires must be sized accordingly to keep line voltage losses to less than 3% between PV generator and battery, less than 1% between battery and charge regulator, and less than 3% between battery and load, all of them at the maximum current conditions. (specifically for service providers).

All wiring shall be color-coded (and/ labelled in case of service providers)

All supplied wires must be in UV-resistant conduits or be firmly fastened to the building and/or support structure. Cable binders, clamps and other fixing material must also be UV-resistant, preferably made of polyethylene. (for the case of service providers)

All connections should be properly terminated, soldered and/or sealed using MC4 connectors for outdoor and indoor elements. Relevant codes and operating manuals must be followed

The following requirements shall apply:
The choice of installation method and cable routing shall be according to the type of conductor or cable to be used.
The cable routings (DC and AC) on the roof shall be encased in appropriate electrical conduits and not loose cables.
The conduits shall be thermoplastic (PE, PVC)
The supplier must submit the following technical data
Drawings with the routings for the various types of cables
Conduits to be used.
No cables shall be loose.
Cables of appropriate size to be used in the system shall have the following characteristics and cable manufacturers should be reputed national/international brands.
Shall meet IEC 60227/IS 694, IEC 60502/IS1554 standards.
Temp. Range: –100 C to +800 C.
Voltage rating 660/1500V
Excellent resistance to heat, cold, water, oil, abrasion, UV radiation, Flexible
Multi strand, annealed high conductivity copper conductor PVC type 'A' pressure extruded insulation or XLPE insulation. Overall PVC/XLPE insulation for UV protection armoured cable for underground laying. All cable trays including covers are to be provided. All cables conform to the latest edition of IEC/ equivalent BIS standards.
The size of each type of DC cable selected shall be based on minimum voltage drop; however, the maximum drop shall be limited to 1%.
The size of each type of AC cable selected shall be based on minimum voltage drop; however, the maximum drop shall be limited to 2 %.

27.6.11. DC cables shall comply with

Operating continuously at the maximum defined voltage at a temperature of 120ºC
UV protected according to EN 50618

27.6.12. AC cables shall comply with

Operating continuously at the maximum voltage set at a temperature of 90º C.
UV protected according to EN 50618
Operate to a maximum temperature of 250° C under fault conditions.
Resist without damage by withstanding the maximum fault current of the system for the time corresponding to the duration of a short circuit.

27.6.13. Optical Fibers

Single or multimode fibres are allowed.
UV protected.
Operate at a maximum temperature of 50 ^{o}C
Include a protective sheath. The minimum technical specifications of the cables and wires are given below.

The minimum technical specifications of the cables and wires are given

PV to Inverter: DC Cable 4 mmsq Tinned Copper with Multi Strands, Flexible and Double XLPE Coated with UV Resistant and Fire Retardants Properties 1500V Insulation. 4 mm² XLPE/XLPE/Tn-Cu. Two Colour Red and Black with Cable Manufacturing year and name
Grid to Inverter: 4 Core Armoured cable with gauge as per inverter rating. 99.9% pure copper (Stranded) with voltage drop less than 3%, U.V. resistive

27.7. MISCELLANEOUS ITEMS FOR INSTALLATION

27.7.1. WIRING PVC/GI CHANNEL DUCTS

A product of good quality standard material with suitable size to be provided / used.

27.7.2. FLEXIBLE PVC PIPE

The flexible PVC pipe should be of good quality material with suitable size should be used.

27.7.3. COMBINER BOX

Combiner Box should be manufactured through GI material with 100% copper strip in it for termination of PV Arrays must be IP65 for outdoor installation.

27.7.4. JUNCTIONS BOXES OR COMBINERS

Dust, water and vermin proof junction boxes of adequate rating and adequate terminal facility made of fire-resistant Plastic (FRP) shall be provided for wiring. Each solar shall be provided with fuses/ Circuit breakers of adequate rating to protect the solar arrays from accidental short circuit.

27.8. Civil Works and Mounting of Modules Structure

The supplier shall comply with all applicable legislations, such as the licensing of civil works, capacity and permits to perform the contractor's activity, safety, health, and environment.

The mounting system shall be designed according to the Euro Code and DIN 1055 and IBC-2009 standards or comparable local standards. Depending on the terrain, the suitable type of foundation must be chosen, preferably the ramming design for the PV system.

