

IMPACT OF VARYING CABLE LENGTH OF DISTRIBUTED GENERATION TO POWER LOSS AND VOLTAGE MAGNITUDE

This project report is presented in partial fulfillment for the award of the

Bachelor in Electrical Engineering (Hons.)

Of

UNIVERSITI TEKNOLOGI MARA (UiTM)



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ACKNOWLEDGEMENTS

In the name of ALLAH, Most Generous and Most Merciful.

It is with the deepest sense of gratitude of the Almighty ALLAH who gives strength and ability to complete this thesis project. All good aspirations, devotions and prayers are due to ALLAH whose blessing and guidance have helped me throughout to entire project.

I would like to take this opportunity to express my appreciation to my supervisor, Puan Zuhaila Bt Mat Yasin for guiding me and sharing with me his knowledge and experience in order to complete this project. Her guidance, advice, co-operation, encouragement and useful ideas were very much appreciated.

To my beloved parent, sisters and brother, deepest thank you for your pray and always being supportive in whatever I have done. My sincere thank also goes to all my friends including everyone who helped me directly and indirectly in completing this project.

ABSTRACT

The Distributed Generation (DG) has created a challenge and an opportunity for developing various novel technologies in power generation. The proposed work discusses the impact of cable length of DG to the power losses and voltage magnitude. From previous studies, DG reduces line losses, increases system voltage profile and hence improves power quality. This thesis present the analysis with two units of DGs installed at the bus with minimum voltage in the system. Shunt capacitor bank is also introduced in the system in order to improve the voltage at the load and to reduce the losses. The proposed method is tested on a standard IEEE-69 bus system and the results of the simulation carried out using Power System Simulator/Advanced Distribution Engineering Productivity Tool (PSS/ADEPT) software. The voltage magnitude and power losses obtained by performing a conventional load flow calculation in PSS/ADEPT software.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDIES

Distributed generation (DG) is expected to become more important in the future generation system [1]. Many of power systems in Malaysia consist of distributed generation to minimize the cost of operation. It also enhances the efficiency, reliability and operational benefits of the distribution systems. In one network system, it consists of one central generator with the loads. The loads always changing depend on the situation. When the population increase, the load also increase and lead to the increasing of demand [2]. As a result, a central generator needs more supply to meet the demand. For that particular reason, distributed generation will supply the extra power needs by the load.

A distributed generator can be connected directly to the load or to the utility's transmission or distribution system to provide peaking services. It can be powered by both conventional and renewable energy sources. In this proposed work, distributed generation is power by hydroelectric power station where is located at remote area. It is possible to vary the overhead line cable length since located far from the load. Every cable length for transmitting the power from distributed generation to the load will impact the system performance mainly in power loss and voltage magnitude [1,3].

Shunt capacitor bank (SCB) is introduced to the network system mainly to reduce the losses and improve the voltage at the load. It can be installed at anywhere in the power system, but in this project it was installed at the distributed generator. Distributed generation will provide a good supply in order to improve supply quality and restore the stability margin to the system [4, 5].