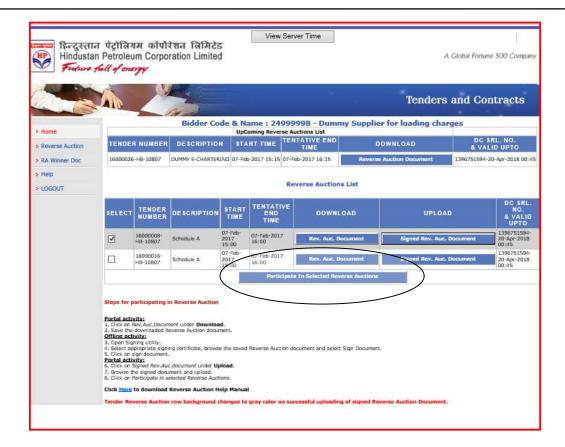
E Proc Application – Reverse Auction Process Vendor Manual – Version 2.2



Bidders should select appropriate tender and click on "Participate in Selected Reverse Auctions" button. On selecting the participation button, reverse auction screen will be displayed.

The following sections describe the screens which are displayed for Non-SOR (non-Schedule of rates) and SOR (Schedule of rates) tenders respectively.

3.2 Screen for Non-SOR Tenders (Tenders not having schedule of rates)

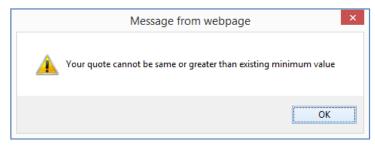
Upon selecting a Non-SOR tender (Tenders not having schedule of rates) for participating in the bidding process, the following screen is displayed.





Field descriptions in Non-SOR Screen: The following fields are available in Non-SOR screen

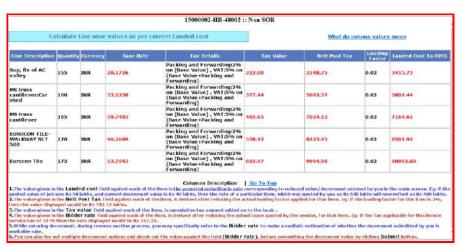
- <u>Previous Bid</u>: At the start of the Reverse Auction this field will display Bidder's original quote given in Price bid. However, during the Reverse Auction, this field will show the previous quote submitted by bidder.
- <u>Current Landed Cost</u>: Bench Mark Price will be shown for first bid and thereafter latest bid as received by HPCL for successive bids.
- <u>Increment/ Decrement Landed Cost by << 0.00 % >>:</u> This field shows Reverse Auction decrement percentage or decrement amount as pre-set by HPCL. In the above example bidders can decrease the rate by 0.5%.
- **Upward-downward arrows are for arriving at proposed rate:** Bidders can arrive at the proposed amount by clicking the upward and downward arrow. No bid is submitted at this stage. *Bidders can increase the rate for arithmetic comparison but cannot submit the quote. In case the bidder tries to submit an increased quote the following error message will be displayed.*



• <u>Leading Bid:</u> At the start of RA process, this field will show the Bench Mark Price. Subsequently while auction is in progress, this field will show latest minimum quote submitted by the participating bidders.



- <u>Submit Current Quote:</u> This field has a Blue coloured button labelled as "Submit Quote". This button is to be used by the bidder for actually submitting the revised quote. Bidder should remember to click on the corresponding radio button before click on "Submit".
- <u>Line Details:</u> The Line details field has a blue button labelled as "Show" button. If bidder clicks on "show" button a popup screen is displayed. Bidders should click on the "Show" button to check individual item rates against a proposed amount, which has been arrived at by clicking "upward/downward arrow". No bid is submitted by clicking "Show" button. In the popup screen bidder should click on "Calculate line wise values as per current landed cost" button to see detailed calculations for each of his decrement quotes.



• <u>History:</u> The History field has a blue button labelled as "**Submissions**". Clicking on the "**Submissions**" button shows details of quotes submitted by the bidder with date and time. Bidders Price bid quote is also visible in submissions.



- Reverse Auction logout: This button is useful for screen logout.
- Digital clock: Digital clock displays server time.



3.3 Screen for Schedule of rates Tenders

Upon selecting a SOR tender for participating in the bidding process, the following screen is displayed.

