



Scope of work

Consultancy services for setting up floating solar power plants in Kochi Refinery and Shore Tank Farm areas in Kochi, Kerala including specifications preparation, tender document preparation, technocommercial evaluation, supervision of project execution & commissioning activities

1.0 Introduction:

Bharat Petroleum Corporation Limited (BPCL) is a vertically integrated Energy Company (PSU), having Fortune 500 Maharatna Status, engaged in Manufacturing and Marketing of diverse range of Petroleum Products through various Oil Depots, Installations, LPG Bottling Plants, Lube Oil Blending Plants etc. across the country.

BPCL is planning to set up solar power plants at various locations in the country as part of diversifying into Renewable energy business. BPCL is looking for Project Management Consultants (PMC) who are experienced, credible, resourceful and competent for providing such services to BPCL in setting up Solar Plants.

The project will be taken up for implementation on Engineering, Procurement and construction contract (EPC) basis from designing to commissioning and subsequently Operation and Maintenance (O&M) by EPC contractor for 5 years.

Scope of the consultant includes preparation of tender documents & specifications for EPC contract, evaluation of tender documents & technical bids, support in finalizing the bidders, approval of design and drawings, supervision of project execution & commissioning activities for all civil, structural, electrical and other related works in all respects as per the detailed scope work.

2.0 Capacity of the solar plant and Location

BPCL-Kochi Refinery has large water bodies inside Kochi Refinery and its Shore Tank Farm at Puthuvype, Kochi as detailed below.

1. Rain Water Harvesting pond of approximate size 18 Acres inside Kochi Refinery. Estimated capacity is 4.6 MW DC/3.2 MW AC. Power evacuation through internal electrical grid of Kochi Refinery for internal consumption without export to external grid.
2. Water bodies of approximate total area 14 Acres inside Shore Tank Farm (STF) of Kochi Refinery. This location is nearly 20km away from the above site. Estimated capacity is 5.2 MW DC/3.7 MW AC. Electricity generated will be consumed internally at STF utilizing the Banking facility of Kerala State Electricity Board (export to external grid is involved).

3.0 Brief Description of the project

Kochi Refinery is located at Ambalamugal, Ernakulam district in Kerala. This refinery has captive power plant as well as grid connection from Kerala State Electricity Board (KSEB) for meeting its internal electrical load demand. Refinery is importing around 12 MW of power from KSEB, and rest of the power is produced from the captive power plant. Nearly 18 acres of water body is available inside refinery premises for installation of floating solar plant. Power evacuation is planned through the nearby 6.6kV substation of Kochi Refinery.

STF is the Crude Tank farm facility of Kochi Refinery, which is located nearly 20km away from refinery at Puthuvype, Kochi.

This installation depends wholly on KSEB for its electricity demand and has a 11kV connection from KSEB. Part of the electricity generated from this floating solar plant will be consumed internally and the remaining will be exported to KSEB. The exported energy will be utilized to set off the electricity demand in other time zones using the banking facility of KSEB. Power plant shall be connected to the 11kV substation inside STF for power evacuation.

It is proposed to set up floating solar plants in these locations and utilize the electricity generated for captive consumption.

4.0 Scope of work:

BPCL has already conducted a study at these locations to assess the feasibility of installation of floating solar power plants in these water bodies. However, consultant shall conduct a site visit and carry out a preliminary assessment to ascertain the capacity and parameters of the floating solar plant before preparation of design specifications, estimate and bidding documents. No additional charges shall be paid in case of any minor changes in BPCL expected and consultant studied generation capacity. The capacity of solar plant would be finally decided based on consultant's assessment.

Scope of the consultant includes preparation of tender documents & specifications for EPC contract, evaluation of tender documents & technical bids, support in finalizing the bidders, approval of design and drawings, supervision of project execution & commissioning activities for all civil, structural, electrical, handing over of the plant to BPCL/O&M vendor,..etc and all other related works in all respects required for the successful completion and operation of the plant.

This entire job involved in successful completion of this project shall be in the scope of the EPC contractor including engineering, design, procurement, installation, testing, commissioning, and subsequent O&M for 5years.

