



RAJASTHAN ELECTRONICS & INSTRUMENTS LIMITED, JAIPUR

(An ISO 9001 : 2015 & 14001 : 2015 “Mini Ratna” Central Public Sector Enterprise)

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JAIPUR-302034

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NOTICE INVITING TENDER FOR “SUPPLY OF BOS (EXCEPT SPV MODULES & STRING INVERTERS), ERECTION, TESTING, COMMISSIONING AND 2 YEARS COMPREHENSIVE O&M OF 2.64 MWP (DC) CUMULATIVE CAPACITY GRID CONNECTED ROOF TOP SOLAR PV POWER PLANTS”

TENDER NO. REIL/RE/2021-22/PP/21093 dated 02.09.2021

Important Dates:

Pre Bid Meeting : 13.09.2021 at 11:00 Hrs

Last Date & Time for submitting e- tender: 23.09.2021 up to 15:00 Hrs

Date & Time for opening of e-tenders: 24.09.2021 at 15:00 Hrs

Kindly note that only online bid will be considered against this tender

RAJASTHAN ELECTRONICS & INSTRUMENTS LIMITED, JAIPUR

NOTICE INVITING TENDER NO. REIL/RE/2021-22/PP/21093

This is a Notice Inviting Tender (NIT) for “Supply of BOS (except SPV Modules & String Inverters), Erection, Testing, Commissioning and 2 years Comprehensive O&M of 2.64 MWp (DC) cumulative capacity Grid Connected Roof Top Solar PV Power Plants” as per description and terms & conditions specified hereinafter:

Item Description:

S. No.	Description
1.	Supply of BOS (except SPV Modules & String Inverters), Erection, Testing, Commissioning and 2 years Comprehensive O&M of 2.64 MWp (DC) cumulative capacity Grid Connected Roof Top Solar PV Power Plants

E-Tendering Procedure: The work shall be carried out through submission of online tenders only. No offer in physical form will be accepted and any such offer if received by REIL will be out rightly rejected. Tender documents can be downloaded from our website www.reiljp.com or website of CPPP www.eprocure.gov.in. Final bids are to be submitted on website www.eprocure.gov.in. Any changes modification in the tender enquiry will be intimated through above websites only. Bidder are therefore, requested to visit our website regularly to keep themselves updated.

The bidder should have a valid Digital Signature certificate issued by any of the valid certifying Authorities to participate in the online tender.

The bids shall be uploaded in electronic form only through e-tendering system on website www.eprocure.gov.in.

Note: e- Procurement system does not allow submission of documents after due date of tender. Incomplete form or non-submission of documents to verify details may results into rejection of your offer and no communication shall be done for submission of documents.

Price Bid:- Price Bid format given with tender is to be uploaded after filling all relevant information like basic prices, taxes & duties. The Price bid should be uploaded strictly as per the format available with the tender failing which the offer is liable for rejection (blank or changing format of price sheet will not be accepted by system). **REIL reserve the right to distribute the work.**

The bid shall comprise of technical bid and commercial Bid. The detailed scope of work, terms and conditions etc. are available with the Bid documents.

The bidder shall submit bid security form alongwith technical bid.

The details for Bid are as follows:

S. No.	Item	Description
1	Last date for submission of Online Bid	23.09.2021 (15:00 Hrs)
2	Opening of technical Bid	24.09.2021 (15:00 Hrs)
3	Opening of Commercial Bid	To be informed later to successful bidders in the technical bid
4	Date of Online Pre Bid Meeting	13.09.2021 (11:00 hrs)
5	Contact Person(s) for Technical Queries	1.Sh. Amitabh Sharma, DGM (RE), amitabh.sharma@reil.co.in 2.Sh. Kuldeep Singh Rathore, Engineer (RE), kuldeep.rathore@reil.co.in , +91-7727007749
6	Contact Person(s) for Tender related Queries	1. Sh. Deepak Gupta, DGM (MM), deepak.gupta@reil.co.in , 0141- 2471083

REIL reserves the right to reject the whole or part of any or all bids received, without assigning any reason.

Dy. General Manager (MM)

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RAJASTHAN ELECTRONICS & INSTRUMENTS LIMITED, JAIPUR

Process Compliance Form

(Tenders are required to print on their company's letter head and signed, stamp before uploading).

