

*Progressive Education Society's*

**Modern College of Arts, Science and Commerce,  
Shivajinagar, Pune-411005**

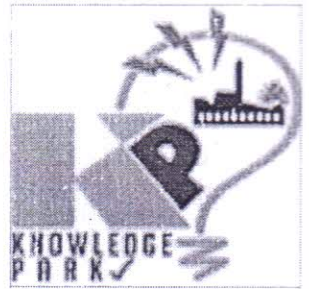
# **ELECTRICAL SAFETY AUDIT**

**March 2016**

- Design / Cost Optimisation
- Innovative Power supply System
- Energy Audit
- Safety reliability audit / study
- Renewable Energy
- Green Building
- Training for Design / Site Engr.

**BANGALE  
Associates**

Office:- 212 Bizzyland, 776 Sadashiv Peth, Pune 411 030.  
Resi:-15, Rajnagar, 55 Premnagar, Bibwewadi, Pune 411 037  
Email :bangale.associates@yahoo.com / bangale@vsnl.com  
Telephone No.: 91-20-24219284, Moo. 91-9823031500.



*Resp. Sir,  
for your info pl.  
Sh*

*26/03/2016  
Jacobu*

*(To Ravi  
Shri. (office)  
Pl. file  
25/4/2016*

23<sup>rd</sup> March 2016

Respected Principal

1 MODERN COLLEGE OF ARTS SCIENCE & COMMERCE

2 MODERN COLLEGE OF ENGINEERING

SHIVAJINAGAR PUNE 411005

Dear Sir

Sub: Energy audit of your college by KNOWLEDGE PARK (approved by management)

Ref : Our discussions on above subject

Thank you for the courtesy extended to under signed during his visit to your office.  
It has been decided to carry out

- 1 Energy audit,
- 2 Feasibility Study of renewable energy

You are requested to issue PO for these two works.

For energy audit fees and terms REFER YOUR PO given in 2012

For feasibility study of RE for your college with a view to have maximum possible RE like solar , if possible wind & biogas based generation , This will involve load study , recording weather data , design & ratings of RE equipments , interconnections with loads , optimization of system from economics point of view

Consultancy fees for Feasibility study of RE will be 5% of cost of total system with cost of solar system with battery Rs 150 rs per watt fee per watt @5% will be 7.5 Rs per watt