Consultant shall have the primary responsibility of completing and commissioning the project within the agreed time schedule, cost estimates and ensuring quality of all contractor supplied materials and workmanship in line with sound established engineering practices, specifications, standards and codes.

The consultant will act as an extension of BPCL, always keeping in view BPCL's interests and advising / guiding BPCL on all important matters, to ensure the project is completed within cost, time and quality targets. Consultant shall have to provide backing to BPCL unconditionally during any unforeseen circumstances arising out of this Solar plant while planning / execution /commissioning as well as performance guarantee period. This will also include unconditional support to BPCL in case of any contract related litigation arising with EPC contractor. PMC shall arrange the logistics, vehicle and accommodation for their staff at site for day-to-day movements and coordination with BPCL, vendors and other authorities.

The broad scope of work includes

1. The overall scope of work of the consultant shall involve end to end support i.e. from concept to commissioning, complete handholding and support in preparation of documents, approvals, coordination and implementation of Solar PV Power Plant for BPCL.
2. Drafting of tender documents, issue technical specifications of components, clarifications to the queries of the prospective bidders, participating in the meetings with the bidders,

evaluation of the bids received and support to BPCL for award of contract are also included in the scope of PMC.

3. Complete protection system co-ordination for the Solar PV System, including Short Circuit studies & Relay Coordination

till the point of connection at BPCL substation is in the scope of the consultant. Consultant should recommend the relay settings to be provided for all the protection relays in the solar plant, feeder in the evacuation substation, and should coordinate these settings to the existing settings in the evacuation substation.

4. Consultant shall conduct site visits as and when required for collecting all the site related details like soil data, topography, land profile, boundary co-ordinates, cable route, relay settings, loading pattern, bathymetry data.. etc, which are required for preparation of specification, bidding documents,..etc.
5. The Consultant shall develop the Bid Document based on best industry practices, latest technical developments, prevailing market situation and, their experience with other projects in Setting up Solar PV plants.
6. The Solar Plant will be established through EPC mode. Consultant shall prepare the bid document for EPC contract covering the following in consultation with BPCL
 - a. Eligibility and qualification criteria of bidders
 - b. Evaluation process and selection criteria
 - c. Instructions to bidders
 - d. GTPs, list of documents and drawings,..etc

- e. Special Conditions of Contract
 - f. Obligations and rights of the parties
 - g. Payment terms and conditions
 - h. Technical specification
 - i. Safety guidelines during construction and HSE norms.
 - j. O&M scope and maintenance plan to be followed with KPIs and penalty clauses.
7. The entire job including supply & laying of HT/LT/DC cables /FO cables/control cables, plant lighting, fire alarm systems, fire-fighting systems, CCTV, SCADA system, lightning, earthing, etc. required for the successful completion, commissioning and operation of the project is in the scope of EPC vendor. Consultant shall prepare the bid document covering complete technical scope of work, exclusions, and terminal points in detail.
8. The consultant shall prepare the Bid Qualification Criteria (BQC) and detailed Scope of Work (SOW) in consultation with BPCL. Consultant shall prepare a detailed Cost Estimate based on market analysis and submit to BPCL for approval with all back up documents/budgetary offers and justifications.
9. All technical specifications/requirements related to all equipment to be supplied by the EPC contractor shall be clearly defined including the design standards and design criteria for the whole project by the consultant.

10. The Consultant should clearly specify all requirements to be met by the EPC contractor for successful commissioning and operation of the solar plant, including but not limited to:
 - a. Basic Selection design for Solar PV Plant
 - b. Anchoring and mooring design
 - c. Selection and design of floaters and associated systems
 - d. All associated power and control cabling, OFC, electrical system required and its design criteria..etc
 - e. Lighting, CCTV, SCADA, Fire alarm system, firefighting system ..etc as per requirements
 - f. Complete earthing system including lightning protection system.
 - g. Complete module cleaning system and its associated facilities.
 - h. All civil jobs including access roads, storm water channels, cable routes, foundations, structural, earthing, control room/security buildings etc.
 - i. All electrical equipment & switchgears required for the project including installation of all electrical cables, panels, other equipment, tool & tackles, equipment /gadgets required for proper Installation, commissioning of Solar PV system.
11. The consultant shall specify all the relevant Indian and international standards applicable for solar plants including IS codes, IEC codes, state/national regulations, other statutory guidelines and standard practices which are to be followed during designing, supply, installation, testing, commissioning and operation of Solar PV facility.
12. PMC shall clearly specify power quality related requirements as per the standards applicable and ensure that the same is

met by the EPC vendor. EPC vendors has to submit reports containing the details of actual measured parameters.

