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| <br>पी डी आई एल<br><b>PDIL</b> | EXPRESSION OF INTREST FOR SELECTION OF LICENSOR<br>FOR ENERGY REDUCTION IN AMMONIA PLANTS | PC-146-PNPR-RP01 | 0   | एम.एफ.एल.  |
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## EXPRESSION OF INTEREST (EOI)

FOR

PRE-QUALIFICATION OF LICENSORS  
OF AMMONIA TECHNOLOGY

FOR

ENERGY REDUCTION SCHEMES

IN



AMMONIA PLANT

CLIENT: MADRAS FERTILIZERS LIMITED,  
CHENNAI

*Prepared & Issued by:*



**Projects & Development India Limited**

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FOR ENERGY REDUCTION IN AMMONIA PLANTS

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## SECTION-1

# INVITATION FOR EXPRESSION OF INTEREST (EOI)

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## 1.0 INTRODUCTION

MFL commenced commercial production in 1971, with an annual installed capacity of 2,47,500 MT of Ammonia (750 MTPD) , 2,92,050 MT of Urea (885 MTPD) and 5,40,000 MT of NPK. A major revamp / expansion was carried out in 1998, enhancing the annual installed capacity to 3,46,500 MT of Ammonia (1050 MTPD) , 4,86,750 MT of Urea (1475 MTPD) and 8,40,000 MT of NPK, in addition to extending the economic life of the plants. The Process Licensor for the revamped Ammonia & Urea Plants are M/s HTAS & UTIC respectively. Though the Ammonia Plant is being operated with Naphtha feed stock at present, on receipt of Natural Gas at Ennore Gas Terminal by M/s IOCL by June 2018, the feed stock of the Ammonia Plant will be changed over to CNG for which necessary implementation activities are being carried out.

The Feed stock conversion of Ammonia Plant envisages the following :

- Operation of Ammonia Plant with Naphtha or CNG or mixture of Naphtha and CNG in different ratios.
- Operation of Ammonia Plant using either Naphtha or CNG as Standalone case, for fuel in furnace.



### **Modifications in Ammonia Plant already implemented due to changeover to NG Feedstock:-**

The following modifications have been already implemented during changeover from existing naphtha based ammonia plant to natural gas based ammonia plant:

- Natural Gas Feed and Fuel Preheater
- Natural Gas Fuel Preheater
- Primary Reformer Burners
- Secondary HDS Reactor with new charge of HDS catalyst
- Modification in piping around Secondary HDS Reactor
- Modification in Primary Reformer fuel circuit.
- NG pre-heat coil
- New charge of ZNO catalyst

‘To comply with GOI policy, energy of urea needs to be reduced to less than 6.336 Gcal/MT urea. In order to achieve the above, specific energy of ammonia in ammonia plant (based on, CNG or, CNG + Naphtha or, Naphtha feedstock) along with the associated utilities, need to be reduced’.

Projects & Development India Limited (PDIL), a premier consultancy and engineering organization in India, have been selected as consultant by MFL for preparation of ITB and selection of Process Licensor for carrying out study for Energy reduction in MFL Plants.

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## 2.0 **BRIEF SCOPE OF WORK**

‘Bidder to carry out study of existing ammonia plant for the purpose of finding out various proven possibilities for reducing energy in ammonia plant, such that urea can be produced with an energy consumption not exceeding 6.366 Gcals/MT urea, on an annual basis, backed up by existing utilities and off-site facilities. In order to achieve the desired extent of energy reduction, by implementing proven revamp measures, bidder needs to be conversant with actual energy consumption in ammonia plant at that period of time, for which Base Case Study Report shall be prepared by the bidder. It is essential for Bidder to submit the Base Case Study Report, along with the bid.

Successful bidder shall furnish BED (Basic Engineering and Design) Package. The BED Package shall be complete in all respects including reference to relevant and accepted standards, etc., and other details normally associated with standard BED Package. The BED Package shall include all engineering features, exclusive to existing ammonia plant and site along with necessary licence for ensuing detail engineering to be carried out by third party.

