



***Request for Quotation (RFQ) for the provision of services to undertake a General Energy Assessment and mentorship at a water treatment plant based in Limpopo.***

**CSIR RFQ: 5621/02/10/2020**

Date of issue	18 September 2020
Closing Date and Time	02 October 2020 @ 16:30
Contact details	For submission of quotations or any other enquiries: <a href="mailto:tender@csir.co.za">tender@csir.co.za</a>

## **1 INVITATION FOR QUOTATION**

Quotations are hereby invited for the supply of service for a **General Energy Assessment and mentorship** at a water treatment plant **based in Limpopo**.

The on-site General Energy Assessment and mentorship/ is to be conducted solely by the recipient of this RFQ and may not be delegated, outsourced nor contracted to any other party without prior written notification to the NCPC-SA Project Manager.

## **2 QUOTATION REQUIREMENTS**

### **2.1 The overall purpose of the General Energy Assessment and Mentorship utilizing the UNIDO Methodology is to:**

- To assist with quantifying energy, and identifying other major consumers within their processes.
- To use the assessment as a tool to identify potential opportunities for the reduction and more efficient use of energy consumed by the facility's motor system.
- To verify whether the energy used is efficient and that there is an ongoing program to monitor and improve the use of this resource.
- To establish an energy consumption baseline by means of normalization (regression analysis with indicated baseload).
- To assist in setting energy efficiency index and targets where applicable.
- To collect quantitative data to determine the percentage energy consumption by specific areas or significant energy users (SEUs) across all energy sources to be considered.
- To provide detailed recommendations for any energy efficiency improvements that will result in kWh reduction and result in economic benefits for the company.

- To undertake an economic feasibility analysis of all identified energy improvement opportunities
- To include possible renewable energy options and provide a high level feasibility analysis.
- To present recommendations to the facility management team on selected feasible and viable options and prioritization of implementation options.
- Mentoring of identified staff of the Beneficiaries through conducting a general energy assessment to identify energy saving opportunities for the reduction of energy consumption, energy cost and tonnes of CO2 emitted.

## **2.2 Qualification Requirements**

Due to the nature of the work and methodology required, the bidder should have completed the UNIDO Pumps System Optimisation Expert level course as well as been certified to facilitate at minimum the Pumps System Optimisation End User Training Course. These certificates should be included in the quotation.

## **2.3 PROJECT DELIVERABLES**

The following are key project deliverables required:

### **2.3.1 Project Inception and Planning**

The service provider will develop and draft an assessment plan and schedule outlining the proposed activities and visits to be undertaken at the facility.

The inception phase will also involve planning, coordination and review of the activities to be carried out by the service provider with the timelines also being reviewed at this stage.

### **2.3.2 Mentorship Report**

Compile a progress report after the mentoring session and send to the Project Manager for review and input within 5 working days after the mentoring session. The mentoring of selected staff should be aligned to the General Energy layout in section 2.2.3 below.

### **2.3.3 General Energy Report**

Compiling one (1) assessment according to the reporting template provided to the winning bidder which includes:

- Completion of the General Energy Assessment at the facility.
- Preparation and submission of a draft General Energy Assessment Report outlining the findings of the investigation at each facility, along with the following for each plant:
  - i. Report calculations in and excel document
  - ii. All digital and infrared pictures taken on-site during the assessments
- Visual presentation of the findings to management of the facility.

- Presentation of the Final General Energy Assessment Report with Implementation Plan, identifying cost and dates to management of the facility, and identifying the way forward on implementation of potential options as highlighted in the final report.
- A close-out report summarizing the interventions at the facility, inclusive of the views of management and their intended way forward.
- Submission of meeting minutes for the inception and feedback meetings.

Attention will be placed on execution of the General Energy Assessment with specific emphasis on the focus areas.

#### **2.3.3.1 Key activities to be undertaken will include:**

- Conducting the General Energy Assessment at each facility, using the following steps:
  - i. Walk-through & survey
  - ii. Establishment of process flow diagram
  - iii. Possible measurement of energy sources if deemed necessary
  - iv. Analysis of energy consumption and costs
  - v. Comparison of individual energy resource performance
  - vi. Profiling of individual energy use patterns
  - vii. Inventory of individual energy use and costs
  - viii. Developing a model of facility using regression analysis
  - ix. Identification of improved energy efficiency opportunities as required
  - x. Assessment of the benefits of each the identified opportunities

The above approach is structured to meet the needs of the company and will enable the CSIR's NCP-C-SA to gain an overview of the potential for energy savings, as well as gain a good insight into the relevant management issues of the energy resources.

