CHAPTER 5

RESULTS OF THE STUDY

5.1 A. CAPITAL BUDGETING IN THE GENERATION SBU

i. Generation and Evaluation of Investment Proposal

On a general basis, projects undertaken by the Generation SBU follows a flow chart as shown in Figure 5-1. The need of a power generating plant to satisfy demand for electricity is identified from load forecast and system studies carried out Development Planning Unit (DPU) of TNB. From the results of these studies, the Unit generates proposals to meet this demand. In generating proposals, the Unit carries out generation planning studies to determine the most ideal and optimum energy source (thermal, combined cycle or hydro) and the system. These studies also indicate the required capacities of new power plants, their schedule requirement date, and the various options to meet the demand.

The DPU then carries out feasibility studies and provides project costs estimates including the financial and economic evaluation prior to preparing a project proposal. In generating and evaluating proposals to increase generation capacity, other than technical feasibility, cost and financial returns were not the only criteria in determining the acceptance or rejection of a proposal. Other considerations were also taken into account.
FIGURE 5-1

FLOW CHART ON THE PROCESS OF IMPLEMENTING
A GENERATION SBU PROJECT

* Development Planning Unit (DPU) carries out load forecast studies
  Studies indicate electricity demand requirement for particular area and when the demand is required.

* From load forecast studies, DPU carries out generation planning studies
  Results from generation planning studies and power station studies help to identify type of power generation, location of new power station and when to commission.

* DPU carries out feasibility studies on proposed new power station
  Feasibility studies compare proposal with various alternatives.
  Feasibility studies provide cost estimates and carries out financial evaluation.
  From feasibility studies, DPU selects preferred option and recommends for implementation.

* DPU seeks approval to implement project at the following levels
  a. Development Committee
  b. Management Executive Committee
  c. TNB Board of Directors
  If project exceeds RM 15m, DPU seeks approval from Minister & Treasury

* Upon approval, DPU hands-over implementation of project to Generation SBU (Projects). Finance Unit (FU) undertakes financing of project.

* Generation SBU (Projects) seeks budget from Budget Committee (BC).
  Generation SBU (Projects) details breakdown of cost and expected disbursement schedule.
  Above information are submitted to FU and BC.

* Upon approval by BC, Generation SBU (Projects) proceeds with project implementation and FU seeks sources to finance project.

* During implementation, Generation SBU (Projects) submits Interim Completion Certificates (ICC) to FU for disbursement of funds.
  FU monitors physical progress & seeks justification if actual cost varies to the original cost.

* Upon project completion, Generation SBU (Projects) hands-over station to Generation SBU (Operations) to operate and maintain the station.
  Generation SBU (Operations) maintains records of stations operating expenditure and revenues from station's output.

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These include:

a. TNB’s regulatory conditions
b. Political implications
c. Current and future trends of energy source
d. Government policies on energy fuels
e. Environmental matters
f. Urgency
g. TNB’s social obligations

Some of the above considerations are non-monetary in nature and difficulties often arise in costing and estimating them. The considerations also limit direct comparison of one project to another; For example, Project A cannot be compared directly to Project B, solely on their financial returns. There are constraints, policies, regulations, conditions and intangible items that must be taken into account in generating and evaluating investment project proposals.

After evaluating the various options, DPU then seeks approval to implement the project from the following committees:

a. The Development Committee
b. The Management Executive Committee
c. The TNB Board of Directors
For projects which exceed the sum of RM15 million, DPU would need to seek another level of approval from the Minister as well as Treasury. Approval criteria vary and are not entirely dependent upon the 'rate of return'. Other factors such as urgency and political interference do influence a project's approval.

In our investigation, we find that for projects to be approved, it must satisfy one of the three profitability standards. They are:

a. Benefit/Cost ratio must exceed one
b. Net Present Value (NPV) must be positive
c. Internal Rate of Return (IRR) must exceed 10%.

Nevertheless, urgency, national development and social obligation have always overriden most financial evaluations. For example, in the current situation of energy shortage, a decision has been made to build new power plants to meet the demand with 'time' as the main criterion rather than financial returns.

ii. Financing and Implementation of Projects

Power generation projects are capital intensive projects which require huge capital outlays. Projects are usually financed through loans from both local and foreign institutions. For loan approval, projects are required to have a minimum internal rate of return (IRR). This minimum IRR is determined by lending agencies and from previous projects, the minimum required IRR is 10%. For loan approval, however, projects were analysed on a per project basis rather than comparing them to alternative projects.
Upon approval by the Minister and Treasury, implementation of the project is the responsibility of the Generation SBU (Projects) and finance is handled by the Finance Unit (FU) of the Corporate Services Division. The Generation SBU (Projects) then details further breakdown of the cost, their disbursement schedule and seeks a budget and allocation from the Budget Committee (BC) through the FU. Information submitted to the BC and FU include:

a. planning cost estimates
b. project information summary
c. project implementation cost estimates
d. proposed project cost disbursement
e. proposed financing sources
f. contracted project cost
g. quarterly statement of expenditure

