



मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड
MANGALORE REFINERY & PETROCHEMICALS LTD.
(ऑयल एण्ड नेचुरल गैस कॉर्पोरेशन लिमिटेड की सहायक कंपनी)
(A Subsidiary of Oil and Natural Gas Corporation Ltd.)



**PRE-TENDER MEET (PTM) FOR
POWER SYSTEM UPGRADATION PROJECT**



Document NO.:
MRPL/PROJECTS/01/2022

Mangalore Refinery and Petrochemicals Limited (MRPL) is a subsidiary of M/s. Oil and Natural Gas Corporation Limited (ONGC). MRPL proposes to invite Pre tender meet.

Pre tender Details as follows:

Pre Tender No.	MRPL/Projects/01/2022
Pre Tender on Website	From 12.07.2022 to 18.07.2022
Closing date for submission of any documents if applicable.	Upto 17:00 hrs (IST) on 18.07.2022
Date of Meeting Through VC	<p>19.07.2022 at 10:30AM through Webex using following link: PRE-TENDER MEET FOR POWER SYSTEM UP GRADATION PROJECTS</p> <p>https://mrpl.webex.com/mrpl/j.php?MTID=me2a36bd7957be434e174514d6ae08e21</p> <p>Tuesday, Jul 19, 2022 10:30 am 3 hours (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi Meeting number: 2518 469 1617 Password: 456511</p> <p>Join by video system Dial 25184691617@mrpl.webex.com You can also dial 210.4.202.4 and enter your meeting number.</p> <p>Join by phone Use VoIP only</p>
Pre tenders documents available at	www.mrpl.co.in/eoi

Please contact below mentioned personnel for further details:

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All Credentials/ Documents shall be addressed to

General Manager (Projects)
 Projects Department,
 Netravati Building
 Mangalore Refinery & Petrochemicals Ltd
 Kuthethoor PO, Via Katipalla, Mangalore – 575 030
 Karnataka- India

The envelope containing the documents shall be super scribed **“POWER SYSTEM UPGRADATION PROJECTS”**

**POWER SYSTEM UPGRADATION PROJECT
AT MRPL, MANGALORE**



PRE TENDER MEET (PTM)

**MANGALORE REFINERY AND
PETROCHEMICALS LIMITED**

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1.0 INTRODUCTION

- 1.1 Mangalore Refinery & Petrochemicals Limited (MRPL) a government of India schedule 'A' CPSE and a subsidiary of ONGC is a State of Art Grassroots Petroleum Refinery located in a beautiful hilly terrain, north of Mangalore city, in Dakshina Kannada region, Karnataka State. The Refinery has got a versatile design with high flexibility to process Crudes of various API and with high degree of Automation. MRPL has high standards in refining and environment protection matched by its commitments to society. MRPL has also developed a Green Belt around the entire Refinery with plant species specially selected to blend with the local flora.
- 1.2 MRPL has an Aromatics Complex, which is a downstream unit of the refinery which processes naphtha for the production of high quality Px & Bz. MRPL has high standards in refining and environment protection matched by its commitments to society.
- 1.3 MRPL calls for a Pre Tender Meet for Power system up gradation Project at MRPL.

2.0 BRIEF DESCRIPTION OF THE SYSTEM

- 2.1 MRPL has gone through three phases of expansion and over time has added power generation facilities in each of the three phases. The power generation facility in each phase was supported by associated cooling water and De-Mineralization water system. In addition, as an emergency backup, connectivity to the grid was also provided for start-up and emergency. While Phase 1 & 2 power plants are well integrated, Phase 3 and Aromatic complexes are, geographically separated and the interconnection between each of these power plants is limited.
- 2.2 The design intent of the setting up of own Captive generation facilities was to ensure that the poor reliability of the grid prevalent (and inability of machines to operate at the low frequencies of the grid) at the time of conceptualization of the refinery expansions (1992, 1998 & 2006) does not cause frequent upsets in the complex which would have resulted in production interruptions and high costs. It was also design intent that the utilization of the internal refinery fuel would be cost effective compared to the purchase of power from external source, considering co-generation of steam required for the process. It is also to be noted that Phase-3 was conceptualized without grid connectivity and subsequently connectivity was provided through one feeder.
- 2.3 In the past decade, there have been significant changes to the power generation and transmission infrastructure in the country. Availability of power has stabilized. Operational experience also indicates the same on evidence of grid frequencies that rarely fall below 50Hz (even at lower levels of 110kV). Further the availability of cheap

renewable power has also drastically reduced the cost of power available for long term supplies.

