

INVESTMENT GRADE ENERGY AUDIT (IGEA) FOR URBAN LOCAL BODIES IN KARNATAKA

Broad Terms of Reference (ToR) for carrying out IGEA for ULBs in Karnataka

1. **Background:** Municipal bodies are large consumers of electric energy, in the course of providing basic services such as street lighting, water supply, Underground drainage, collection and treatment of waste water, parks and gardens, etc. Demand Side Management (DSM) measures backed by little to moderate investments can yield substantial cost savings in energy costs. This process of revamping and retrofitting the systems also provides opportunity to improve the standard of service delivery, introduce control systems, avoid loss of water, etc.

Government of Karnataka intends to undertake an Investment Grade Energy Audit (IGEA) of 213 urban local bodies in Karnataka. The IGEA will provide detailed baseline of existing infrastructure stock, prevailing energy consumption levels, identify Energy Efficiency Measures (EEMs), and create the basis for structuring an investment program (either through Public-Private Partnership or otherwise).

In this context the Directorate of Municipal Administration (DMA), Urban Development Department, Government of Karnataka seeks Expression of Interest (EOI) from qualified and Bureau of energy efficiency, G.O.I , certified Energy Auditors/firms/agencies for carrying out the IGEA exercise.

2. **Objectives:** Investment Grade Energy Audit, as the name implies is the process of carrying out detailed energy audit and realistic assessment of investment required to achieve the optimum energy efficiency and related improvements in the service standards. The specific objectives of the exercise are:
 - a. Inventorising all energy intensive infrastructure and facilities and establishing the baseline of prevailing energy consumption (taking into account cyclicity and seasonality)
 - b. Quantifying prevailing service levels provided by existing infrastructure stock
 - c. Identifying Energy Efficiency Measures that can be implemented, taking the entire system into account, rather than stand-alone individual equipment.
 - d. Quantifying cost benefits and commensurate investments required under both scenarios – maintaining current service levels and achieving benchmark service levels
 - e. Evolving an optimal scenario of investments, efficiency gains and commensurate service levels that will be achieved.

The IGEA should provide the basis for developing a well-structured project, which can be implemented successfully and when implemented creates both cost and efficiency gains for the urban local body and more importantly improve the levels of service to the citizens (consumers of the service).

3. **Outline Scope of Work:** The detailed scope of work, with further technical and methodology related details shall be provided at the stage of the Request for Proposal (RfP), which will be issued to short listed bidders. The Outline Scope of Work is mentioned below to provide a broad idea of the work involved, sets of competencies required and outcomes desired. The entire Scope of Work needs to be executed by the short listed bidders in close consultation with the ULBs through the entire course of the assignment.

Services to be covered: The IGEA is expected to cover all facilities and services (100 %) that totally account for the prevailing energy consumption by the ULB. Specifically the coverage will include:

- Water supply systems, including pumping at source, treatment plants, transmission, overhead or underground distribution tanks
- Waste water collection, intermediate pumping and treatment facilities
- Street lighting
- Municipal buildings
- Parks, gardens and other large public spaces
- Solid waste treatment plants, composting yards, abattoirs, workshops, etc.

Packaging of cities (ULBs) : The ULBs in Karnataka have been grouped into 8 packages, with a mix of large and small cities in each package comprising City corporations, City municipal councils, Town municipal councils and Town panchayaths. The details of cities included in each package is available in the annex to this document.

The entire IGEA exercise is required to be carried out broadly in the following stages:

- i) **Facility inventory baseline:** A statement of existing facilities and infrastructure, especially number and rating of electrical equipment, as provided by the ULB shall be included in the RFP document. However, the auditor is expected to carry out extensive field level inspection to verify the same and inventorise the entire infrastructure, including single-line diagrams, flow-diagrams, etc. so as to completely map the existing system.
- ii) **Baseline energy consumption:** For the entire sets of facilities, the prevailing energy consumption should be measured. Energy consumption and related parameters should be verified through on-field measurements, energy meter records and energy bills. All cyclicity in energy consumption within a day, within a week and within a month should be measured. Seasonal variations should be assessed on basis of norms and past historical trends (min 12 past months, ideally past 36 months).
- iii) **Baseline service levels:** Many a municipal services are provided at service levels below desired benchmarks and also vary widely within a city across different areas. For e.g.

illumination levels on roads varies across roads, and in many cases is found to be lower than norms. This may be on account of inadequate number of poles or fixtures, improper design, etc. Similarly, water is pumped for only a few hours in many cities. Improving service levels may imply increase in consumption of energy. It is therefore important that key parameters are recorded as part of the base line measurement.

The Commissioner / Chief Officer of the ULB shall be authorized to sign-off on the baseline data related to facility inventory, energy consumption and service levels.

