UNIVERSITI TEKNOLOGI MARA

SMART GRID SYSTEM

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ABSTRACT

The power grid system, an essential network for delivering electricity from power plants to consumers, comprises generation, transmission, and distribution components. Power plants produce electricity, transmitted via high-voltage lines to substations near populated areas, where voltage is reduced for distribution to homes, businesses, and industries. Balancing supply and demand in real-time and maintaining stability in frequency and voltage levels. The objective of this final year project is to modernize the existing grid system by implementing a smart grid that utilizes microcontrollers for efficient energy management and continuous monitoring. Recognizing the growing demand for sustainable energy solutions, the project aims to offer a cost-effective alternative by harnessing Internet of Things (IoT) technologies. To gather and analyse data effectively, the system integrates sensors like volage sensor and current sensor with communication modules. The key component of the system is the microcontroller, equipped with sophisticated algorithms for data collection. Users are empowered with the ability to monitor energy trends, assess power utilization, and customize settings through an intuitive interface that provides real-time data access and system administration. Through the integration of IoT and ESP32 technology, the proposed smart grid system presents a smart and environmentally friendly energy management framework. By leveraging these advancements, the project endeavours to not only enhance the efficiency and reliability of the power grid but also contribute to the broader goal of sustainability in energy consumption and management.

Keywords: power grid system, distributions, microcontroller, Internet of Things (IoT), energy consumption, continuous monitoring.

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INTRODUCTION

1.1 BACKGROUND OF STUDY

In a time of fast-paced tech progress and a constant need for more energy, it's crucial to keep an eye on how we use power. The usual ways we use energy can be hard to see in our daily lives, so we need a smarter approach to use our resources wisely. This report dives into the world of energy monitoring, especially using the handy microcontrollers. It asks the simple question: why should we bother keeping track of our energy use? The answer goes beyond just collecting data, it opens the door to a future where we use energy in a way that's good for both the planet and our efficiency.

1.2 PROBLEM STATEMENT

There are few problems that had been though before the development the smart grid system. The problem at hand is that a service provider is required to physically visit each customer's house to measure power consumption and calculate monthly bills for domestic customers. Additionally, traditional grid systems lack efficiency in reading and providing insights into energy usage and grid performance, making energy optimization challenging.