- 2.4 With the changes to the international market of Low Sulphur Fuel Oil (LSFO/ MFO) on account of the IMO regulations, the changes to the Automotive fuels landscape with the BS-VI rollout and the overall hardening of Crude prices (excluding COVID years of 2020 & 2021), the cost of internal generation of power has undergone changes from what was envisaged at the time of expansion of the refinery. With this change in the cost of internal generation of power and the cost of purchased power, the philosophy of power sourcing needs to be revisited.
- 2.5 Further there are additional challenges to the continued use of own generation of power on account of the COP-21 and COP-26 targets (through the PAT cycle targets), the increased importance of Environment-Sustainability-Governance (ESG) as a factor for Financing and the stated National targets for Net-Zero attainment.
- 2.6 Considering these Internal and External factors, a comprehensive review of the power supply to the refinery was carried out, along with infrastructure and other constraints and the actions proposed so as to achieve overall objective of bringing down cost of energy consumed in the refinery to meet emerging regulatory guidelines in the longer term.
- 2.7 The Energy Conservation Act, 2001 introduced the Perform, Achieve and Trade (PAT) framework for Energy Intensive Industries. A study was conducted by CHT and EIL in 2018 for assessing the potential for reduction in Energy Consumption and methodologies to achieve the PAT targets going forward.

3.0 OBJECTIVES

Based on this study, it is decided to focus on the up gradation of facilities of Steam and Power network as the major area for energy saving potential as given below:

- 3.1 MRPL presently draws power through state Grid on overhead lines at 110kV from Main Receiving Substation at Bajpe to the tune of approximately 22 MVA. It is proposed to increase the power import to 100 MVA by upgrading the power import infrastructure to 220 kV. Power import will be through underground 220kV cables in RCC trench from Bajpe Substation to MRPL Switchyard.
- 3.2 Upgradation of MRPL Switchyard from 110kV to 220kV for import of 100 MVA presently. In anticipation of power import increase to 350 MVA (addition of 250 MVA), it should be possible to add infrastructure and equipment in future to accommodate the increased power requirement.
- 3.3 MRPL has two separate load shedding schemes for CPP-1/2 and CPP-3. It is proposed to implement an intelligent integrated (CPP-1/2/3) load shedding system with advanced features to isolate specific drives (from Substation level up to Motor level).