To

**Deputy General Manager (MM)
M/s Rajasthan Electronics & Instruments Limited
2, Kanakpura Industrial Area, Sirsi Road,
Jaipur-302034**

Sub:- Acceptance to the process related Terms and Conditions for the e-Tendering

Dear Sir,

**This has reference to the Terms & Conditions for e-Tendering mentioned in the Tender No.:-
REIL/RE/2021-22/PP/21093 dated 02.09.2021.**

We hereby confirm the following:-

- 1) The undersigned is authorized representative of the company.
- 2) We have carefully gone through the NIT, Tender Documents and the Rules governing the e-tendering as well as this document.
- 3) We will honor the Bid submitted by us during the e-tendering.
- 4) We undertake that if any mistake occurs while submitting the bid from our side, we will honor the same.
- 5) We are aware that if REIL has to carry out e-tender again due to our mistake, REIL has the right to disqualify us for this tender.
- 6) We confirm that REIL shall not be liable & responsible in any manner whatsoever for my/our failure to access & submit offer on the e-tendering site due to loss of internet connectivity, electricity failure, virus attack problem with the PC, digital signature certificate or any other unforeseen circumstances etc.

With regards

Signature with company seal

Name:

Designation:

E-mail Id:

ELIGIBILITY CRITERIA:

A) TECHNICAL ELIGIBILITY CONDITIONS:

Bidder must fulfill following criteria:-

1. The Bidder should be a Company / Firm / Corporation, incorporated in India under the Companies Act, 1956 or 2013 and having experience in Design, Supply, and Installation & Commissioning of Solar Power Plants.

OR

A Limited Liability Partnership Firm (LLP) registered under section 12 of Limited Liability Partnership Act, 2008 and having experience in Installation & Commissioning of Solar Power Plants.

2. Bidder should have experience of Supply and Installation - Commissioning of cumulative 2000 kWp Grid Connected SPV Power Plants during last three years i.e. from 01.08.2018 to 31.07.2021 across PAN India. Work order and completion certificate from customer to be submitted by the bidder.
3. Out of above cumulative 2000 kWp capacity, at least one solar PV plant should have been of individual capacity not less than 200 kWp connected with grid in a single work order in any refinery / petro-chemical / oil and gas / power generating plants / steel / metallurgical / fertilizer / cement / chemicals / textiles / Nuclear / Railways / Airports / Hospital / Mining industries / Any Govt. Building / PSUs, which have been in satisfactory operation for at least one (01) year upto 31.07.2021. Satisfactory O&M certificate from customer to be submitted by the bidder.
4. The Bidder should have executed work at Electrical Sub-station of 11 kV / 33 kV or above voltage level, consisting of equipment such as 11 kV / 33 kV or above voltage level circuit breakers and transformer, either as developer or as EPC Contractor which should be in successful operation for at least one (1) year upto 31.07.2021. The required work order and completion certificate is required in this matter.

B) FINANCIAL ELIGIBILITY CONDITIONS:-

1. Firm should have a minimum annual average turnover of Rs. 2.00 Crore in last three financial years i.e. 2018-19, 2019-20 & 2020-21.
2. The bidder should have adequate financial resources or should have sufficient resources audited financial statement to undertake the contract. Below mentioned documents are required:

Letter from a Financial Institution that it is willing to fund the project.

OR

Declaration on bidder's letter head (in case the bidder wish to use the internal resources for funds / shall be furnished).

Bidder should submit following documents along with Technical bid:-

1. Company Incorporation Certificate / Company Registration Certificate.
2. Bankers Report.
3. Balance sheet & ITR for last three years i.e. 2018-19, 2019-20 & 2020-21.
4. Turnover and Positive Net worth value duly certified by CA.

5. Past Experience details as per technical eligibility asked in the NIT. (Kindly attach verified documents from customer such as Work Order, Completion Certificate and O&M Certificate)
6. Photocopy of GST Registration no. & PAN no.
7. Any other relevant documents

(C) OTHER CONDITIONS:

- a) **Responsibility for executing Contract:** The contractor is to be entirely responsible for the execution of the contract in all respects in accordance with the terms and conditions as specified in the acceptance of tender.
- b) The contractor shall not sublet transfer or assign the contract to any part thereof without the written permission of the Deputy General Manager (MM). In the event of the contractor contravening this condition, Deputy General Manager (MM) be entitled to place the contract elsewhere on the contractors account at his risk and the contractor shall be liable for any loss or damage, which the Deputy General Manager (MM), may sustain in consequence or arising out of such replacing of the contract.
- c) **Document:** The bidder should have a valid **PAN / TAN /GST NO & other statutory document as applicable** and produce attested copies of such certificates along with the tender papers in Technical Bid, failing which the tender is liable to be rejected. Check list be attached.
- d) **Right to accept / reject:** REIL reserves the right to reject any or all tender without assigning any reason whatsoever. Also, the REIL authority reserve the right to **award** any or part or full contract to any successful agency at its discretion and this will be binding on the bidder.
- e) The capacity of SPV Power Plant shown in the tender can be increased or decreased to any extent depending upon the actual requirement.
- f) **Assistance to contractor:** The contractor shall not be entitled for assistance either, in the procurement of raw materials required for the fulfillment of the contract or in the securing of transport facilities.