Upon approval by the BC, the FU then acquires the necessary funds at the required schedule for project implementation. Our investigation reveals that, currently, there are no clear cut policies as to the financing mix of projects. In practice, however, external loans were normally used to finance up to 70% of project costs.

iii. Post-Auditing and Monitoring of Projects

Monitoring of a project during implementation is through the submission of the quarterly statement of expenditure to the FU by the Generation SBU (Projects). This statement is compared to the original project disbursement schedule. Supporting information are required for cases where there are disparities.
Our investigation reveals that upon completion of the project, another report which explains and justifies disparities between actual and estimated costs needs to be submitted.

In our investigation, we find that there are no systematic method of post-auditing in the operation and maintenance of the project. Operation and maintenance costs are monitored, but, there seems to be no attempt to compare these costs to the costs estimated in the feasibility study.

B. PROJECT 1: The Pergau Hydro Electric Project

i. Background

The Pergau Hydro Electric Project, is situated on the Sg. Pergau, Kelantan, approximately 75km south-west of Kota Bharu. Preliminary studies began in the early 1960's, but field investigations for feasibility studies only commenced in 1985. Feasibility studies were completed in 1988. Construction started in 1990 and currently, the project is still under construction. The project is a 2 units of 300 Megawatts (MW) powerplant of which the first unit is scheduled to be commissioned in 1995 and the second in 1996.

The plant was designed as a peaking station*. Capital cost (at 1986 prices) were estimated to be RM670 million with an additional sum of RM177 million for the transmission line reinforcement to transport power to the load centre in Kuala Lumpur.

* A peaking station is a power station designed to generate electricity only during peak hours. Peak hours for TNB is between 11.00 a.m. to 3.00 p.m. This is opposed to a base-load station which is designed to generate electricity throughout the day.
ii. Generation and Evaluation of Investment Proposals

Expected load growth pattern derived from load forecast studies, carried out by Development Planning Unit (DPU) of TNB, reveals that TNB generation system needs a new reliable peaking power capability by the mid 1990's. Generation planning studies were carried out to compare the various forms of electricity generation, that is, combined cycle, steam turbine and hydro.

At the same time, a ranking study of all hydro potential projects in Peninsular Malaysia was also done. These studies reveal Pergau hydro as one of the feasible options to be implemented for TNB to meet its needs.

With the identification of Pergau as a feasible option, further studies were carried out to determine its optimum development and to ascertain whether this optimum development was economically feasible compared with the other alternatives.

Various alternative schemes for Pergau with different capacities were examined. For each scheme, Net Present Value (NPV) analyses were undertaken and Table 5-1 gives a summary of the result of the NPV analyses for Pergau at different capacities.
TABLE 5-1  
Summary of NPV's for Pergau with Various Installed Capacities  
(at discount rate of 10%)  

<table>
<thead>
<tr>
<th>Installed Capacity</th>
<th>NPV (RM x 10^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 MW</td>
<td>- 104.7</td>
</tr>
<tr>
<td>260 MW</td>
<td>33.4</td>
</tr>
<tr>
<td>390 MW</td>
<td>118.9</td>
</tr>
<tr>
<td>600 MW</td>
<td>162.3</td>
</tr>
<tr>
<td>780 MW</td>
<td>152.7</td>
</tr>
</tbody>
</table>

From the above table, an arrangement with a total installed capacity of 600 MW was evaluated to have the highest NPV at a discount rate of 10%. Increasing the discount rate from 10% to 12% did not alter the outcome of the evaluation. To satisfy the forecasted load growth pattern and to meet the peaking requirements of the system, it was further decided that out of the 600 MW, 300MW would be in service by 1995 and a further 300 MW by 1996.

iii. Implementation and Post-auditing of Projects

Currently, Pergau is in the implementation stage and financing is from a soft external loan. Interviews with relevant personnel reveal that actual project cost is envisaged to exceed estimated cost. In cases such as this, in order to obtain additional budget and approval, the additional cost needs to be justified in comparison to the original cost.

Approval for this additional cost needs to be obtained from the same approving authority which approves the original project. Currently, approval for this additional cost has not been sought after yet.
Financial re-evaluation and post auditing of projects due to changes in actual cost is not a standard procedure in TNB. As Pergau is still under construction, financial re-evaluation and post auditing has not been carried out. However, the project proposal does suggest optimum operating mode for the station.

iv. Comments on Project Evaluation

An elaborate study was carried out to determine the optimum form of energy generation to meet the need especially the peaking load requirement in the mid-1995. Further studies were then carried out to decide on the best arrangement which include the installed capacity and the stages of implementation. Studies were both technical and financial, and selection were made based on the highest NPV as well as the envisaged requirement of the system. Our investigation did not reveal any sensitivity or risk analyses being carried out. Issues of inflation were also not dealt with. The NPV’s were calculated at discount rates of 10% and 12% and both discount rates points to the same option.