All structural components shall be painted, coated as per instructions of the Engineer, otherwise protected against corrosion and UV light to ensure the supporting structures integrity all along the minimum 25 years design life. Particular attention shall be paid to the prevention of corrosion of the connections between different metals. All materials should be selected to avoid corrosion and degradation. The use of ferrous metals, contact of dissimilar metals and the use of any wood or plastic components are strongly discouraged. Aluminium, stainless steel and galvanized steel components are preferred.

Only the mounting structures shall be fixed. Its design and construction should take the following into consideration:

The fixing/mounting structure must be compatible with the proposed PV modules.

The fixing/mounting structure shall have 25 years warranty against defects.

The mounting structure must be designed to withstand the permanent load of the modules, cables and other components attached to it, as well as mechanical loads due to local Environmental conditions such as wind, snow, or earthquakes (if applicable). A detailed structural design report should be submitted for approval. Mounting structures and fixing systems shall allow access to all installation components for maintenance purposes.

The mounting structure and the fixing elements shall avoid bimetallic corrosion between different metals.

The mounting structures shall be installed allowing a certain distance between each other to minimize shading between modules installed in adjacent structures, if applicable.

The mounting structures, fixing systems, nuts and bolts must withstand high levels of corrosion using stainless steel or hot-dip galvanized steel. Galvanization should be sufficient to provide corrosion protection for at least 40 years, galvanization of at least 99 microns is mandatory. No screw holes will be drilled at site in GI structure components, it should be ensured that no screw holes be made after galvanization.

If concrete, the cement mix shall be submitted for evaluation.

The design criteria for wind loads should be 150 km/h. The nuts and bolts or ballast to be used shall be appropriately justified based on calculations.

The mounting structures shall include cable runs appropriate for the number of and size of cables to be used.

The mounting structures shall be connected to the ground of the PV system through an adequate electrical system.

The mounting structures shall not be confined under pressure or any mechanical process to avoid damaging the PV modules.

Site grading, levelling, drilling exploratory bore holes and consolidation of the area pertaining to the installation of SPV modules.

Embedment of structures suitable for mounting PV modules.

Lying of earthing equipment /structures and connecting to the main ground as per the statutory requirements.

Construction of control room

Cutting of cable trenches etc. wherever necessary

27.9. OTHER FEATURES:

The PV Module(s) should be warranted for a minimum period of 10 years from the date of supply, inverter with five years and the battery should be warranted for a period of 5 years from the date of installation. The warranty card to be supplied with the system must contain the details of the system. The manufacturers can also provide additional information about the system and conditions of warranty as necessary.

Adequate space should be provided behind the PV module/array for allowing unobstructed airflow force passive cooling.

Cable of appropriate size should be utilized to keep electrical losses to a bare minimum.

The control electronics should not be installed directly with the battery. All wiring should be in proper conduit of capping casing. Wire should not be hanging loose.

27.10. Instruction and O&M manuals

Two copies of Instruction and Operation and Maintenance Manual in English and the local language should be provided with the system. The manual shall be furnished at the time of dispatch of the equipment and shall include the following aspects:

Precautions during unpacking

Instructions for handling at site.

Erection drawings with written assembly instructions that would enable the Client to carry out erection with his own personnel if opted by him.

Detailed instructions and procedures for the installation operation and maintenance. Pre-commissioning tests.

About solar PV system – its components and expected performance.

Principle of Operation of various equipment

Safety and reliability aspects About power conditioning unit’s software and controls

Clear instructions on regular maintenance and troubleshooting of Solar power system

Name and address of the person or service centre to be contacted in case of failure or complaint.

Outline dimension drawings showing relevant cross-sectional views, earthing details, constructional features.

27.11. Modules Cleaning System

A module cleaning system shall be envisaged for spraying the soft water over the modules manually, by providing storage tanks, water pumps, PVC piping network & valves. This cleaning process is to be carried out periodically depending upon the intensity of dust deposition over the PV modules. The contractor shall ensure that adequate infrastructure for water is developed at rooftop which will be further used for water cleaning of panels through pressurized water guns. If contractor uses water from installation place, then he will be charged accordingly.

27.12. Drainage System

While undertaking installation of mounting structure the drainage system of the roof should be respected. In case there is no drainage system, or it must be changed, the contractor shall ensure and clearly demonstrate the adequacy of the drainage for possible rainfall in consultation with the site owner and instructions of the Engineer.