#### **2.3.3.2 The General Energy Assessment report must comprise the following sections:**

**[A] Cover page**

**[B] Document Control Page**

**[C] Executive Summary**

The Executive Summary should include:

- a) The Company's current energy resource consumption and cost:
  - i. Plant total Electricity Usage (kWh/Annum)
  - ii. Plant total Electricity Cost (Rand/Annum)
  - iii. Plant total Energy Usage (kWh Equivalent/Annum)
  - iv. Plant total Energy Usage (Rand/Annum)

- b) Potential quantitative annual energy savings reported in bulleted format and preceding the Main Summary Table of Savings Opportunities:
- i. Annual kWh savings against total plant kWh consumption
  - ii. Total energy savings against total plant energy consumption
  - iii. Annual Rand savings against total plant electricity cost,
  - iv. Annual Rand savings against plant energy cost,
  - v. % saving against annual plant energy cost.
  - vi. Total tons of CO<sub>2</sub> reductions
  - vii. Total % CO<sub>2</sub>e reduction

The General Energy Assessment Report will highlight no/low cost options to be considered by the company management for immediate implementation. Where investment in new equipment/ technology is recommended, the maximum payback for savings options to be considered will not exceed 2 years in the **Summary Table** in the **Executive Summary Section** of the **General Energy Assessment Report**. The 0-2 year payback period serves to encourage the company to implement energy savings opportunities. Longer-term options will only be considered if aligned to strategic objectives of the company and must be shown in the “**Qualitative Findings**” table separate and below the Summary Table in the Executive Summary.

The summary of recommendations should be reported in the format shown in the following Table in the Executive Summary of the General Energy Assessment Reports. The tables serve as a template **and do not suggest the limitation of any recommendations to two per section in the report as indicated in the Table below**. The full extent of the investigated savings of the facility is to be reported in the following Summary Tables:

In the case of **Energy and associated Energy savings** recommendations the following Summary Table is applicable:

No.	Resource Optimisation Opportunities	Estimated Savings			Investment Cost (Rand per Annum)	Payback Period (Years)
		kWh per annum	Rand per annum	Ton CO <sub>2</sub> e per annum		
Electrical Energy Savings Recommendations						
1.						
2.						
Energy Savings Recommendations						
1.						
2.						
Qualitative Findings						
1.						
2.						
TOTALS						

**[D] Contents Page**

**[E] Brief Introduction**

This section entails a 15-20 line description of: -

- a) The NCPC-SA's mandate in terms of providing assistance to industry in reducing its resource consumption and managing it sustainably.
- b) The Industrial Energy Efficiency Project and its objectives.
- c) The introduction between the NCPC-SA and the Company in building synergies
- d) The Company's objective to have a General Energy Assessment Conducted
- e) The Company's long term goal to manage its energy consumption

### **[F] Facility/Company Information**

This section requires 10-20 lines of the Facility description regarding the following:

- history viz: inception year, location,
- production/product range and specialisation
- growth/expansion/amalgamation from inception to date in term of branches available, staff complement, and product/service range
- Any special technology being used at the facility that is widely publicised and not regarded as Intellectual Property (IP) by the company
- Special accreditations secured by the facility over the years e.g. ISO aligned EnMS 50001, ISO 9001, ISO 14001 accreditation etc.

This section of the report also requires the following information pertaining to each of the Company's plants:

- a) Aerial view of the facility location (e.g. google based)
- b) Street View of the facility location (adjacent to aerial view picture)
- c) Facility contact details in tabulated format:
  - i. Facility Name
  - ii. Physical Address
  - iii. Phone, Fax
  - iv. E-mail
  - v. Website
  - vi. Number of Employees
  - vii. Contact Person Name, Number & Email
  - viii. Identification of Service/Process
  - ix. Departments Identification
  - x. Office hours for facility
  - xi. Production hours of the facility

### **[G] Process Description**

This section must include a basic process description (simple block diagram) and operations description (e.g. seasonal variation, daily shifts and monthly procedures) pertaining to the resource consumption streams on-site including distribution system and end use requirement.