### 2.1 **Base Case Study :**

It is envisaged that, there shall be 2 (two) occasions for preparation of Base Case Study Report, as mentioned hereunder :

#### 2.1.1 **Preliminary Base Case Study Report :**



In accordance with that mentioned in ‘Brief Scope of Work, the Base Case Study Report, in connection with energy savings in Ammonia Plant, has to be submitted along with the Bid. Accordingly, bidders need to visit plant site for collection of documents (from client) and plant information, for preparation of ‘Base Case Study Report’, for submission along with bid. Preliminary Base Case Study Report, shall essentially consist of Base Case pfd, list of revamp measures / new and modified equipments, Energy Saving Achievable along with approximate CAPEX cost of revamp measures.

#### 2.1.2 **Base Case Study Report After Award of Job :**

Successful Bidder on receipt of clear work order, need to re-visit plant site, for collection of detail information, which shall be mainly used for development of a comprehensive Base Case Flow sheet. The Base Case Flow sheet, importance of which need not be emphasized, shall form the basis, based on which the revamp measures, exclusively meant for achieving energy reduction in existing ammonia plant, shall be worked out.

#### 2.1.3 **Information Collection Alongside Information for Base Case :**

In the course of finalizing the energy saving revamp measures in the existing ammonia plant, with the ultimate objective of achieving energy consumption of 6.336 Gcals/MT urea (on an annual basis and overall basis) contribution of energy from utilities / offsites, towards urea energy, need to be known. The same has to be worked out and established by vendor, and therefore, along with

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collection of information for 'base case report / pfd' preparation for ammonia plant, vendor shall also collect following information :

- aa) Information from existing ammonia plant, for evaluating specific energy consumption of ammonia, at the battery limit of existing ammonia plant.
- bb) Information from existing urea plant, for evaluating specific energy consumption of urea, at the battery limit of existing urea plant.
- cc) Information regarding energy inputs into the complex (in the form of naphtha, CNG, electric power, steam, etc.), and corresponding amount of urea produced, need to be collected from the existing plant site, for evaluating specific energy of urea on overall basis.



#### 2.1.4 Contents of Final Base Case Report from Vendor :

- As already mentioned earlier, Final Base Case Report shall be made by vendor, upon award of the job. The Final Base Case Report needed to be ratified by Owner and / or Owner's Consultant.

After Owner's approval, vendor shall proceed with vendor's scope of work and obligations for preparation of BED Package and delivering the same to Owner, for carrying out detail engineering work.

- The contents of Final Base Case Report from vendor, shall comprise of, but, not limited to the following :
  - a) List of revamp measures
  - b) List of New equipment
  - c) List of modified equipment
  - d) Final Base Case pfd (process flow diagram) based on,
    - i) Catalyst conditions present in the plant when data shall be collected by vendor, (This is termed as 'Normal' Conditions)
    - ii) Development of separate 'pfd' based on E.O.R. (End of Run) conditions of HT Shift Conversion and LT Shift Conversion Catalysts, in Front End of Ammonia Plant.
  - e) Specific energy consumption of Ammonia, at Ammonia Plant Battery Limit, for
    - i) Normal Catalyst Conditions (as mentioned in d) above
    - ii) E.O.R. Catalyst Conditions
  - f) Quantum of Energy Saving :

In Final Base Case Report, vendor shall specify the

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- i) Quantum of energy saving for 'Normal' catalyst condition case,
- ii) Projected quantum of energy saving, under E.O.R. conditions of H.T. Shift and L.T. Shift Catalysts.

g) Pressure Drop in Front End :

Pressure drop in process gas path in Front End of Ammonia Plant, shall be evaluated for two cases, namely,

- i) 'Normal' conditions of Catalyst (in front end)
- ii) Projected E.O.R. conditions of catalysts (in front end).