D) Electrical Contractor License

- The work shall be carried out by the contractor, having valid Electrical Contractor License for carrying out installation work under the direct supervision of the persons holding valid certificates of competency issued by the State Government. The same shall be submitted to REIL by successful bidder after placement of work order.
- The successful BIDDER shall furnish the names and particulars of the certificate of competency of supervisor and workmen to be engaged for carrying out this work.

E) PRICES:

- a. Prices are to be quoted **in Indian Rupees**.
- b. Prices quoted in the Price/Financial Bid must be meaningful and measurable in the context.
- c. Price must be quoted in original sheet of BOQ failing which the same is liable to be rejected
- d. Offer shall be valid for 60 days from the date of bid opening

Scope of Works, Technical Specifications& Drawings

SCOPE OF WORKS (SOW)

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I. INTRODUCTION

1. PROJECT DESCRIPTION

REIL proposes to set up Grid connected Roof Top Solar Power Projects by hiring LSTK services. The roof top grid connected Solar PV plant (Phase I & Phase II) shall be set up at single site in District - Auraiya. Phase I shall be set up at petrochemical complex Plant area. Phase –II shall be set up at residential (Colony) area. Both to be executed / implemented simultaneously.

This tender invites the bids for Check Survey, Design, Engineering, Procurement, Supply, Construction, Erection, Testing, Commissioning and including 2 years comprehensive O&M of 2.64MWp (DC) cumulative capacity Grid Connected Rooftop Solar PV Power Plants at site in District Auraiya (UP).

The Project execution methodology for the Grid connected roof-top Solar PV projects based on a philosophy that the project shall be executed in LSTK mode and REIL / Customer will control all aspects of the Project execution on behalf of Customer to complete the project on time and within specified costs.

Site Access Details:

Particulars	Description
District	Auraiya
State	Uttar Pradesh
Nearest City	Kanpur, 85 Kms by Rail & 120Kms By Road
Nearest Highway	NH-2
Nearest Railway Station	Phaphund, around 5 kms.
Nearest Domestic Airport	Amausi, at a distance of about 200 kms

Meteorological Parameters:

Elevation above mean sea level, m	139.5
Max. ambient temperature	45° C max.
Min. ambient temperature	8° C min.
Average daily ambient air temperature	25.3° C
Max. Relative Humidity (%)	65
Average Annual rainfall (mm)	Approx.670.3 mm per Year
Average normal annual wind velocity	7 km/h

Isoceraunic level (days per year)	15.1
Seismic level(Horizontal acceleration)	0.1 (Zone-II)
Average number of rainy days/ year	70
Average UV Index	7

Technical Details:

REIL shall provide SPV Modules & String Inverters of cumulative capacity 2641 kWp at site. Minimum wattage of SPV Module shall be 330 Wp. The contractor shall coordinate the safe storage of material at site.

Cumulative Minimum DCCapacity:	2.64MWp
Estimated life of PV Power plant	25 Years
PCUs (StringType)	As per design, Efficiency \geq 98% <u>Inverter Capacity:</u> The continuous combined rating of all PCUs shall not be less than i.e 2.5MW(AC) at unity power factor at ambient temperature of 50 deg and 0.95 p.f.
Power Evacuation	1. For phase-1 Set-1 Solar Plant: Power to be evacuated at 33KV Level. New Substation of Indoor type (Transformer-Outdoor), 1500 KVA, 33/0.415 - 0.800 KV, proposed near Old C&P Store. 2. For phase-1 Set-2 Solar Plant: Power to be evacuated at 33KV Level. New Substation of CSS Outdoor Type, 800 KVA, 33/0.415 - 0.800 KV, proposed near New Product Ware House. 3. For phase-1 Set-3 Solar Plants: Power evacuation at LT 415V Level within the each building premises 4. For phase-2 Set-4 Solar Plants: Power evacuation at LT 415V Level within the each building premises.
Minimum Expected CUF	15%
Min. Performance Ratio (PR)	75%
(Values of CUF & PR after netting off the auxiliary consumption)	

Brief Summary of Plants:

Two types of roofs are considered for the project i.e shed type and flat RCC roofs.

