MITIGATION OF VOLTAGE SAGS USING DYNAMIC VOLTAGE RESTORER AND DISTRIBUTION STATIC COMPENSATOR

Thesis is presented in partial fulfillment for the award of the

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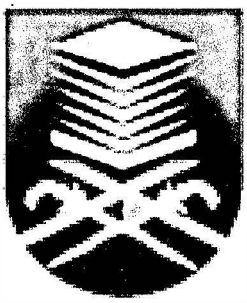

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ABSTRACT

This paper presents the techniques of mitigation the voltage sags and interruption in a distribution system. Dynamic voltage restorer (DVR) and the distribution static compensator (D-STATCOM) are used in this study. Both of these methods are based on the Voltage source Converter (VSC) principle. The DVR injects voltage in series with the system voltage and D-STATCOM injects a current into the system to correct the voltage sag and interruption. All the mitigation techniques will be tested for different types of fault. The simulation will be using MATLAB Simulink software. Results are presented to assess the performance of each device as a potential distribution power solution.

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CHAPTER 1

INTRODUCTION

1.1 Overview

Both electric utilities and end users of electrical power are becoming increasingly concerned about the quality of electric power. The term power quality has become one of the most prolific buzzword in the power industry since the late 1980s [1]. The issue in electricity power sector delivery is not confined to only energy efficiency and environment but more importantly on quality and continuity of supply or power quality and supply quality. Electrical Power quality is the degree of any deviation from the nominal values of the voltage magnitude and frequency. Power quality may also be defined as the degree to which both the utilization and delivery of electric power affects the performance of electrical equipment [2]. From a customer perspective, a power quality problem is defined as any power problem manifested in voltage, current, or frequency deviations that result in power failure or disoperation of customer of equipment [3].

Power quality problems concerning frequency deviation are the presence of harmonics and other departures from the intended frequency of the alternating supply voltage. On the other hand, power quality problems concerning voltage magnitude deviations can be in the form of voltage fluctuations, especially those causing flicker. Other voltage problems are the voltage sags, short interruptions and transient over voltages. Transient over voltage has some of the characteristics of high-frequency phenomena. In a three-phase system unbalanced voltages also is a power quality problem [2]. Among them, two power quality problems have been identified to be of major concern to the customers are voltage sags and harmonics, but this project will be focusing on voltage sags.