- 3.4 CPP-2 is interconnected to CPP-3 via underground 33kV cable (1C x 630 sq.mm, Cu) through a 33kV / 34.5kV, 31 MVA Inter-Connecting Transformer (ICT). To improve reliability, a second ICT is proposed to be installed. This new ICT will be supplied as Free-Issue-Material (FIM) to the successful contractor.
- 3.5 CPP-1 has two Steam Turbine Generators (STG), CPP-2 has three STGs and CPP-3 has two STGs. It is proposed to convert two STGs in CPP-2 and one STG in CPP-3 to back pressure turbines.
- 3.6 As a result of the conversion to back pressure turbines, cooling water requirement for CPP-2 and CPP-3 will reduce as a result of which it is proposed to optimize operation of Cooling Towers of the CPPs by modification of the cooling water circuits and infrastructure.
- 3.7 There are two Gas Turbines with HRSGs in CPP-3. HRSG produces steam at 100 bar (VHP) which is let down through PRDS to 40 bar (HP) steam for refinery consumption. Letting down through PRDS results in wastage of energy. In order to meet HP steam demand without resorting to PRDS, it is proposed to implement either HRSG revamp for producing 40 bar (HP) steam or installation of a new VHP to HP back-pressure turbine generator.
- 3.8 In Delayed Coker Unit (DCU), Wet Gas Compressor is installed to compress gases generated during coking operation from low pressure to high pressure. This is a pure condensing machine without extraction. Hence it is proposed to convert the compressor to motor drive for reducing the condensing load on cooling towers and HP steam demand.
- 3.9 After the 2 STG's refurbishment as stated in 2.7.5 above at Ph-1/2, VHP-HP PRDS in Phase-1/2 will be closed. In addition to this, it is also proposed to install a new HP steam boilers for meeting the deficit in steam demand of Phase-1/2.
- 3.10 Aromatics Complex intends to augment its grid infrastructure to 110kV from current 33kV in order to draw increased power to the tune of 35MVA. Carrying out detailed study of the requirement for carrying out the Grid Augmentation works along with detailed cost estimation. Carry out detailed route survey in consultation with MSEZ & MRPL – Aromatic Complex. Interact with MSEZ for getting any details for the project requirement in consultation with MRPL.

4.0 SCOPE OF WORK

- 4.1 The scope includes but not limited to preparation of Engineering documents, Cost Estimation, Tendering, Project Management, approval / review of documents, inspection, expediting, quality, safety at construction site and construction supervision, certification of invoices etc.

- 4.2 Preparation of front-end engineering including adequacy check of existing system (if required), residual design, tender document preparation, bid evaluation and ordering for composite work contractor. Review of detail engineering documents, HAZOP and SIL study (if required), supervision of construction activities, mechanical completion, testing, pre-commissioning, commissioning, stabilization test and PGTR test run, review and certification of Final Documents.
- 4.3 PMC to ensure availability of sufficient qualified manpower at Engineering (HO) and site office dedicated for this project and ensure completion of the project within the time schedule specified in the tender.
- 4.4 The work shall be carried out in three phases
Phase-1: Detailed Feasibility Study / FEED
Phase-2: Tendering and Vendor Evaluation
Phase-3: System Implementation and Deployment

Phase-1: Detailed Feasibility Study

- Carrying out detailed study of all the proposals as mentioned from 3.1 to 3.10 above. Detailed list of activities are given below.
- Submission of technical specifications for 220kV cables (from Bajpe Substation to MRPL Switchyard).
- Route survey and feasibility study for laying of 220kV cables in concrete trench from Bajpe Substation to MRPL Switchyard.
- Modification in Bajpe Substation will be done by KPTCL.
- Study of the existing 110kV Refinery switchyard and submit the modifications / up gradation required for converting the infrastructure to 220kV (for 100 MVA power import) including incorporating future additional power requirement of 250 MVA.
- Study of the existing electrical infrastructure of interconnection between CPP-1, 2 and 3 and to recommend modifications / up gradation required for the proposed power import of 100 MVA.
- Evaluation of the technologies and solutions for implementation of intelligent integrated load shedding for CPP-1/2/3 for load shedding up to motor level and recommendation of the best solution (including basic design of the system and total number of inputs / outputs)
- MRPL has installed Inter-Connecting Transformer (33 KV/ 34.5kV, 31.5 MVA) between CPP-2 and CPP-3 (connected through 33 kV cables). Study to determine maximum power flow through the existing cables and to recommend solutions to increase the power flow (if required) up to the limit of the ICT.

