MANAGEMENT PROBLEMS OF PUBLIC ELECTRICITY AND WATER CORPORATION WITH SPECIAL REFERENCE TO EGYPT

By

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Contents

List of Diagrams........................................ iii
List of Tables........................................... iv
Abstract.................................................. vii
Acknowledgement......................................... xi

CHAPTER I

INTRODUCTION............................................. 1
: Background to the Problem................................ 2
: Objective of the Study.................................... 3
: Scope of the Study...................................... 3
: Data Collection......................................... 5
: Organization of the Study............................... 7
: Review of related Literature............................ 7

CHAPTER II

HISTORICAL DEVELOPMENT OF PUBLIC ELECTRICITY AND WATER CORPORATION (PWMC)............................................. 24
: Background.............................................. 24
2. The Central Electricity and Water Administra-
tion (CEWA) 1958-1985................................... 26
3. The Central Electricity and Water Corporation
(CEWC), 1966-1975........................................ 29
4. Public Electricity and Water Corporation,
(PWMC), 1975-1991........................................ 32
5. Structure of PWMC up to 1981 .......................... 35

CHAPTER III

PLANNING AND BUDGETING SYSTEM.......................... 40
1. Objectives OF PWMC................................... 40
2. Planning in PWMC..................................... 44
1) Departmental Planning................................... 44
a) Structure................................................. 44
b) Functions of Departmental Planning......................... 47
1. Operational Planning.................................. 46
2. Developmental Planning................................ 51
11) The Budgeting System................................ 54
iii) Financial Planning..................................... 77
CHAPTER IV: ENSO’s PLANNING SYSTEM: AN ANALYSIS
1. Evaluation of ENSO’s Planning
   a) Main Features of ENSO’s Planning
      1) Annual Budget
      2) Departmental Planning
   b) The Validity of ENSO’s Planning
   c) Factors Affecting ENSO’s Planning
      1) Internal Factors
      2) External Factors
   ............. 105
   ............. 106
   ............. 110
   ............. 113
   ............. 115
   ............. 116
   ............. 135

CHAPTER V: AN ASSESSMENT OF ENSO’S PERFORMANCE
1. Productivity
2. Profitability
3. Services
   ............. 163
   ............. 164
   ............. 186

CHAPTER VI: CONCLUSIONS AND RECOMMENDATIONS
   A) The Need for a Systematic Planning Approach
   B) How to apply a Corporate Planning System to ENSO
   ............. 203
   ............. 204
   ............. 207
   ............. 211

APPENDIX 1:
APPENDIX 2: ENSO Organizational Chart
APPENDIX 3: ENSO Organizational Chart (1)
APPENDIX 4: ENSO Present Organization Chart (2)
APPENDIX 5: Map of the Sudan showing the distribution of Electricity and Water Services among the Southern towns
APPENDIX 6: Main Wates in the Preparation of the Electricity Plan
APPENDIX 7: Map of Sudan, showing ENSO Electricity Systems and Potential Hydro Sites
APPENDIX 8: General Layout of the Blue Nile Grid and Eastern System
BIBLIOGRAPHY
   ............. 240
   ............. 241
   ............. 242
   ............. 243
   ............. 244
   ............. 245
   ............. 246
   ............. 247
   ............. 248
<table>
<thead>
<tr>
<th>Diagram No.</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The four-step management process (for one manager for one task)</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>How the deciding or planning process fits into the process of management</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>3 managers in hierarchy (only one subordinate is shown for each)</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>Position of the Planning Division in the Organisational Structure of PRWC</td>
<td>45</td>
</tr>
<tr>
<td>5</td>
<td>A) Corporate Planners as one of the different departments of the organization</td>
<td>215</td>
</tr>
<tr>
<td></td>
<td>B) Corporate Planners as a personal adviser to the Chief Executive</td>
<td>225</td>
</tr>
<tr>
<td>6</td>
<td>Corporate Planning Committee in the intermediate position between the Corporate Planner and the Chief Executive</td>
<td>217</td>
</tr>
<tr>
<td>Table No.</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>Committed Generation</td>
<td>56</td>
</tr>
<tr>
<td>2</td>
<td>Forecast Output of Existing and Committed Generators</td>
<td>59</td>
</tr>
<tr>
<td>3</td>
<td>The New Generation Proposals</td>
<td>61</td>
</tr>
<tr>
<td>4</td>
<td>The New Generation Proposals for the Six Years Plan 1977-1983 - With Date of Commissioning</td>
<td>62</td>
</tr>
<tr>
<td>5</td>
<td>Proposed Budget, Approved, and Cuts for 1973/74-1980/81</td>
<td>66</td>
</tr>
<tr>
<td>6</td>
<td>Annual Budget for Electricity</td>
<td>71</td>
</tr>
<tr>
<td>7</td>
<td>Inadequacy of the Approved Capital Budget 1977/78-1980/81</td>
<td>72</td>
</tr>
<tr>
<td>9</td>
<td>Effect of Cost Regulation on the Value of the Proposed Plan</td>
<td>75</td>
</tr>
<tr>
<td>10</td>
<td>Annual Budget Expenditure</td>
<td>79</td>
</tr>
<tr>
<td>11</td>
<td>The Rate of Increase in Salaries and Wages</td>
<td>86</td>
</tr>
<tr>
<td>12</td>
<td>Increase in Fuel and Operating Materials costs in Karachi Area over the past 3 years (1973/74-1980/81)</td>
<td>83</td>
</tr>
<tr>
<td>13</td>
<td>Projects which are financed through loans</td>
<td>89</td>
</tr>
<tr>
<td>14</td>
<td>Proposed and Approved Capital Budgets 1977/78-1980/81</td>
<td>91</td>
</tr>
<tr>
<td>15</td>
<td>The Annual Amount of Water and Electricity Produced and sold by PEMC</td>
<td>93</td>
</tr>
<tr>
<td>16</td>
<td>Number of Consumers</td>
<td>97</td>
</tr>
<tr>
<td>Table No.</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>17</td>
<td>Deficit in Manpower and Transportation Facilities</td>
<td>53</td>
</tr>
<tr>
<td>18</td>
<td>The Rate of Revenue Collection Compared to Total Billing</td>
<td>105</td>
</tr>
<tr>
<td>19</td>
<td>Summary of Demand Increase and Generator Capability</td>
<td>166</td>
</tr>
<tr>
<td>20</td>
<td>The Rate of Deterioration in the Generation System of PEWC</td>
<td>168</td>
</tr>
<tr>
<td>21</td>
<td>Maximum Demand Forecasts for the Existing Systems for 1980-1981</td>
<td>169</td>
</tr>
<tr>
<td>22</td>
<td>Towns with no Electricity Supply at Present</td>
<td>172</td>
</tr>
<tr>
<td>23</td>
<td>The Total Number of Urban Population with Access to Electricity (By Province)</td>
<td>174</td>
</tr>
<tr>
<td>24</td>
<td>Distribution of Electricity Consumers (By Category of Consumers)</td>
<td>176</td>
</tr>
<tr>
<td>25</td>
<td>Blue Nile Grid Generation Shortfall (Average Hydrological Year)</td>
<td>177</td>
</tr>
<tr>
<td>26</td>
<td>Daily Production of Water at the Four main Stations</td>
<td>179</td>
</tr>
<tr>
<td>27</td>
<td>Number of Towns with Access to Urban Water Facilities</td>
<td>182</td>
</tr>
<tr>
<td>28</td>
<td>Rate of Growth in Number of Water Consumers</td>
<td>184</td>
</tr>
<tr>
<td>30</td>
<td>Financial Performance for the Years 1974-1980</td>
<td>189</td>
</tr>
<tr>
<td>31</td>
<td>Financial Deficit Caused by Merger of the Public Utilities with PEWC</td>
<td>190</td>
</tr>
<tr>
<td>32</td>
<td>Annual Deficit of FEWC Area (Figures as to 30th June)</td>
<td>194</td>
</tr>
<tr>
<td>Page</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>33</td>
<td>Financial Performance of the Blue Nile Field and Shartoon Area for the Years 1977-1981</td>
<td>195</td>
</tr>
<tr>
<td>34</td>
<td>Lost Working Hours in the two Fison Oil and Soap Factory</td>
<td>200</td>
</tr>
</tbody>
</table>
ABSTRACT