Field descriptions in SOR Screen: The following fields are available in SOR screen:



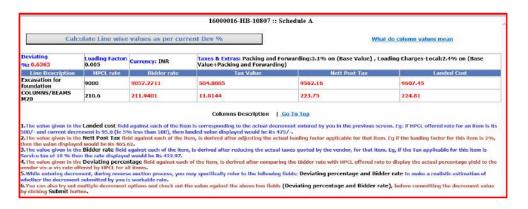
- <u>Previous Bid</u>: At the start of the Reverse Auction this field will display Bidder's original quote given in Price bid. However, during the Reverse Auction, this field will show the previous quote submitted by bidder.
- <u>Current deviating %</u>: Bench Mark Price will be shown here in the initial screen and latest bid received by HPCL for successive bids.
- Increment/ Decrement Deviating % by << 0.00 % >>: This field shows Reverse Auction decrement percentage pre-set by HPCL. In the above example bidders can decrease the rate by 0.5%.
- <u>Upward-downward arrows are for arriving at proposed rate:</u> Bidders can arrive at the proposed amount by clicking the upward and downward arrow. No bid is submitted at this stage. *Bidders can increase the rate for arithmetic comparison but cannot submit the quote. In case the bidder tries to submit an increased quote the following error message will be displayed.*



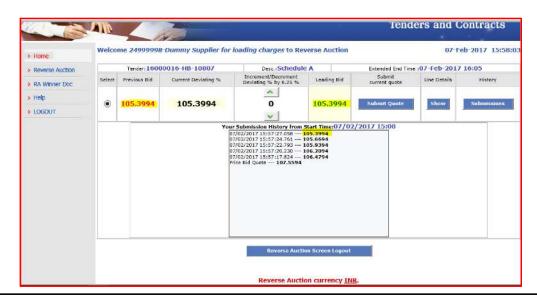
• <u>Submit Current Quote: This field has a Blue coloured button labelled as "Submit Quote". This</u> button is to be used by the bidder for submitting the actual RA quote.



- <u>Leading Bid:</u> This is the latest minimum submitted quote while Reverse Auction is in progress. At the start of Reverse Auction, leading bid is the Bench Mark Price.
 - The leading bid is displayed as a percentage of SOR rate. In the above example screen shot, the leading bid is 61.54% of SOR rates which is 38.46% less than SOR rate. If the leading bid is above SOR rate it will be displayed as 100+ percentage ie. a leading bid which is 5.5% above SOR would be displayed as 105.50.
- <u>Line Details:</u> The Line details field has a blue button labelled as "Show" button. If bidder clicks on "show" button a popup screen is displayed. Bidders should click on the "Show" button to check individual item rates against a proposed amount, which has been arrived at by clicking "upward/downward arrow". No bid is submitted by clicking "Show" button. In the popup screen bidder should click on "Calculate line wise values as per current dev %" button to see detailed calculations for each decrement.



• <u>History:</u> The History field has a blue button labelled as "Submissions". Clicking on the "Submissions" button shows details of quotes submitted by the bidder with date and time. Bidders Priced bid quote is also visible in submissions.





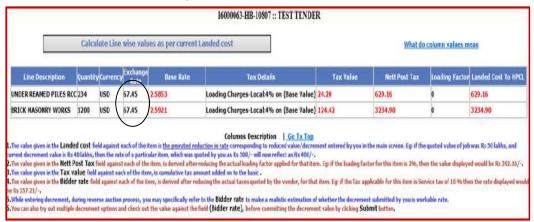
3.4 Screen for Multi-currency Tenders:

Upon selecting a Non-SOR Global tender (with multi currencies) for participating in the Reverse auction bidding process, the following screen is displayed. Bench Mark shall be in INR currency only.

Field descriptions are as shown in section 3.2.



• **Leading Bid:** This field will show the Bench Mark Price in INR currency. Bidders are requested to submit reduce rates in INR only.



• <u>Line Details:</u> If bidder clicks on "show" button a popup screen is displayed. Bidders can view individual item rates against an intermediate decrement, (arrived at by clicking "upward/downward arrow"). No bid is submitted by clicking "Show" button. In the popup screen bidder should click on "Calculate line wise values as per current landed cost" button to see detailed calculations for each of his decrement quotes.