An exhaustive investigation has been carried out to determine the option to fulfil the requirements using various computer softwares with various scenarios. The selection were made based on the highest NPV and this is in line with what is proposed by financial theory. However, sensitivity and risk analyses and the issues of inflation were not addressed in the evaluation and selection process.
5.2 A. CAPITAL BUDGETING IN THE TRANSMISSION SBU

i. Generation and Evaluation of Project Proposals

The flow chart for implementing a project for the Generation SBU is as shown in Figure 5-2.

Load forecast and generation planning studies carried out by the Development Planning Unit (DPU) will indicate whether there is a need of a new transmission line system or upgrading of an existing line. DPU then generates a proposal to perform the above task with other options for comparison and evaluation. The options were initially evaluated based on their technical merit.

The criteria that need consideration in the technical evaluation include:

i. Transmission voltage; either 66 kV, 132 kV or 275 kV,

ii. Transmission route; which includes the end points (where the substations are to be sited), the type of terrain along the line of traverse, the rentice* available as well as the environmental factors.

iii. The system of interconnection between the various transmission and distribution voltages.

iv. Capacity of the system.

*Rentice is the land corridor upon which transmission lines are built.

On the technical aspect, the design of each option must be adequate, reliable and physically feasible. Another aspect that needs consideration is the environment and the design must adhere to the various environmental regulations. All options must satisfy the technical and environmental aspect prior to any economic or financial evaluation. When these options satisfy all the requirements, DPU then carries out an economic and financial evaluation on them.
FIGURE 5-2

FLOW CHART ON THE PROCESS OF IMPLEMENTING A TRANSMISSION SBU PROJECT

* Development Planning Unit (DPU) carries out load forecast, generation planning and transmission system studies. Studies indicate the need of a new transmission line system or upgrading of existing system to transmit electricity from generating stations to load centres to cater envisaged electricity demand.

* DPU generates project proposal and other options capable to perform above task.

* DPU evaluates proposal and options based on technical, environment and economics & financial aspects. From evaluation, DPU selects preferred option and recommends for implementation.

* DPU seeks approval to implement project at the following levels
  a. Development Committee
  b. Management Executive Committee
  c. TNB Board of Directors
If project exceeds RM 15m, DPU seeks approval from Minister & Treasury

* Upon approval, DPU hands-over implementation of project to Transmission SBU (Projects). Finance Unit (FU) undertakes financing of the project.

* Transmission SBU (Projects) seeks budget from Budget Committee (BC). Transmission SBU (Projects) details breakdown of cost and expected disbursement schedule. Above information are submitted to FU and BC.

* Upon approval by BC, Transmission SBU (Projects) proceeds with project implementation and FU seeks sources to finance project.

* During implementation, Transmission SBU (Projects) submits Interim Completion Certificates (ICC) to FU for disbursement of funds. FU monitors physical progress & seeks justification from relevant authority if actual cost varies to the original cost.

* Upon project completion, Transmission SBU (Projects) hands-over transmission line to Transmission SBU (Operations) to operate and maintain the transmission. Transmission SBU (Operations) maintains records of operating expenditure incurred.
The procedures and techniques used in carrying out the economic and financial evaluation vary from project to project. Nevertheless, our investigation reveals that techniques put forward by financial theory are being used in some of the financial evaluation. Techniques such as NPV, benefit/cost ratio and Economic internal rate of return (EIRR) are currently being employed in these evaluations.

Based on the outcome of the economic and financial evaluation, DPU then recommends an option for implementation. Ideally, the basis of selection would be the economic and financial performance. However, TNB has not standardised the techniques to be used to measure this and most evaluation employs a combination of techniques.

After determining the recommended option, DPU then seeks approval from the following committees to implement the project:

a. The Development Committee
b. The Management Executive Committe
c. The TNB Board of Directors

The TNB Board of Directors gives approval to implement projects of up RM 15 million and projects which exceed this amount needs approval from the Minister and Treasury. DPU through TNB would seek approval from them if projects exceeds this amount.
In our investigation, we find that the most important criteria in the generation, evaluation and selection process is the technical and environment aspect. Options must satisfy these criteria for them to be evaluated further. The next important criteria would be the financial and economic performance. However, in the selection and approval process, some criteria may override the financial performance. These criteria may include urgency, political pressures, national development and social obligation.

ii. Project Financing and Implementation

Upon approval by the relevant authority, DPU then hands over the project to the Transmission SBU (Projects) for implementation. The Finance Unit (FU) of the Corporate Services Division, at the same time, is responsible for providing the funds. A budget request to the FU is submitted by the Transmission SBU and the request outlines the project definition, its scope, estimated cost and the proposed disbursement schedule.