Planning, as defined by many writers, is the means to maximize the total effectiveness of an organization. Effectiveness, here, is defined as the degree to which an organization attains its objectives. Thus if planning is the means to effective performance, absence of planning should be one of the reasons for ineffective performance.

Other writers define planning as: "a systematic method for the effective and efficient management of change in the best interest of the organization." This includes the setting of objectives and goals and the formulation and selection of alternative strategies and courses of action to reach the goals and objectives.

FMG, as one of the important public organizations in the country, has recently been subject to severe criticism because of its ineffective performance. Many of the studies made on the corporation's performance has attributed this ineffectiveness to the ineffectiveness of the corporation's management system.


This study is designed to examine the planning system of PAMC as a management function, which should enhance the performance of the corporation.

The main research method adopted in carrying out this study was personal interviews with all top management echelons of the organization.

Previous studies on the organization were also examined, as well as all official documents relating to the subject. Books, United Nations publications and articles were also considered.

The main problems encountered in this study were the non-availability of statistical data and exact figures within PAMC, since their operations are usually based on rough estimations and out of date data. The same method of estimation was adopted to provide the figures which appear in this thesis, but different sources were examined in order to try and arrive at more exact data. This entailed interviewing and reinterviewing people in different positions many times.

Although the data available in the Statistics Division of PAMC was meagre and to some extent out of date it was nevertheless helpful.
Most of the financial data was extracted by the writers own effort from the annual budgets, the balance sheets and the auditors report on the corporations financial performance.

The main findings of this study was that no Proper Planning was practiced within P.W.C. The annual budget, although referred to as the annual plan, but being in the traditional sense and made on an incremental basis is more appropriate as a control device than as a planning mechanism.

Departmental planning as practiced by P.W.C. was not complete because it is not part of a strategic plan thus it lacked the required action which forms an important part of a proper planning system.

Financial and manpower planning were completely missing. This created a great world of uncertainty for the corporation, with regard to its means of achieving its objectives.

Systematic planning as a management function is not recognized at any level of the corporation. This led to a situation where most of the decisions were haphazardly done, mostly in response to a pressing problem. This in turn led to further straining the corporation's resources.
The study consists of six chapters arranged as follows:

Chapter one contains an introduction to the study.

Chapter two deals with the development of the corporation.

Chapter three discusses the planning process as it exists within the corporation.

Chapter four makes an assessment of PBWC's planning system.

Chapter five examines the corporation's performance.

Chapter six contains a conclusion with some recommendations for improving PBWC's planning system.
I would like to express my deepest gratitude to Dr. Al-Angab Ahmed Al-Terifi for his invaluable supervision and guidance which have enriched this study and brought it to fruition.

To Dr. H.A. Ayyash, my sincere thanks and appreciation for his help in choosing the subject of this study.

My thanks are also extended to Dr. M. Al Hasan, who was associated with this work at the beginning, for his encouragement and advice.

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Background to the Problem

This study is primarily concerned with identifying and analysing some of the management problems that impede the performance of big and complex organizations.

Recently a considerable number of organizations in Sudan have grown in size, scope and complexity of operations. This situation has brought to the surface the question of management efficiency. It is useless to emphasize the crucial role played by a sound management system in the social and economic development of the nation. As put by Peter Drucker:

"Managing goes way beyond passive reaction and adaptation. It implies responsibility for attempting to shape the economic environment, for planning, initiating and carrying changes in that economic environment for constantly pushing back the limitation of economic circumstances on the enterprises' freedom of action... Management is not just a creature of the economy, it is the creator as well and only to the extent to which it masters the economic circumstances and alters them by conscious directed action does it really manage". 1/

This quotation defines the large and difficult task which management is to carry out. The manner in which each organization conducts its activities determines the

degree to which it can attain its objectives. Management is the primary force within organizations for coordinating the activities of the subsystems and relating them to the environment.

Another scholar states that:

"Managers are needed to convert disorganized resources of men, machines and money into a useful enterprise. Managers combine the service they can render, mobilize the required means of production, coordinate activities both within the enterprise and the outside world and inspire people associated with the enterprise to work towards common objectives. They are the activating element."

Thus it is clear that the manner in which management performs its function directly affects the organization's performance positively or negatively.

In their quest for sound and effective systems of management, the different national governments in Sudan have sought different organizational forms for public enterprises as instruments for carrying out public policies. Such forms vary according to the type of management adopted. Among the most common of these forms are:

- Departmental enterprises
- Government or shareholders

companies and public corporations. This latter form has recently gained popularity and it is believed to be more efficient and more effective in achieving the stated objectives. Motivated by the professed efficiency of public corporations, a considerable number of Sudanese public enterprises have been given the corporate form of management since the late sixties. However, the practical contribution of these corporations to the development of the national economy and to the welfare of the public has posed the vital question of whether these enterprises are operating with acceptable degree of efficiency, and are successfully achieving their stated objectives and adopting sound and effective systems for carrying out their objectives.

