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A Review on Energy Conservation System with IoT Oriented Technique

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Abstract - *Energy demand has increased tremendously in organizations, industries and homes. The energy-saving aspect is necessary for controlling and monitoring energy. Multiple factors need to be considered for energy utilizing especially new challenges facing sectors in industry and residency. This paper presents various techniques which are used for energy conservation system. Managing energy conservation with an effective manner provides sustainability for human beings. A problem-solving approach is exercised by using different technologies to reach towards goal. The energy harvesting technique discussed with various method execution. That helps us to cultivate our new method, which is helpful for the energy system using IoT and 5G with an energy system is a major focus of this paper. The usage of load and billing generation effectively is kept the main implementation goal. Real-time applications with ANN tool is observed as useful for energy optimization.*

Key Words: Internet of Things, Big Data, Microgrid, Energy Harvesting System, 5G.

1. INTRODUCTION

The environment of a larger change in the last 30 years is to increase in information technologies and mass production that convert high use of energy. Energy can play an important role in daily and professional life. Energy hits without any specific aspect in the world. It consists of major parameters as follows:

- Energy efficiency
- Energy conservations
- Techniques for a renewable energy system

When we turn ON electrical appliances it requires electricity. Now a days challenging task to make business more efficient is the contributing power system. Collaborative way to saving energy measures in effect. Conservation can reduce costs and become more reliable. Multiple traditional architectures show existing parts for the conservation of energy like wind energy sources. We need to discover more new upcoming strategies that help to achieve a goal. The simplest method to avoid troubles associated with any technology is to need less of it. So as per the boost in requirement of energy, it is a basic truth to highlight more ways for conservation that can beneficial for all organizations.

2. RELATED WORK

The system is used as an architecture that consists of IoT techniques. Multiple sensors take part with actuators for completing the configuration. As the software part of architecture comes with the module, which two functions for monitoring and controlling, readings with continuous ambient temperature as well as humidity. The authority gives to the house owner. All data is stored online so a user can view bills and pay the remaining or total bill amount for each month. Data analysis can be done with the user's permission for access. Users can set requests for the database and communicate with the server [1].

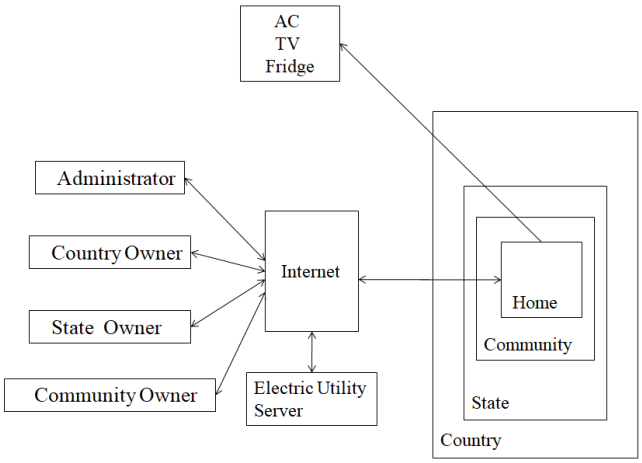

Fig -1: System Architecture

The system is designed with IoT and platform of Big data for analytical and scalable storage for a smart way of building user's privilege. An administrator, country owner, state owner, community owner communicates with appliances such as AC, TV, Fridge in-home through the internet. All data is stored on an electric utility server which connected with the internet as shown in Fig. 1. The devices were monitor and control with remote access. Through mobile users can get an online bill that generates using this system with accuracy.

Microgrid manages resources of energy distribution and loads for various parts in boundaries with the electrical environment. The system presents an optimal control strategic part for its robustness to the storage system of energy. It helps to update the usage cost of grid power low-level robust activity. This approach increases the cost of the worst-case economy. External servers and microgrid communicate with the database through an interface like RESTful API. Real-time data capture using prediction module and the optimal control module [2].