The FU then proposes financial arrangements for the funding of the project and submits them to the Budget Committee (BC). There are no clear cut policies as to the financing mix of projects in the Transmission SBU. Some projects are internally financed while others, especially the larger ones, utilise external loans. Our investigation reveals that external loans are used to finance up to 70% of project cost. We, however, do not find any studies or calculations being carried out to determine the optimum capital structure for Transmission SBU projects.
For larger Transmission SBU projects which requires external funding, the lending institutions usually requires certain minimum IRR (or EIRR) for qualification of such financing. In such cases, a more elaborate financial and economic evaluation is carried out.

Transmission SBU (Projects) would proceed with the implementation of the project upon approval of the budget by the Budget Committee (BC).

iii. Post-auditing and Monitoring of Projects

Monitoring of a project during implementation is through the submission of quarterly statements to the Finance Unit (FU). This statement compares actual disbursements to the original disbursement schedule. A review of the physical progress and expenditure spent is also being carried out quarterly. Any change in scope, design, technique, contract, commercial terms and method of construction needs to be endorsed by the same approving committee. Any cost overrun needs firm justification and endorsement from relevant authority.

In our investigation, we find that there are no systematic method of reviewing projects during operation. Operation and maintenance cost are monitored but there are no attempts to compare them to figures estimated in the evaluation stage.
iv. Summary

In general, we find that procedures on the process of investment generation, evaluation, selection and implementation in the Transmission SBU are available. Some of the advocated capital budgeting techniques such as B/C ratio, NPV and IRR are being employed.

We also find that technical aspects are stressed more than the financial aspects. This is not surprising as options evaluated must be options which are fool-proof and workable.

In the implementation stage, there are no studies made to determine the optimum capital structure for the project. External financing are being used for some projects but there seems to be no justification as to the derivation of an optimum percentage of external versus internal funding.

There are rules and guidelines attempting to monitor and control the expenditure and to check progress of the project. Any change in the scope and terms of the project needs to be endorsed by the approving authority. Cost overruns need to be explained and justified prior to approval of any additional budget.

As to post auditing, our investigation do not reveal that this is being carried out except for the monitoring of operation and maintenance cost. Projects are stressed more in their implementation but not in the monitoring of their performance during operation.
B. PROJECT 2: Transmission System Development for Kulim Hi-Tech and
132kV Transmission Line System from Prai-Kota Star

i. Background

Kulim Hi-Tech is a newly gazetted industrial area in Kedah and electricity is
required to meet the energy needs of the industries in the area. Load forecast and
system studies carried out by TNB reveals the need to extend a transmission
system to meet the load requirements of the area. Subsequently, a proposal for
this project was generated which is for the development of a transmission line
system to the area and the associated 132KV transmission line system from Prai
to Kota Setar in Kedah.

Prior to any approval for the implementation of a transmission development
project, a justification paper which outlines the needs, system and viability of the
proposed system must be prepared. Justification paper for this project was
prepared in July 1991 by Development Planning Unit (DPU) of TNB. Upon
approval of the project, it was handed-over to the Transmission SBU for
implementation. The project is still currently under construction.

ii. Generation and Evaluation of Investment Proposals

Four alternative options were proposed. These four options were clearly outlined,
giving detail arrangement of each system, the equipments required, the line route
and the work involved. Estimated cost for each option are as in Table 5-2.
Table 5-2

Details and Cost Summary for the Four Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Details of Option</th>
<th>Cost (RM million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To build PMU Kulim Hi Tech 132/33/11kv</td>
<td>38.9</td>
</tr>
<tr>
<td></td>
<td>To lay 17km 132 kV line Kulim-Kulim Hi-tech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To re-lay 20km 132 kV line Bkt.Tengah-Kulim</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>To build PMU Kulim Hi-Tech 132/33/11 kV</td>
<td>39.6</td>
</tr>
<tr>
<td></td>
<td>To lay 17 km 132 kV Kulim-Kulim Hi-Tech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To lay 40 km 132 kV line Sg.Petani-Kulim Hi-Tech(N)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>To build PMU Kulim Hi-Tech 132/33/11 kV</td>
<td>39.6</td>
</tr>
<tr>
<td></td>
<td>To lay 17 km 132 kV Kulim-Kulim Hi-Tech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To lay 40 km 132 kV line Sg.Petani-Kulim Hi-Tech</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>To build PMU Kulim Hi-Tech 132/33/11 kV</td>
<td>40.2</td>
</tr>
<tr>
<td></td>
<td>To lay 6 km cable 132 kV Kulim-Kulim Hi-Tech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To re-lay 20 km 132 kV Bkt.Tengah-Kulim line</td>
<td></td>
</tr>
</tbody>
</table>