- iv) **Identification of EEMs:** Identify Energy Efficiency Measures not just at the energy consuming device / equipment level, but the entire system. For e.g. at a pumping station, EEMs should not just be for the motor-pump set, but the entire treatment plant should be examined for effectiveness of capacity utilisation, leakages and pressure loss points, balancing flow-rates through the system, etc. Similarly, in street lighting the systems should be examined in terms of effectiveness of illumination provided, integrating switching points, etc. and not just in terms of the EEM for the lamp / luminaries.

Extent of savings should be quantified, should the prevailing service levels be maintained or if enhanced to benchmark service levels.

- v) **Investment planning under both scenarios:** Extent of investment required for implementing EEMs while maintaining current service levels should be estimated. Investment requirement should be assessed on basis of realistic price levels in the market for standard products and services . Proprietary items should be avoided. Further investment required to achieve benchmark service levels should also be estimated. A pragmatic approach should be adopted, in consultation with the ULB concerned to estimate the amount of investment required.If the entire infrastructure needs to be replaced or rehabilitated, the same may not be considered. However, if there are some improvements to be done, they should be considered. For e.g. putting in place a missing street light pole, or relocating the pump to help reduce head loss and thereby reduce energy consumption. However, if the entire piping network is corroded, replacement of the entire piping network should not be considered.
- vi) **Developing optimal scenario:** In many cases the investments may far outweigh the savings to be achieved through energy efficiency measures, while the positive outcome may be improved quality of service. So an optimal scenario, that considers a combination of EEMs, commensurate investment and acceptable service delivery standards should be arrived at in consultation with the ULB. The ULB is expected to sign-off the optimal scenario it has arrived at. Projected savings, NPV and IRR should be computed for this optimal scenario.

4. **Deliverables:** For each ULB – separate reports should be prepared. The energy auditor is expected to prepare the following reports for each ULB:
 - a. **Inception Report : To be submitted within 3 weeks of award of the assignment**, this will contain – workplan, on-site issues, working mechanisms with ULB and its counter-part teams, availability of data / documents, calibration certificates of instruments, infrastructure constraints, etc.
 - b. **Baseline Report:** This report will document baseline data pertaining to – infrastructure stock / inventory of the existing facility, energy consumption and prevailing service levels or performance parameters. **This should be submitted within 8 weeks from award of work.** ULBs are required to sign-off this report within 1 week of submission of this report.
 - c. **Draft IGEA Report:** This report will contain details of EEMs identified, detailed analysis and explanations of how the optimal scenario is arrived at, maintenance requirements to maintain projected energy savings, methodology for monitoring savings, and financial analysis of the optimal scenario arrived at. At this stage, the energy auditor is also expected to make a detailed presentation of the findings and the recommendations to the municipal leadership in each ULB. **The Draft IGEA Report should be submitted within 4 months from award of work**, and the presentation to the ULB must be made within one week of submission of Draft IGEA Report.
 - d. **Final IGEA Report:** The Draft IGEA Report will be reviewed by the ULB and the DMA, GoK. Comments and suggestions provided must be incorporated in the final report. Emphasis will be on technically, operationally and financially feasible solutions which are implementable. **Final IGEA Report must be submitted within 2 weeks of receipt of comments / suggestions from ULB / DMA or six months from award of work, which ever is later.**
5. **Project Implementation Arrangements:** The contracts for the bid packages will be awarded through the Directorate of Municipal Administration. Superintending Engineer, DMA shall be the Program Coordinator , supported by a team of Engineers for all programme management work in terms of bidding and contract management, oversight of the performance of auditors, coordination with ULBs, review of deliverables, etc.

A Nodal Officer (Engineer) shall be nominated in each ULB to coordinate all work with the energy auditor, support in field-work and data collection process, examining investment scenarios, review of reports, etc. The Chief Officer / Commissioners shall be responsible for signing off the findings, after scrutiny and validation of data by the Nodal Officer.

6. **Key Qualifications of bidders:** The bidding Auditors/firms/agencies should possess key competencies and qualifications for the assignment, which include:

- a. The Auditors/firms/agencies should be Bureau of Energy Efficiency (BEE) certified energy auditors.
- b. The Auditors/firms/agencies should possess professionals with appropriate qualifications and expertise in area of Electrical Engineering, Public health engineering, civil engineering, etc. as required by the scope of work. The minimum educational qualification of the key personnel should be as follows:
 1. Electrical Engineering Minimum one Post graduate and others - graduate in engineering.
 2. Civil Engineering Graduate in Engineering.
 3. Public health Engineering Graduate in Engineering.
- c. The Auditors/firms/agencies should possess relevant past experience in carrying out energy audits, assessment of Investment requirements and structuring projects for implementation . The Auditors/firms/agencies should have completed at least one similar project with a total connected load of minimum 1500 KVA, during the last 5 financial years (2007-2008,2006-07,2005-06,2004-05,2003-04),in any of the Central/State Government Departments / Local Authorities/ Public Sector Undertakings.
- d. The Auditors/firms/agencies should have in the last five financial years (2007-2008, 2006-07 ,2005-06 , 2004-05, 2003-04) achieved in at least two financial years an average annual financial turnover of Rs 50.00 lakhs .
- e. The firm must possess adequate measuring instruments related to energy, illumination, water pressure and flow, Mechanical Horse-power / torque, etc. These instruments should be of reputed make, recently calibrated and certified. the Firm should be capable of deploying non-destructive testing methods, such as water flow measurement through ultrasonic meters.
- f. The firm should not have been black-listed / debarred by any Government agency; not be involved in any role with that ULB that can potentially conflict with its role as an Energy Auditor. .

