IDENTIFYING THE OPTIMAL LOCATION AND SIZING OF EMBEDDED GENERATION IN A DISTRIBUTION SYSTEM

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UNIVERSITI TEKNOLOGI MARA (UiTM)

SITI AISHAH BT. BAKAR
Faculty of Electrical Engineering
Universiti Teknologi MARA
40450, Shah Alam, Selangor
Malaysia

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ABSTRACT

This project report presents a technique to determine the location and sizing of Embedded Generation (EG) in order to minimize system losses in the distribution system. A new indicator was developed and found to be able to find the best location of EG. The performance of this technique is tested on a 69-bus IEEE Reliability Test System. A load flow programmed written in Matlab programming was used to evaluate the power flow voltage and losses in radial distribution network. The results show the best of location of EG has able to minimize the system losses.

Keywords: Embedded generation, Voltage stability index, Power losses.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

For many years, power systems were vertically and centralized operated. The large thermal and nuclear generation plants have produced most of the power since it has the scale and economic merits. These kinds of generation are often related to adequate geographical placement (water sources, technical constraints, etc). The electric power is transmitted and distributed toward consumers over long distance and using different voltage levels. The centralized and hierarchical control is applied which allows the system to be monitored and controlled in a real time.

The existing power system structures are changing, due to electric utilities as well as public organization. There are several reasons for these changes, some of which are as follows:

- Geographical and environmental constraints of large generating plants
- Stability and security problems
- Continuous growth of power demand, especially in the emerging countries. Need of investments to sustain the development in the power demand
- Privatization, deregulation and competitive markets
- Emergence of generation techniques with small ratings, environmental benefits, increased profitability and which can be combined with heat generation i.e. fuel cells and co-generation.