2.2 Energy reduction schemes provided by bidders shall be applicable for Natural gas, Naphtha and also for dual feed Naphtha/Natural gas in the mixture ratio of 25:75, 50:50, 75:25.



2.3 Utility Balance Diagrams :

- The significant contributions and the role played by some of the utility plants and facilities in the overall energy scenario / consumption need to be identified and properly presented during the course of study of the plant complex, by different bidders.
- Accordingly, along with the information to be collected by the Bidder for preparation of Base Case Study Report on Ammonia Plant, bidder shall also collect information, for the identified utility plants and facilities.
- Therefore, in order to get clear picture on the role / contribution of the existing utility plants and facilities on the targeted specific energy consumption of urea, along with the 'Base Case Study Report' of ammonia Plant, Bidder shall be required to re-work the following, namely,
  - a) Power Balance
  - b) Steam Balance
  - c) Cooling Water Balance / Distribution

Bidder shall accordingly collect necessary information from plant and submit report on a), b) & c) above, along with the Bid.

2.4 BIDDER shall provide and be responsible for the tasks summarized below but not limited to the following:

- Process Design Basis
- Piping and Instrumentation Diagrams (P & IDs).
- Basic control schemes and basic trip logic / interlock diagrams for safe and stable operation of ammonia plant.
- Optimized Process Flow Diagram of complete ammonia plant with mass and energy balance and incorporating revamp measures both for (a) Normal case and (b) E.O.R. case
- Physical and Chemical properties of major flow streams to be depicted in process flow diagrams.

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- Detailed Process Description
- Equipment List
- Line list
- Process datasheets for equipment
- Process data for instruments
- Piping material specification
- Operating & control philosophy
- Heat exchanger datasheets along with tube sheet layout
- Performance Guarantee
- Utility requirements
- Hazardous area classification
- Chemicals & consumables
- Electrical load summary
- Plot Plan
- Drawings & documents

The Basic Engineering and Design Package for the plant shall include all basic technical details for clear understanding of process technology. Such technical information to be included in the basic engineering and design package, shall be established only in the English language.



#### 2.5 Energy Savings To Be Achieved :

- Bidder shall furnish energy savings / reduction of each individual energy saving measure, together with total energy savings to be achieved upon implementation of Bidders' Energy Saving Scheme.
- Total energy savings that shall be achieved, shall be furnished for,
  - a) Normal Case
  - b) Extrapolated for E.O.R. case.
- Bidder shall also furnish cost implication of each individual energy saving measure, as well as, overall cost for the total energy saving revamp.

#### 2.6 Specific Energy Consumption Of Ammonia :

- Bidder shall evaluate specific energy consumption of ammonia, at ammonia plant battery limit, from plant operating data collected for Base Case Study of Ammonia Plant.
- Bidder shall also calculate and furnish the projected specific energy of ammonia (at ammonia plant battery limit), upon implementation of total revamp measures for energy saving.



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- Specific Energy of Ammonia to be achieved on implementation of of energy saving revamp measures, shall be furnished for
  - a) Normal Case
  - b) Extrapolated for E.O.R. Case

#### 2.7 Performance Guarantee :

- Bidder shall guarantee the quantum of energy saving
- Bidder shall guarantee, reduction in specific energy consumption of ammonia compared to Base Case



The reduction in specific energy consumption, is envisaged to be achieved upon implementation of Energy Saving Measures, proposed by Bidder, for existing Ammonia Plant.

Note : Detail terms of guarantees with respect of quantum of energy savings to be achieved in Ammonia Plant, shall be dealt in detail in the enquiry to be issued subsequent to the present E.O.I.