- For multi-currency tenders, **currency exchange rate** shall be visible in show screen. This currency exchange rate shall be of unpriced bid opening date. Basic rates are **displayed in original currency**. For every decrement in INR, corresponding item rates are visible in original currency.
- In case rates for certain lines are **quoted in INR**, the currency exchange rate shall be displayed as 1 (one).



4 Procedure for Submission of new reduced bid

Reverse auction shall be held for a period of 60 minutes. The auction process automatically gets extended by a further period of 5 minutes in case of receipt of any fresh bid during the last 5 minutes of the auction period. This process will continue until no bids are received in the last 5 minutes of the auction. Thereafter reverse auction shall get automatically closed.

During the bidding process, Bidders should use the increment/Decrement arrow keys to revise their bids. After the decrement is done, bidders should press the "SUBMIT" button to submit the fresh bid.

Upon submission of fresh bid, the bidder will be able to see his fresh bid in "Previous Bid" field.

4.1 Benchmark price calculation

As per the latest Reverse auction terms and condition, the benchmark price shall be the lowest of the prices quoted by techno-commercially accepted vendor's bids vis-à-vis HPCL estimated rates. The benchmark price is discreetly calculated by system without revealing the vendors identity.

Please note -

During the entire bidding process, the bidder's identity vis-à-vis quoted price shall be confidential.



- If a competitor submits a fresh reduced bid, the field "Leading Bid" for SOR or Non-SOR tenders will show the latest bid. This happens instantaneously and would be visible to all bidders on their screens.
- It may be noted that if two bidders submit the quote almost at the same time, the system will consider the bidders rate/quote which hits the system first. This time difference is logged till the mille second. In such a scenario, the system will send the following message to the second bidder cautioning him that the bid submitted is not the lowest bid.





5 Reverse Auction Closure

As explained in section 3 above, the RA process will continue until no bids are received in the last 5 minutes of the basic auction period (60 mins) or extended auction period.

If no bid is received in the last 5 minute period, reverse auction shall get automatically closed. The moment RA is completed, colour of auction line changes to 'yellow' and submit button will be disabled. This indicates the closure of Reverse Auction.



6 Refreshing of screen

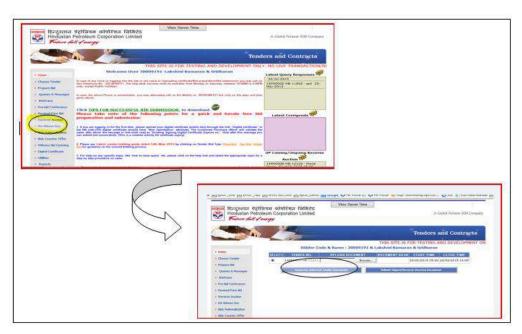
Bidders can refresh the screen by clicking on 'Reverse Auction' menu option in left pane, select the appropriate tender and click on participate in reverse auction button.



7 RA winner document

After completion of Reverse Auction, Lowest bidder will get an email intimation to download and submit the RA winner document.

Vendor can download the 'RA winner document' by to clicking on the "Generate Browse & submit Winner Document" button available in "RA Winner Document" menu option as shown below.



The successful bidder should -

- Select tender and click on 'Generate selected Tender Document'.
- Save the document and sign it using signing utility.
- Select the signed document by browsing
- Submit signed Reverse Auction document.
- Bidder can save the following confirmation message generated by system for records.





8 Multiple Reverse Auctions

If a bidder wishes to participate in more than one RA at the same time, bidder should select all tenders and download and enter passwords for each selected tenders and click on 'participate in selected Reverse Actions' button.

Please note a bidder can participate in upto 5 Reverse Auctions on the same screen at a time. Also, passwords are different for each of the different Reverse auction on same or different tenders.



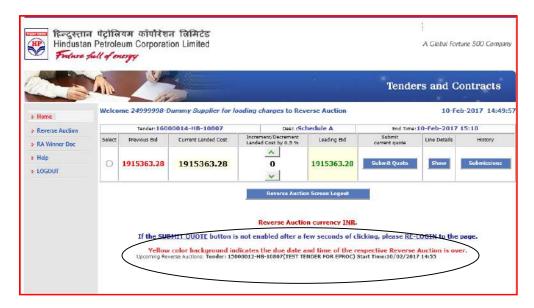
On selecting multiple RAs the following screen is displayed.





The procedure for participating in each of the multiple reverse auctions is same as that of participating in a single reverse auction explained in various sections above.