A technical analysis was then carried out for each option based on its adequacy, reliability and physical feasibility of the system. Simultaneously, the route is selected based on engineering, economic and environmental factors. Economic and financial analyses for the four options were then performed. Cost of each option were first compared. Next, B/C ratio, NPV and Economic Internal Rates of Return (EIRR) were then derived for the four options. Results of the economic and financial analyses are as in Table 5-3.
Table 5-3

Results of the Economic and Financial Analysis for the Four Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Benefits</th>
<th>Cost</th>
<th>B/C Ratio</th>
<th>NPV</th>
<th>EIRR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RM41.0m</td>
<td>RM 38.9m</td>
<td>1.05</td>
<td>RM 21m</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>RM41.2m</td>
<td>RM 39.6m</td>
<td>1.04</td>
<td>RM 16m</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>RM41.2m</td>
<td>RM 39.6m</td>
<td>1.04</td>
<td>RM 16m</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>RM41.1m</td>
<td>RM 40.2m</td>
<td>1.02</td>
<td>RM 9m</td>
<td>13</td>
</tr>
</tbody>
</table>

Option 1 was the option recommended for implementation. From the above table, the bases for selection, other than the technical criteria, were basically costs, B/C ratio, NPV and EIRR. Option 1 is superior in all of the economic and financial criteria compared to the other options and was therefore recommended.

iii. Implementation and Post-Auditing

The project is currently in the implementation stage. Our investigation could not determine the source of financing for the project. However, due to its moderate cost of the project, it is very likely that the project is financed internally. The proposal also did not outline the optimum capital structure for the project.

Interviews with relevant personnel reveal that total project cost is expected to exceed the estimated cost. However, any variations in cost from the original cost needs to be supported by firm justification and approval needs to be obtained from the same approving committee which approves the original proposal. Our investigation also reveals that financial re-evaluation of the project with the new cost is not a standard procedure.
iv. Comments on Project Evaluation

Our analysis reveals that an elaborate study has been carried out to determine the best option to meet the required need. Further analysis were then carried out to decide on the technical feasibilities of each option based on system adequacy, reliability and physical feasibility. Cost and economic returns of each option were then compared using different techniques which include the benefit/cost ratio, NPV and the Economic Internal Rate of Return (EIRR).

The four options proposed are options which are all technically feasible in terms of their adequacy and reliability. The options were then compared based on their economic and financial returns. Option 1 was evaluated to have the best return in terms of its B/C ratio, NPV and EIRR and was therefore recommended for implementation.

The report did not reveal any sensitivity or risk analyses being carried out. The issues of inflation were also not dealt with in the evaluation. Technical feasibility was the first criteria to be met, with economic and financial returns as the next. For the project under study, the chosen option has the highest B/C ratio, NPV as well as EIRR.

A discount rate of 10% was used in the calculation for B/C ratio and NPV.
5.3 A. CAPITAL BUDGETING IN THE DISTRIBUTION SBU

A simplified flow chart on the procedure of project implementation for a Distribution SBU is as shown in Figure 5-3.

i. Generation and Evaluation of Projects

Application for a budget to implement distribution projects are carried out on an annual basis with supplementary budgets to be prepared every 6 months after budget date. Supplementary budgets are to cater for any unforeseen projects or other additional funds required to complete existing projects.

Generation of a distribution project begins when a consumer applies for an electricity supply at District Level through the District Manager. The District Manager evaluates the application and proposes options to link the customer to the existing network. Each option outlines the technical details of the system, its route, equipments and items to be used to implement the project. The proposed schedule, cost and revenues to be obtained from the project are also detailed.

Options are then evaluated based, first, on its technical feasibility, and second, on its cost and potential revenue. The project cost include cost incurred in the acquisition of land, salaries, purchase of equipments and items, works to be contracted out, transportation and travelling cost.
FIGURE 5-3

FLOW CHART ON THE PROCESS OF IMPLEMENTING A DISTRIBUTION SBU PROJECT

* TNB’s potential consumer requests for an electricity supply to an area. Submission is made at TNB’s District Office through TNB’s District Manager (DM). The request outlines the estimated load, type of consumer, voltage and date required.

* TNB’s District Manager (DM) evaluates the request. Evaluation is carried out in terms of the availability of power in the area and other technical aspect including the system of inter-connection.

* DM prepares a proposal and estimates the project cost. The proposal details the technical aspects, project cost and expected revenue from project. Project cost determines amount of contribution required from consumer.

* DM submits proposal to Area Manager (AM) through Capital Works Authorisation Forms (CWA).

* AM gathers all proposals from all DMs in his area. For small projects for District and Area level, AM can approve projects but CWA forms needs to be sent to Budget Committee for budget approval.

* AM submits all proposals to General Manager (GM), Distribution.

* GM (Distribution) seeks approval to implement major projects from:
  a. Development Committee
  b. Management Executive Committee
  c. TNB Board of Directors
  If project exceeds RM 15m, DPU seeks approval from Minister & Treasury

* Upon approval, DM undertakes project implementation and Finance Unit (FU) undertakes financing of the project.