**Objectives of the Study:**

This thesis aims at:

1. Studying planning as a management function that affects the performance of PWSO.
2. To offer proposals as how the planning problems of PWSO could be solved.

**Scope of the Study:**

PWSO was chosen for this study for the following reasons:
1) Its performance is and has been for the past few years, an issue of the day, since this concerns and indeed directly affects the public and their welfare. The recurrent cuts in the electricity and water supply have very deep and far-reaching social and economic repercussions which could ultimately lead to rather serious political implications. As one member of the Board of Directors has put it:

"Production losses resulting from electricity cuts in this country may be counted in millions, while the remedy could cost a sum of fifty thousand Bangladesh pounds". 1

2) PEMC provides a unique example of a public corporation. Although it is a corporate body, this is in name only, since it is really no more than an analogue of the government departments and there are no well-defined corporate aims.

3) PEMC is a good example of a big and complex organizations where complexity has brought about new challenges to its management with this being clearly reflected in its performance.

Preliminary studies and surveys conducted on PEMC showed that the organization is indeed facing a number of fundamental

1/ Deliberations of the Dissolved Board of Directors, PEMC, Minutes of the 11th Meeting 4-3-1979.
problems which can be grouped into the following categories:

a) Internal organizational and management problems.
b) External constraints, primarily government regulations and procedures.

In my opinion, the internal problems of an organization may have more serious and far-reaching effects than the external ones. The effective management of an organization enhances its performance by integrating the environment both inside and outside the organization and by solving both internal and external problems which impede the organization's performance. Finally, effective management utilizes the actual as well as the potential resources available both inside and outside the organization.

The history of PWGC shows that it was fairly successful, judging by the extent to which it was able to attain its objectives. However, since the early seventies it has gradually deteriorated into a loss-making body, unable to meet its social obligation of providing adequate water and electricity services. This deterioration is still continuing. Evidence shows that the unfavourable factors that affected the corporation's performance could not be wholly attributed to external influences, rather a significant part emanates from within the management system itself.
The most prominent managerial problems include the following:

- Absence of corporate objectives and policies.
- Lack of cooperation, communication and coordination.
- An ill-defined organizational structure which results in confusion over duties, delegation of authority and accountability.
- An inability to meet the declared goals and objectives.
- A questionable distribution of manpower.
- A low level of employee morale. \(^1\)

However, this is confined to developments in PENG up till 1981.

Data Collection:

Data and information for this study were obtained from the following sources:

1) Interviews with members of top management staff of PENG i.e., Department heads, section heads and members of the planning divisions.

2) Official documents.

3) Previous studies and surveys on the work of PENG.

4) Relevant literature in public administration and management.

Organization of the Study:

This study contains six main chapters as follows:

Chapter I: Introduction to the study and a review of the relevant literature.

Chapter II: A historical account of the development of the corporation.

Chapter III: Consideration of the planning process as it exists within the corporation and an account of the corporation's objectives.

Chapter IV: An evaluation of PEMC's planning.

Chapter V: An assessment of the PEMC's performance.

Chapter VI: Conclusion and recommendations.

Review of Related Literature:

Definitions of Planning:

A plan is a detailed method, formulated beforehand, for doing or making something. Planning is the process of deciding in advance what is to be done and how. It therefore involves determining overall missions, identifying key result areas and setting specific objectives as well as developing policies, programs and procedures for achieving them. East and Rosenweig define it as follows:
"Planning provides a framework for integrating complex systems of interrelated future decisions. Comprehensive planning is an integrative activity that seeks to maximize the total effectiveness of an organization as a system in accordance with its objectives."

Egerton and Brown, define planning according to the following concepts:

1/ Planning is a systematic method for the effective and efficient management of change in the best interest of the company.
2/ It includes determining where the organization is to go as well as how to get there; or, more formally, the setting of objectives and goals and the formulation and selection of alternative strategies and courses of action to reach the goals and objectives.
3/ Planning identifies and analyzes opportunities, weaknesses, problems and threats and sets priorities for capitalizing on or overcoming them so that company resources will be put to the best use.
4/ Planning is incomplete if it does not entail regular measurement of progress toward objectives and goals and the execution of strategies and action programs.
5/ Planning is, or should be a continuing process, not a once a year exercise, involving all those whose jobs have a significant effect on the fortunes of the company.
6/ It is already distinct from forecasting. Forecasting, one of the essential elements of planning, is a prediction of what will happen on the basis of certain assumptions.
7/ Planning is an attempt to determine what should happen (in very specific terms) and then to take steps that make it likely to happen.

In the light of these definitions it may be said that planning is concerned with the future. It differs from forecasting in that it is intellectual in nature; it is mental work that requires reflective thinking; imagination and foresight.1/

It is equally true that planning is not decision making. Rightly they both relate to future action with no specification of the time elements, while planning is a much more comprehensive process. It consists of establishing objectives, determining various (and possibly numerous) lines of action to achieve the objectives, determining decision points through the pattern of alternative actions and finally selecting a simple primary pattern for action based upon sequential decisions and a decision among total possible patterns of action. Furthermore, timing of action is a necessary requisite of planning. Planning may also include establishing a list of plans and their priority with the highest ranked plan being considered as the plan which stimulates the action.

Hence certain characteristics emerge from this definition which shape the most important steps in an effective planning process.

a) Identification of a need or reflection of stimulus.
b) Assimilation of information.
c) Relating of bits of information and beliefs.
d) Establishing objectives.
e) Establishing premises.
f) Forecasting future conditions.
g) Structuring alternative chains of actions based upon sequential decisions.
h) Ranking or selecting total plans which will achieve the best balance of ultimate objectives and subsidiary objectives.
i) Establishing policies.
j) Establishing standards and means for measurement of adherence to the plan of action.

Types of Planning:

Different authors have distinguished a variety of types of planning. The basic idea behind the subject is that the term planning may be applied to practically any activity. However, although many types of planning have appeared under different titles, yet they all cover more or less the same activities. The following classification from Murdock's "Nature of Planning and Plans" seems to be more comprehensive to cover all other classifications:

1/ Ibid., p.41.
1. **Physical Planning**: It deals with specific arrangement of objects, such as office layout, location of buildings and equipment etc. Here the primary objective is spatial arrangement.

2. **Organizational Planning**: It is concerned with the grouping of activities, the development of a pattern or structure of working relationships among personnel in the enterprise, establishment of channels of communication and lines of authority, staffing of positions in the organization and management development.

3. **Process Planning**: Its major objective is the development of a method or process as required. This has often been called by other writers "Operational Planning", since it is concerned primarily with sequences of motions, rather than arrangements of objects or relationships among people.