**Appreciate your support and look forward for your PO so as to start & complete the work in time**

Regards

A.T. Bangale  
Knowledge Park

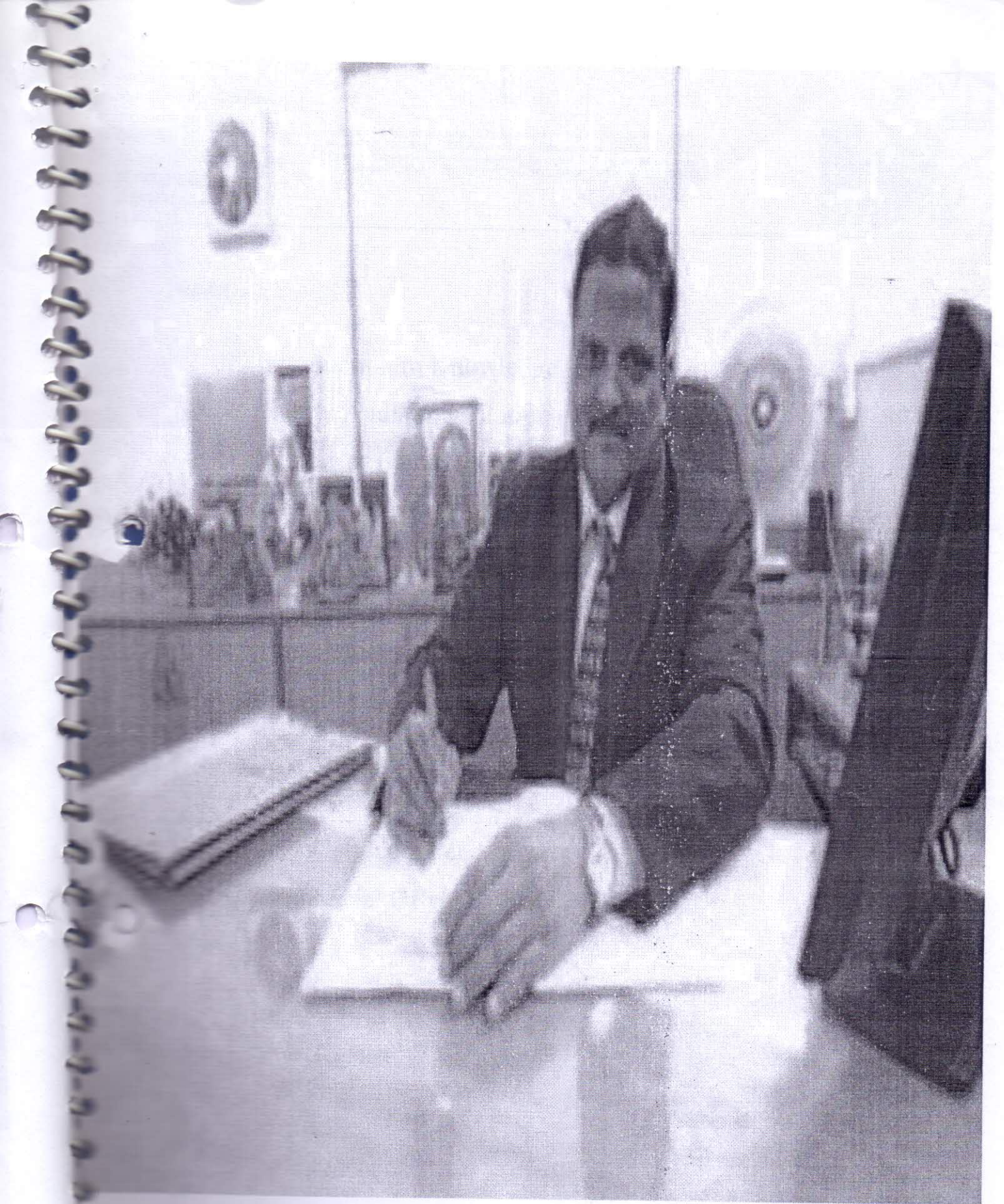
Energy Audit Solutions

**MODERN COLLEGE OF ARTS SCIENCE & COMMERCE,  
SHIVAJINAGAR, PUNE 411005**



By

**Knowledge Park,  
Pune  
March 2016**



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1.0

## 2.0 Introduction:

### Knowledge Park

Bangale Associates, Pune have signed an MoU and established a Knowledge Park. Different technical activities are conducted through the knowledge park. It includes organization of national level seminars, workshops, faculty development programmes and discussion meetings of professional engineers. Maharashtra Energy Development Agency (MEDA) has granted empanelment to the Knowledge Park for conducting energy audit activities. Members of Knowledge Park have conducted energy audits of VARIOUS educational institutes, Commercial & industrial premises, MSEDCL Substations, feeders,etc Certified Energy Auditors associated with Knowledge Park. Shri. A.T. Bangale is expert in Power System Design, Energy Audit and different aspects of Power Quality.

It is the private organization working with the intention to percolate the knowledge from working professionals in electrical industry to academia and students. Knowledge Park consists of groups of different subjects related to electrical and mechanical industry.

### 3.0 Proposal for services

- a) Energy Audit and Solution
- b) Up-gradation of Substation and Power Distribution System
- c) Feasibility of RE

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### **Some features of an audit include**

We, at Knowledge Park, can complete an on-site power quality audit and make recommendations for commercial and industrial facilities. During the audit, monitoring devices will be placed throughout the facility in order to determine precisely where in the system power quality problems are being found, as well as to monitor the quality of the power being supplied by the electrical utility. In general the following are the activities involved in the power quality audit.

- Basic data gathering and analysis
- Review of facility wiring and grounding systems
- Analyze recorded electrical data and utility disturbances
- Provide written recommendations, as necessary

### **Possible Solutions to the power quality problems:**

- Power factor correction
- Dynamic sag correction
- Power quality monitoring
- Harmonics filter, static
- Harmonics filter, dynamic

We are a group of highly qualified and experienced professionals approved by MEDA and working in the field of power quality and energy audits. We are confident that it is possible to identify the problem, with ways & means of minimizing the losses, achieving significant energy saving.

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### 3.2 Energy Audit and Solutions

- Energy audit should ensure that every single unit of energy & power gives the maximum in terms of production.
- It is the translation of conservation ideas into realities, by blending technically feasible solutions with economic and other considerations with in a specified time frame.
- It attempts to balance total energy inputs with its use.
- **Objective of energy audit**
- To reduce energy usage by setting norms for it & revising them time to time.
- Identifying area of wastage & curve them.
- Remove root cause of losses.
- Developing the habit of maintaining proper record of energy consumption.
- To reduce consumption by adopting latest technology.
- To reduce cost of production & maintain high degree of productivity.
- Awareness, consciousness, training, publicity suggestion about scheme.