A description of the systems present on site in terms of operational conditions with respect to the Company's product requirements must be provided and may include descriptions of the following:

- a) High level identification of systems
- b) High level identification of parameters of systems
- c) Etc.

### **[H] Consumption Data**

This section entails the following:

- a) 24 months latest, tabulated data on:
  - i. The facility's kWh consumption and associated cost (Rand), the % contribution of the plant energy cost to the plant's Maximum Demand (MD), its comparison to seasonal production data
- b) 24 months latest and applicable data depicted by a:
  - i. pie chart showing the energy cost proportionated by the to the rest of the plant's energy consumption.
  - ii. graph of production vs electrical and energy cost
  - iii. graph and data of a baseline of energy usage showing the patterns or any other significant activity or independent variable to validate a model through regression analysis
- c) Data Analysis Requirements.
  - i. The General Energy assessment report must quantify by means of a table, an energy balance, and regression analysis, the energy consumption for at least 12 latest and consecutive months plotted against an appropriate independent variable(s) for the following in order to establish baseline data:-
    - Electricity
    - Energy

### **[I] Identification of Energy Saving Measures**

This section further contains the quantitative and qualitative information for all the different energy efficiency recommendations that will yield kWh and Rand savings for the Company. The service provider must identify and explain each energy saving opportunity briefly in approximately 5-8 lines followed by the following critical data regarding the recommended savings opportunity:

- 1-2 line mathematical calculation (quantitative expression) to substantiate the kWh/kL/tonne saving recommended
- Substantiate Estimated kWh/kL/tonne savings:
- Annual estimated Rand savings
- Capital Cost (Rand):
- Payback Period (Years)

The evidence of software results (in summarised version) must be inserted in this section of the report, showing all relevant and applicable results such as screenshots of input data and output data including an Excel document showing all input data used during the assessment. The detailed results are to be included in the Appendix Section of the General Energy Report

### **[J] Conclusions**

The Service Provider concludes the report by including all the main recommendations in a summarised manner. The following recommendations must be distinct from each other:

- Quantitative recommendations
- Qualitative recommendations
- Long term strategic recommendations of 3.5 - 4years and more

### **[K] Recommendations**

In this section of the report, the Service Provider prioritises the recommendations in importance of:

- No cost resource savings opportunities
- Low cost resource savings opportunities
- Medium cost resource savings opportunities
- High cost resource savings opportunities

The prioritisation of certain energy savings projects may also be a strategic decision derived from the Company Management and could include ease of implementation. In this case, the service provider must accept this guidance and include this information in the report. The service provider must therefore utilise the time on-site effectively to solicit key company information directly from the plant's appropriate management in this regard.

### **[L] Appendices**

This section must contain but is not limited to:-

- i. detailed tables of data used for measuring and logging.
- ii. detailed graphs of data representing extensive measurement and logging data
- iii. extensive descriptions of parts of the process or the whole process
- iv. detailed and extensive ducting/piping diagrams
- v. maintenance records
- vi. best operating practises
- vii. extracts of guidelines
- viii. detailed calculations pertaining to savings recommendations highlighted in the body of the report
- ix. etc

### **[M] Reporting and Company Feedback**

A Feedback Presentation will be presented to management of each facility following the completion of the detailed General Energy Assessment reports based upon the recommendations identified. The final report will include a utility audit, highlighting of specific

areas for potential savings, recommended additional utility metering requirements, as well as further recommendations regarding ongoing energy resource monitoring & targeting, etc. Historical resource usage data will be expertly analysed in detail through a process of regression, and the report where applicable will include benchmarking data based upon performance indices. These will be used in comparison with known performance indices to further establish the scope for savings potential.

The final report will upon completion, be presented at a formal feedback session with management of the facility, and the intended purpose is to outline the project focus and confirming the options identified for implementation.

A plan of action for possible implementation of the options is then to be agreed upon with management of the facility.



