UNIVERSITI TEKNOLOGI MARA

WEB BASED APPLICATIONS FOR ENERGY MANAGEMENT SYSTEM INCORPORATED NETWORK RECONFIGURATION USING GENETIC ALGORITHM

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ABSTRACT

The Web Based Applications for Energy Management System in UiTM has established itself as a strong medium for distributed computing: a network user interface that is powerful and an independent platform. This research was involved with the development of Web Based Applications for Energy Management System for providing Web application system, Web monitoring System and Genetic algorithm Based Network Reconfiguration Technique for loss minimization in the UiTM Distribution System. Web Based Applications for Energy Management System can be broadly classified into three basic methods. The Web Monitoring System is a sort of information system in which during a certain time on a systematic way, data are being collected, handled, managed, analyzed and presented data from energy meter (33 ION^{TM}). The Web Application System program is designed for the client to configure a system (e.g calculates a load flow). The development on Web Application system uses An ActiveX technology approach. The Genetic Algorithm Based Network Reconfiguration Technique for loss minimization in the UiTM Distribution System is also proposed based on general combinatorial optimization algorithm. The development uses language Active Server Pages (ASP), HTML and C/C++. This program was tested on a Windows platform, which is a typical development environment for Web Based Applications for Energy Management System in UiTM. It provides access to UiTM's personnel via Internet or Network UiTM. The results show that optimal configuration of 32 number of feeder or the substation in UiTM could provide loss minimization, reduces the active power loss in a power system at UiTM distribution network.

Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknology MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledge as referenced work. This topic has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

In the event that my thesis be found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree and agree be subjected to the disciplinary rules and regulations of Universiti Teknologi MARA.

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CHAPTER 1

INTRODUCTION

1.0   Background

The Energy Management System (EMS) is the core of every power system control center. These hardware and software packages collect operational data from all the substations in the power system, filter the measurements for bad data or communication errors and present the operator with a set of tools using this refined data. This enables the operator to perform analysis on the current state of the power system and determine its future behavior. It is used to control energy consumption to ensure for efficient usage. The recent trend has observed the utilization of Internet EMS, organized and related trend data over the Internet, which have been evolving over the past decade. This technology helps perform key Energy Management functions such as organizing energy use data, identifying energy consumption anomalies, managing energy costs, and automating demand response strategies.

The EMS specific application described as state estimation, security analysis and optimal power flow provide the real time means of developing controls for operating power systems securely. To achieve this objective, the execution sequentially, validating the condition of the power system, before developing controls that may be based on economics but which specifically endeavor to avoid actual and potential security violations. The execution of the EMS may be initiated in several ways, commonly executed continually at periodic rate that ranges from 5 to 20 minutes, which is the