* GM (Distribution) seeks budget from Budget Committee (BC). CWA Forms submitted to BC and FU for budget approval.

* Upon approval by BC, DM (Distribution) proceeds with project implementation and FU seeks sources to finance project.

* During implementation, DM (Distribution) submits Interim Completion Certificates (ICC) to FU for disbursement of funds. FU monitors physical progress & seeks justification from relevant authority if actual cost varies from the original cost.

* Upon project completion, DM (Distribution) maintains the system. DM (Distribution) maintains records on operating expenditures and also revenues from project.
Potential revenues are estimated from the expected electricity consumption of the consumer. The recommended option is then submitted to the Area Manager using the standard Capital Works Authorization (CWA) Forms.

For projects at District and Area level, the Area Manager would give approval to the implementation of the projects. Whilst approving projects, the Area Manager also gathers all proposals from other District Managers from within his area. These proposals are then submitted to the General Manager of the SBU for concurrence and budget allocation.

For major projects which involve major system development, approval needs to be obtained from the General Manager (Distribution). In approving these projects, the General Manager would seek views of the Business Development Department to ensure consistencies of the major projects within TNB.

The General Manager (Distribution) then submits all proposals to the Budget Committee (BC) to obtain funds to implement the proposals. The Budget Committee (BC) comprises of the following members: the Managing Director who acts as chairman and all the General Managers.

From interviews, it was gathered that approval is granted to most distribution projects.
Other than to obtain approval, submission to the Budget Committee is for obtaining a bulk allocation for the Distribution SBU to implement projects. Our investigation reveals that except for the estimation of cost and revenue, no financial analysis are carried out and no capital budgeting evaluation criteria are employed. Projects are approved based on necessity or urgency, rather than on quantitative financial returns.

ii. Implementation and Post-auditing of Projects

Once a budget has been allocated for a project, the Distribution SBU through its District or Area proceeds with the implementation of the project. Most distribution projects are internally financed with a 10% to 50% contribution from consumers. Financing of projects are handled by the Finance Unit (FU) of the Corporate Services Division. The FU would seek external loans if there are insufficient internal funds and these loans are obtained on a bulk rather than on individual project basis.

During implementation, projects are monitored through the submissions of Interim Completion Certificates to the FU. Any variances between actual cost and the original estimated cost needs to be explained and justified.

During operation, our investigation finds that no post-auditing or review of projects are being carried out for the distribution projects. Districts do keep records on sales of electricity to consumers, operation cost and maintenance cost of the system.
Cash flows generated by a project could therefore be determined. Hence, post-auditing could be carried out, if it is required since the necessary data are available.

### iii. Summary

We find that procedures and guidelines on the generation and evaluation process in the Distribution SBU are available. However, the procedures are crude and simple. Techniques used may not be able to identify projects which could reap maximum returns to the shareholders.

Our investigation reveals that TNB implements most distribution projects without carrying out a detailed financial analysis. The current approval policy of distribution projects is understandable as TNB has to operate within its regulatory framework of providing electricity whenever there is a need. Financial return is not the only consideration to implement projects. For example, distribution projects for industrial, commercial and urban residential areas are projects which bring in good returns and projects for isolated and rural areas do not give good returns. However, TNB and the Government would not want rural and isolated customers to be deprived of this basic amenity. TNB and the Government is still in the process of electrifying the nation and it has a moral obligation to supply electricity to all users in the country, no matter how remote they are. The Government has an obligation to develop the nation and electricity is an important component for development.
However, whilst adhering to the above policy, TNB also has set various conditions to ensure that the returns from these projects are reasonable. These conditions include:

i. Consumers contribution amounting to 50% of project cost for domestic consumers, 20% for commercial consumers and 10% for industrial consumers.

ii. Consumers are also required to guarantee a minimum monthly charges for the first 5 years which totals to \(1.2 \times \text{project cost}\) irrespective whether they consumed electricity or not. The guarantee needs to be paid in a form of a ‘performance bond’ prior to project implementation.

iii. Consumers are also required to pay compensation, through the deduction from the ‘performance bond’, in case of default, ie. consumers not able to consume the amount of electricity they are supposed to consume. This is to make good the capital expenditure that has been incurred in providing the facility.