## 2.4 PROJECT SCOPE AND ACTIVITIES FOR THE COMPANY

Deliverable/Task List	Expected Results	Minimum Estimated Time/ Duration & Location
<b>Part 1: Meet Facility owners/managers to:</b> a. Introductions between Service Provider and Company Top Management b. Brief presentation and discussion on the General Energy Assessment c. Develop a baseline period for the energy consumptions d. Determine/measure system profiles and trends during the on-site assessment e. Determine facility's electricity and energy consumption and targets for production, usage and optimisation. f. Establish electricity and energy cost and application challenges for present and future systems requirements.	1. Copies of all relevant utility bills. 2. Electricity and energy, parameters information. 3. Meeting minutes and attendance registers	[0.5 Day] On-Site
<b>Part 2: Conduct plant walk through in order to:</b> a. Gain familiarity with the facility's production process b. Identify & familiarise the distribution and use of electricity and energy consumption c. Question and photograph (if allowed) the operation and maintenance of significant electricity and energy consumers and observe the behaviour patterns of the various systems present. d. Understand the operating parameters of various equipment on-site eg:- compressed air pressure profile(s), temperature and cooling profiles for various equipment and machines used in the company's process e. Discuss and identify with the appropriate company representative/s (eg:- maintenance manager or site engineer etc), the location of equipment and related pipelines (including electrical distribution boards etc) and end uses where measurements will be conducted during the General Energy Assessment to obtain authorisation and go-ahead from the appropriate Facility Representative/s to complete any measurements required during the assessment and to be included in the Final Report.	1. Records of plant, measurement data and observations regarding: Electricity and Energy, usage.	[0.5 Day] On-Site

Deliverable/Task List	Expected Results	Minimum Estimated Time/ Duration & Location
<p><b>Part 3: Conduct General Energy Assessment and establish Energy Consumption Baseline:</b></p> <ol style="list-style-type: none"> <li>Establish, meet and interview the people who influence energy consumption significantly.</li> <li>Identify various energy consumption opportunities that will offer greatest potential for savings by evaluating &amp; determining the various system parameters such as:- motor power drawn, temperature gradients, air flow, pressure at point of generation for distribution &amp; end use. It is recommended that these measurements are to be done on normal weekdays (e.g. Monday to Friday) and then repeated over a weekend (Saturday or Sunday) period in order to establish any variances in the operations, operating parameters and the energy consumption of the resources its associated Motors upon start up procedures of these equipment.</li> <li>Confirm Day One measurements to develop trends and fluctuating demand and generation curves.</li> <li>Review operational controls and record consumption patterns,</li> <li>Review operator training, establish the Maintenance Policy and Track Record for equipment significantly impacting resources consumption such as energy, water and waste,</li> <li>Note the operating parameters of significant resource consumption streams linked to equipment that may influence such resource consumption significantly.</li> <li>Characterise the current resource consumption and operation of poor performing end-use applications that cause production issues and challenges.</li> <li>Note the operating parameters (Min &amp; Max volume/load) of significant resource consumption equipment</li> <li>Investigate resource saving options and quantify the implementation cost and saving benefit using calculations to substantiate savings.</li> <li>Establish relevant drivers and model the energy consumption baseline</li> <li>Mentor identified staff from the beneficiaries while conducting the General Energy Assessment</li> </ol>	<ol style="list-style-type: none"> <li>Record of: consumption patterns and operating parameters of electricity and energy consumption</li> </ol>	<p>[3 Days] On-Site</p>

Deliverable/Task List	Expected Results	Minimum Estimated Time/ Duration & Location
<p><b>Part 4: General Energy Assessment Report Drafting:</b></p> <ul style="list-style-type: none"> <li>a. Analyse Measurement Results.</li> <li>b. Where necessary, conduct research and obtain quotations for any recommendations tabled.</li> <li>c. Draft and refine the General Energy Assessment Report, table recommendations.</li> <li>d. Report Feedback (vetting) will be provided by the relevant NCPC-SA PM, which should be incorporated into the report.</li> </ul>	<ul style="list-style-type: none"> <li>1. Draft General Energy Report(s) and send to NCPC-SA PM.</li> <li>2. Followed by the Final Assessment Report completion upon feedback from NCPC-SA PM.</li> </ul>	<p>[3 Days] Home Based and On-Site</p>
<p><b>Part 5: Report Feedback Meeting to Company Top Management.</b></p> <ul style="list-style-type: none"> <li>a. Project Manager and Service Provider to arrange and secure a suitable and convenient time slot with the Company Top Management to provide a Final Report Feedback and discuss implementation of recommendations. (On-site feedback meeting only – no skype, webinar nor teleconferences or any form of distant meeting format)</li> <li>b. Incorporate necessary changes to be made to the report after the Final Report Feedback is given to Company Top Management.</li> </ul>	<ul style="list-style-type: none"> <li>1. Attendance Register for Report Feedback Meeting</li> </ul>	<p>[1 DAY] On-Site</p>
<b>Expected Working Days</b>		<b>8 Days</b>