4. **Financial Planning**: It is concerned primarily with obtaining the right amounts of money at the right time, and to ensure the proper allocation of the available money so that it does not lie idle, the investment of money in terms of risk return ratios and the prevention of loss of money through waste or in any other way. Financial plans are usually closely tied in with the other functional plans of an organization.
6) Functional Planning: It is directed towards any major type of work which the organization carries out, usually on a continuing basis, e.g., marketing, manufacturing etc. Functional planning represents a section of physical, organizational and financial planning applied to functional objectives.

6) General Planning: It is total planning i.e., it is the master planning for the organization as a whole, it is the summation and integration of functional plans in one sense and the establishment of the framework for functional plans in another. General planning is a combination of all four preceding types of planning. General planning is the process by means of which the organization adapts to its environment in time to ensure its existence. It solves and prevents present and future problems internal and external in nature. 

This type of planning is specifically known as "Corporate Planning" which has recently started to gain in popularity, especially after the introduction of the "System Approach" to the study of organizations. People started to view the organization in terms of whole systems.

1/ Ibid., pp. 41-42.
contrary to the traditional approach of viewing it as a composition of different individual parts. Thus concern has shifted from the efficiency of the particular to the efficiency of the whole organization.

The basic assumption here being that the productivity of the whole organization is greater than the sum of the productivity of its individual parts.

However these divisions are not operated as isolated entities, but are knitted together in a corporate management team applying a synergistic effect. As Simmons would call it:

"the two-plus-two-equals-five phenomenon. This overview and integration of the total operation helps direct the future of the organization in the right direction". 1/

Going to our "Corporate Planning" concept, we believe that since it is the effectiveness of the whole corporation that concerns this thesis, then it is more appropriate to seek models of whole system planning, rather than any of the other prevailing types of planning.

The problem that faces such type of planning is that many authors have given the term different meanings, such

as long-range planning, comprehensive planning, strategic planning, etc. Some give the term a specific connotation - the determination of strategy; others consider it a process which extends and enlarges the annual budgeting cycle; some consider it essentially a matter of deciding "what business you are in"; some consider that a major programme, such as the conversion of the coal-based gas industry, represents a corporate plan.

This problem of definition is also complicated by the different classifications of planning, such as formalisation planning, indicative planning and directive planning which also exist. Finally there is a variety of individual terms: objectives, strategy, purpose, aims, targets, goals, policies, programmes, and even philosophies, all of which appear in any comprehensive view of the literature.

However what concerns us here is the substance of the subject rather than its semantics, since no visible differences exist as to substance, as further extension of the problems of defining the term will be attempted. Nevertheless Denning's definition of the term seems to be the most pertinent to the subject of this thesis; according to Denning, Corporate Planning is:

"A formal, systematic, managerial process, organized by responsibility, time and information, to ensure that operational planning, project planning and strategic planning are carried out regularly to enable top management to direct and control the future of the enterprise". 1/ 

To further clarify this definition, Denning defined the expressions as:

Operational Planning: "The forward planning of existing operations in existing markets with existing customers and facilities. This type of planning seems to be a continuing preoccupation of middle management. The time span over which such planning can usefully be carried out depends on the nature of the business. In business where quick response to changing task is required detailed operational planning for more than a year ahead is usually regarded as wasteful of management time and effort. On the other hand, in industries with a greater degree of stability, it may be possible to develop effective detailed operational plans for five years or more". 2/ 

Project Planning: "The generation and appraisal of the commitment to, and the working out of the detailed execution of, an action outside the scope of present operations which is capable of separate analysis and control". 3/ 

Here the time span could be 2, 3 or 15 years, depending on the nature of the task. 

Strategic Planning: Until recently, in many public and private enterprises, operational and project planning  

1/ Denning, p.2.  
2/ This, p.3.  
3/ This, p.5.
represented the sum of planning activities. Both operations and projects were carried out in a framework of policy which was usually implicit rather than explicit. The advocates of systematic corporate planning base their case on the view that the determination of the future can be improved by a systematic, analytical approach which reviews the business as a whole in relation to its environment.

Thus strategic planning is the determination of the future posture of an organization with special reference to its product-market posture, its profitability; size; rate of innovation; and its relationships with its executives, employees, and certain external institutions.

Strategic planning can vary greatly in nature and the time span over which decisions are taken. It is also important to note that a strategy can only be made a reality by undertaking projects or operations. Essentially, a strategy is a set of ideas about a desirable future and a broad pattern of attainment. It is conceptual rather than tangible. To achieve that future requires action, and, in business terms this action will be expressed in projects or in operations.\(^1\)

The idea behind, combining these three types of planning in one systematic process is that:

"A business at one moment or time is conducting operations and will have a variety of projects in various stages of completion. The sum of all these at some point in the future will represent a strategic posture explicit or implicit and will enable top management to see what the shape, size, profitability etc. of the business are likely to be at that point in the future. This will probably raise questions as to whether this is a desirable future. If the answer is no, a desire for improvement can trigger off a strategic rethinking which will lead to the generation of new projects or more efficient operations, both of which will need to be planned. Thus, corporate planning made up of these three types of planning is of its essence an iterative, rather than a once and for all, process." 1/

Model of Corporate Planning:

How does the system work?

The following illustration, taken from Argenti "Systematic Corporate Planning", offers an insightful explanation of an effective planning process.

1/ Ibid., p.6.

2/ Argenti John; Systematic Corporate Planning, Nelson and Sons Ltd., Great Britain, 1974, pp. 10, 12.
Diagram (1)

1. Accept task.
2. Decide how.
3. Give instructions.
4. Check results.

The four-step management process (for one manager for one task).

Diagram (2)

1. Accept task.
2. Decide how to decide.
3. Consider alternatives.
4. Select the best.
5. Draw up action plan.
7. Check results.

How the deciding or planning process fits into the process of management.

Source: Argenti, John; Systematic Corporate Planning, Nelson and Sons Ltd., Great Britain, 1970, pp. 10, 12.
the exercise of great care and thought then he will deliberately search for imaginative ways of performing the task (Stage B). He will carefully examine the merits of each before making up his mind (Stage C), and he will then prepare detailed plans for each of his subordinates (Stage D). But if at stage "A" he decides that prompt action is indicated he will perform the remaining stages at such a speed that they will be reduced almost to vanishing point. Thus his decision at stage C will consist of selecting the best of a very few alternatives after a necessarily hasty and superficial examination. The action plans that he draws up for this subordinates at stage D, may be no more elaborate than a few words, probably spoken rather than written. Deciding then is a truncated form of planning, or planning is an extended form of deciding, or since both lead to the giving of instructions. However in the one case they are usually brief and simple and in the other usually complex and carefully devised.