B. PROJECT 3: Electrification of a Housing Scheme in Taman Indah, Muhibbah 11, Setiawan

i. Background

This is a typical project to extend an electrical distribution system to service TNB’s new consumer. The project is initiated by the developer of the housing scheme, through an application to the TNB district office in Setiawan, Perak. The number of consumers estimated for the project was 212 with a load requirement of 541 kVA.
The estimated cost was RM 195,147, of which RM 143,710 is attributed to project cost and the balance of RM 51,437 to service and development cost. Approval for the project was made in 1991 and currently, the project has already been completed.

ii. Generation and Evaluation of Investment Alternatives

Distribution projects are initiated by potential consumers of TNB through their applications for electricity supply. These applications are made at TNB’s district offices and are first processed by the District Managers. The District Manager reviews the technical aspects of the application and proposes a system of interconnection to the potential consumer. The District Manager also estimates the project cost and expected revenues from the project. The amount of contribution from the consumer is also determined. The District Manager then submits his recommendation to the relevant Area Manager for approval.

The Area Manager gives approval for projects at District and Area level. For major projects which involved major system development, approval needs to be obtained from the General Manager (Distribution). Projects approved by the Area Manager are also submitted to General Manager (Distribution) for concurrence and to obtain a budget.
Recommendations and project proposals are submitted through a standardised forms called the Capital Works Authorization (CWA) Forms. The form outlines details and cost of the proposed project including the amount of cost incurred for salaries, procurement of equipments and items, any works to be contracted out, transportation and travelling. For the project, these costs amount to RM 195,147. Of the amount, 50% would be provided by the developer as a contribution fee and this amounts to RM 97,574. Yearly expected revenue to be earned from the project was estimated to be RM 105,307 and this was based on a yearly sales of 491,040 units of electricity.

The project proposal did not detail any other cash flow calculations or other economic or financial analysis. Only a single proposal was submitted without any alternatives.

iii. Implementation and Post-Auditing

Upon approval by the Area Manager or General Manager (Distribution), the General Manager (Distribution) submits the CWA forms to the Finance Unit (FU) of the Corporate Services Division to obtain a budget to finance the project. The FU proposes arrangements for project financing and submits them to the Budget Committee (BC) for approval. The District Manager proceeds with the implementation of the project upon approval by the Budget Committee.
During implementation, the project is monitored by the submission of various Interim Capital Works Completion Certificates by the District Manager to the FU. The FU monitors any variances between actual and original cost. The FU would seek justifications and reasons from the District Manager and approval from the relevant authority for any variances between the two costs.

Our investigation reveals that records of revenues from the project are being maintained.

iv. Comments on Project Evaluation

Distribution projects are relatively small in nature but large in numbers. They are also relatively simple, fast to design and implement as compared to Generation or Transmission projects. Due to the above, there already exists standardisation in design and cost. As such, proposals for distribution projects are not as elaborate as Generation or Transmission projects. Normally a single proposal is proposed without any alternatives. No financial or economic analysis are being carried out. For approval, the project cost and the revenue expected from it in the first year are compared.

For the project under study, 50% of the project cost is being provided for by the developer of the housing scheme.
Distribution projects evaluation do not go through an elaborate economic and financial analysis and our investigation reveals that most distribution projects are being approved for implementation. TNB, however, has guidelines and procedures that need to be adhered to, prior to the implementation of distribution projects. These include the requirement of a minimum contribution from potential consumer as well as a minimum monthly payment from them. The amount of contribution varies with the type consumer load.

5.4 A. CAPITAL BUDGETING IN THE CORPORATE SERVICES DIVISION

A flow chart on the process to implement projects undertaken by the Corporate Services Division (CSD) is as shown in Figure 5-4.

i. Generation and Evaluation of Project Proposals

The project proposals are normally initiated from within TNB for example by a District Manager who requires an office space. Proposals are forwarded to his Area Manager and then to the General Manager of the SBU for approval. Proposals are then forwarded to the CSD, who would then carry out feasibility studies on them.

In the feasibility studies, other options are generated and these options are compared with the original proposal. Comparisons are generally made in terms of the requirements, design, schedule, location and cost. For example, construction of a new building is compared to leasing of existing office space or purchasing of an existing premise. The feasibility studies are summarised in a short justification paper with a recommendation on the preferred option.
FIGURE 5-4

FLOW CHART ON THE PROCESS OF IMPLEMENTING A CORPORATE SERVICES DIVISION PROJECT

* An SBU requests for a project.
  Project may involve a facility to run an operation, for example an office block.
  Request is initiated by a District Manager (DM), who submitted his request to his Area Manager (AM), who later submits all requests in his area to the General Manager of the SBU.
  GM (SBU) then submits request to Planning Unit (PU) of Corporate Services Division (CSD).
  The request outlines the proposal, need, requirements, date required and their justification.

* PU (CSD) evaluates the request.
  PU carries out feasibility studies, generates and evaluates other options to fulfil request.
  From feasibility studies and evaluation, PU selects and recommends preferred option.

* PU (CSD) submits recommendation to General Manager (GM) of CSD.

* GM (CSD) seeks approval to implement project from
  a. Development Committee
  b. Management Executive Committee
  c. TNB Board of Directors
  If project exceeds RM 15m, GM (CSD) seeks approval from Minister & Treasury

* Upon approval, PU (CSD) hands over project to Implementation Unit (IU) of CSD for project implementation. Finance Unit (FU) undertakes financing of the project.