## 2.5 USE OR LOAN OF NCPC-SA MEASURING EQUIPMENT

The following NCPC-SA measuring equipment is available to Service Providers:

- Infrared thermometers
- Single phase power analyser
- Current Meter
- Voltmeter
- Lux meter
- etc

The following NCPC-SA measuring equipment is available to Service Providers that have completed the Expert Level UNIDO based systems optimisation training for the purpose of conducting specific systems optimisation assessment:

- Fans Flowkinetics measurement kit
- Pumps Systems Optimisation measuring kit
- Compressed Air Systems Optimisation measuring kit
- Flue Gas Analyser and related equipment making up the Steam Systems Optimisation Measurement Kit
- 3 Phase Power Analyser
- etc

Once the tender is awarded to the winning bidder, the Service Provider is advised to contact the NCPC-SA Project Coordinator directly to inquire on the use/availability of the equipment to be loaned. All equipment queries are communicated directly to the NCPC-SA Project Coordinator.

The name and contact details of the NCPC-SA Project Co-ordinator will be made available to the winning bidder upon request thereof at the end of this tender process.

There is no cost to the service provider for the loan of NCPC-SA equipment. An “equipment loan document” and a “test equipment hiring policy” document have to be signed & completed by the service provider ahead of receiving the equipment from the Cape Town-based NCPC-SA regional office.

## 2.6 FACILITY TO BE ASSESSED

### 2.6.1 COMPANY DATA

Once on-site, the Service Provider must confirm accuracy of the information provided in the table below by updating any information in the table that may be incorrect or inaccurate. Neither the CSIR nor the NCPC-SA will be held liable for any inaccuracies that may be contained in the tables below.

INDUSTRIAL PROCESS USED	Water Treatment
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Process Areas
Security Area
Gym Training Area
Fresh Water Treatment Area
Sewage Treatment Works Area

UTILITIES	
<u>Name of utility</u>	<u>Quantity</u>
Pumps	12
Motors	10

## 2.7 PROJECT SCOPE AND ACTIVITIES

The following table outlines the activities that must be followed during the development of the General Energy Assessment Report:

Stages of Assessment	Activities	Duration
<b>Inception Meeting</b>	A meeting with management of the company to discuss the scope of the assessment and to gain their support as well as to request a company contact during the period of the assessment.	0.5 days
<b>Collation of data specific to the NCPC-SA's General Energy Assessment</b>	Collation of completed pre-visit questionnaire (PVQ), conducting interviews or discussions with management of the participating company, and visiting the plant to present details of the planned assessment.	0.5 days
<b>General Energy Assessment and Mentorship</b>	<p>This includes:</p> <ul style="list-style-type: none"> <li>i. Walk-through &amp; survey</li> <li>ii. Establishment of process flow diagram</li> <li>iii. Possible measurement of energy sources if deemed necessary</li> <li>iv. Analysis of energy consumption and costs</li> <li>v. Comparison individual energy resource performance</li> <li>vi. Developing the regression analysis model on the facility</li> <li>vii. Profiling of individual energy use patterns</li> <li>viii. Inventory of individual energy use and costs</li> <li>ix. Identification of improved energy efficiency opportunities as required</li> <li>x. Assessment of the benefits of each the identified opportunities</li> <li>xi. Mentor identified staff from the beneficiaries while conducting the General Energy Assessment</li> </ul>	3 days
<b>Write / Compile General Energy Assessment and Mentorship Report</b>	Using the provided General Energy Assessment Report template, submit draft reports to NCPC-SA responsible Project Manager, along with all calculations in an excel spreadsheet and providing any additional supporting documentation. Additionally, a short mentorship report should be written providing a summary of the results.	6 days
<b>General Energy Assessment Feedback Meeting</b>	Present the findings of the General Energy Assessment to management of the facility.	0.5 days
<b>Complete final General Energy Assessment report</b>	Responsible Project Manager will send the draft received to the concerned company representatives for approval, before submitting for internal technical	0.5 days

	review. Depending on the feedback, reworking the draft may be required and an Implementation Plan of recommendations is be included.	
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## 2.8 ESTIMATED PROJECT DURATION