In most organizations the relationship between the managers is hierarchical. This is also the kind of the organization we are dealing with in this study, i.e. each manager reports to a supervisor above him and has several subordinates below him for whom he is responsible. The essential logic of this arrangement which simply places
several exhibit "2", i.e. one on top of the other, as shown in the following diagram:

Diagram (1).

3 Managers in a hierarchy (only one subordinate is shown for each).

Senior Management:

1. Accept task
2. Decide how
3. Give instructions
4. Check results

Middle Management:

1. Accept task
2. Decide how
3. Give instructions
4. Check results

Junior Management:

1. Accept task
2. Decide how
3. Give instructions
4. Check results

The decisions taken by managers near the top of the hierarchy will usually be more important than those taken by managers lower down, i.e. those decisions will have a more far-reaching effect upon the organization’s ability to achieve its purpose than those taken lower down.1/

Where such an arrangement exists one would expect the whole organization to perform as one unit from top to bottom, guided by one major task which is split down into numerous operational objectives and delegated to the constituent parts of the organization. This would entail senior managers spending more time on planning (as opposed to deciding) because the importance of their decisions justifies the expenditure of considerable resources on the decision making step. Managers at upper levels of the hierarchy take some decisions of such importance to the organization that they are categorized "Strategic". Strategic planning, then, is the careful, deliberate, systematic taking of decisions which affect or are intended to affect the organization as a whole (as opposed to only parts of it) over long periods of time.2/

So corporate planning may be defined as the careful systematic taking of strategic decisions. But, in a similar manner as in the above mentioned explanation of systematic

1/ Ibid., p.16.
2/ Ibid., p.17.
planning, corporate planning includes not only systematic taking of strategic decisions, but also the checking of strategic results. This is actually the way in which top management of the organisation can control the organisation's performance and keep it in line with the stated objectives.
Background:

The Public Electricity and Water Corporation (PEWC) is a large and complex organization. The present organizational structure is a product of a series of changes that have taken place throughout its history.

In this part of the study an attempt will be made to give a brief account of the evolution and development of PEWC.

Four main phases in the development of this organization can be identified: The first phase is the Sudan Light and Power Company Limited from 1925-1959. The second is The General Electricity and Water Administration from 1959-1966. The third is the Central Electricity and Water Corporation from 1966-1973, and the last is the Public Electricity and Water Corporation from 1974 to 1981.

1. The Sudan Light and Power Company Limited 1925-1959:

The SLPC started as a limited liability company owned by British shareholders. It was to take over and manage, on behalf of the Sudan Government, the existing water and electricity works, ice supply and steam tram and ferry services
services in Khartoum, Khartoum North and Omdurman.\(^1\)

The company was given a concession until the end of 1955 to exercise all the above mentioned activities.

In 1950, the company extended its activities to Wad Medani. The Wad Medani Light and Power Company was formed like the SLPC in England, with a capital of £1,000,000 and a period of concession up to the end of 1955 in the town of Wad Medani, and the adjacent areas. The share capital of the SLPC was £2,428,000. As its operations were on a small scale, it was designed as a managing agent i.e., providing management and technical services.

During the following two decades the services provided by the SLPC increased steadily. In 1955, the installed generator capacity had reached about three mega watt. In 1952, the Sudan Government purchased all the shares held by the British and thus became the sole shareholder of both SLPC and the Wad Medani Company. Despite this fact, the legal status of the two companies had not changed, because it was believed that leaving them on the British Register of Joint Companies would enhance the opportunity of raising funds in England. Yet no advantage was realised from this.

position and the Sudan government took over the responsibility of providing the needed funds from 1961-1966 Development Plan.

An important phase in the development of the organization started shortly after independence of the Sudan. In 1956 the Minister of Finance and National Economy submitted a memorandum to the Council of Ministers in which he suggested the creation of two local public boards to temporarily take over the function of the two companies - SLPG and Wad Medani Company. In the long run a public corporation was to be entrusted with electricity and water services in the whole of the country. The decision to form an autonomous public corporation was interrupted however by the military coup in 1956. After the coup d'etat a new law establishing a Central Electricity and Water Administration was enacted. This was a departmental type of a public enterprise attached to the office of the Minister of Public Works.

2. The Central Electricity and Water Administration (CEWA)

Although a new organizational form was assumed, the internal structure did not differ from that of the SLPC.

At the top was a general director with a deputy director, who in turn was assisted by the heads of five departments.

The functions and duties of CEWA were to generate, distribute and sell electricity and to store, purify and sell water. In addition CEWA was entrusted with conducting research and studies connected with water and electricity supply and demand.

All senior posts were occupied by former British staff of SLPD, except for the deputy director, who was the only Sudanese. Organizationally, the only point of difference between CEWA and SLPD was that the former became a wholly government body dependent on government sources of finance. All staff members were considered government employees subject to civil service rules and regulations. Besides CEWA had to follow all financial regulations of the Central government. The financial criterion for CEWA’s performance was that:

"It shall be the duty of the administration of CEWA to manage the enterprise on a proper commercial basis, such that the revenues of any year are sufficient to meet the expenditure of that year". 2

From 1959 onwards, the operating capacity of the existing power stations witnessed a steady increase when

1/ Appendix No. 1.
an additional ten mega watts were added to the Burri Station. In 1952 a fifteen mega watt hydro power station at Senar and a twelve mega watt station at Khashm El Girba were constructed by the Ministry of Irrigation and Hydro Electric Power and handed over to CEAWA. These simultaneously added to the administrative tasks of CEAWA and resulted in the creation of a new administrative unit known as Area Managers, thus a sixth department was established within CEAWA for running the areas affairs.

The third phase of development came about in the early sixties with the advent of the October Popular Revolution in 1962. The October regime was, broadly speaking liberal democratic. The characteristic feature of this period was the call for change, motivated primarily by the slogans for purges, which extended to many civil servants in all government institutions. CEAWA was no exception. In addition the period was also characterized by the call for complete Sudanization, with the result that many Sudanese administrators were placed in important technical and administrative posts for which they had neither the qualifications nor experience. The Sudanization, which was hurriedly done, had its effect on the performance of the public service. CEAWA as one of these organizations was in no better position.

\[1/\]
Memorandum of the Professional Engineers to the Prime Minister, 2.9.1973, The Memorandum of PEMC's officials Trade Union to Seved/Torshima E. Torshima Committee 29.7.1973, PEMC.
Other changes which had an effect on CEWA’s position were the result of pressure exercised by its Trade Unions for the transformation of the organization into a public corporation under the leadership of a Board of Directors. Such pressure was strengthened by the moves towards decentralization in both administrative and political fields, civil service neutrality and administrative reform.