• Scrolling Message on Upcoming RA: If one RA is in progress and another RA is going to start, the eligible bidder will see a scrolling message 'Upcoming Reverse Auction:Tender no..... start time......' on the screen.



9 Postponement / Cancellation of Reverse Auctions

In case HPCL decides to postpone or Cancel a scheduled Reverse Auction, all eligible bidders will be informed by suitable e-mails well in advance.

In case of RA Cancellation due to RA failure or any other reason, bidders will also be informed by email to witness the price bids on the portal at scheduled date and time. A mail message will be received by eligible bidders towards this.

10 RA extension

• In extreme case of Server outage, network outage or failure of Internet connectivity, (or any other unforeseen conditions) from HPCL's end, fax/ E-Mail communication shall have to be made immediately, to concerned purchase officer of HPCL. No such request shall be entertained beyond one hour of the RA closing time. To provide equal opportunity, HPCL may decide to extend the Reverse auction at their discretion, but not as the right of the bidder. The vendors participating in Reverse Auction process shall be kept on standby for 1 Hour after RA closing time.

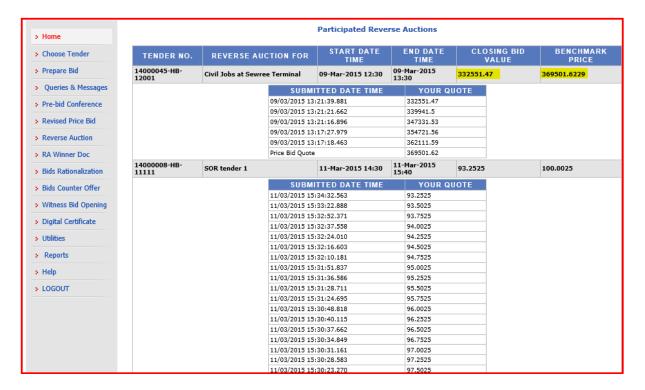


- HPCL shall investigate the above matter and decision for extension of Reverse Auction shall be based on the merit of the issues pointed out and verified by HPCL and same shall be final and binding on the vendor.
- HPCL shall complete the investigation within two working days of receiving complaint from any of the vendor.
- In case of decision to extend Reverse Auction, intimation mail may go out to all vendors within a day of investigation closure. Vendors shall generally be given intimation, a day in advance before extended Reverse Auction is commenced. The Reverse Auction shall commence from the last saved decrement value and shall be open for period of original duration from commencement.

11 Reports:

Bidder can see 'list of Reverse Auctions participated' thru Reports.

By clicking on 'Participated Reverse Auctions' in Reports tab, Bidder can see tender number, tender description, RA start date and End date, Closing Bid value and Bench Mark Price along with their own submitted bids along with date and time.





12 Email Messages to Bidders

Il eligible bidders will be getting e-mails pertaining to Reverse Auctions from time to time. A list of such e-mails is given below –

• Email Regarding witnessing of loading factors

Evaluation has been completed for Tender/Schedules/Lines: 10-02-2016 16:36:25 in the system. Please login to the site https://etender.hpcl.co.in and click Witness bid opening tab to witness loading factor if any against above tender. Note: This is system Generated Mail. Pls do not reply to this email.

Mail Regarding Reverse Auction date & Time (including Loading factors)

Reverse Auction has been called for a schedule of above tender. Please login to your account. Go to reverse auction tab. Download RA Document. Sign it with the appropriate certificate and upload it on the same page to proceed for participation in reverse auction.. RA Desc: Schedule A RA Date On: 18-05-2016 16:05:00. Please login to witness your Loading Factors before participating in Reverse Auction on schedule date and time. You may refer the help manual available in portal to understand the RA process.

Please ensure to login on the scheduled date and time to participate in the reverse auction. You may also contact Helpdesk at 022-4114666 between 8.00 AM to 8.00 PM for any kind of support on the RA process.

• Email regarding Reverse Auction Winner document:

Reverse Auction has been concluded for a schedule of above Tender. Tender Number: XXXXXXXXX , RA No:356 ,RA Desc: SCHEDULED A ,RA Date:26-MAR-2015:12:00 You are the lowest bidder on the recently concluded RA against subject tender. Please click on RA winner doc tab and submit the digitally signed RA winner document, generated from system as a token of confirmation to the final rate submitted by you. HPCL reserves the right to further negotiate the prices with lowest bidder for reducing the price/cancel the reverse auction process/tender at any time before ordering without assigning any reasons except in cases where tender is required to be cancelled after opening of priced bid and identification of L1 vendor wherein reasons for cancellation are to be conveyed to the L1 vendor.