PHASE	SET	TYPE OF ROOF	PLANT CAPACITY	DESCRIPTION OF ROOFS
Phase-I :	Set-1	Shed Type Roof (Metallic sheets)	1361KWp	1 No. PV plant at C&P Stores area, which is a cluster of roofs of 7 no's of various stores/warehouse surrounding C&P Stores, inside petrochemical complex Plant area.
	Set-2	Shed Type Roof (Metallic sheets)	768 KWp	1 No. PV plant at New Product Ware House inside petrochemical complex Plant area.
	Set-3	Flat RCC Roof	330 KWp	8 no's. PV Plants of various capacities spreaded across petrochemical complex Plant area. One of the roof is metallic sheet shed.
Phase-II :	Set-4	Flat RCC Roof	182 KWp	6 no's. PV Plants of various capacities spreaded across residential (Colony) area
Combined Capacity:			2641KWp	

Description for Set-1 of Phase – I RTS Plants

PV Plan tNo.	Location number	Location Name	Type of Roof	ProposedCapacity KWp	
Phase-I: Set-1 (Plant Area)					
1	1	Workshop (South West)	Shed	140	
	2	Old C&P Store (South WestFacing)	Shed	270	
	3	New Spare Store -1 (South West Facing)- General store		Shed	315
		4a	EIL Store (South East facing)		
	4b	EIL Store (Northwestfacing)	Shed	128	
	5	Spare-Shed-1		Shed	40
		(North West facing)			

6	Spare Shed-2 (South West facing)	Shed	48
7a	New Spare Shed Yard-4 (South East facing)	Shed	152
7b	New Spare Shed Yard- 4 (North West facing)	Shed	140
TOTAL: KWp			1361

Proposed Power Evacuation Point of Phase-1 Set-1:

Location for Proposed 33KV Indoor Type SS for Set-1, Ph-1

Existing 4P Structure of Cable Terminations (2 I/C + 1 O/G), approx.50 mtr away from new Substation location

33KV Indoor Type Substation (with outdoor Transformer) has been proposed near C&P Store for Set-1 of Phase-1 plant, and power to be evacuated at 33KV level. Existing 4P Structure to be dismantled and all existing 33KV cables to be re-routed to new Substation, and terminated at proposed new indoor type HT Switchboard. SLD attached in Annexure-5

Description for Set-2 of Phase – I RTS Plants

PV Plant No.	Location number	Location Name	Type of Roof	Proposed Capacity KWp
Phase-I: Set-2 (Plant Area)				
2	8a	New Product Ware House (North West)	Shed	563
	8b	New Product Ware House (South East)	Shed	205
	TOTAL: KWp			768
33KV CSS (Compact substation) has been proposed for Set-2 of Phase-1 at outside corridor of North West side of Stores area, power to be evacuated at 33KV level to the nearest 33KV available grid of existing solar plant approx.1.5km away. SLD attached in Annexure-5				

Description for Set-3 of Phase – I, RTS Plants

PV Plant No.	Location number	Location Name	Type of Roof	ProposedCapacity KWp		
Phase-II: Set-1 (Plant Area)						
3	15	SS – 5	Flat RCC	12		
4	16	Project office	Flat RCC	34		
5	17	New Fire Water Pump House	Flat RCC	25		
6	18	SS – 33	Flat RCC	89		
7	19	SS – 4	Flat RCC	30		
8	20	Canteen Building	Flat RCC	59		
9	21	SS – 06	Flat RCC	53		
10	22	old fire Water Pump House	Shed	28		
		TOTAL: KWp		330		

For Phase-I Set-3 plants, power to be evacuated at LT 415V level to the existing LT Panels inside the building premises in respective area(s).(Metering at each location of installation required for meeting RPO obligations),by making necessary arrangements. SLD attached in Annexure-5

Description for Set-4 of Phase – II, RTS Plants

pv Plant No.	Location number	Location Name	Type of Roof	ProposedCapacity KWp		
Phase-II: Set-1 (Township)						
11	9	Dhanvantri Hospital	Flat RCC	42		
12	10	Township SS – 1	Flat RCC	20		
13	11	DAV school	Flat RCC	56		
		Auditorium	Flat RCC			
14	12	SS – 3	Flat RCC	14		
15	13	Estate office	Flat RCC	9		

