



PUDUCHERRY POWER CORPORATION LIMITED
(A GOVERNMENT OF PUDUCHERRY UNDERTAKING)



T.R. PATTINAM - 609606, KARAIKAL.

Phone No:04368- 233060,

E-Mail : ppclmmc@gmail.com

Fax: 04368 - 233355.

Ref. No: U-090/MMC/2020-21/1256 Our GSTIN No.: 34AAACP6507E1ZS Dt. 29.09.2020

ENQUIRY

To

As per list enclosed.

Sub: Inviting offer for engaging accredited auditor firm of Bureau of Energy Efficiency Auditor for carrying out Mandatory Energy Audit 2020-21- Reg.

QUOTATION TO BE:

Submitted on or before 21.10.2020 - 12.00 Noon	Opened on 22.10.2020 -03.00PM
Kept valid upto three months	Submitted in TWO PARTS.

Sealed quotations are invited for engaging accredited auditor firm of Bureau of Energy Efficiency Auditor for carrying out Mandatory Energy Audit 2020-21 as detailed below and as per the scope of work furnished in the annexure and as per our terms and conditions mentioned therein.

Pre-Qualification Requirement:

- # Our DC No. is TPP0086PY. The Bidder should be eligible to conduct Mandatory Energy Audit
- # The Vendor who wishes to Participate in the Tender should have valid certification of BEE Statutory to perform Mandatory Energy Audit as per EC Act 2001, BEE regulation 2010.
- # Vendor to submit a copy of order of Energy Audit conducted in any of the Thermal Power Plant during the Audit process as per BEE Guidelines for Thermal Power Plant sector with Performance Certificate.

TERMS AND CONDITIONS:

1. The rate quoted should be inclusive of material, manpower mobilization and demobilization, travelling charges, boarding and lodging charges, tools and tackles, etc. required for the Audit, GST, EPF & ESI charges and other charges as admissible.
2. 100% Payment will be made within 30 days from the date of receipt of your invoice after completion of work satisfactorily and approval of Engineer-in-charge
3. **EARNEST MONEY DEPOSIT:** An Earnest Money Deposit of Rs 5000.00 (Rupees Five thousand only) should be paid by demand draft drawn in favor of the EXECUTIVE ENGINEER (MECH), Puducherry Power Corporation Ltd T.R. Pattinam, Karaikal on any Nationalized/Schedule bank payable at Karaikal. The earnest money deposit will bear no interest and will be released after successful completion of the work and acceptance.
4. Parties registered with NSIC or SSI/MSME is exempted for submitting EMD/SD. However copies of supporting Documents/Certificates should be kept in separate cover super scribing "Earnest Money Deposit Exemption".



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5. The party shall be required to place the earnest money and the tender in separate sealed envelopes marked "Earnest Money" and "Tender" respectively. Both the envelopes shall then be placed in another sealed envelope and submitted to the tender inviting authority in the usual manner. The officer opening the tenders shall first open the envelope containing the earnest money. If the earnest money is found to be in order, only then the Officer shall proceed further with opening the tender.
6. The bill in triplicate along with advance stamped receipt should be sent to the undersigned for effecting payment.
7. Necessary Gate pass should be obtained well before the commencement of work.
8. All the Safety Rules as per the Factory Act 1948, Puducherry Factory Rule and PPCL Safety instructions to be strictly followed inside the plant area.
9. In case of any faulty workmanship in the scope of work, the tenderer must rectify the same. Otherwise the estimated amount will be deducted in your work bill.
10. Our GSTIN No.: 34AAACP6507E1ZS registered with Commercial Taxes Department, Puducherry.
11. Sealed quotation should be super scribed as "QUOTATION / ENQUIRY NO. U-090 for engaging accredited auditor firm of Bureau of Energy Efficiency Auditor for carrying out Mandatory Energy Audit 2020-21 - due on 21.10.2020".
12. Applicable other charges, if any should be clearly mentioned as whether inclusive or exclusive. If not mentioned, it will be presumed that the rate quoted is inclusive of all taxes other charges.
13. The party should submit two copies of photographs of all the employees deployed in PPCL for the above work for gate pass purpose. The name & photo of the employees should be attested by the contractor.
14. The undersigned reserves all rights to accept/reject any or all the quotations without assigning any reasons thereof.