• Email Regarding postponement of Reverse Auction

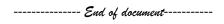
Reverse Auction for Tender No 15000017-HB-10807 - SOR TENDERS scheduled at 01-May-2015 12:00 is postponed to 01-May-2015 15:00. Please ensure to login on the scheduled date and time at 01-May-2015 15:00 to participate in the reverse auction event. RA slot is not available

• Email regarding Cancellation of Reverse Auction

Reverse Auction for Tender No 15000016-HB-10003 - Demo Tenders scheduled at 20-Apr-2015 15:45 is cancelled. Bid opening can be witnessed from 20-Apr-2015 16:00 onwards. RA is cancelled

Reverse Auction Extension Mail

Reverse Auction has been extended for a schedule of above tender scheduled at 22-Apr-2015 14:00 has been extended and new event time is 04-Feb-2016 15:00. We regret the inconvenience caused. Please login to your account in http://etender.hpcl.co.in, Click on Reverse Auction tab and participate in Reverse Auction with new decrypted password.







Technical						
SI.No.	Description	Attached File	Set Value	Supporting Doc. Req'd		
1	Annx-1	Annx-I.I-SV STATION SCOPE OF JOB.pdf	-	No		
2	Annx-2	Annx- II - Terms Conditons.pdf	-	No		
3	Annx-3	Annx- III-Schedule of Quantity .pdf	-	No		
4	Annx-A	ANNEXURE A-SAMPLS SV STATION LAYOUT.pdf	-	No		

SCOPE OF WORK

1 GENERAL SCOPE OF WORK

- a. Scope of work shall include but not limited to designing, planning, engineering, procurement (manufacturing/supply), construction/ erection, testing, commissioning of 7 KW solar PV plant as a turnkey contract according to terms and conditions set out herein. Turnkey EPC contract shall be in accordance with all applicable regulations and permits so that the solar PV plant fulfills the requirement by Project developer and the technical specifications as specifically mentioned under this contract. The turnkey development of solar PV plant by the turnkey EPC Contractor shall essentially include:
- b. Basic project planning, sequencing and scheduling, solar resource assessment, energy yield predictions for project life cycle, basic and detailed designing, project component selection, preparing engineering and construction drawings, obtaining permissions, and all other requirements as required for commissioning and interconnecting the solar PV plant up to the HPCL Electrical Room.
- c. Manufacturing, supply, sourcing, procurement, transportation of all solar PV plant equipment's, required insurance, electrical components, structural components, civil engineering material, mechanical engineering components, earth moving equipment's, construction machinery and all other construction equipment's as required for development, implementation, construction, testing, commissioning and interconnection to the applicable evacuation voltage level.
- d. Arranging for water and electricity during construction, obtaining permits and approvals from all local stakeholders, government statutory bodies, obtaining permissions from electrical inspectorate, liaison with transmission utility for evacuation infrastructure and commissioning of plant.
- e. Site preparation (Roof Top Cleaning), providing construction infrastructure like site office, internal roads, stores etc., assembly and construction of the entire solar PV plant, all pre-construction tests, site management and supervision, labor provision, testing and commissioning of all the equipment's in steps and

- commissioning and interconnection of the utility scale solar PV plant to applicable evacuation voltage level.
- f. All the operations not expressly included, that are necessary for proper functioning of the solar PV plant and fulfillment of the guaranteed performance, rules, regulation, and applicable codes, being the meaning of necessarily all these things, which are inherent to the Project and without which the solar PV plant would be unable to start operating commercially.
- g. Commissioning of the solar PV plant, 7 days performance Guarantee test, monthly and yearly performance evaluations.
- h. Training's personnel for operation and maintenance, handing over the plant to HPCL, provision of all the documentation necessary for the correct performance.