3. The Central Electricity and Water Corporation (CEWC) 1966-1971

During this period CEWA adopted the form of an autonomous public corporation led by an appointed chairman and a Board of Directors. The Board consisted of the General Manager, a representative of the Ministry of Finance and Economy, five members appointed by the Council of Ministers on the recommendation of the minister concerned for five years.

The general manager was to be directly responsible to the Board of Directors which was itself directly responsible to the Minister of Public Works.¹

The organizational structure of CEWC was more or less the same as that of CEWA². At the head of the organization ¹ PWMC, CEWC Act 1966, Section 3, 6, (1) & (2).
² See Appendices 1 & 2 respectively.
was the General Manager, assisted by a deputy General Manager. The corporation was composed of five departments. Three of these departments were the main technical departments of water, electricity and mechanical works, headed by specialized engineers. The other two departments were the finance and personnel departments.

The functions of CEWC were broadened to include (beside supplying electricity and water services to the urban areas) initiating and developing electricity and water supplies throughout the country.

In order to achieve its stated goals the Board of Directors was empowered to generate, distribute and supply electricity for all purposes and to extract, impound, acquire, store, distribute and supply water for all purposes other than agricultural and irrigation purposes. Consequently the Board was given a number of fund-raising powers. It was allowed to transfer funds between the different items of the approved budget. It was also given the right to issue stocks and bonds and to borrow money to meet expenses incurred in connection with any work the cost of which was properly chargeable to capital. It was also given the right to change electricity and water tariffs from time to time, after the approval of the Minister and the finance authorities.
As regards its financial objective, CEMCO was expected to function on a commercial basis. This meant that the revenue of any year should be sufficient to meet its outgoings including depreciation and interest on capital.

In 1969, the construction of a hydro-electric station at Roseires Dam on the Blue Nile was completed and connected to Khartoum by a 485 Kilometer line linked with two power transmission lines from Wad Medani thermal station and Gennar Hydro-power Station. Thus for the first time an interconnected power system was created in Sudan, known as the Blue Nile Grid. This added a new unit to the organizational chart of CEMCO.

In 1969 a major political change took place with the advent of the May Revolution under the leadership of Major General Mamingri. Since its early days his government declared its belief in a socialist policy as the best and only route for the development of the country. Towards this end a plan for reorganizing the entire government machinery was put forward. The 1962 Transitional Constitution was suspended and a Republican Decree was issued dissolving all the existing para-statal and autonomous bodies so that they revert to the control of their respective ministries. CEMCO's Board of Directors was abolished in June 1969 and the General Manager
was made to report directly to the Minister of Public Works.

In July 1971, nine towns which had previously been
the responsibility of the Ministry of Public Works, with
electricity supply based on diesel generators, were set
under CEWC in its suspended form, together with eleven
towns with water facilities. To cater for this develop-
ment six new Area Management units were created.

In 1971 the corporation was transferred from the
Ministry of Public Works to the newly established Ministry
of Housing. However, in 1973 the Ministry of Housing was
amalgamated into the Ministry of Local Government, Housing
and Community Development. Accordingly CEWC became the
responsibility of the Minister of Local Government and was
renamed Public Electricity and Water Corporation (PEWC).

4. Public Electricity and Water Corporation (PEWC)
1971-1981

The PEWC continued to function with the same structure
as that of CEWC. No changes in its status were made. The
only difference being that a new Board of Directors was
appointed.1/ Two types of boards were introduced: A policy
1/ See Appendix No. 3.
Board known as the planning and steering Board and an executive Board. The planning and Steering Board was made up of the Minister of Local Government as Chairman, with a membership of the General Manager, of PWWC, the under-secretaries of the Ministries of Finance and National Economy, the People’s Local Government, Industry, Irrigation and Hydro-Electric Power, 6 members to represent the People’s Executive Councils within the provinces, 3 members representing the Trade Unions, 3 members representing important consumers, a prominent public figure, a public administration specialist, a prominent electrical engineer, a prominent person, a hydraulics specialist, a mass media personality, a commentator, a member from Saba Women’s Union.\textsuperscript{1}

The functions of the Planning Board were:

a) To formulate the general policy of electricity generation, distribution and use and water purification, storing and distribution.

b) To formulate personnel training and development policies.

The functions of the Executive Board were defined as “executing the general policies drawn up by the Planning and Steering Board”.\textsuperscript{2} The General Manager of PWWC was

\textsuperscript{1} PWWC Act 1975 PWWC: Constitution of the Planning Board Ch.5.
\textsuperscript{2} 1975 Act PWWC, Functions of the Board of Directors, Ch.5.
made chairman of this Board and the membership comprised the deputy General Manager, Heads of the various departments of PWGC, 3 members representing the workers, the Undersecretary of the Ministry of Irrigation, a member from both the ministries of Industry and Commerce Cooperation and Supply.

In 1978, these two boards were dissolved and replaced by one Board which was given full authority to supervise and control PWGC's work throughout the country. Its membership was cut down to only fifteen members and the corporation was placed under the direct leadership of the President.\(^1\) These two amendments seem to be the only fundamental differences which distinguished the new Act enacted in 1976 from that of the 1975 Act. The corporation was to carry on the same duties and responsibilities and the newly established Board of Directors was to carry on the functions of the two dissolved boards. Shortly, after the President took over responsibility for the corporation, the Board was dissolved and the General Manager became directly responsible to the President.

In 1980 PWGC was placed under the Minister of Energy and Mining.

\(^{1}\) 1978 Act PWGC, Ch.4, Section "3".
5. Structure of PEDG as in 1971:

The present structure of the corporation is large and complex. It consists of a headquarters in Khartoum with seven directorates: 1) Electricity, 2) Water, 3) Administrative, 4) Financial Affairs, 5) Commercial Affairs, and 6) Supplies.

There used to be a seventh directorate for running the provincial areas which were: 1) Khartoum area, 2) Blue Nile area, 3) Kordofan area, 4) Darfur area, 5) Eastern area, 6) Red Sea area, 7) Danassin area, 8) Northern area, and 9) Southern area.

The Area Management Directorates have now been abolished in line with the recent trend towards decentralisation of the public service.

PEDG has 136 electricity offices and 72 water offices all over the Sudan. The map shows the distribution of these offices in the main towns of the Sudan. All stations are centrally managed from the headquarters in Khartoum where all major decisions are taken.