16	14	Shalimar Complex	Flat RCC	41
TOTAL: KWp				182

For Phase-II plants, power to be evacuated at LT 415V level to the existing LT Panels inside the building premises in respective area(s). (Metering at each location of installation required for meeting RPO obligations), by making necessary arrangements. SLD attached in Annexure-5

Physical Details:

S. No.	Location	Type of Roof	Available Area (Sq. meter)	Roof Slope
Phase-I: Set-1 (Plant Area)			(Tentative)	
1	Workshop(South West)	Shed	1200	18°
2	Old C&P Store(South West Facing)	Shed	2430	14°
3	New Spare Store -1 (South West Facing)-General store	Shed	2453	14°
4a	EIL Store(South East facing)	Shed	1120	14°
4b	EIL Store(Northwest facing)	Shed	1120	14°
5	Spare-Shed-1(North West facing)	Shed	480	8°
6	Spare Shed-2(South West facing)	Shed	880	18°
7a	New Spare Shed Yard-4 (South East facing)	Shed	1260	10°
7b	New Spare Shed Yard- 4 (North West facing)	Shed	1260	10°
Phase-I: Set-2 (Plant Area)				
8a	New Product Ware House (North West)	Shed	5059	9°
8b	New Product Ware House (South East)	Shed	2781	8°
Phase-I: Set-3 (Plant Area)		Type of Roof	Available Area(Sq. meter)	
15	SS – 5	RCC	230	
16	Project office	RCC	720	
17	New Fire Water Pump House	RCC	400	
18	SS – 33	RCC	1050	
19	SS – 4	RCC	540	
20	Canteen Building	RCC	800	

21	SS - 06	RCC	800
22	old fire Water Pump House	Shed	200
Phase-II: Set-4 (Township)		Type of Roof	Available Area (Sq. meter)
9	Dhanvantri Hospital	RCC	650
10	Township SS - 1	RCC	680
11.1	DAV school	RCC	550
11.2	Auditorium	(Sheet roof+RCC)	1150
12	SS - 3	RCC	330
13	Estate office	RCC	295
14	Shalimar Complex	RCC	820

SITE VISIT:

Any interested bidder in site visit may contact to REIL person. The contact details are given in tender documents.

Scope of Work:

NOTE: The SPV Modules & String Inverters of cumulative 2641 kWp capacity shall be supplied by REIL at site. However, the contractor shall coordinate for safe storage of SPV Modules and String Inverters at site.

The Scope of Work includes all Check Survey, Design, Engineering, Procurement, Supply of Equipment and Material, Testing at manufacturer's works, Inspection, Packing and Forwarding, Supply, Receipt, Unloading and Storage at site, associated Civil & structural Works, Services, Permits, Licences, Statutory Approvals, Installation and incidentals, Insurance at all stages, Erection, Testing and commissioning of 2.64MWp(DC) Grid Connected Rooftop Solar PV Power Plants and performance demonstration along-with associated Power evacuation system up to the designated Substations/Locations along with its route survey on Lump sum turnkey basis and 10 (Ten) years comprehensive operation and maintenance with material & man power in accordance with Technical Specifications.

***2.64 MWp (DC) Roof Top Solar PV Plants divided in two phases and both the phases shall be constructed in parallel and for captive use only. Contractor has to deploy enough manpower to carry out the works in parallel at all sites.**

Before proceeding to the works, Contractor must follow the guidelines of Oil Industry Safety Directorate (OISD) / Instructions from Plant Authorities with prior approval and utmost precaution.

1. DESIGN AND ENGINEERING:

The scope of the bidder includes complete system design and engineering, finalization of drawings / documents, submission of engineering drawing / documents and processing of their approvals by Customer / REIL. Initially contractor shall submit design basis report along with preliminary design showing general system layout within 7 days from LOI / Work Order for in principle approval of Customer / REIL. The detailed design shall be submitted by contractor within 20 days from LOI / Work Order.

The scope shall include submission in proper shape & format, all the Drawings including engineering drawings, sizing calculation, data, test procedures, Equipment layout, Drawings/Data sheets of all the equipment/materials under scope of supply, Civil structural/architectural drawings prepared by structural engineer, Load bearing capacity details, detailed design drawings of Earthing system, Lightning system, Fire fighting system, risk analysis and HAZOP study, Lighting system, Inverter and control room etc, Manuals including O&M Manuals, Control System Manuals with details of error/ fault code, Handbooks of equipment like Inverter, Transformer, LT/HT Switchgear etc and any other required design documents covered under technical specifications in requisite numbers to the Owner at different phases of the project as per the requirement of Customer.

Bidder shall design the walkways of adequate width and spacing such a way that the roofs are optimally utilized for installation of PV modules. The walkways should be provided across the roof and crossing should be provided at regular intervals so that the personal can easily walk and approach each and every module during construction & O&M period. The walkways of minimum width 400 mm shall be made of hot dip galvanized MS profiles/ hot rolled/ cold formed steel sections. Galvanization thickness shall be of min 80 micron. Galvanization of the mounting structure shall be in compliance of latest IS 4759. The thickness of structure should be at least 3 mm. It should be the responsibility of the bidder to optimize the design and the available rooftop space to accommodate the 2.64 MWp DC capacity SPV power plant including the walkways and get it approved from Customer / REIL. In addition to this, bidder shall also provide adequate provision of safety lines at appropriate locations and sloped borders of the roof for safety.

Short circuit calculation and coordination relay settings and detailed protection philosophy, Complete load flow study, transient study and under frequency study to be carried out by contractor for power to be fed to proposed Substations.

Technical coordination (including participation and arranging technical Co-ordination meetings with Customer / REIL / Suppliers) shall be under the scope of bidder.

Based on the SOLAR INSOLATION data (for site) from reliable sources, the solar PV system should be so designed that it shall take into account the mean energy output after allowing for various losses, temperature corrections, on an average day for each month of the year.

The contractor shall keep the adequate provision for measurement of solar isolation by means of placing of required quantity of Pyranometers as per the various tilt angle of the rooftop space and Modules in order to analysis the actual plant performance. One of them shall be placed on horizontal surface and the other on adjustable inclined plane

The Pyranometer on module plane to be fixed to the module mounting structure (MMS) only in order to follow the module plane.

The Contractor is required to measure the Solar Radiation and other climatic conditions relevant to measure the Plant performance. This is necessary to study Solar Level and Guaranteed Performance of the Solar Power Plant. The satellite based analysis is to be combined with direct ground based measurement equipment in order to achieve the necessary accuracy and level of detail in the assessment of solar radiation levels and climatic conditions.

Submission of basic design data, design documents, drawings, and engineering information including GTP and test reports to REIL / Customer for review and approval in hard copy and soft copy from time to time as per project schedule. The documents typically include, but not limited to, the following:

- Existing Roof Layouts and Weight distribution design
- Shadow analysis
- Solar insolation data and basis for generation
- Electrical/Civil/Mechanical Design calculations, Structural Analysis and wind load design etc. (licensed software as well as design templates)
- GA & detail drawings for architectural, civil, structural and RCC works for the entire project which shall include various buildings and facilities like Indoor Switchgear for inverter and control room, water supply & module washing system networks, fire protection system, MMS structure, foundation works etc.
- General arrangement and assembly drawings of all major equipment
- Schematic diagram for entire electrical system
- Cable support structures and cable trays/ladders
- ESE Lightning arrester arrangement with foundation details
- GTP & GA drawings for all types of structures/ components, protection switchgears & other interfacing panels
- Test reports (for type, routine and acceptance tests)
- Detailed technical specifications (GTP) of all the equipment
- Relay setting charts
- Overall plant layout
- Power Evacuation System Drawings and erection/Cable laying plans
- Quality assurance plans for manufacturing (MQP) and field activities(FQP)
- Detailed site EHS plan, fire safety & evacuation plan and disaster management plan.
- Detailed risk assessment and mitigation plan.
- O&M Instruction's manuals for major equipment
- As-built drawings / documents and deviation list from good for construction(GFC)

➤The contractor shall forward the following to REIL / Customer within 20 days from issue of LOA/signing of the Contract (whichever is earlier):

- Schedule for various activities in the form of PERT Chart.
- Detailed engineering calculations, Design basis report and complete layout of the plant with detailed BOQ (Bill of Quantities).
- Equipment data sheets, guaranteed technical particular of equipment and GA drawings of major equipment like PV Modules, inverter, mounting structure, transformer, HT< Panels and Cables etc.
- Detailed manpower deployment schedule.

