

**OPTIMAL BIDDING PRICE STRATEGY IN ELECTRICITY
AUCTION FOR NEW CAPACITY IN MALAYSIA CONSIDERING
UNCERTAINTY**

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ABSTRACT

The objective of this project is to find the optimal bidding price in electricity auction for new power - plants in Malaysia. This strategy is applied to three most common generation technologies which is coal, gas-fired (CCGT), and nuclear. It is important for the generating company to determine the minimum bid prices that it should submit in the auction in order to ensure that the investment would be profitable and meet the Minimum Acceptable Rate of Return (MARR) aimed by the company. The uncertainty such as fuel cost, overnight cost, operation and maintenance (O&M) cost and utilization factor are considered in the model. The effect of these uncertainties on the bid prices is studied using 1) sensitivity analysis and 2) probabilistic analysis. Results show that the bid prices of nuclear is more sensitive to the changes in investment cost, O&M cost and utilization factor and less sensitive to the fuel cost than coal and CCGT. On the other hand the bid price of CCGT is more sensitive to the fuel cost. The sensitivity of coal plant shows result somewhere in between the nuclear and CCGT.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

In the last few decades, Malaysia electricity industry has gone through an evolution significant industrial development due to rapid growth in economics. Electricity first made appearance at the turn of 20th century which functions to supplying mining operation and transformed into localized district supply system supplying commercial, industrial and domestics sectors. At this time most of generating plant use low grade coal, local wood, import oil and water as a resource to generate electricity. The demands for electricity increase rapidly bring to development of central power station which function to control and construct the transmission lines and national grid.

The industry began with the private generation companies in year 1900 mainly in supplying the tin mining industry. The notable pioneer was Malacca Electric Light Co. Ltd. (1913), Huttenbachs Ltd. (1916), Perak River Hydro Electric Co. Ltd. (1926) and Kinta Electric Distribution Co. Ltd. (1928) [1]. In 1949, Central Electricity Board (CEB) was developed to provide electricity to peninsular Malaysia. CEB was then renamed as National Electricity Board (NEB) in 1965. The revolution followed by corporatization of NEB in July 1990 and again changed its name to Tenaga Nasional Berhad (TNB). As the demand increased rapidly as stated in [2] which is demand for electricity increases 4.7 % per year, the government was unable to build power generation fast enough. During that time, privatization was an attractive alternative. TNB was privatized and listed on the Malaysian Stock Exchange in 1992.