Table -1: Power Usage Pattern for Load Consumption

Load Consumption						
Power (kW)	Time (h)					
	0	4	8	12	16	20
-20						
-10						
0	✓	✓				
10			✓			✓
20				✓	✓	

Table -2: Power Usage Pattern for PV Generation

PV Generation						
Power (kW)	Time (h)					
	0	4	8	12	16	20
-20						
-10						
0	✓	✓				✓
10			✓		✓	
20				✓		

Table -3: Power Usage Pattern for Net Demand

Net Demand						
Power (kW)	Time (h)					
	0	4	8	12	16	20
-20				✓		
-10			✓			
0	✓	✓			✓	
10						✓
20						

The power usage pattern for load consumption, PV (Photovoltaic) generation and net demand with power (kW) and Time (h) as shown in Table 1, 2, 3 respectively. Conditions of a microgrid are operating for input data problems with a control grid connection.

The battery is powered with edge devices, and the constraints of battery capacity are limited as to size, lifetime, a width of the device. When multiple edge devices present then it is impossible to energize the battery. The system implemented spectral analysis with the usage of hardware. It also gives the equation with the energy evaluation of hardware. Yule-Walker theorem used for energy consumption [3].

Energy harvesting is a method that useful for the battery life of IoT devices and makes it autonomous of energy parameters. Sources that are offered for energy can convert heat into electrical energy. It represents the structure and equivalent electrical model with the analysis and results of a simulation. System show applications related to IoT which is wearable. The heat of the human body changes with reverse according to nature [4].

Design of an energy harvesting system with a powerful connection between solar and electromagnetic devices that operate for multiple tasks of consumption and management of low power with wireless sensors. It overcomes the power supply for a lack of sustainability and enables various operations. Energy harvesting for an ambient and hybrid source for a minimum power of input and requirements voltage is the way of system design [5].

The traditional method required twice energy harvesting processes, while using the system it except linear regulator and design whole on switch capacitor which is based on power convertor. Large end to end system efficiency can be gain through this system. The architecture consists of a conventional capacitor less low-dropout (CL-LDO) regulator with large scale graphs for validating data [6].

The system proposes energy conservation to reduce the reference zone of temperature which is based on a fuzzy logic method. Thermal behavior can be modeled with an artificial neural network technique. It also predicts zone temperature and estimates zone status. The zone temperature model maintains the comfort range and zone cooling material requires building structure. Further, it sets the lower and upper threshold limits for the system [7].

The architecture of system based on IoT applications which investigate mobility-aware network for lifetime maximization. It performs real-time computation with conditions of quality-of-service. It is a time-efficient way for energy conservation [8].

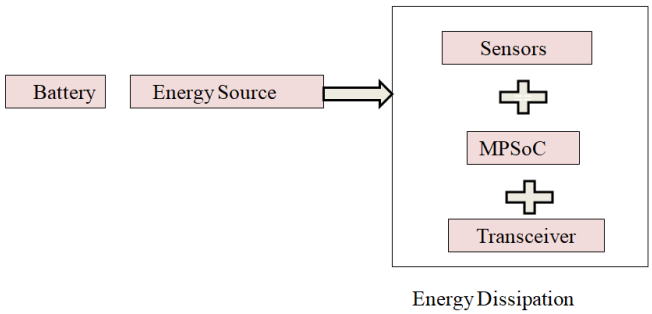

Fig -2: Communication with devices

The system consists of energy sources and sensors, MPSoC, transceiver. The energy source responds to the energy dissipation module for gaining energy. The sensor can sense physical objects and acquire input data further required for performing a task. Multiprocessor System-on-Chip(MPSoC) is useful for task execution and transceiver achieve the communication between the IoT device and the gateway, shown in Fig. 2.

From the demand for load and energy resources availability, system forecasts based on daily, seasonal and yearly at the microgrids. It combines predicted and regular data for managing the interconnection of microgrids. Maintenance of scheduling requires a long term environment. For real-time applications, ANN is a suitable tool. The activation function and simulation model is described in the construction of the system. It includes the importance of implementing the latest unit to improve in demand of load [9].

The three-level structure is used in infrastructure for communication purposes. The system allows a reliable and more economical constant environment for actual implementation. The smart grid is the central hub for collecting load data which impacts on storage and cost analysis [10].

The communication infrastructure is equipped with a three-layer hierarchical structure, consisting of HAN, NAN, and WAN. Cognitive radio technology is used to guarantee a more efficient, reliable, and economical communication infrastructure in the smart grid.

3. CONCLUSION

In this research, we focused on various approaches which found to be helpful for energy conservation. Also, energy harvesting system implementation using new technologies like IoT, ANN are explored here. The attempt was to obtain not only emerging tools but also implementations of particular related use cases.

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