27.13. Other Civil Works

The contractor shall specify any other civil work they intend to perform, if applicable. Such works shall always be verified and approved by the Client and shall be legally permitted before being carried out.

The acceptance of the civil works is intended to ensure the quality and proper performance of all works performed for which it was designed and throughout its useful life. The work should be in accordance with the detailed engineering reports and specifications, local and all applicable regulations, standards, and mandatory technical documentation.

All equipment to be supplied shall be mandatory new and without any previous utilization or usage.

27.14. Electrical Works

The contractor shall comply with all applicable legislation, such as the licensing of electrical works, capacity and permits to perform the contractor's activity, safety, health, and environment. The electrical works consists of the supply of all electrical equipment as well as its proper installation and final commissioning. All equipment to be supplied must be new and without any previous utilization or usage.

27.15. Operational Track Record and Performance

The proposed PV modules and inverters shall be part of a well-developed and proven product range. It will be ensured that the latest installation figures for the proposed models and inverters along with the operational track record and/or bankability reports are sought.

27.16. Health and Safety

The PV system shall be designed to include provisions that respect the health and safety of the public, operators and any other personnel who may have an interest in the PV system throughout the project’s lifetime. All safety equipment shall comply with applicable Pakistan codes for use in this project.

27.17. Environmental and Social

The solar PV system shall be designed/installed to include provisions of Environmental and social impacts of the project with a goal to make an already Environmentally friendly project more in compliance with the environmental and social considerations which consist of, but not limited to, the following.

27.17.1. Access to the rooftop:

It has been ensured during the survey that only the buildings without any permanent encumbrance or encroachment are selected. However, any debris or obstructions/encumbrance built after the survey on the roof that could cause access restrictions to the rooftop, the contractor will be required to clear those before installation of PV system.

The contractor will suggest dumping sites for all debris generated during the construction phase of the project. Suitability of rooftop: The contractor will carry out any repair/rehabilitation of the rooftop required due to wear and tear, age of the building etc. if required. The purpose is to ensure the safety of the roof and its capacity to hold the additional load of the proposed solar PV system.

27.17.2. Fire Protection

Determination of the local fire protections should be carried out in accordance with the applicable standards. Portable fire extinguishers of the appropriate type and rating complying with the national codes and recognized solar industry practice, and adequate first-aid kits including eye wash bottles, shall be provided at each inverter shelter and at the control building. Smoke detectors should be installed in each inverter shelter and at the control building.

27.17.3. Electrical Protection

The electrical protection scheme shall disconnect faulted electrical sub-systems within the system, meet the Network Operator’s requirements and be designed to adequately protect the electrical components of the PV system for the maximum design fault currents at the site and any other electrical conditions passed through from the utility system.

27.17.4. Acceptance and Commissioning

The acceptance of the electrical works is intended to ensure the quality and proper performance of all works performed for which it was designed throughout its useful life. The work should be in accordance with the draft implementation, regulations, standards and mandatory detailed engineering report and technical documentation submitted. The commissioning of the electrical works is described in the commissioning of the PV system.

27.17.5. Acceptance

The PV system shall be considered accepted only after all tests defined in the commissioning tests have been performed and approved by the client.

27.18. Commissioning

In the commissioning process, a set of verifications and tests are to be carried out to ensure the proper functioning of the photovoltaic system based on detailed engineering. All tests must comply with the applicable standards and requirements as per NEPRA and AEDB Testing, Commissioning and

Net-metering guidelines (in line with the guidelines of International Solar Energy Society (ISES). The contractor shall get the approval of the PDA Engineer 2 weeks prior to the start of the commissioning process.

27.19. Operation and Maintenance

The operation and maintenance period/DLP shall start after the acceptance of the PV system and after the punch list has been all solved and approved by the client.

27.19.1. Operation

The general principles of the PV system operation shall be based on, but not limited to, the following requirements:

The PV system shall remain operational in full compliance with technical, environmental and safety requirements and in accordance with national regulations and legislation. The operation of all equipment shall be performed in accordance with the supplied O&M manual, service manuals and manufacturer supplied recommendations. The PV system shall be capable of operating in automatic production mode under normal operating conditions.