13. Consultant shall recommend reputed makes and models of each of the equipment to be used for the job in line with MNRE/other statutory requirements and other standards/regulations applicable for solar PV systems. Consultant shall include in tender, adequate spares for various items of procurement by EPC contractor (Commissioning Spares, Start Up Spares, Maintenance Spares, operation spares etc.)
14. SCADA of Solar PV generation related parameters shall have monitoring and control facilities at UCR control room as well as monitoring facilities at centralized control room at MUMBAI. Monitoring stations and software with required licenses shall be included in the scope of the vendor.
15. The bid document shall include the requirements related to the inspection at manufacturers' works/sites, QA/QC of the vendor supplied equipment, packing/dispatch, etc.
16. Warranty, Performance Guarantee and penalty clauses shall be clearly specified in the EPC tender.
17. Design drawing requirements and other documents to be prepared by the EPC contractor shall be included in the specifications. Plant performance and acceptance testing and handing over details shall be defined in the technical part of the tender.
18. Following points also shall be taken into consideration while designing the solar power plant.

- a. Site topography, ground conditions, wind load, etc.
 - b. Other environmental risk such as flood risk, hail, landslides, lightning, earthquakes, salinity, seismic risk, etc.
 - c. Bathymetry, soil data and other data required for designing of floating solar project
 - d. Legal requirements and clearances required from local as well as other statutory bodies.
 - e. Assessment for air pollutants (e.g. nearby factories or dust producing processes)
 - f. Analyze the metrological data/weather data, historical weather data of the project area for selecting appropriate technology for the proposed site.
19. The tender will be floated by BPCL on its e-procurement/GEM portal. The consultant shall participate and assist BPCL in the pre-bid meeting and in formulation of responses to clarifications sought by the bidders on technical, commercial, legal, policy and regulations (state & central) related queries. Subsequently, corrigendum shall be released by BPCL based on discussions with consultant for addressing the queries raised during the pre-bid meeting.
20. Consultant will complete evaluation of offers received against subject tender including but not limited to evaluation of bidders with respect to tender BQC technical bid, framing of technical queries, evaluation of responses to queries, finalization of technically qualified vendor/s and recommendation for price bid opening of finalized vendor/s.
21. Consultant shall review the bidder's technical experience and financial capability in line with the BQC evaluation criteria set in the tender document and submit the

evaluation. For the bidders, who meet the eligibility criteria, their technical proposal shall be reviewed, further by consultant. For the bidders who meet the financial criteria, proposals shall be evaluated and such bidder/s meeting the techno-commercial criteria for the Project shall be recommended by consultant for price bid opening. An evaluation report indicating the detailed evaluation of Bidder/s for the Project shall be prepared and submitted to BPCL for further action.

22. Consultant shall provide necessary assistance to BPCL for conducting negotiations with contractors for items, which are new items, AHR items or items expected to undergo large variations. PMC to carry out the rate analysis based on the market rate and justify the reasonability of the rate etc. as per the tender condition. PMC shall provide all necessary assistance to BPCL for retendering at no extra cost if required. PMC to monitor AHR / ALR items, huge variation in quantity of any item during the execution and keeping checks and balance on the same.
22. Upon awarding the project to the EPC Contractor, consultant shall act as the project management consultant (PMC) for site construction monitoring, supervision and management including Performance Guarantee Test Run (PGTR) on behalf of BPCL.
23. PMC shall arrange for a Kickoff Meeting with EPC Contractor immediately after the award of LOA in coordination with BPCL. The venue for KOM shall be decided by BPCL and same shall be confirmed to PMC / EPC Contractor. PMC shall keep ready all relevant documents for the KOM. PMC

shall prepare MOM for the above meeting and circulate after approval from BPCL.