1/ Appendix No. 4.
2/ A Memorandum from the General Manager to the Board of Directors dated 4.3.1979.
3/ See Appendix No. 5.
Similarly all recruitment, promotions, transfers, fuel allocation, car distribution etc., are centralized in Khartoum and as well subject to government rules and regulations.

PEAC employs about fifteen thousand, of these there are about twelve thousand workers or unclassified and about 3 thousand classified employees, who include about 500 engineers with different specializations.

All personnel affairs are run by a personnel division, located within the administrative department. The function of the division is to compile and maintain personnel records to formulate disciplinary actions and to administer all personnel recruitment, promotions, transfers, allowances and post service benefits. These are all carried according to standing personnel rules and regulations and closely following the civil service rules and regulations - theoretically, the corporation is an autonomous body which is supposed to be governed by flexible rules which enhances the corporation's performance. In practice the personnel division is engaged in routine administrative matters which mainly aims at keeping all personnel affairs in conformity with the established government rules and procedures.
PEWO exercises complete monopoly over the field of electricity and water supply in Sudan. It has therefore always been an important element in all the national development projects in the country. Successive governments largely relied on it for the execution of their development plans. This heavy burden on the corporation is actually the crux of its problem.

A quick glance at all the phases of development of the corporation shows a strong correlation between the different political regimes and the type of organization adopted. As observed by Abu Saif: "It has been a reflection of what has been going on in the general political environment".1/

It is worth noting here that these changes in the structure of the corporation were not accompanied by changes in the laws that governed its work. These changes seemed to affect the structure rather than the way it functioned. A good example of this is the Corporation’s Act itself, where the 1973 Act was just a photo copy of the 1973 one. Whole sections were transferred unchanged from one to the other.2/

2/ See 1973 and 1978 Acts PEWO, Chapters on Objectives, Duties and Responsibilities of PEWO.
At the same time we find that the same internal regulations and procedures still prevail as those in the sixties. Thus the corporation embodies just another form of the rigid bureaucracy that characterizes government departments. As put by a senior engineer:

"We do not say that the corporation works in a vacuum. It had its rules and procedures that suited a certain time and certain circumstances, but we did not change these rules and procedures to cope for the new developments. This weakened these procedures and made them out of date."

Moreover, it is important to note that since the seventies many studies have been conducted in an attempt to evaluate the performance of PESO. "Efforts have been made to avoid the continuous deterioration in the corporation's performance, why haven't we achieved any results?"

The reason for this, in my opinion is that nearly all these studies have affected only structural changes, i.e., changes in forms and composition of the Board of Directors or changes in personnel. For example, in the last ten years five persons have been appointed as general managers of the corporation which has created a climate of instability within

1/ PESO, Sayed Mohamed Ibrahim Khalil, Memorandum to the Minister of Energy and Mining, (in Arabic), April 1991, p.5.
2/ Ibid., p.1.
the management of the corporation and affected the manage-
ment process itself. The World Bank Mission in 1978 stated
that as a precondition for implementations of Power Project
III, the following problems should be resolved: 1/

1) Management effectiveness.
2) Financial viability.
3) Accountability.
4) Procedural problems.

1/ PBWC Power Project III, A Brief Note on the Findings
 of the World Bank - Power Project, Appraisal Mission
 From July 26 to August 28, 1978.
CHAPTER III.

THE PLANNING AND BUDGETING SYSTEM.

This chapter will deal with the type of planning which exists at PFWC. The first part of the chapter will provide an examination of the corporation's objectives and planning as a means of achieving these objectives. In so doing the focus will be on the failure of the corporation to develop clearly defined corporate objectives, lack of clear policies and corporate planning. Budgeting as a possible type of planning as well as the financial policies adopted by PFWC will be discussed.

1. Objectives of PFWC

PFWC's objectives as stated in the Act of 1975 (amended 1978) are as follows:-

1) Provision of water and electricity for the following purposes:-
   a) All industrial and agricultural purposes.
   b) All market, residential and other service centres.
   c) To promote social and economic standards in certain areas of the country.

Besides PFWC has the following financial objectives:

a) To achieve an 8% return on net asset on electricity.
b) To achieve a 5% return on net asset on water.

1/ 1975 Act and 1978 Act, PFWC, Ch.2, Section 6 (a, b & c).
As to the first part of objectives concerning the provision of water and electricity services for residential, agricultural and other activities all over the country, it may be observed that a statement of objectives is rather wide and imprecise. It is therefore difficult to measure the achievements of the corporation against these objectives. Within the corporation itself these objectives have been differently understood and differently interpreted by different employees. Most heads of departments and chiefs of divisions defined their jobs and responsibilities in rather general terms like providing water and electricity services. No quantification of objectives has been attempted. Thus there is no way of measuring their performance.

Furthermore, all objectives are technically-oriented. As such they aim to perform maintenance operations, correct faults, make connections i.e. they aimed at carrying out operations as best they could with the available materials and spare parts. No management development objectives were mentioned by any of the staff except one head of division and there was no evidence that they had even been considered.

As to the second category of objectives a good deal of conflict existed as to the validity and acceptability of the 6% return on electricity and the 4% return on water. About fifty per cent of the interviewees did not realize the
existence of these rates at all. Among those who did know about them, only a few knew how much the rate was. At one extreme, one of the heads of departments did not know that EWC was required to make profit. Among those who were aware of this fact some believed that the stipulated rates were unsustainable judging by their long experience. This has been exemplified by the introduction of a new electricity tariff in 1978. It was believed that this tariff would produce a 12¾% return in the first year of operation and a 10% and 8% in the second and third year respectively. But what actually happened was that, the annual return in these same years did not exceed 5% and of late it has declined to about 4%. /

The Electricity Department believed that the fixing of a certain rate for their profitability was unworkable. The reasons they gave were that in deciding on their projects they were governed by forces other than the rate of return, including the location of the project, its visibility and the type of consumers and the willingness of the financiers. In practice this meant that the electricity department was not free to determine its own financial objectives.

/ Interview with the Financial Manager, Financial Department, EWC, July, 1981.
As for the Water Department, they believed that the idea of making profit from their services was wholly unacceptable. They considered their service to be a public utility and that it is morally wrong to treat it on a commercial basis. This too precluded the involvement of the Water Department in deciding its financial objectives.

The result was a situation where the two main departments did not participate in the establishment of the corporate objectives and consequently had no commitment to achieving them.

The practical result of such a situation was a corporation consisting of a collection of departments with no common goal. Thus no clear policy existed at any level of the corporation. This has compounded the situation in which PENG has always functioned: a lack of clearly defined policy or long-range planning. A policy statement as defined by Argenti shows:

"What the organization intends to achieve (the objective), some of the things it is not going to do if that makes the objective harder to attain (the constraints) and some of the things it is going to do (the means). It is its long-term strategy."  

