

Smart home energy management System



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Declaration

This thesis is a presentation of our own research work. Where ever the contributions of others involved, every effort was made for indicating this clearly, due to reference to literature and the acknowledgement researches and discussions.

The work was made under the supervision of Sir Muhammad Haris at University of Management and Technology, Lahore, Pakistan.

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Table of Content

Introduction	9
1.1 Context	10
1.2 Theoretical Background	10
1.3 Energy Management in Pakistan	10
1.4 Study Purpose	12
1.5 Home Energy Management	13
1.6 Smart Home Energy Management	13
Problem Statement and Literature Review	14
2.1 Problem Statement:	14
2.2 Literature Review	15
2.2.1 Electricity Demand	15
2.2.2 Typical Daily Load Curve	16
2.2.3 Peak Demand and Growth	16
2.2.4 Demand Response	17
Chapter 3	18
Flow charts and Block diagram	18
3.1 Circuit Block Diagram	18
3.2 Power Calculating Flow Chart	19
3.3 Time Calculating Flow Chart	21
Chapter 4	22
Hardware Description	22
4.1 Main Control Panel	22
4.2 Switching Panel	24
4.3 The Power Supply Panel	29
4.4 The Buzzer Circuit	32
4.5 Liquid Crystal Display (16x2 LCD)	33
4.6 Current Transformer (CT)	34
Chapter 5	36
Results and Conclusion	36
5.1 Results.....	36
5.2 Applications	36

Appendix

37

References 45

Table of Figures

Table 1.1: Annul Electricity Consumption	12
Table 4.1: LCD Pin Configuration	33
Equation 4.1	32
Figure 4.1: Microcontroller	22
Figure 2.1: Electricity Demand Graph.....	15
Figure 2.2: Daily Load Curve.....	16
Figure 4.2: 4x4 Keypad	23
Figure 4.3: Relay	25
Figure 4.4: PC817 opto-coupler	26
Figure 4.5: 2N2222 transistor	26
Figure 4.6: Free Wheel Diode	27
Figure 4.7: silicon V-I curve	28
Figure 4.8: Forward and Reversed Biased Diodes	28
Figure 4.9: Light Emitting Diode (LED)	29
Figure 4.10: 220/18 AC Volt Transformer	30
Figure 4.11: Positive Half-cycle	30
Figure 4.12: Negative Half-cycle	31
Figure 4.13: Resultant DC volts	31
Figure 4.14: Contrast Adjustment	34
Figure 4.15: Current Transformer	35

Abstract

With the passage of time and the increase in population, living standards and country development we are facing a rapid increase in electricity demand. But unfortunately, we are also facing other problems like heavy/long load shedding and more than 5000 MW electricity shortfall. In this era, we have to develop such solution which can save and reserve the electricity generated. We need to restrict the people to use the electricity very carefully, beneficially and financially comfortable. In this project, we have developed a solution which will automatically manage the home appliances and control their performance. We are using a Smart Home Energy Management for effective home power consumption. Smart home energy management system is expected to be effective for saving electricity costs and reducing the maximum demands in peak hours. In this system, there are different kinds of components involved including software algorithms and hardware elements to cooperate with each other and to provide several services in smart home. The development of the energy and the rise in the number of new consumers of electricity demands a serious need to improve the energy management system in domestic use. Energy management is a concept which could be applied in different scenarios, but in this report we are concerned about the management of the energy in homes. For this, the process of controlling, conserving and scheduling energy in homes maybe called as energy management.

For this project energy management means how to use the appliances of a home and how to divide the load consumed by each load to avoid maximum usage in peak hours and consequently reducing the cost of electricity and meeting the needs of the user at the same time.

KEYWORDS: Electricity Demand, Daily Load Curve, Peak Demand, Smart Home Energy Management.

Chapter 1

Introduction

One of the biggest problems of this era is to control the load and manage it smartly. More than 30% of consumption of the energy of the world exist within the domestic sector. Fifteen percentile of the energy consumption could be reduced which could result in saving energy and provide solutions for load shedding in third world and under-developed countries, this could be achieved by proper load management of appliances with a suitable system. By an automatic control of the appliances this result could be improved. A Smart Home Energy Management System (SHEMS) could effectively be vital for minimizing the energy costs considering the different time price of electric power in a smart home environment. Different kinds of system components including hardware elements, software algorithms and network connections are required to cooperate with each other to provide various services in a Smart Home Energy Management System (SHEMS). With the development of SHEMS, residents have the opportunity to schedule their electricity usage pattern to reduce their electricity cost and effectively using the available power.