Estimation of the plant generation based on Solar Radiation and other climatic conditions prevailing at site. The Contractor shall have to assume the worst case radiation data base amongst the databases from NASA, Meteonorm, Solar GIS, IMD. Accordingly, the EPC Contractor has to design the Plant assuming the worst case as the STC for the PR & CUF guarantee testing. Contractor will be responsible to meet the contracted PR and CUF requirement with the above finalized data base as STC.

Bidder shall carry out the structure analysis of the roof (in the existing condition and after implementation of Rooftop Solar PV system). The structure analysis shall be vetted by an independent certified structure engineer/consultant.

Contractor shall design their SPV panel structure according to wind load (130 km/hour) and slanted metal sheet roof structure of warehouse. Contractor shall also explore the design so that PV Module will have the self-cooling effect to improve the performance. Load bearing strength of roof top of warehouse and its suitability for installing solar PV plant, design of SPV structure and distribution of load on roof top beam shall be inspected by structural engineer and structural design need to be vetted by structure engineer/consultant. Any changes in structural design suggested by REIL / Customer shall be binding on the contractor.

Design of associated civil, structural, electrical & mechanical auxiliary systems includes preparation of single line diagrams and installation drawings, manuals, electrical layouts, erection key diagrams, electrical and physical clearance diagrams, design calculations for civil, structural & RCC works including analysis & design input file, Earth-mat, Bus Bar & Spacers, indoor and outdoor lighting/ illumination etc., GTP and GA drawings for the major equipment including Power evacuation system etc. Design basis & calculation sheets, and other relevant drawings and documents not covered above but are required for engineering of all facilities within the scope and satisfactory performance of the plant shall be provided.

All drawings shall be fully corrected to match with the actual "as – built" site conditions and submitted to REIL / Customer after commissioning of the project for record purpose. All as-built drawings must include the Good for Construction deviation list.

DELIVERABLES OF DESIGN AND ENGINEERING

The deliverables and documents typically include, but not limited to, the following:

DELIVERABLES	CHECKLIST
Shadow Analysis Report	<ul style="list-style-type: none">• Analysis is done such that the array is shadow- free from 9:00 am to 3:00pm (or 3 hours on either side of solar noon)
Design Calculations	<ul style="list-style-type: none">• String sizing and inverter matching• Cable sizing• Sizing of protection equipment• Sizing of Transformers
Array and Equipment Layout	<ul style="list-style-type: none">• Proper row spacing to avoid shadow of modules during peak sunshine hours• Sufficient access to equipment and all solar modules for cleaning and maintenance
Foundation Design and Layout	<ul style="list-style-type: none">• Size and composition of foundation blocks• Composition of concrete mix• Anchoring mechanism shall be clearly defined• Adhesion and water-proofing application shall be clearly defined
Earthing calculations	<ul style="list-style-type: none">• Correct soil resistance is used for calculation• Step and touch potential (for larger plants)
Structure drawings and structural analysis	<ul style="list-style-type: none">• Detailed BoM of structure with specifications and material used for all members• Material and size of nuts, bolts and other accessories• Galvanisation thickness• STAAD report• Correct wind speed data for the location as per Zone
Single Line Diagram	<ul style="list-style-type: none">• Equipment size, gauge of cable and protections are clearly depicted
Communication Systems	<ul style="list-style-type: none">• Data Logging• SCADA• Remote Monitoring
Performance Ratio and Generation Estimation	<ul style="list-style-type: none">• All relevant losses are included and accounted for in the estimation

Bill of Material	<ul style="list-style-type: none">List of all material and equipment as per contract
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2. PROCUREMENT & SUPPLY:

- a) The equipment and materials for Grid Connected Solar PV Power Plant with associated power evacuation system (Typical) shall include but not limited to the procurement, supply, transport, insurance, receipt, unloading, storage, erection, testing and commissioning of all supplied material for the following:
- b) SPV module-mounting structures (fixed) fasteners, MMS foundation and module interconnection.
- c) Array Junction boxes, distribution boxes and Fuse boxes: MCBs/ isolators, Surge Arrestors with string monitoring capabilities and with proper lugs, glands, ferrules, terminations and mounting structures.
- d) DC and AC cables of appropriate sizes with adequate safety and insulation.
- e) Power Conditioning Units (PCU) with SCADA compatibility, common AC power evacuation panel with bus bars and circuit breakers LT & HT Power Interfacing Panels, Plant Monitoring Desk, AC & DC Distribution boards.
- f) LT switchgear unit (s), protection and metering units/ compartments, auxiliaries such as HVAC and fire suppression systems, as applicable, step-up transformers to match utility grid, HT switchgear unit, Control Systems etc. with Power and Energy ratings, details of which are as specified in Technical specifications.
- g) Step – up transformers (inverter duty) in relevance with Central/state grid code and inverter manufacturer requirements.
- h) Auxiliary transformer (s) for internal consumption, as part of CSS, if required.
- i) Metering and protection system along with all accessories and power supply units.
- j) HT/LT Power and Control Cables including end terminations and other required accessories for both AC & DC power.
- k) Internal 415V interconnection & Indoor feeder panels to cater auxiliary needs of plant.
- l) 33KV Indoor switchgear and panels having incoming and outgoing feeders with VCBs, CTs, PTs Bus bars, cables terminals kits and protection system. The control and relay panel should form integral part of the switchgear (i.e., should be physically integrated into one unit). The switchgear will be installed in a separate switchgear room.