The bidding Auditors/firms/agencies may associate with and include other firms / individuals as part of their teams to enhance their competencies. However, after the work is awarded the energy auditor will not be permitted to sub-contract part or whole of the work to any firm / individual not earlier indicated in the Expression of Interest.

7. **Submission of EOI:** Interested firms with appropriate qualifications must submit their Expression of Interest, at the following address:

The Director

**Directorate of Municipal Administration
Urban Development Dept., Govt. of Karnataka
9th Floor, Vishveshwariah Centre
Dr.B.R.Ambedkar veeahi Bangalore–560001**

8. The last date for submission of Expression of Interest (EOI) is 30-03-2009.

8. Interested firms should submit all necessary documents to support their claim for being pre-qualified and short listed for the IGEA exercise. The Expressions of Interest should necessarily include:
- a) Profile of the firm, including its consortium / joint venture / subcontractor. Clearly indicate the lead firm, attach agreements / letters of association with consortium / JV / subcontractors for this assignment.
 - b) Financial details (audited income statement & balance sheet) for past five financial years.
 - c) Detailed CVs of key personnel and other supporting staff proposed for this project.
 - d) Details of relevant past experience (including client details, value of work, scope of work and outcomes achieved). **In this regard the client Certificate clearly indicating the Project scope (KVA), period fixed for completion, Total payments made ,date of start & completion and satisfactory completion, should be invariably enclosed .**
 - e) Brochures, data sheets, client references, project completion certificates, etc.
 - f) Infrastructure and equipments possessed by the bidding firm.
 - g) Declaration regarding not black-listed / debarred by any Government agency and not involved in any role with ULBs that can potentially conflict with its role as an Energy Auditor.

Note: Director of Municipal Administration retains the right to modify and/or enhance the ToR at the stage of the RfP. The TOR may be modified in terms of coverage of institutions under the exercise, services covered in different institutions to be audited, activities to be undertaken, deliverables, methodologies or in any other manner deemed necessary.

*Sd/-
Director of Municipal Administration*

ANNEX to outline T.O.R for Investment grade Energy Audit

Package of ULBs for IGEA

Sl. No	Package No.	Name of Districts in package	Details of ULBs				
			City Corpn	CMC	TMC	TP	Total
1	Package – 1	a) Bangalore (Rural)	-	1	4	-	5
		b) Ramnagara	-	2	2	-	4
		c) Mandya	-	1	4	2	7
		d) Kolar	-	2	4	-	6
		e) Chikkaballapur	-	2	3	1	6
		Sub total	-	8	17	3	28
2	Package – 2	a) Bangalore (Urban)	-	-	1	-	1
		b) Tumkur	-	3	4	3	10
		c) Davangere	1	1	1	3	6
		d) Shimoga	-	3	1	5	9
		Sub total	1	7	7	11	26
3	Package– 3	a) Mysore	1	-	4	4	9
		b) Hassan	-	1	5	2	8
		c) Chamarajanagar	-	2	1	2	5
		d) Kodugu	-	1	-	3	4
		Sub total	1	4	10	11	26
4	Package– 4	a) Chitradurga	-	1	3	2	6
		b) Chikkamagalore	-	1	3	4	8
		c) Dakshina Kannada	1	-	4	4	9
		d) Udupi	-	1	2	1	4
		Sub total	1	3	12	11	27
5	Package– 5	a) Belgaum	1	2	7	6	16
		b) Uttar Kannada	-	3	2	6	11
		Sub total	1	5	9	12	27
6	Package– 6	a) Haveri	-	2	5	1	8
		b) Gadag	-	1	5	3	9
		c) Dharwad	1	-	2	3	6
		Sub total	1	3	12	7	23
7	Package– 7	a) Bellary	1	1	4	4	10
		b) Bijapur	-	1	5	-	6
		c) Bagalkot	-	4	5	3	12
		Sub total	1	6	14	7	28

8	Package- 8	a) Bidar	-	2	3	1	6
		b) Gulbarga	1	2	6	3	12
		c) Raichur	-	2	3	1	6
		d) Koppal	-	2	1	1	4
		Sub total	1	8	13	6	28
		Grand Total	7	44	94	68	213