2. EVACUATION OF POWER & METERING POINT:

- a. For the purpose of this project, the evacuation voltage shall be at 440 V AC (three phase) wherein evacuating point cum metering point shall be installed at internal network grid of the HPCL.
- b. HPCL will provide one Spare 440 V AC (three phase) point for integration of Solar Output with the grid.
- c. Solar Generation Meter shall be installed at 440 V AC to measure generated energy from the proposed solar PV power plant. The energy metering at HPCL station by DISCOM is at 440V level.
- d. Bi Directional meter/s shall be installed at 440V interconnection point to measure importexport of energy. Any additional requirement for check meter/s by DISCOM / TRANSCO at any other voltage level will also be in the scope of the bidder. The metering scheme shall be as per the norms of the utility and any change in the location of meter/s or any other requirement of the utility shall be provided by the bidder without any additional cost implication to HPCL.
- e. Necessary Net Metering Agreement along with all other Liasoning and other formalities with the DISCOM and any other statutory authority is under the scope of bidder.

f. Any License fees on demand Note Raised by any statutory authority such as UGVCL, PGVCL, and GEDA will be paid by HPCL.

3. ELECTRICAL WORK

Consisting of installation of solar PV modules, junction boxes, grid-tied string inverters, meters, control panel, switchgear for evacuation, interconnection through wires, cables, bus bars, etc.; plant and human safety and protection equipment including danger signs etc.

4. CIVIL AND OTHER NON-ELECTRICAL WORK

- Module Mounting Structures (MMS):Successful Contractor shall design, fabrication, supply and install module mounting structures with all required accessories like clamps, nuts, bolts, cable ties etc.; only 1-Axis manual seasonal type structures can be accepted OR The structures can be of only seasonal are accepted;
- <u>Foundations</u>: Successful Contractor shall design and construct appropriate civil foundations for Module Mounting Structures, inverters, etc.
- <u>Cable Trenches:</u> Construction of RCC cable trenches with cable trays and chequered
 plate covers in Electrical Room, earthen excavated cable trench with alternate layers
 of sand and brick as per relevant IS from PV arrays to Electrical room to Evacuation
 & up to Take over point shall be provided by the Contractor.
- <u>Cable Trays</u>: Cable Trays to be provided for laying of cables from Solar PV Panel
 to Inverter, Electrical Room to Inverter etc. The inverter shall beinstalled in the
 telecom room and necessary cabling from telecom room to electrical room and
 telecom room to roof to be done through cable trays

5. ROOF TOP CLEANING

The Contractor shall clear the site, as required, so as to compact the plant in minimum possible area and also minimize shading losses because of solar PV module structures. The Drawing of the Roof top denoting the area of Roof Top as sample has been attached (ANNEXURE A)

6. STATUTORY REQUIREMENTS:

All construction, operation and maintenance procedures shall be carried out through appropriate relevant standards, regulations laid by GETCO/UGVCL/GEDA/GUVNL/CEI/MNRE/HPCL and/or any other agency as and when applicable. Further, this shall comply with the applicable labor laws. The Bidder shall make themselves aware of such requirements and shall not solely depend on the Company to avail full information.

7. PLANNING AND DESIGNING:

- a. The Contractor shall plan and design for the electrical / mechanical / civil requirements including but not limited to plant configuration, space optimization, distance between rows of modules, sufficient passage for man-power movement in the plant, mounting structures, cable routing, selection of equipment and items, procurement plan etc. to enhance plant output.
- b. The design of all civil foundations, R.C.C structures, buildings etc. will be carried out considering appropriate seismic zone of the area. All appropriate loads, wind velocity, seismic factors etc. will be considered as per the relevant IS Specifications while designing any Civil/Mechanical/Electrical structure. Also, the environmental conditions, atmospheric effect, rain water data, land profile, etc. will be considered as per site condition and accordingly appropriate precautions, preventive measures such as applications of the Epoxy to Underground concrete structure and application of sufficient galvanization to steel structure will be taken while designing the structures. RCC of appropriate grade will be adopted considering surrounding weather and soil effect of site and as per the relevant LS standard specifications. The concrete mix design of required strength shall be carried out in Govt. approved laboratory and shall be submitted to client for approval.
- c. The Contractor shall take into consideration all parameters like wind speed, seismic zone, safety factor etc. for the purpose design and construction of civil foundations for all civil work as per relevant IS codes.
- d. The Contractor shall carryout Shadow Analysis at the site and accordingly design strings and arrays layout considering optimal usage of space, material and labour.
- e. All designs & drawings have to be developed based on the governing standards and requirements of the project and keeping in mind basic design specifications.