29/09/2020

EXECUTIVE ENGINEER (MECH-PLANT)



PUDUCHERRY POWER CORPORATION LIMITED
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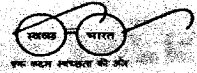
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Scope of Work for conducting Mandatory Energy Audit

1. The primary objective of the proposed Mandatory Energy Audit is to fulfill the BEE norms of compliance. The Energy Audit should involve an in depth study of all the major energy consuming equipments.
2. The study should focus on improving energy usage efficiency and identifying energy saving opportunities at various equipment and sections.
3. Detailed comprehensive investigation / measurements of major equipment, process / systems and key areas will be carried out by using portable sophisticated instruments with a view to reduce the energy consumption levels.
4. Data collected should be compared with the design values and margin for improvement should be found out.
5. Based on the analysis and the onsite spot measurements with portable instruments or data taken from the control panel / monitoring system, suitable energy efficiency measures should be recommended.
6. Operation practices of the end users from energy efficiency point of view should be looked into wherever possible, no/low-cost energy conservation measures should be initiated/trial runs should be show-case to realize the energy savings
7. The specific energy consumption on Gate to Gate basis should be carried out
8. Presentations/discussions on the findings of energy conservation measures should be shared with plant management.
9. Finalized energy conservations measures should be documented and detailed implementation plan should be worked out in consultation with the plant management. For each of the identified measures, The Energy Auditor shall draw the technical features, establishing the energy savings and cost savings. For these selected measures, monitoring and verification methods (based on the available instrumentation) will be derived for future justification.
10. The finalized energy audit report should be presented to the management along with the implementation plan. The energy audit report will highlight the details of specific energy consumption, list of recommendations to reduce energy consumption and costs, monitoring and evaluation of impact of selected energy conservation measures. The report should be prepared as prescribed in the Notification (as per Form 4 format). The report should be certified by the Accredited Energy Auditor.
11. Four hard copies and a soft copy of mandatory Energy audit report should be submitted to the management.
12. To coordinate with BEE / SDA on behalf of Designated Consumer (PPCL), to submit the detailed report in the form and manner as sought by BEE as per EC act 2001 and submit the data required in Form 2.
13. The proposed deliverable of energy audit study is the report, which consists of following:
 - a. Detailed observations, operational practices and actual energy consumption details (wherever possible) and areas for energy conservation should be given in the report along with analysis.



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- b. Proposed energy conservation measures should be grouped as No cost, low cost and capital intensive measures after detailed discussions with plant management;
- c. Technical specifications of retrofit equipment specific to the site requirements will be drawn to match the best efficiency level;
- d. The investment cost for each of the recommended energy conservation measure will be estimated in consultation with plant management.
- e. Economic viability of the individual measures should be derived (in terms of simple payback method)

Apart from the above energy audit report, monitoring and verification documentation required for PAT compliance should be consolidated to support GTG specific energy calculations along with plant energy manager.

14. A team of 3-4 Engineers should undertake this energy audit study, consisting of accredited and certified energy auditors by BEE. The professionals involved in this study should be those who are having experience in conducting such energy intensive industry studies (electrical and thermal background).
15. PPCL will authorize/depute energy manager who will represent and negotiate on all deliverables specified in this offer. He will be responsible for communicating any changes or updates to specified services under this proposal to Energy Auditing company.
16. The Energy Auditing Company should nominate an accredited energy auditor (as team leader) for continuous interaction and facilitation for smooth function/delivery of services in time. He is responsible for reporting any discrepancy encountered in the day-to-day operation of the energy audit and PAT services specified in the proposal.
17. The estimated time duration for completing the proposed scope of work under mandatory energy audit exercise is about 1 week for completing the field study of power plant and another 2-3 weeks for analysis and preparation of report.
18. All field measuring / monitoring instruments required for Energy audit is under your scope. All field measuring / monitoring instruments used for Energy audit should have latest testing and calibration certificate from accredited testing lab/agency.
19. The study of Energy Audit should be carried out in following areas with specific emphasis on auxiliary power consuming equipment performance evaluation:
 - a. Study of performance of Gas Turbine, Steam generators (HRSG) & GBC's
 - b. Steam Distribution consisting of pressure drop, steam leakage evaluation, Insulation survey/heat loss due to un-insulation, steam trap survey, blow down etc.
 - c. Electrical systems
 - d. Auxiliary study includes Fans, Blowers, Pumps, Cooling Water Systems, etc
 - e. Cooling system
 - f. Station auxiliaries - Fuel handling systems, HP & LP water system, DM water system, Air compressors, AC & ventilation system