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## Review of Transformer substation and distribution system

The and existing power distribution system for metering & protection system, energy saving opportunities and potential can be checked and realized.

### 4.0 Technical Proposal

4.1 **Creating awareness:** - To create awareness about energy audit, electrical safety and associated systems separate training programs to staff members of hospital will be organized. One of the most successful means of motivating employees is through "awareness". Employees can be stimulated to support an energy management program if they are informed about

- (1) The amount of energy they are using
- (2) The costs involved
- (3) The critical part that energy plays in the continued viability
- (4) Various ways to save energy in their operation
- (5) Relationship between energy consumption and energy cost per unit.
- (6) The seriousness of the energy problem and its potential effects on nation's economy.

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**4.2 Project Engineering :** This is divided into following five steps:

**Step 1 Data collection**

1. Single line diagram for HT System
2. Single line diagram for main LT system (Transformer and D.G.Set)
3. Single line diagram for HVAC system
4. Single line diagram for UPS System
5. Single line diagram for lighting and other raw power loads
6. Rating of each unit and their present location in institute, proposed locations of equipment considering perspective plan of hospital, size and type of cables used for internal distribution systems
7. Layout of different systems
8. Electricity bills for last three years
9. Fuel consumption bills for generators and boilers,
10. Details of equipments like auto claves, MRI centre, pump house, air-conditioner and chillers etc.
11. Power quality analysis at few critical locations as defined by client
12. Electrical energy consumption /audit at few critical locations as defined by client

Measurements as per standard procedure of energy audit will be taken at strategic locations. Standard equipment are available with Knowledge park. Detailed study of existing system will be done by experts and proper communication with concerned authorities of hospital and institute will be done during execution of project.



## **Step 2 Data Analysis of available data**

1. Collection of data at different locations
2. Study of present system redundancy
3. Study of present loading conditions
4. Study of present equipment redundancy

Data gathered during this project will be analyzed and from this feasible recommendations can be submitted to the management for energy saving and improvement of power quality. The data will be analyzed by experts in the respective field. The alternatives with estimated budget if any will be indicated as options to the management for short listing and approval. After getting approval of specific alternative, documentation will be prepared by experts and will be submitted to concerned authorities of institute. The executed project will be monitored by Knowledge Park for smooth running for duration of three years. Experts associated with Knowledge Park will provide continuous guidance to your authorities for up-gradation, installation and commissioning of new systems.

## **Step 3 For betterment of your esteemed trust we recommend following additional studies**

1. Water quality and audit
2. Safety audit
3. Scope for use of renewable energy
4. Use of smart grid for optimum use of system

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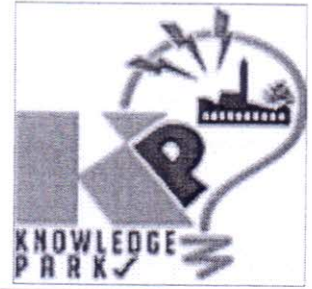
#### **Step 4 Study of Data and preparation of schemes**

1. Quantify and qualify present requirements
2. Study alternative schemes
3. Present two schemes for review to client
4. Work out detailed engineering for execution of the alternatives finalized by client.
5. Study of present loads and required loads based on data collected
6. Study of present system redundancy and required redundancy
7. Study of present loading conditions and required loading conditions
8. Study of present equipment redundancy and required redundancy
9. Study and analyze the data for improvements in the existing systems.

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## Step 5 Submission of of the work carried out and detailed report including solutions .

Under the guidance of Mr. A.T. Bangale, a team of senior experts who will be assisted by group of graduate post graduate student engineers/ from the field will carry out the data collection, observation and report preparation.

### Team

A.T.BANGALE, Rajeev Shastry, S.M. kshirsagar, Mr Anil Grde Mr. Dhumal, Mr. Deshmukh, Miss Krani and selected Students from MR , BE, TE SE

### FEES

Comprehensive studies and recommendations for following

Energy Audit

Rs 1,00,000/-

Up-gradation of substation and power distribution systems Rs 50,000/-

Feasibility of RE like solar, feasible RE solar, wind , biogas etc

Rs 7.45 per watt or 5% of cost of recommended feasible RE in watts.

### Details of payment schedule

1. 20% advance against confirmed order
2. 30 % after data collection
3. 30% after submission of preliminary report
4. 20% after submission of final report

A.T. Bangale

CEO

Knowledge Park

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