24. The consultant shall submit program of execution both in the form of activities in 'project' as well as quantitative program in terms of month wise physical targets for various disciplines of work. These shall be weekly updated considering the progress of the project. The monthly progress report to be submitted by the consultant shall indicate progress of activities against targeted dates and targeted quantities, reasons for shortfalls, if any, corrective action taken, etc.
25. The Consultant shall review all the drawings and documents including the design submitted by the EPC Contractor, as listed but not limited to below, and ensure conformity of the same with various standards and specifications:
 - a. Review and approve of site layout, various design drawings, system design, anchoring and mooring design, design of floaters and related systems, detailed engineering documents including array layouts, earthing system design, detailed soil test reports & bathymetry survey reports, foundation design & drawings, lightning protection system, lighting systems, protections settings, engineering data, specifications, drawings, cable schedules, fire alarm/ firefighting system, etc. submitted by EPC.
 - b. Review of details of civil work involved for the above as per BPCL standards. This will include all buildings, cable trenches, road, drains, fencing, foundations, pedestals and any other structures required for the successful erection, commissioning and stabilization of all Solar PV plants.

- c. Review of equipment design and drawings supplied by contractor for adequacy in line with safety norms and technical standards etc.
 - d. Review of HSE plan submitted by the EPC contractor and ensure implementation during Project execution.
 - e. Checking of check list for Solar PV Plant, foundations and electrical installations.
 - f. Approval of Construction QAP, Work Procedures and SAP (Safety Assurance Plan), ensuring safety at construction site as per PMC/BPCL laid down guidelines, precommissioning, commissioning and concluding contract, etc.
 - g. Checking & approval of detailed Bill of Materials along with specifications in line with tender document. The PMC shall review and check the material receipt at site and issue material receipt note, etc. with supporting documents. If not complete or not of satisfactory, quality reasons/justifications need to be provided.
 - h. Review and approve Quality Assurance Plan (QAP). Review and approve of Manufacturers' internal test reports / Contractor's inspection reports (as per QAP) and conduct FAT (Factory Acceptance Test) of equipment, based on which dispatch clearance will be accorded by the consultant.
 - i. Review and approve Pre-Commissioning & Commissioning Procedure / Checklist and submit to BPCL for approval.
26. Consultant shall be required to review the project execution, as brought out below and ensure conformity of the same with the contractual terms & conditions.
- a. Project Organization structure detailing the escalation matrix and communication protocol.

- b. Prepare and review project schedule
- c. Review of execution methodology
- d. Periodic review of Procurement plan and activities
- e. Periodic review of Inspection and dispatch plan
- f. Review of health, environmental and safety at site
- g. Review of Billing Schedule of the EPC contractor
- h. Day to day correspondences for the execution including contractual issues
- i. Monitoring the progress of work with the Master construction schedule
- j. Organize Progress review meetings on daily/weekly basis
- k. Preparing the catch-up plan for the delays and ensuring its implementation
- l. Submission of Project progress in monthly basis
- m. Review and recommend the Bills of the EPC contractor for payment along with certification of measurement sheets for completed job
- n. Change order management for design changes and extra items
- o. Prior flagging of anticipated bottlenecks, analysis of its reasons and suggest/implement corrective actions
- p. Review of warranty certificates of the materials as submitted by the EPC Contractor
- q. Review and ascertain the cost variation arising as a result of Change in Law and determine the Additional Cost.
- r. Verify all the project/Plant related approval obtained by the selected bidder from time to time from the concerned authority.
- s. Documents submitted by the Contractor and assessing that the material specifications are meeting the tender specifications.