Company may approve minor deviations or suggest required modifications in the same, which are meant for increasing plant performance without sacrificing quality / workmanship norms.

- f. The technology offered shall be commercially established technology and at least one Project based on this technology shall be satisfactorily operational for at least one year in India.
- g. The Company reserves right to modify the specifications at any state as per local site conditions / requirements and EPC contractor shall comply with modification without any extra cost and time.

8. APPROVAL OF DESIGNS / DRAWINGS:

- The following procedure has to be followed for assessment and approval of designs, specifications and drawings during the course of the project: The Contractor shall submit to the Company the documents in hard copy and soft copy to both with proper reference and drawing numbers. The respective documents for selection, supply, installation, erection, commissioning of equipment/ structures have to be submitted at least 15 days in advance to the planned start of the activity as per Contractor's project schedule. The Contractor shall submit documents as required for this project according to his design and specifications. The Company / Consultant (on behalf of the Company) will assess and approve the documents within 10 days of submission of documents; and only after the approval the Contractor shall release the documents on site for execution. The documents shall be revised by the Contractor as per instructions /comments given by the Company / Consultant (on behalf of the Company) if required, prior to execution. Subsequent revisions and the final version of the documents shall also be submitted in hard and soft copy to the Company and the Consultant. The Contractor has to take into account the above mentioned process of revisions (if required) and adjust the preparation and delivery of the documents such that the overall planned project schedule is not affected.
- b. The Contractor has to submit all drawings, which are related to plant for approval and the Contractor, shall not claim any drawing as their intellectual property.

Drawing which is developed for project will be the intellectual property of the Company.

- c. The Bidder shall submit basic engineering drawings of all civil work, including but not limited to, layout of the power plant indicating rows of photovoltaic modules, basic MMS design, civil foundations, location of control panels, DC and AC Distribution Boxes and anchoring design / details, electrical SLD, shading analysis and generation estimation report etc. The maximum permitted line losses on the AC Side is 3%.
- d. The Contractor shall submit a comprehensive maintenance schedule for operation and maintenance of the photovoltaic power plant along with checklists before commencement of work on site and shall be liable for abiding by the schedule. All construction, operation and maintenance procedures shall be carried out through appropriate relevant standards, regulations and labor laws.

9. FINAL COMMISSIONING:

The commissioning procedure shall be as per HPCL / GEDA / UGVCL /GETCO / MNRE/ Chief Electrical Inspector to Government (CEIG) requirements/PGVCL as applicable . The Contractor shall also ensure the following:

- a. Obtaining written certificate of commissioning of the facility and permission to connect to the grid from the office of the Chief Electrical Inspector of the state and any other authorized representative from Government of India (GoI)/ GEDA/ HPCL/UGVCL/PGVCL.
- b. Inspection and successful electrical commissioning certificate from the Company.
- c. Obtaining all certificates required by Discom (UGVCL/PGVCL) from agency appointed by them.
- d. Satisfactory completion certificate towards completion of all other contractual obligations by the Contractor as stipulated from the Company.

10. DETAILED SCOPE OF WORK IS AS BELOW:

Sr. No.	Activities	Supplier/ EPC	Purchaser/ HPCL			
A	Approvals					
1	All the documentation work related approval, clearance, submission from various State or govt. or any other legal authority to successful implementation and commissioning of the project.	S	P (HPCL will provide only supporting document)			
В	General Works					
1	Transit insurance, Workmen compensation,	S				
2	Handling Local issues (if any) for EPC Scope of Work	S				
3	Construction Power and Water	S				
4	Temporary storage, security and manpower basic amenities	S				
5	Health, Safety and Environment Standards	S				
C	Supply, Design, Installation, Testing & Commissioning					
	DC Part					
1	Supply of Photovoltaic Module	S				
2	Unloading at site, storage, inter carting, shipping on desired location from storage yard, Security and Installation of Photovoltaic Module	S				
3	Responsibility of Disposal of PV cartoons and any packing material	S				
4	Interconnecting Cables for PV Modules 4 sq. mm and 6 sq. mm as per design concept with supply of UV Resistance cable tie	S				
5	MC4 connector and Y-Branch connector	S				
6	Cable Trench for DC Cable	S				
7	DC side Earth Pit (As per detailed engineering)	S				
8	PV Module Earthing	S				