27.20. Maintenance

To ensure the normal and correct operation throughout the life cycle of the PV installation, preventive and corrective maintenance tasks should be performed. As much as possible, maintenance operations should take place at night.

The preventive maintenance to be performed consists of routine inspections and maintenance of the equipment with procedures and frequencies determined by the type of equipment, manufacturer's indications, environmental conditions, and the specified project requirements. This is intended to reduce the likelihood of unplanned downtime of the PV system and the corresponding undesirable production failures. The preventive maintenance activities include:

Inverter maintenance operation

Verification of the fixing/mounting structures

Cleaning of the PV modules

Verification and maintenance of other electrical equipment (cables, AC and DC boxes, connections, low voltage switchgears etc.)

The corrective or reactive maintenance to be performed must respond to the equipment's fault repair needs after their occurrence. Performing these tasks may lead to an unplanned production outage. Therefore, the corrective maintenance activities should be carried out as soon as possible to minimize possible financial costs.

27.21. Production Guarantees

The production guarantees of the PV system will be in the form of quantity in terms of energy produced and quality in terms of availability and the system's PR. Production guarantees shall be

required during the first five years of operation and will be measured at the end of each month/year as per JV counting from the date of acceptance of the system.

The PV system availability shall be measured and values below 97.5% shall not be accepted. System availability will be determined as the proportion of time annually that the PV system generated electricity excluding all grid outages as well as planned and unplanned maintenance. If below, the equipment supplier shall have to justify the reason for such amount and may be subject to a non-compliance penalty. Annual PR shall be measured and should be within the value submitted within 0.1%. If it is more than 0.1% below the value for that year, the supplier must justify the reason for that amount and may be subject to a non-compliance penalty.

The energy generated must reach the value of the award of the contract and should not be lower. If lower, the operator must explain the unavailability of the PV system and the maintenance times so that the expected value would have been proportionally reached.

27.22. Contractor Guidelines

27.22.1. The Contract

The contract will be awarded on JV Model basis including engineering, procurement, detailed design, supply, install, test, commission and operate basis, with quoted number of years back up support for proposed period. The contract shall include a complete rooftop/carport/open area PV system delivering AC power at the specified site and/or building.

27.22.2. Layout

The contractor shall submit CAD drawings in A3 for the proposed site showing:
North direction
Location of the PV modules and inverter(s).
Location of the grid connection
Location of water to be used for the O&M

27.22.3. Single Line Diagrams (SLDs)

The contractor shall submit a general SLD including a total overview of the electrical circuit of the PV system from the generators (PV modules) to the injection point (power evacuation) and total overview of the electrical circuit of the DC part of the PV system, namely from the PV modules to the inverter(s).
In the design following elements should be represented:
Inverters and its location
PV arrays
Combiner boxes
PV strings
DC cables
Earthing system
Disconnectors and DC protection
AC cables
Meter
PV System connection with Backup Power Supply/UPS/Gen Set etc.

Other miscellaneous details

27.23. Detailed Design and Engineering Report

27.23.1. Applicable standards:

IEC 62548 or equivalent Photovoltaic (PV) arrays - Design requirements the contractor shall submit complete design and engineering report including but not limited to the following:

Submission of certificate/report by structure engineer regarding building roof strength analysis to assess the existing strength of roof capable to withstand the load of heavy solar structure.

Submission of SAP-2000/STADD Pro Wind Analysis (aerodynamic study) report in case solar structure is elevated.

Any works envisaged including clearing of the roof, change of the items on the roof, any fixes to the roof, works to pass cables, DC and AC cable runs, PV modules fixing/mounting structures and others.

Fixing/mounting structures to be used Mechanism of safe transportation of solar system and allied structure to the rooftop of the building especially multistorey buildings which may require crane/tower crane etc.

Currents and voltages to be used in DC and AC

Sizing of the PV array – mentioning at least the number of modules per string, array and total, Isc and Voc versus the allowed by the inverter.

PV modules and inverters to be used.

Generator to be used

Sizing of the AC and DC cables – including the section and the estimated losses.

Earthing and grounding for lightning protection – the grounding system of the building should be used for the PV system.

Combiner/distribution boxes DC and AC

Junction boxes DC

MCB's to be used including the protection at DC and AC levels – the system should be able to isolate each string, each array, and each inverter, if applicable. At the AC level all voltage levels should be able to be isolated.