27. The consultant will supervise the delivery, quality, construction & commissioning of Solar PV Plant, workmanship, etc. The consultant would be required to check the delivery against Bill of Quantities and the specifications of materials supplied.
28. The consultant has to schedule and supervise the daily jobs during civil jobs, installation to testing, commissioning and handing over of the system.
29. Coordinate with EPC for obtaining necessary statutory approvals (including KSEB/CEA approvals) from the competent authorities and registering with relevant statutory agencies as applicable is included in the scope of the consultant. Consultant shall also prepare commissioning report detailing actual performance vis-a-vis rated performance
30. Consultant shall arrange AS-BUILT drawings, Operating & Maintenance Manuals and all relevant documents in 3 sets (Hardcopy) from EPC contractor along with two set soft copy in pen drives / portable hard disk etc. for the complete system in pdf & AutoCAD format (including raw / native file) and handover to BPCL.
31. PMC shall continue to depute its manpower for stabilization period till the successful completion of Operational Acceptance Test (OAT shall be conducted after 30 days from the date of commissioning).

32. Consultant shall also conduct a Performance Guarantee Test of the solar plant at the end one year from the date of completion of OAT and ensure that the plant performance parameters are met as per specifications/contract conditions.
33. Consultant shall provide experienced team for successful completion of Project in time and quality. The team shall consist of a project coordinator and team of engineers in the respective disciplines (civil, electrical, mechanical, etc. as required) and other staffs as required. Consultant shall depute one competent site engineer per site for successful execution of project at site till the completion of OAT. PMC to nominate one competent project manager for effective coordination of the projects. Extra manpower required if any shall be deputed by the PMC as and when required for the successful for completion and commissioning of the plants.
34. The site team shall have minimum 3years experience in solar power project execution & commissioning. The team has to supervise and monitor the site activities on a daily basis till the completion of the job. Project manager shall visit sites as on when required during the course of execution.
35. Consultant shall be responsible for all aspects of the consultancy and shall nominate a competent and experienced Project Manager who will be the primary point of contact for dealings with BPCL. The Project Manager shall ensure that the work is carried out in accordance with the Contract and the schedule targets are met and that BPCL is kept continuously informed on the progress of the work.

36. Consultant shall maintain records of the construction activities and maintain a hindrance register with reasons in detail.
37. Consultant shall give clearance to start the O&M activities after ensuring the design performance of the system and handover the system to O&M party / owner for trouble free continuous operation.
38. Consultant shall assist BPCL for closing of the contracts and issue necessary documents required for closure of contracts like job completion certificate, justification for time delay/levy penalty for delay, deductions from the contractor as part of penalty, ..etc

5.0 General Conditions:

1. Any activity not specified in tender but required to be necessary for successful completion of the job is considered to be part of scope of consultancy services.
2. BPCL inputs shall be taken during different stages of the entire project. Draft copy of all documents shall be submitted for BPCL review and comments before finalization.
3. Sunday and BPCL declared public holidays shall be considered as off/ holidays. Normal work timing shall be from 8.15 AM to 5.00 PM on all working days or as decided by BPCL from time to time. Consultant may be required to work on weekly offs or public holiday or for extended hours during normal days for completing the project in time. No extra charges shall be payable in such cases.

4. Consultant will be required to carry out visit to BPCL site for site survey, data collection, Kick-off meeting, Pre-bid meeting, project review meetings, discussions, presentations etc. for EPC tender. No separate charges shall be payable to consultant for such visits.
5. Consultant will be required to carry out shop visits to vendor works for FAT of supply items. No separate charges shall be payable to consultant for such visits.
6. All prices quoted by consultant shall be inclusive of all types of lodging, boarding, travel charges, local conveyance etc.
7. Consultant has to undergo a safety training (will be provided by BPCL) for obtaining gate pass and carrying out the jobs.
8. Consultant shall follow BPCL Work Permit system and relevant rules and regulations as applicable in BPCL.
9. All relevant COVID protocols as issued from time to time by Govt. of India, Kerala Govt. and BPCL shall be applicable.
10. Consultant's site personnel shall be seated at worksite along with EPC contractor staff. Consultant shall arrange his own container, laptop/computer, phone, stationary etc. Single phase power supply at one point shall be provided by BPCL for lights and fans to container based on availability.
11. All basic safety requirements / items like safety shoe, helmet, boiler suit, gloves, safety goggles etc. for the team will be in the scope of the consultant.