* IU (CSD) through GM (CSD) seeks budget from Budget Committee (BC).
  IU (CSD) details breakdown of cost and expected disbursement schedule.
  These are detailed in CWA Forms which are submitted to BC and FU for budget approval.

* Upon approval by BC, IU (CSD) proceeds with project implementation and FU seeks sources to finance project.

* During implementation, IU (CSD) submits Interim Completion Certificates (ICC) to FU for disbursement of funds.
  FU monitors physical progress & seeks justification from relevant authority if actual cost varies from the original cost.

* Upon project completion, IU (CSD) hands-over project to DM (SBU) but IU (CSD) still carries out maintenance of the project.
Recommendations on the preferred option are then submitted to the General Manager of the CSD. Approval of the project depends upon its cost. General Manager of the CSD could decide projects of up to RM 250,000 and the Chief Executive Officer (CEO) of TNB could approve projects of up to RM 5 million on his personal capacity.

For projects which exceed RM 5 million, proposals are to be submitted to the following committees:

a. Development Committee
b. Management Executive Committee
c. TNB Board of Directors

For projects costing RM 15 million and above, approval needs to be obtained from the Minister and Treasury.

Our investigation reveals that there is no set of criteria on the evaluation and selection process. Selections are based mainly on the cost of previous buildings, size of district and urgency of project. Financial calculations that carried out are normally cash flow calculations which compare investments in building the facility to leasing or renting an existing facility. There are no definite techniques that are being used in this comparison, but common techniques employed are the payback method and the benefit/cost ratio. However these techniques only serve as a guide and are not used as a selection criteria.
ii. Financing, Implementation and Post-auditing of Project

The financing of the project is handled by the Finance Unit (FU) and the implementation is by the Implementation Unit of the CSD. Projects undertaken by CSD are usually medium size and are internally financed.

During implementation, projects are monitored by the submission of various Interim Completion Certificates to the Finance Unit by the Implementation Unit. Any variances between the actual cost and the original cost needs reasons and justifications. Approval from the same committees which approve the project needs to be obtained for any of such variances.

No post-auditing are being carried out on projects undertaken by the CSD except for the report of any cost escalation and delays.

iii. Summary

Our investigation reveals that procedures are available in the CSD for purpose of evaluating its projects. In addition, some studies have also been carried out in the generation and evaluation of these projects. However, these procedures seem to be crude. Currently, there are no set of criteria on the selection and approval of projects. Financial analysis are being carried out but there are no standardisation in the techniques used. Results obtained from financial analysis only serve as guides and not used as selection criteria. Projects are approved irrespective of their returns or benefits.
B. PROJECT 4: Implementation of a Proposed Highrise Office Building on Lot P.T. 335, Section 41, Kuala Lumpur

i. Background

TNB owns a plot of land on lot P.T. 335 Section 41, Kuala Lumpur and it was proposed that a high rise office building to be developed on the plot. A study was conducted to establish findings and make recommendations on its suitability as an office building for TNB and other commercial uses.

The plot is located off Jalan Raja Abdullah, approximately 100 metres from Jalan Sultan Ismail. The study was conducted in 1992, and during the study, it was anticipated that the building would be constructed from 1992 to 1994 with income being generated in 1995. At the moment due to the urgency of other projects, development for this project is still being kept on hold.

ii. Generation and Evaluation of Investment Proposals

The proposal to develop the plot was initiated by the Properties Section of the Corporate Services Division. The plot is already zoned for commercial development and is earmarked for the development of a highrise building. In the study to assess the viability of the project, no other alternatives were proposed except for the high rise building. No studies were carried out to determine the most optimum height for the building. Studies, cash flow and rate of returns calculation were only calculated on the one proposal.
In the evaluation, cash flow analysis was carried out for a period of 23 years (1992-2015). No reasons were given as to why 23 years was chosen as the study period. Income generated were from rentals either from TNB’s SBUs or other commercial entities. Income rates were estimated based on market rental rates from buildings in the neighbourhood as well as the economic conditions of the country. The study revealed the viability of the project with an internal rate of return of 91% over the development cost. Currently, the project has not received the necessary approval and has not commenced yet.

iii. Implementation and Post Auditing

The project has not been implemented.

iv. Comments on Project Evaluation

The above project is one of a few projects, in which studies were carried out to ascertain its viability. However, our findings revealed some flaws in the evaluation of the project. These include:

a. The study did not consider other alternatives in the determination of the best option to develop the plot of land.

b. The cost of the plot was not considered in the evaluation. As such, the project indicated such a high return. This is misleading.

c. Sensitivity and risk analyses were not carried out in the studies, especially in the estimation of rental rates.

d. There was no justification for the 23 year period chosen for the life of the building.