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The details of installed equipment and brief scope of work are given below

A. Gas Turbine & Steam Generator (HRSG)

The study of Gas Turbine & Steam Generator (HRSG) should cover following areas

- Performance Evaluation of GT and HRSG
- Monitored parameters of GT & HRSG
- Mass & energy balance of GT and HRSG
- Estimation of Condenser performance & deviation due to higher temp. of condenser water, less circulation water flow or other factor should be made
- Performance study of cooling towers and CT fans should be carried.
- Efficiency evaluation of Gas booster compressors, feed pumps, cooling water pumps, raw water make up pumps and condenser pumps should be made.

B. Gas Booster Compressors (GBC's) - 5 Nos.

The performance, loading and efficiency of GBC's to be studied and recommendations to be made for scope of improvement for best operating conditions of plant and Energy conservation measures that can be implemented.

C. Electrical Systems

The scope should cover the study of Electrical System comprising the Electrical Substations, Transformer loading practices, Power Factor Management, analysis/optimizing Incoming Voltage Conditions and Distribution losses.

i. Transformer Load Management

The study should cover analysis of the loading practices on distribution transformers to evaluate the operating efficiencies of the Transformers of unit Auxiliary, unit service, cooling water plant, etc. Such a study should identify the measures for achieving optimum loading conditions and minimizing transformation losses.

ii Power Factor Management

Study should cover the power factor at different bus levels/feeders, compensation required and the overall effect of reactive power compensation. Rationalization of location of capacitor banks should be evolved based on the measurements.

iii Distribution Losses

Study should cover energy losses in cable system and the measures to be taken for minimizing the energy losses in the cables and the overall distribution losses.

D. Electric Drives

Both HT and LT motors (above 15kw) loading condition such as operating load analysis, operating parameters such as load variation, Power Factor should be measured. Based on the above studies the following recommendations should be made.

- Proper sizing of motor
- Use of energy efficient motor by replacing oversized and less efficient motors
- Retrofitting inverters or soft - starters
- Re-shuffling of motors as per loading
- Reactive power compensation for motors



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E. Techno-economics of each of the proposals should be worked out based on trial results and case study.

F. Compressed Air System (Generation, Distribution & Utilization)

Plant uses both Instrument and service compressed air system for the operation of the unit.

The following study should help in conserving considerable energy.

- Free air delivery assessment (output of compressors)
- Estimation of specific energy consumption (kw consumption per cfm)
- Quantification of compressed air leakage - No load test (if possible)
- Optimum pressure generation and pressure drop
- Optimization of compressed air utilization and distribution

Detailed analysis of the above should be carried out by using portable instruments to arrive at suitable recommendations

G. Cooling Towers

The cooling tower efficiency will directly affect the performance of plant equipment which leads to higher energy consumption in view of this a study should be under taken to analyse the present approach and range of the cooling tower against its designed values.

Performance of individual equipment w.r.t cooling water (temperature/quantity) would be made.

H. A/C & Ventilation Systems

The scope of study should cover:

- Estimation of actual TR generation by the chillers
- Measurements of power consumption and estimation of specific power i.e KW/TR for compressors, chilled water/brine pumps, cooling water pumps, cooling tower fans etc.
- Operational features of compressors such as temperatures, pressure controls.
- Study of auxiliary components included are
 - a. Condenser water pumps
 - b. Cooling tower fans
 - c. Application potential for various energy saving retrofits
 - d. The above areas should be studied to identify opportunities for energy saving

I. The Energy audit study should identify the ways to reduce the Auxiliary Power Consumption and improve the Heat rate.

Encl: PPCL Plant Configuration Diagram

PPCL-KARAIKAL GATE TO GATE SCHEMATIC DIAGRAM