- m) Solar Generation Meters/kWh meters/ABT meters (Main and Check) with all necessary metering rated CT's and PT's at the plant take off point as well as at the substation as per CEA Metering Regulation 2006 as amended time to time and state metering code.
- n) Lightning arrestors for entire plant area.
- o) Flexible GI pipes, cable conduits, cable trays and accessories/trenches.
- p) Earthing of the entire plant as per relevant standards.
- q) Control room equipments
- r) Testing instruments for maintenance and monitoring of equipment.
- s) Spares & consumables as required or recommended, for the complete O&M period.
- t) Fire protection system in buildings and fire extinguishers.
- u) Weather monitoring station shall include but not be limited to the following:
 - (i) Pyranometers – for horizontal and tilted plane
 - (ii) Ultrasonic Anemometer (wind speed and direction)
 - (iii) Temperature Sensor – Ambient and module surface
 - (iv) Power source to the all sensors
 - (v) Data Logger
- v) Construction of suitable structures for power evacuation system for taking off from plantend and receipt of lines at Substation end like Cable trays/Lattice Tower/double pole/four pole structure on RS Joist/H-Beams etc.
- w) Laying of HT cables from plant take off point to the designated substations/locations.
- x) Illumination of the Plant/Area Lighting along the periphery, Roads of the plant/Control Room Building.
- y) Uninterrupted Power Supply (UPS) system for SCADA/Fire Detectors/Auxiliary Supplysystems.
- z) Materials and accessories, which are required for satisfactory and trouble-free operationand maintenance of the above equipment.

Any other equipment / material not mentioned but required to complete the Solar Power Plant facilities in all respect.

Factory Acceptance Tests

All acceptance and routine tests of equipment as per the specification and relevant standards shall be carried out. Charges for these tests shall be deemed to be included in the equipment price.

All major/critical items (Modules, Inverters, SMU, HT Switchgear, LT Switchgear, Transformer, SCADA, 33 kV AC cables) shall be inspected and tested through REIL / Customer or its authorized agency/consultant during manufacture and in assembled condition prior to dispatch in accordance with the standard practice/ pre-approved QAP of the manufacturer and applicable Standards and charges for the same shall be included in the Lump sum cost as quoted by the bidder. No separate payment shall be done for inspection and testing. REIL / Customer representatives may also be present during such Inspection. However, it is not binding upon the REIL / Customer to always send the its representatives for witnessing Inspection.

REIL / Customer at its own discretion may undertake the quality checks during their manufacturing stages also.

Copies of test certificates for such inspections in triplicate shall be supplied to REIL / Customer before dispatch of the equipment.

Transportation of equipment from works to site, unloading and storage

Transportation of equipment from works to site, receipt, unloading, Transit insurance and safe storage of all supplied equipment inside Customer's Premises shall be under the scope of contractor. The open storage space would be provided by the REIL / Customer but the construction of sheds and other structures, if required would be under the scope of bidder.

The Contractor shall at his own cost and initiative arrange for and obtain all necessary permissions, permits, consents and licenses, as may be necessary, to transport the equipment/ material, machinery, and labour along or across highway, roadway, railway, bridge, dike, dam, river or through posts of toll collection, Octroi checks or other line border or barrier.

3. CONSTRUCTION AND ERECTION WORKS:

- a) Construction of foundation for various facilities like MMS structures, Main control room, Compact Sub Station, Inverter transformer and other electrical equipments, weather monitoring station etc.
- b) Supply, packaging, transport and installation of MMS structure for SPV panels.
- c) Construction of Main Control Room housing various HT< Switchgear, C&R