

# **Fault Analysis In Microgrid**

**This is presented in partial fulfillment for the award of the  
Bachelor of Electrical Engineering (Hons)  
UNIVERSITI TEKNOLOGI MARA**



**ASLYNA BINTI ASRIN  
FACULTY OF ELECTRICAL ENGINEERING  
UNIVERSITI TEKNOLOGI MARA (UiTM)  
SHAH ALAM  
JAN 2012**

## ACKNOWLEDGEMENTS

First of all, I really would like to thank to Allah s.w.t for His approval and blessing that made all this happened and came true. Nothing can be done without His permission. Allhamdulillah.

A special and most honoured gratitude to my supervisor Encik Norazlan Bin Hashim for his guidance, teachings and support throughout this project. I am truly honoured and humble to have him as my supervisor because his knowledge and expertise is very vast and wide. I am beyond doubt enjoyed the challenge of discussing and debating various aspects and topics regarding my project with him which later helped me improve my final project and knowledge about it.

I would also like to thank Puan Aida Sulinda Kusim and Dr. Muhamad Nabil Hidayat for the evaluation of my technical paper presentation, technical paper and final report for this project.

Special thanks to my acquaintances for helping me with their precious suggestions and supports throughout the completion of this project. Your kindness will be embedded in my heart forever.

## **ABSTRACT**

Microgrid is another alternative solution in enhance the reliability in supplying power to consumers. However, high current magnitude could damage the components from this system. Therefore, this paper presents an analyzing type of fault current and voltage in microgrid. The aim would be the discussing type fault that are most severe between single line to fault (SLG), line to line fault (LL) and also three phase fault. It is very important to analyze so that it can help in implementat ion of future protection. Microgrid is available in islanded and grid connected mode. A demo version of The Wind Asynchronous Generator In an Isolated Network in Matlab is used and available for both modes after a few Simulink application modification. The Matlab Simulink software version 7.11.0(R2010b) is used to conduct a simulation on this project. The data results of all fault current and voltage will be discussed and all simulation results also will be included.

# TABLE OF CONTENT

CHAPTER 1 .....	1
1.1 Overview .....	1
1.2 Problem Statement .....	2
1.3 Objectives.....	2
1.4 Scope of Work.....	2
1.5 Thesis Organization.....	3
CHAPTER 2 .....	4
LITERATURE REVIEW .....	4
2.1 Introduction .....	4
2.2 Types of Fault.....	4
2.3 Causes of Fault.....	5
2.4 Single Line to Ground (SLG) Fault.....	6
2.5 Line to Line (LL) Fault .....	8
2.6 Three Phase Fault.....	10
2.7 Microgrid.....	10
CHAPTER 3 .....	12
METHODOLOGY .....	12
3.1 Introduction .....	12
3.2 Flow chart of a process.....	12
3.3 Process of Analysis .....	14
3.3.1 Circuit Construction.....	14
3.3.2 Configuration parameter.....	17
3.3.3 Fault Location.....	18
3.3.4 Setting Output Device.....	19
3.3.5 Run Simulation.....	20
3.3.6 Result Analysis.....	20

# CHAPTER 1

## INTRODUCTION

### 1.1 OVERVIEW

Nowadays, with enhanced development power system became much more complicated. There are demands that need to be fulfilled and other issues that should be emphasized which are reliability and cost reduction. The most important issues when developing a new power system is the reliability of the system itself. In other words, electricity supply should continuously delivered to the consumers 24 hours a day. If power outages happen then consumers will face loss especially industries because of the high possibility that they had to stop their operation.

The dependency of fossil fuels that keep on rising force the developer to find other alternative solution by using renewable energy resources in strategically location for cost reduction. Therefore to maintain the power system reliability, fault analysis has to be perform so when fault occurred these power system component can be protected. Another solution will be by propose a system called microgrid. Microgrid is a localized grouping of electricity sources and loads that normally operate connected to and synchronous with the main grid, but can disconnect and function separately as physical or economic conditions varies [1].

This paper presents a method of fault current and voltage determined in microgrid. Besides that, it is also important that current and voltage analyzed during fault when microgrid is in islanded mode or connected in main grid. Then, fault analysis at all busbars is conducted and discussed to achieved all the purposes.