27.23.2. Technical Drawings and As-Builts

All final technical drawings and as built must be delivered upon acceptance of the PV system and rectified, if necessary, after acceptance for both the civil and electrical works. A PV system O&M manual should also be delivered in accordance with the manufacturer's recommendations.

27.23.3. Acceptance of the PV System

The PV system shall be considered accepted after all commissioning tests have "passed" and without any fail and after receipt of all technical drawings and as-builts as well as the O&M manual. A preliminary acceptance certificate (PAC) shall be provided upon successful commissioning. A punch list shall be produced and corrected before the acceptance/transfer of the PV system is made to the client. The contractor shall be liable for the PV system in the 1st year and the 2nd year regarding the annual energy generated as per the value submitted by the award of the contract. The final acceptance certificate (FAT) shall only be given after 2 years and provided that this condition is met either in year 1 and 2 or on year 2.

28. Digitization of Tubewells

Drinking water and wastewater treatment plants account for **30-40%** of the total energy consumed by municipal governments, making them the single largest energy consumers in the municipal sector. Energy costs for water and wastewater utilities are indeed significant, but they also represent the largest controllable cost of providing water and wastewater services. Studies have estimated that **15-30% energy** savings is readily achievable through cost-effective efficiency measures in water and wastewater plants, and that utilities can realize significant financial returns with a payback period from only a few months to about five years. Similarly, as per World bank report "Electricity costs are the largest "controllable" operating costs for most WWUs, and international experience indicates cost reductions of as much as **20 to 40%** are feasible through improved efficiency of energy use (ESMAP 2012, Wat ergy 2007)". Inadequate investments in water supply networks have resulted in the loss of **30% of the country's drinking water** before it reaches end-consumer. To ensure quality of drinking water services to communities and reduced emissions via digitization, PDA pledges to transform all the tubewells on digitization mode. To do so, the bidder is required to not only provide RE Integration (solarization) but also implement SCADA systems on all tubewells. In order to ensure the quality of service, the SCADA system shall have the following components:

28.1. Water Supply SCADA:

28.1.1. **Purpose:**

Real-time monitoring, control, and data acquisition of water supply networks, optimizing resource management and minimizing losses.

28.1.2. Key Features:

Real-time data acquisition on electricity consumption, water supply, flow rates, and potential consumption patterns.

Remote control of pumps for on/off switching and scheduling based on demand.

Centralized monitoring and control room for comprehensive network oversight.

Proactive water consumption statistics and prevention, reducing water loss and theft.

Data-driven insights for optimizing pumping operations and energy consumption.

Capable of interrupting functioning in case of abnormal operation.

Remote Access and control of turning on and off tubewell.

Capable of issuing highlighting abnormal electricity parameters.

Capable of limiting over voltage and over current for protection.

Have remote website/app for monitoring and control

Have SIM for data communication.

Customizable remote schedule of operation for tubewells.

Onsite self-protection of device against surge

Customizable voltage and current limiting conditions.

Link down protection.

Motor Protection against overload and underload run

Provisions for Electricity Parameters Monitoring such as Voltages, Currents, Power Factor, KVA, and KWh

28.1.3. **Working Principle:**

Sensors gather real-time data transmitted to a central control center. Remote terminal units at pump stations monitor power consumption and send alerts. SCADA software management system analyzes data, enables remote pump control, and triggers alarms for anomalies. Cellular networks ensure reliable communication.

28.1.4. **Specifications:**

SCADA comprises of various software and hardware components and shall meet the following specifications.

28.1.5. **RTU-Remote Terminal Unit:**

SCADA based automation system backed by powerful microcontroller (at least 32 bit) and on chip GSM module for remote control and data communication must have32-bit multi-channel (40) with 24 analog channels Microcontroller board Main Unit, Modbus/Multi-channel interface-based Energy Analyzer with 3 phase Potential sensors and Clip type Current Transformers (Class 0.5 with capacity for 30 to 100 Hp Motors), Complete Communication Module (Wireless Data Transmission using GPRS), Electrical Panel and Accessories and Electronic Components, In-built Battery back-up for 5-6 Hours, Switching relays to control pumps with capacities from 30 to 100 hp Motors, Cog-Type Display Unit on site for showing I, V, KVA, KW, KWH and Power Factor, ABS/PC material based internal enclosure for main circuit, Flash memory on board for status storage, On terminal smart metering and real time energy data display.

28.1.6. **SCADA Central Monitoring & Control System Dashboard**:

Web Based/Mobile Application for Monitoring & Control, Complete software management system providing Smart metering and electricity parameter statistics in real time. Daily, weekly and monthly reporting systems.

28.1.7. Cloud Storage and Data transportation:

Should provide data storage and data transportation facilities for the project period.

SCHEDULE 1
SPECIFICATIONS OF THE SOLAR POWER SYSTEM

Contractor will provide Solar power system design with detailed BOQ with drawings and simulation reports.

Sr. No	Name of Component	Model	Name of Manufacturer	Country of manufacturing	Brand Name	QTY

SCHEDULE 2
GUARANTEED ENERGY GENERATION (for Each Site)

Guaranteed Energy Generation is [-]KWh per day average calculated by dividing the total energy generated in one year divided by 365 Days. Year wise Energy Guaranteed is given below.

YEARS	GUARNTEED ENERGY GENERATION FOR _____ Solar power system
YEAR-1	
YEAR-2	
YEAR-3	
YEAR-4	
YEAR-5	
YEAR-6	
YEAR-7	
YEAR-8	

YEAR-25	

FORMOFBANKGUARANTEE/BONDFORADVANCEPAYMEN

Guarantee No._____
Executed on _____
Expiry date _____

Letter by the Guarantor to the Employer]

WHEREAS the _____(hereinafter called the Employer) has _____

(Particulars of Contract), with _____

_____(here in after called the Contractor).

AND WHEREAS the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of Rupees_____(Rs._____) which amount shall be advanced to the Contractor as per the provisions of the Contract.

AND WHEREAS the Employer has asked the Contractor to furnish Guarantee to secure advance payment for performance of his obligations under the said Contract.

ANDWHEREAS_____(Bank) (hereinafter called the Guarantor) at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

NOW THEREFORE the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above-mentioned Contract and if he fails and commits default in fulfillment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, of which the Employer shall be the sole and final judge, as aforesaid, on the part of the Contractor, shall be given by the Employer to the Guarantor, and on such first written demand payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This guarantee shall come into force as soon as the advance payment has been credited to the account of the Contractor.

This guarantee shall expire not later than _____by which date we must have received any claims by registered letter, telegram, telex or telefax.

It is understood that you will return this Guarantee to us on expiry or after settlement of the total amount to be claimed hereunder.

_____

Guarantor (Bank)

Witness 1:

_____ Signature _____

Affidavit for non-backlisting of Firm

[Print on Stamp Paper]
Non-judicial stamp paper (with a value of Rs. 100)

Date: _

AFFIDAVIT

It is hereby solemnly confirmed and declared that M/s ----------, is declaring on oath that the Applicant:

- is not in *bankruptcy* or liquidation proceedings.
- has *never* been declared *ineligible/blacklisted* by Government / Semi-Government / Agency or Authority or any employer till date due to the any reasons
- is not making any *misrepresentations* or concealing any material fact and detail.
- has not been convicted of, fraud, *corruption*, collusion or money laundering.
- is not aware of any conflict of interest or potential *conflict of interest* arising from prior or existing contracts or relationships which could materially affect its capability to comply with its obligations; and
- does not fall within any of the circumstances for *ineligibility* or disqualifications

(Stamp of Company) (Signatures of Authorized Rep)

_____

Company Name
Attestation by Oath Commissioner and/or Notary Public

FORM OF PERFORMANCE SECURITY

(Bank Guarantee)

Guarantee No._____
Executed on _____
Expiry date ___

[Letter by the Guarantor to the Employer]

Name of Guarantor (Bank) with address:___ Name of Principal (Contractor) with address:_____
Penal Sum of Security (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 Employer) in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, 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 Employer's above said Letter of Acceptance for _____ (Name of Contract) for the __
_____(Name of Project).

NOW THEREFORE, if the Principal (Contractor) 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 Employer, 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 Clause 30, Defects after Taking Over, 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 Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer'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 Employer’s designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the principal (Contractor) 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 Employer 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.

Witness:

1. ____

Guarantor (Bank) Signature _

_____

Corporate Secretary (Seal)

Name_

Title __