

Organisation of research paper

This report encompassed a section on literature review followed by a brief description of the method. The analysis of the results and findings are then discussed in Chapter V. The significance of the results and how it would influence TNB will be discussed in the concluding chapter.

instantaneous to short term and longer term.

In the past capacity planning in the electricity industry is determined by the utility. Today the statement remain at most half truth. This is generally because as much as the capacity requirement can be indicated by the utility, but the responsibility to have the capacity addition to power plant the whole nation lies with the Government. Today the existence of an "Inter Agency Planning Group" will ensure that the capacity addition to the country is adequately planned. There is also open competition to capacity addition, i.e. generation sector which is also regulated. Hence the role of the utility have taken a turn. However the delivery system from the generation of power to the consumer still remain a monopoly to the utility.

Capacity planning is important for any company, in this case TNB because inadequacy will result to losing customers through slow service or allowing competitors to enter into the market. If excessive a company may need to reduce price to stimulate demand, underutilised workforce, seek additional or less profitable services to stay in business just to indicate a few.

Capacity here is defined as the rate of output that can be achieved from a process and capacity planning is the level of capacity that will meet market demand in a cost effective way. There are constraints in the meeting the demand and cost minimisation, these are mainly from financial, resources, technical, environment and political.

Objective

With this framework, this research paper will look at two aspects of capacity planning. Firstly the issues and concern of an electricity company when deciding on capacity addition and factors that influences this decision. Secondly, an investigation on the sensitivity of fuel price, demand forecast and financing method to the decision on adding capacity and the anticipated cost. Hence the objective of this study is to provide answers or indication on:

1. What are the influencing factors to consider for decision making in capacity addition?
2. How are discount rate and capacity factors responding to the decision in capacity addition?.

Scope of Study

The scope of the study for objective (1) is a discussion and argument on findings based on historical records. This findings are elaborated in the present context and assess the relevance of the factors today. This section of the study is subjective and may provoke counter arguments. Nevertheless this study is intended as an on-going research as the electricity sector environment changes in time as TNB have experience from Lembaga Letrik Negara (LLN).

The second objective will be discussed with the aid of a financial

modelling. In the past, such model is not normally used as only least cost to the nation are factors influencing the decision making. However, in the new environment of competition, the financial viability of the capacity addition plays a major influencing role in assessing how TNB as a public listed company can optimise its capacity addition investments. There are many factors influencing the decision, however the major inputs considered here are only the demand represented in the form of factor affecting the capacity, and the discount rates used. Capital cost is a major input factor but the variation in cost is mainly due to project delay in implementation. Thus sensitivity analysis is important here because a plan that is least cost under a reference set of forecast data may not be so under an alternative set of forecast parameters.

The key objective in planning is to recognise these uncertainties and to develop a plan that can be adapted to changing business condition and at the same time minimising total cost. The probability weighted range of forecast parameters model will be used here.

This approach is not readily used in the Malaysian electricity sector. However, there are cases (past gas turbines projects, 1995) in which a financial analysis approach were adopted and not probability weighted method. The development of the model is seen as another research and proposed for future study.

CHAPTER 1

INTRODUCTION

Background of the Malaysian electricity sector and capacity planning.

Tenaga Nasional Berhad (TNB), is a service industry to provide the reliable and continuous source of electricity. The major characteristics that identifies it from most other industries are firstly the commitment of relatively large capital for a long period. Secondly the long lead time for production expansion. In most manufacturing industry, the lead time may be one to two years, but for electricity sector it requires two years and above for construction alone. Thirdly, electricity sector provide the critical infrastructure input to the other industries. Therefore it has to be in place before or simultaneously developed with the need of consumers.

Electricity is different because it is not a commodity that can be manufactured ahead of time and stored until demand for it arises, but it must be produced as and when required. With customers already in the 4 million bracket electric power is a dynamic system and the prime objective of the system is to keep continual balance between supply and demand.

The supply side consist of power stations that need to be planned, constructed and operated while demand changes as a function of time, from