

DEPARTMENT OF ELECTRICAL ENGINEERING

(Format for) Final Year Project Proposal 2016



Group No. _____ [e.g. FYP_EE-12-13/01]
(To be filled by the official receiving the proposal)

1. Title:

2. Group Details

Roll No	Name	Contact Number	Email
EE-			
EE-			
EE-			
EE-			

2.1 Internal Advisor:

Name:

Designation:

2.2 External Advisor:

Name:

Designation:

Company:

PEC Number:

Contact:

Email:

2.3 Funding/Sponsoring Organization (if any):

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- New
- Extension/Modification to previous Project (if yes, specify title and year/batch)

2.5 Nature of Project (Please mark)

- Simulation based
- Hardware based

3. Project Description (Use separate sheets for description)

3.1 Executive Summary/Abstract:

Energy audit being the most useful tool is still practiced in an outdated style in Pakistan. The whole process is tedious, completely manual and is time consuming with no assurance of accuracy. The main reason, therefore, for this project is to devise an efficient, rapid and automated technique for energy audit that can guarantee its user high level of accuracy.

The main theme of the project is to develop an application based on non intrusive algorithm that was invented by George W. Hart, Ed Kern and Fred Schweppes of MIT in the early 1980s. The application is smart enough to detect the devices that are connected along with the duration of on time and also how much power an individual device is consuming. All this results in achieving the energy consumption of a resident or industry.

In order to achieve the desired target a lot many ideas and work is needed to be full filled before it. The most important of all is to understand the algorithm and to convert it into a code that runs and gives the satisfactory results. Also there is a need to transform the collected data into such a form that it becomes compatible with designed application. The collection of data through sensors is also a milestone in achieving our proposed idea.

3.2 Objectives and Deliverables:

Energy audit has become a primary task for many of the bigger projects. Audit not just helps in the projects but in today's world where energy crisis is one of the leading problems, it helps its user to determine the energy consumption, maximum demand, and power factor measurement and also to check the efficiency of the electrical appliances in use. It proves to be vital to overcome energy losses. Not only this as we move towards the smart grid we cannot ignore the importance of energy audits. So through this project we are planning to achieve a highly sophisticated, computerized and expeditious energy audit mechanism which measures each and every detail with complete accuracy.

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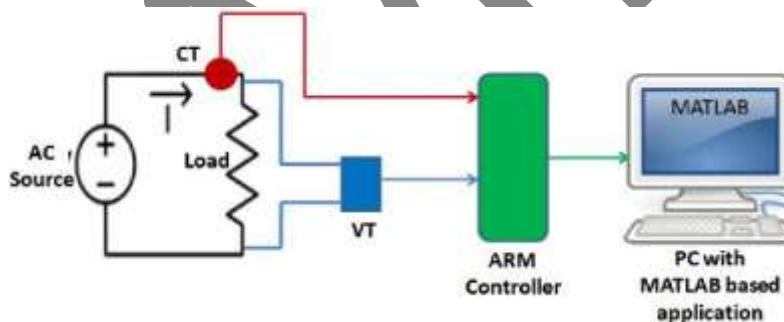
This energy audit system will make use of non intrusive algorithms for the identification of the devices as well as to calculate the efficiency of each device.

To achieve such a project we have the following work lined up:

- Designing of a data collection device that collect the current, voltage ,real ,reactive power of the place where the audit is being performed through the help of sensors, transducers etc.
- Coding of an application that conducts the audit on the basis of non intrusive algorithm. It includes the complete database of the appliances that may be present.
- A MATLAB based GUI (graphical user interface) that displays the result of energy audit in the form of graphs and tables.

The total outcome of the project will be mainly an application for energy audit along with the simulation results of the two devices on which our project will be tested, a data collection device that will be used for collection of necessary information needed by energy audit application and finally a GUI to view the results of audit.

Fig 1: A depiction of the completed project with all its components



3.3 Beneficiaries

This project will be directly benefiting the following:

- * Industrial Consumers
- * Commercial Consumers
- * Residential Consumers

Industries have large number of departments and equipment thus manual and conventional methods of auditing will result in days and days of tedious calculations incorporating inaccuracies thus this project will be aiding industrial and commercial users to reduce the discrepancies and losses, improving the efficiency and controllability of entire system. Indirectly this project will lead to serve the power system of Pakistan as the system becomes efficient progressively from primary end to

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Secondary end.

3.4 Constraints and Potential Risks:

For a massive project like this time is one of the major risks. Our project comprises Non-Intrusive Load Management algorithm whose implementation is one of the most complicated and thus developing a perfectly functional code and troubleshooting will take most of the time. Most importantly achievement of a design properly following IEEE/IEC standards will be time consuming. These standards need to be considered for industry acceptability of this project. The practical implementation of projects involving simulation are likely to have many constraints as simulation is done in an ideal environment thus configuration of many components may differ and would eventually effect the desired outcome.

3.5 Equipment required for making prototype/working model:

The major equipment of the project includes:

1. Arm cortex M3 processor board
2. Current sensors
3. Voltage transformers
4. Miscellaneous circuit components

The estimated cost of our overall project is PKR 10,000/=

4. Project Management:

The overall project may be divided into sub categories of:

- The integration and designing of data collection module.
- The learning and analysis of the collected waveforms.
- The extensive task of coding an application using the non intrusive algorithm.
- The designing of GUI application on MATLAB
- The report writing of our project.

Each of the above tasks has been assigned months on the following Gantt chart according to the work involved in attaining that sub category. The major time has been assigned to the coding of application since it is the core of the project and in order to accomplish our goal it has to be completed with dedication and determination.

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GANTT CHART:												
	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT		
DATA COLLECTION AND INTEGRATION	■	■	■									
DATA ANALYSIS OF WAVEFORMS	■	■	■									
PROGRAMMING AND CODING OF AN APPLICATION			■	■	EXAMS		■	■	■	■		
GUI ON MATLAB							■	■	■	■		
REPORT WRITING								■	■	■	■	■

5. List of Accessed Resources:

The following is the list of literature and website from which the help was taken:

1. Design and implementation of energy audit system employing embedded device by A.Pournima "M.Krishna Paramathma2, Department of Electrical and Electronics Engineering, Kalasalingam University, Krishnankoil, Virudhunagar DT (T.N), 626126, India.
2. Electrical Event Identification Technique for Monitoring Home Appliance Load Using Load Signatures by Youngwook Kim, Seongbae Kong, Rakkyung Ko and Sung-Kwan Joo, Member, IEEE, Korea University, Seoul, Korea.
3. Energy Spectrum-Based Wavelet Transform for Non-Intrusive Demand Monitoring and Load Identification.
4. A framework for non-intrusive load monitoring and diagnostics by James Paris, submitted to the department of electrical engineering and computer sciences.
5. Incorporating Non-Intrusive Load Monitoring Into Building Level Demand Response by Dawei He, Weixuan Lin, Nan Liu, Ronald.G.Harley, and Thomas. G. Habetler, Fellow, IEEE
6. Energy Audit Application for Building of Small and Medium Enterprise by N.M Maricar, Electrical Engineering Department, Taibah University, Madinah, Saudi Arabia and M.H Othman, Computer Science Department, University Teknikal, Malaysia.
7. Non-intrusive efficiency estimation method for energy auditing and management of in-service induction motor using bacterial foraging algorithm by V.P Sakthivel 1 R. Bhuvanewari S. Subramanian, Department of Electrical Engineering, Faculty of Engineering and Technology, Annamalai University, Chidambaram, 608 002, Tamilnadu, India. Institute for Energy Systems, Economics and Sustainability, Florida State University, Tallahassee, USA.