12. Consultant site team shall have at least one WLL/Landline phone for communication purpose.
13. The Consultant shall not be allowed to bid for the tender of EPC works
14. PMC Vendors has to submit their scope related queries within 10 days from tender floating date and Pre-Bid meeting shall be arranged by BPCL on 11th day from tender floating.

6.0 Deliverables

All deliverables will be considered complete on acceptance of report/documents by BPCL EIC.

1. Preparation and submission of Final RFP/tender document for floating tender enquiry to EPC contractor
2. Technical & Commercial evaluation of EPC Tender bids
3. Final Bid Analysis and recommendation for award
4. Review and approval of EPC contractor design documents and drawings, project schedule, layouts, GTP etc.
5. FAT at vendor works
6. Completion of Supply, Installation, Testing and commissioning of Solar Plant

7. Consultant shall submit 3 sets of color copies of all documents, evaluation sheets, excel sheets, design documents, site MOM's, project schedule, hindrance register etc. and two soft copies in USB drives.

7.0 Time of completion

Mobilization Period: 7 days for site deputation of personnel for executing job

The entire job shall be completed within 9.5 months period from the date of LOA/PO.

SL. No	Activity	Work Duration
STAGE – 1: Preparation of Tender documents for EPC- 4 Weeks from LOA/PO date (20% weightage of contract value for LD calculation)		
1	Kick off Meeting (KOM)	Within 1 Week from LOA/PO date
2	Preparation and submission of tender docs for EPC contract.	Within 3 Weeks from LOA/PO date
3	Preparation and submission of Final docs after incorporating BPCL comments	Within 4 Weeks from LOA/PO date

STAGE – 2 : Receipt of Bids & Evaluation – 8 Weeks from tender floating by BPCL (20% weightage of contract value for LD calculation)		
4	Conducting Pre-bid Meeting for EPC Tender	Within 1 Week from tender floating
5	Technical & Commercial evaluation of bids including post tender clarifications and submission of report	Within 3 Weeks from receive of tender bid documents from BPCL
6	Price Bid opening by BPCL on recommendation from PMC	Within 7 Weeks from tender floating
7	Final Bid Analysis and Recommendation for award	Within 8 Weeks from tender floating
STAGE – 3: Execution of EPC works – As per the project schedule (60% weightage of contract value for LD calculation)		
8	Supply, Installation, Testing & commissioning and performance check of Solar Plant	Within 26 Weeks from award of LOA/PO for EPC

8.0 Payment Terms

Sl No	Mile stone	Payment % of price
1	On preparation and submission of final tender specification for EPC job and acceptance by BPCL	10%
2	On submission of Techno-commercial evaluation report, submission of recommendation and issue of LOA/PO to EPC vendor	10%

3	Approval of site layout, design and detailed engineering doc, quality assurance plan and construction drawings submitted by EPC contractor	10%
4	On Completion of shop inspection for major items	5%
5	On completion of civil works, installation of floaters, structural foundations on pro-rata basis	15%
6	On completion of erection of solar panels, inverters, and other major equipment on prorata basis.	25%
7	On testing and commissioning of solar PV plant	15%
8	On submission of complete documentation including performance guaranty check and handing over to BPCL	10%

9.0 GENERAL CONDITIONS OF CONTRACT/MILESTONE LIQUIDATED DAMAGES(LD)FOR DELAY

General conditions of contract shall be applicable except for LD clause. LD will be applicable for Stage-1,2,3 deliverables. Stage wise LD of 0.5% per week of delay or part thereof to a maximum of 5% percent of the weightage percentage of contract value specified in clause 7.0 above is applicable for delays in achieving milestone timelines.

10.0 Schedule Of Rates

SN	Description	UOM	Qty	Unit Rate (in Rs.)	Amount (in Rs.)
1	PMC service @ Solar plant at KR	LS	1		
2	PMC service @ Solar plant at STF	LS	1		
2	Additional Manday rate for engineers (8 hours) for carrying out additional scope which is not included in the Sl. No.1 & 2 above	Man Days	30		
Total amount					