#### 2.8 Information / Documents from Owner :

The information / documents which are as listed below, shall be furnished by Owner in the Enquiry documents, to be issued subsequent to receipt of response on the “Expression of Interest” document being issued presently :

1. Energy equivalence figure, for imported electric power from State Grid
2. Number of boilers operating under normal conditions, normal and design capacity of each boiler, conditions of steam generated in boiler and boiler efficiency.
3. Specification of feedstock and fuel used in Complex
4. At normal capacity operation of all units in the complex, specific energy consumption of the following :
  - a) Ammonia at Ammonia Plant B/L.
  - b) Urea at Urea Plant B/L
  - c) Overall energy of urea at B/L of complex
5. Average daily ammonia production presently
6. Ammonia production capacity to be maintained after energy revamp
7. Average daily urea production
8. Average annual urea production
9. Existing balance diagrams for

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- a) Cooling water distribution, in overall complex
- b) Steam balance in overall complex
- c) Electrical Power balance

10. 'CO' slip from H.T. Shift Converter and L.T. Shift Converter at E.O.R. (End of Run) conditions.

11. Time period within which Energy Saving Revamp Measures is desired to be implemented,

12. Operating life of all catalysts in Ammonia Plant.

### 3.0 **PRE-QUALIFICATION CRITERIA**

#### 3.1 **Technology/Technical Criteria:**

The Bidder should be an established process licensor in the field of Fertilizer plant (ammonia) and should necessarily possess experience of having successfully implemented the schemes for energy reduction in the last 10 years period from due date of EOI for at least one Revamp/ Debottlenecking project comprising of Ammonia Plants of similar or higher capacity.

Licensor shall submit Letter of satisfactory running of Plant from Owner for the project wherein the energy reduction schemes by process licensor has been implemented.

3.2 Licensor shall submit documentary proof from their plant owner OR their own plant as operators in the form of plant logbooks and laboratory analysis OR any other documents to verify the quality and quantity of product.

### 4.0 **GENERAL**

4.1 The Licensor must not have been debarred / blacklisted by any Govt. Department, Agency, PSUs / Institution / Agencies / Autonomous Organisations. The Licensor shall submit a self-certification by an authorized person to this effect.



4.2 Licensor should not be under liquidation, court receivership or similar proceedings.

4.3 MFL/PDIL will not be responsible for any costs or expenses incurred by the Bidder in connection with preparation or delivery of EOI.

4.4 EOI shall be submitted in hard copies as per instruction to the Licensors. EOI sent through e-mail with covering letter followed by hard copy through courier shall also be accepted.

4.5 Madras Fertilizers Limited reserve the right to reject any or all EOI received without assigning any reason.

4.6 Licensor is to submit documentary evidence to support the references provided herein for fulfilling the Technology Criteria of EOI. The following are minimum documents required:

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- a. Details of reference unit including the details of contact person(s).
- b. Extract of License agreement or relevant document as proof of same.
- c. End users certificate from the licensee (on licensee's letter head) to detail out following:

|     |  |  |
|-----|--|--|
| i   | Capacity of the unit in terms of:        |  |
| ii  | Energy consumption before revamp         |  |
| iii | Energy consumption After revamp          |  |
| vi  | End product and Capacity of end product. |  |

- d. Date of commissioning & commercial production.
  - e. Commercial performance of the unit for at least one year indicating plant load (average & highest), major operation problems & remedial measures taken and reasons of shutdown if not operating presently (technical and / or commercial).
  - f. Guarantee performance parameters and Confirmation on meeting guaranteed performance satisfactorily.
- 4.7 Licensor shall also furnish complete audited annual financial year statements including Balance Sheet, Profit & Loss accounts statement and all other schedules of immediate preceding financial year, self-certification of being not under liquidation, court receivership or similar proceedings, in the first instance itself, in support of their fulfilling the Licensor's Qualification Criteria.
- 4.8 In case of Foreign Licensor, if any of the documents in support of meeting EOI are not in English language, then the original document along with English translation of the same duly certified, stamped and signed by Local Chamber of Commerce or respective Embassy shall be furnished.
- 4.9 Date & Time for Submission of Proposal (EOI):
- The due date & time for submission of Proposal (EOI) by the Licensor is 19.02.2018, 1600 hrs (IST).**
- 4.11 **PRE-BID MEETING SHALL BE HELD on 01.02.2018 , 10:00 a.m at MFL Chennai.**
- 4.12 Clarification, if any, can be obtained from Mr S. Thamilselvan DGM, MFL {[dgmts@madrasfert.co.in](mailto:dgmts@madrasfert.co.in) } / Sri P.R.Sahu, HOD (M.M), PDIL) {[prsahu@pdilin.com](mailto:prsahu@pdilin.com) / [anjali@pdilin.com](mailto:anjali@pdilin.com) }



