

# Sustainable Energy Efficiency Implementation in Building

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## Abstract

Energy efficiency and green technology are common terms been discussed in engineering world today with the aim to achieve a low-carbon society. In Malaysia, these two terms were boost up when the government starts to implement National Green Technology Policy pioneered by Ministry of Energy, Green Technology and Water starts by the year of 2009. Different area needs different approach of energy efficiency, without compromising the comfort level of the user. In focusing the implementation of energy efficiency in building, this research will discuss different measures starting from the simplest measures such as awareness program up to smart method which include hardware control and user interface. Smart energy efficiency measures will combine the use of control device, sensors, fast communication medium and a GUI which will enable user access, monitor and control. This research will also look on the wireless as a communication medium in order to enhance the process of control and monitoring.

**Keywords:** Energy Efficiency in Building, Wireless Control, Green Technology, Sustainable Energy Management

## 1. Introduction

Energy saving implementation in a building requires a lot of attention due to its complexity of purpose, system and equipment varieties. Building types also can be categorized by use, type of construction, size and thermal characteristic. Different building needs different solution. For example, proposed energy saving measures for shopping complex building will be different with measures for government complex building, so as for university building.

All researchers need to understand the process of implementing energy management and efficiency before proposing any measures in order to have the best solution for system.

As an example, proposing a solution for energy efficiency measures which requires a lot of wiring process seems not economically efficient if it is meant for old or existing building. The process of installing sensors and other equipment which require rewiring process will definitely increase the implementation cost, and thus will affect the return-on-investment calculation. A lower return on investment value may be achieved if the same proposal be implemented in newly constructed building. Therefore, prior knowledge in the process of energy management and efficiency is a must before proposing any energy saving solutions.

This paper will discuss the process of implementing sustainable energy management process starting with the principle of sustainable energy

management up to the example of real project implementation, which is wireless energy control in a building.

## 2. Energy Efficiency in Malaysia

By definition, sustainable energy management refers to the process of managing energy consumption to ensure that energy has been efficiently consumed. Thus, sustainable energy management means we need a process to achieve it, not just merely a product or device installation.

In Malaysia, the Government has introduced a National Energy Policy in guiding the future energy sector development. There are three main objectives which cover the areas as follows:

- i. The Supply; with the aim to ensure the provision of adequate, secure and cost effective energy supply.
- ii. The Utilization; in promoting the efficient utilization of energy and discourage wasteful and non-productive pattern of energy consumption.
- iii. The Environment; to minimize the negative impact of energy production, transportation, conversion, utilization and consumption on the environment.

The process in implementing energy management and efficiency project can be described as in the chart below:

