UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

THE RELATIVE EFFICIENCY MEASUREMENT OF ELECTRICITY DISTRIBUTION COMPANIES USING DATA ENVELOPMENT ANALYSIS (DEA) : A CASE STUDY IN ASEAN COUNTRIES

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ABSTRACT

Electricity consumption has advanced rapidly in the global application and forced industry to use large amounts of electricity. Due to the demand in electricity consumption which keeps increasing day by day, the electricity distribution companies need to improve their performance to ensure that the company's performance is in line with the increasing of demand. Therefore, to measure the performance, this project focused on to measure the relative efficiency of electricity companies in ASEAN countries by using Data Envelopment Analysis (DEA) that used multiple inputs and multiple output and using the dual value in project determination to determine improvement inefficient electricity distribution companies (EDC). The result showed that there were 3 electricity distribution companies with efficiency score 1 pointed to EDC1, EDC3 and EDC6 while another six (6) electricity distribution companies were inefficient with score in the range of 0.0041 to 0.9068. From peer group analysis, EDC 6 is the most efficient electricity distribution company compared to EDC 1 and EDC 3 thus will be used as a reference set (λ) in improving the inefficient electricity distribution companies. For the future works, another method can be used to determine efficiency instead of DEA such as Analytical Hierarchy Process (AHP).

Keyword: Data Envelopment Analysis (DEA), Electricity Distribution Company (EDC), Efficiency.

1 INTRODUCTION

1.1 Research Background

In the 20th century, technology is developing rapidly and history has shown that the technology has supported people to accomplish more jobs in less time and less energy (Sanjay Kumar Pal, 2008). Technology is being used in almost everything in our lives, such as the use of office technology, communication, transportation, education, manufacturing, and many more (Ramey, 2013).

Through technology development, technology require electricity to reach the needs of most of the activities. For example, the Japanese began to introduce high-speed trains in 1964, which can reach a top speed of 130 mph, which carries more than 100 million passengers using electric power in the first three years (Cameron, 2014). In addition, replacing engine technology workers to ease the work that is more efficient in terms of energy consumption using electricity. Thus, the technology requires electricity to reach the needs most of the activities, especially for daily needs and country's development.

Since the daily needs and country's development use electricity as the main element, electricity consumption has advanced rapidly in the global application and industry began to use large amounts of electricity. Statistic showed the electricity consumption has more than doubled in the ASEAN zone from 2000 to 2013 and Indonesia country was the highest percentages increased in electricity consumption at 7.2% in 2013, then followed by the countries of Thailand, Malaysia, Vietnam, Philippines, Singapore, and Myanmar (Enerdata, 2014). In Malaysia, electricity services in the country through the current developments over time in line with the increase in population, development and technological progress. The government has and will strive to meet the growing demand and ensure sufficient electricity supply, quality and reliable to become more competitive in the market thus ensure their survival in the market (Ahmad & Othman, 2014).