It is anticipated that the work will commence upon acceptance and signing of a contract with an appropriate specialist appointed by the CSIR's NCPC-SA, and it is expected that the assessment be completed within one (1) month of commencement of the project, depending on the extent of the project at the plant. Consideration will also be given to the measurement and monitoring needed to be undertaken at the facility.

The table below outlines the sequence of completion along with estimated commencement dates, and the amount of days budgeted for each:

Activity	Assessment Estimated Commencement Date	Amount of Working Days	Assessment Estimated Completion Date
Inception Meeting	05 October 2020	0.5 days	05 October 2020
Collation of data specific to the NCPC-SA's General Energy Assessment	05 October 2020	0.5 days	05 October 2020
General Energy Assessment and Mentorship	06 October 2020	3 days	08 October 2020
Write / Compile General Energy Assessment and Mentorship Report	09 October 2020	3 days	13 October 2020
General Energy Assessment Feedback Meeting	16 October 2020	0.5 days	16 October 2020
Complete final General Energy Assessment report	19 October 2020	0.5 days	19 October 2020

All reports issued and presented to the company will be completed under the CSIR's NCPC-SA brand, and the final report and feedback meetings will be concluded within 3 weeks of on-site assessment completion.

## 3 EVALUATION CRITERIA

3.1 Bidders has the correct qualifications

3.2 Selection of suppliers will be based on the 80/20 preference point system.

- 3.3 Please take note that the submitted BBBEE Certificate should be SANAS Accredited or Sworn Affidavit with the dti template. Any Certificate which is not as mentioned will not be considered for evaluation.
- 3.4 Indicate CSD number (National Treasury Central Supplier Database) on quotation. If not registered yet on CSD, use [www.csd.gov.za](http://www.csd.gov.za) to register.
- 3.5 No order will be issued or no contract will be signed without a valid CSD number.

#### 4 PRICING QUOTATION

- 4.1 Price needs to be provided in South African Rand (excl. VAT), with details on price elements that are subject to escalation and exchange rate fluctuations clearly indicated.
- 4.2 Price should include additional cost elements such as freight, insurance until acceptance, duty where applicable, etc.
- 4.3 Payment will be according to the CSIR Payment Terms and Conditions.
- 4.4 The bidding Service Provider is to complete and submit the table below for each site providing the quotation in response to this RFQ.

##### 4.4.1 Table for Project Milestones and Costing

Project Milestones	Fee excl. VAT (Rand)
Introduction Meeting with Company Management on-site	
General Energy Assessment and Mentorship – Observe, Interview, Measure, Log, Analyse Data & Summarise Findings & Recommendations and Mentor identified staff	
General Energy Assessment and Mentorship Report Generation / Development	
Report Feedback Meeting to Company Management on Site	
Transportation and logistics	
<b>Total fee excl VAT (Rand)</b>	
<b>Total fee incl VAT (Rand)</b>	

#### 5 OTHER TERMS AND CONDITIONS

- 5.1 The supplier shall under no circumstances offer, promise or make any gift, payment, loan, reward, inducement, benefit or other advantage, which may be construed as being made to solicit any favour, to any CSIR employee or its representatives. Such an act shall constitute a material breach of the Agreement and the CSIR shall be entitled to terminate the Agreement forthwith, without prejudice to any of its rights.
- 5.2 A validity period of 90 days will apply to all quotations except where indicated differently on the quote.
- 6 No goods and/or services should be delivered to the CSIR without an official CSIR Purchase order. CSIR purchase order number must be quoted on the invoice. Invoices without CSIR purchase order numbers will be returned to supplier.**

#### 7 Note: This is not a Purchase Order.