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## SECTION-2

# INSTRUCTIONS TO LICENSORS FOR SUBMISSION OF EXPRESSION OF INTEREST

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## 1.0 INTRODUCTION\_

### 1.1 DEFINITIONS

1.1.1 Owner' means Madras Fertilizers Limited (MFL), a company incorporated in India .

1.1.2 'Consultant' means Projects & Development India Limited (PDIL), a company incorporated in India.

### 1.2 SCOPE OF WORK

The brief scope of work and pre-qualification criteria have been provided under Section – 1: Invitation for Expression of Interest.

### 1.3 OWNER'S RIGHT TO ACCEPT/ REJECT

The MFL reserves the right to accept or reject any EOI and to annul the bidding process and reject all EOI at any time without thereby incurring any liability to the affected Licensor or any obligation to inform the affected Licensor of the grounds for the MFL's action.

## 2.0 PREPARATION / SUBMISSION OF EXPRESSION OF INTEREST

### 2.1 LANGUAGE OF EOI

The EOI and all correspondence incidental and related to EOI shall be in English language. Any printed literature and document submitted in any other language should be accompanied by authenticated English translation, in which case, for purpose of interpretation of the EOI, English translation shall govern. Responsibility for correctness in translation shall lie with the Licensor.

### 2.2 COST OF BIDDING

The Licensor shall bear all costs associated with the preparation or delivery of its EOI, participating in discussions etc. including costs and expenses related with visits to MFL's office and the site(s). MFL/PDIL will in no case be responsible or liable for those costs and expenses regardless of the outcome of the bidding process.



### 2.3 DOCUMENTS COMPRISING EOI

2.3.1 The EOI must be complete in all respect leaving no scope for ambiguity. It is in the interest of Licensor to submit complete and comprehensive proposal leaving no scope for MFL/PDIL to raise any further questionnaires. The MFL/PDIL may evaluate the Licensor on the basis of document submitted in the first instance in order to adhere with project schedule requirements.

2.3.2 Licensors required to make a proposal in a format as outlined in the Checklist enclosed in this EOI document in order to achieve the objective of maintaining uniform proposal structure from all the Licensors. These requirements must be adhered by all the Licensors.

#### 2.3.3 Licensor shall submit the following for expressing their interest:

- i) Cover letter giving brief introduction and expressing interest to participate in Bidding process.

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- ii) Information details as per FORM-1 and Pre-qualification criterion as per FORM-2 along with supporting documents such as copies of work order, contract agreement, completion certificate etc.

## 2.4 SUBMISSION OF EOI

Licensors are required to send the complete proposal / EOI document along with all supporting documents duly signed & stamped on each page (in original +one copy) so as to reach at the following address within the due date & time:

**Projects & Development India Limited,  
(Materials Management Department)  
P.D.I.L Bhawan, A-14, Sector-1,  
Noida, (PIN 201301)  
Dist. Gautam Budh Nagar (UP). (India)**

**Kind Attention:**

**Mr.P.R.Sahu, Addl. General Manager (M.M)**

**Fax no. : +91-120-2529801**

**Tel no. : +91-120-2544063.**

**E-mail : [prsahu@pdilin.com](mailto:prsahu@pdilin.com)**

In case of submitting EOI through e-mail, the e-mail is required to be sent to [prsahu@pdilin.com](mailto:prsahu@pdilin.com)