- A second ICT will be supplied as Free-Issue-Material (FIM). PMC to study the location for installing the ICT, design of infrastructure for the installation and deciding on the source and termination of the power and control cables from the ICT. PMC shall also carry out feasibility study of operation of the two ICTs in parallel.
- Engineering and submission of technical specifications for conversion of steam turbines to back pressure turbines (2 nos. in CPP-2 and 1 no. in CPP-3).
- As a result of the conversion to back pressure turbines, cooling water requirement for CPP-2 and CPP-3 will reduce. Study of modifications required and submission of recommendations for optimizing the operation of Cooling Towers by modification of cooling water circuits and infrastructure.
- There are two Gas Turbines with HRSGs in CPP-3. HRSG produces steam at 100 bar (VHP) which is let down through PRDS to 40 bar (HP) steam for refinery consumption. Letting down through PRDS results in wastage of energy. In order to meet HP steam demand without resorting to PRDS, it is proposed to implement either HRSG revamp for producing 40 bar (HP) steam or installation of a new VHP to HP back-pressure generator. PMC to study the above options and submit the preferred recommendation along with technical specifications.
- PMC to submit technical specifications for converting Wet Gas Compressor to motor drive to reduce condensing load on Cooling Towers and HP steam demand without affecting the process requirements and operations of the compressor circuit in DCU.
- Study of the existing 33kV Aromatic Complex Grid Infrastructure and submit the modifications / up gradation required for converting the infrastructure suitable for taking power through upgraded 110kV (for 35 MVA power import).
- Finalization of complete scope of work for tendering for implementation of proposals as given from 3.1 to 3.10.
- Detailed presentation to MRPL Management on the feasibility report. Presentation may have to be conducted either at site or through Video-Conferencing as and when required by MRPL. PMC may be required to give up to three presentations.
- At the end of this phase, the final deliverable will be a Techno-economic detailed feasibility report covering above activities as a FEED package.

Phase-2: Tender Preparation, Vendor Evaluation and Bid Process Management for Tender (s) for PACKAGE contracts for carrying out the recommendations in the DFR / FEED.

Phase-3: System Implementation and Deployment – Execution including Supervision of all works for complete Project.

5.0 DATA TO BE FURNISHED BY THE BIDDER

1. General Information				
1.1	Name of the BIDDER / Firm			
1.2	Nature or legal status of the Firm			
1.3	Name and address of associated companies to be involved in the project with relationship and role, if any.			
1.5	Registered Address of Firm			
1.6	Contact Person			
1.7	Designation and address of Contact person			
1.8	E.mail			
1.9	Turnover & Net worth of the Firm during last three financial years (Please enclose copy of audited annual reports)	Year	Turn Over (INR)	Net Worth (INR)
		2019-20		
		2020-21		
		2021-22		
2. Past experience of the bidder.				
2.1	<ul style="list-style-type: none"> • Design, Engineering and Construction management of Switch yard of at least 110kV level. • Design, Engineering and Construction Management of GIS sub-station. • Design and implementation of load shedding facility logic in major Industries. • Retrofit activities of at least one STG. • Design, Engineering & HRSG modification or retrofit. • Design, Engineering, and installation of PRT. • Major modification / revamp activities of Power plant equipments. • Supervision services for execution of Electrical/ Mechanical/ Piping works. Details of above activities in last ten (10) year term.			
2.2	Bidder should provide necessary documents staining the above clauses. The bidder shall give copies of signed Agreement/ Work order/ Purchase order/ acknowledged final report or any other document to prove the scope of completed works against the order to the satisfaction of MRPL.			

6.0 DISCLAIMER

MRPL has prepared this document to give interested parties background information on the project. While MRPL has taken due care in the preparation of the information contained herein and believes it to be accurate, neither MRPL nor any office authorities, officers, employees, agents/and advisors gives any warranty or make any representations, express or implied as to the completeness or accuracy of the information contained in this document or any information contained in this document or any information which may be provided in connection therewith.

Interested parties are required to make their own inquiries and respondents will be required to confirm in writing that they have done so and they do not rely on the information provided in the Pre Tender document in submitting their response. The information is provided on the basis that it is non-binding on MRPL or any of its authorities or agencies or any of their respective officers, employees, agents or advisors.

MRPL reserves the right not to proceed with the project, to alter the timetable reflected in this document or to change the process or procedure to be applied for listing of enquiry partners. It also reserves the right to decline to discuss the project further with any party expressing interest. No reimbursement of cost of any type whatsoever will be paid to persons, or entities, expressing interest in the project.