## 2.5 OWNER'S RIGHT

- 2.5.1 MFL/PDIL reserves its right to call for originals of the supporting document submitted for verification, if required and also to cross check any details as furnished by the Licensor from their previous Clients / Consultants etc. Licensor shall have no objection whatsoever in this regard and shall facilitate MFL to obtain the same.
- 2.5.2 MFL/PDIL reserves the right to make use of available in-house data (their own or their Consultants) also for pre-qualification of Licensor(s) who have submitted EOI. The decision of MFL /PDIL will be final and binding on the parties.
- 2.5.3 This EOI intends to short list the suitable Licensors available for processing of ammonia plant. Owner reserves the right to further call for information to assess the suitability of the technology for the need. Owner reserves to go in for further evaluation methodologies to zero in on technology.

## 2.6 CONTACTING MFL

No Licensor shall contact MFL/PDIL on any matter relating to its EOI from the time of submission of EOI unless requested so in writing. Any effort by a Licensor to influence MFL/PDIL in the decision making in respect of EOI will result in the rejection of that Licensor.

**INFORMATION**

LICENSOR IS REQUESTED TO COMPLETE THE FOLLOWING QUESTIONNAIRE

| SR.<br>NO. | DESCRIPTION   | LICENSOR'S RESPONSE | REMARKS |
|------------|---|---------------------|---------|
| 1          | Willingness to provide the requisite proven license technology for commercial use to MFL / DEC(YES / NO)      |                     |         |
| 2          | Complete reference list of all the units licensed (YES/ NO)<br>(Refer clause-3.1 & 3.2 of invitation for EOI) |                     |         |

**SPECIFIC EXPERIENCE FOR PRE-QUALIFICATION CRITERIA**

Licensor shall furnish their experience details of the reference unit for pre-qualification:

| <b>S. NO.</b> | <b>DESCRIPTION</b>   | <b>DETAILS</b> |
|---------------|--|----------------|
| 1.            | Name of project and location<br>(Refer clause-3.1 & 3.2 of invitation for EOI)                             |                |
| 2.            | Project Details :<br>Capacity of the project (units)<br>(Refer clause-3.1,3.2 & 4.6 of invitation for EOI) |                |
| 3.            | Name of Owner, Postal Address, Phone / Fax No./ E-mail Address<br>(Refer clause-4.6 of invitation for EOI) |                |



| S. NO. | DESCRIPTION  | DETAILS  |
|--------|--|--|
| 4.     | Supporting Document as above and as per clause 4.6 of Invitation for EoI | <ul style="list-style-type: none"> <li data-bbox="1051 188 1983 285">           • Extract of License agreement as per clause 4.6 (b)<br/>           Yes <input type="checkbox"/> No <input type="checkbox"/> Page No. of PQ Bid _____         </li> <li data-bbox="1051 285 1983 383">           • Whether copy of Work Order / Contract Agreement enclosed<br/>           Yes <input type="checkbox"/> No <input type="checkbox"/> Page No. of PQ Bid _____         </li> <li data-bbox="1051 383 1983 480">           • Capacity of the unit as per clause 4.6 (c-i)<br/>           Yes <input type="checkbox"/> No <input type="checkbox"/> Page No. of PQ Bid _____         </li> <li data-bbox="1051 480 1983 578">           • Certificate for successful commissioning with date of commissioning &amp; commercial production enclosed<br/>           Yes <input type="checkbox"/> No <input type="checkbox"/> Page No. of PQ Bid _____         </li> <li data-bbox="1051 578 1983 675">           • Certificate regarding satisfactory operation of plant for the last one year from EOI due date<br/>           Yes <input type="checkbox"/> No <input type="checkbox"/> Page No. of PQ Bid _____         </li> <li data-bbox="1051 675 1983 773">           • Commercial performance of the unit as per clause 4.6 (e)<br/>           Yes <input type="checkbox"/> No <input type="checkbox"/> Page No. of PQ Bid _____         </li> </ul> <div style="margin-left: 100px;"> <input type="checkbox"/> <input type="checkbox"/> </div> |