But if PSWC has no corporate objective or clear policy and no long-range planning, how does it conduct its work? The remaining part of this chapter will deal with this question.

2. Planning in PSWC:

In 1976 PSWC at last came to realize the significance of a planning system. Therefore a planning division was set up in each of the Electricity and Water Departments.

1. Departmental Planning:

a. Structure:

The following diagram shows the location and composition of the planning divisions in both departments.

As shown in the diagram the planning division was one of several divisions, equal to them in status. Each planning division was headed by a chief engineer, a civil engineer in the Water Department and an Electrical Engineer in the Electricity Department. The 2 planning divisions were set up as part and parcel of the operation offices. This may be one of the reasons why planning for electricity and water was always mainly concerned with the technical side of operations. Even the set up of the various sections within the two divisions indicates that planning was thought to be meant for designing technical projects, such as networks, stations, etc.
Diagram No. 4:
Position Of The Planning Division in the Organizational Structure of EWG.

General Manager

Electricity Dept.

Planning & Operations

Head

Chief Engineer Operations

Asst. Head Chief Engineer Operations

Senior Engineer Planning

Chief Engineer (Const.)

Senior Engineer Engrs.

Chief Engineer (Water)

Senior Engineer Engrs.

6 Asst. Engrs.

1 Asst. Engrs.
The two planning divisions were designed to comprise twenty-four staff members for electricity planning and thirty-six for water planning (here the demarcation between planning and operations design is not as clear in the case of electricity department). However further inquiries revealed that there were twenty-two employees to whom various planning functions such as statistics, forecasting, information collection and assembling were allotted. Although this list was found within the water planning division, the employees concerned were not. When this research was being conducted, the available staff in both divisions consisted of eleven engineers in the electricity planning division and one in the water planning division. Furthermore, the job specifications given in the water planning division list did not exist in the case of electricity. Ten of the electricity planning staff had no specified tasks, nor were their posts defined within the hierarchy, with the exception of the head of the division. At the time of this research he was assigned to another task within the Corporation as a local counterpart for the Power III Project. This left the rest of the planning staff with no clearly defined tasks, no clear lines of authority and ultimately no responsibility. "Fortunately all of us have the will to work" as one of the

\[1/\] Interview with the Head of Water Planning Division, PWOC, May, 1961.
planners has commented. In view of this situation, the next section of this chapter will deal with the function of departmental planning in MDC.

**b) Functions of Departmental Planning:**

"In order for objectives to lead to results they should be presented in a hierarchical order starting at corporation level (corporate objectives), moving to departmental, area and district level. On the basis of these objectives plans of actions and budgets (financial plans) can be developed to meet the set objectives both in the short as well as the long run."

Planning as defined by the Management Development and Productivity Centre team includes two separate concepts:

a) **Planning of activities on both an annual and long term basis to cover both Operational Activities and Major Development Projects**, such planning therefore includes targets and programmes of action for each activity giving set time limits for their execution and estimates of material and labour requirements.

b) **Budgeting**: Planning for the financial requirements of such programmes and projects.

In view of these definitions, departmental planning will be dealt with in the following sections of this chapter.

1. Operational Planning: All operations of the PSE&G were carried out in the outstations of water and power plants, at the area or district level. At the area level this consisted of an area office with a resident chief engineer (Electricity or Water) assisted by two senior engineers for water and electricity respectively.

On the other hand each area office had a director for administrative and financial affairs and supplies. The number of staff of these area offices varied from one area to another depending on size, importance and the volume of work. The duties of the Chief Engineer were to supervise, direct and control all the technical side of the corporation's activities within the area. This includes: the efficient overall performance of work, implementation of all construction work, provision of necessary materials for work as well as inspecting employees and reporting on them.

At the head of the area office there was an area director who was usually either an electrical or a civil engineer with a substantial experience of not less than 10-12 years.

The duties and responsibilities of the area directors may be summarized in the following:-
1) To supervise the units technically and administratively in the areas and to coordinate them to implement the programmes and policy devised by the area administration.

2) To lead the work forces in the area as a unified unit to achieve the commercial objectives of the corporation.

3) To supervise the maintenance and efficient running of the corporation's properties, to take actions on complaints and to take the necessary decisions in solving problems and to submit the major problems to the director of the area administration at headquarters.

4) To represent the corporation in his area, to prepare the annual budget and supervise its implementation and to present periodical reports to the area administration in headquarters about the progress of work in the area and the obstacles facing it and possibly proposing solutions to them.1/

As may be noted, the duties and responsibilities of the area offices did not include any planning function. This indicated that no operational planning took place at the area level.

1/ Mawzoum Hassan Mustafa Committee, A Study of the Fungus Local Organizational Structure, PLOO, 1976.
"While attempts were made by some areas but not all, to produce an operational plan, which indicated the jobs to be done, but not the resources required to complete it, it was not adhered to."

This further indicated that the job of Area Management was confined to the routine running of daily operations within the areas, which were usually reported to the headquarters on a monthly basis. The information included in these reports tackled only the technical problems of the specific plant or station, with no financial, administrative or personnel information included. Recently even the frequency of the monthly reports has declined. In some cases requests had to be made by the headquarters office to the areas to send in their reports. This was especially true of the relatively remote areas, which meant that sometimes someone from the concerned division in the headquarters had to go personally to collect the required information. This was observed in the Statistics Department when recently a team of employees had to go to Dongola, El Wali, El Fasher and Wadai, to get information about water and electricity sales, the rate of consumption and the amount produced in those areas.

No major decisions were taken at area level. Here only minor matters such as the replacement of minor spare parts,

1/ Management Development and Productivity Centre Team, Knowledge, P.7.
cleaning of engines and making house connections were
dealt with, otherwise all major problems were referred
to headquarters, and acted on only under their instruc-
tions. Such major decisions might include stopping an
engine for maintenance or power out / a certain part
of the area as work conditions might require.

At headquarters of course no operational planning
was carried out, such as scheduling and programming actions,
operations and activities. If this could not be done at
the area level where all information was available it was
even less likely that it could be carried out at the centre.

Therefore all that was done at the centre when a problem
arose was the issuing of general instructions and directives
about how to operate an engine and for how many hours, the
type of fuel to be used etc. These general instructions
came out either annually or at time of crisis.

On the other hand all major construction projects were
decided on, designed and implemented by the central staff of
PEWCO.

2. Development Planning: Development planning or long
range planning in PEWCO is a recent phenomenon, introduced
only in 1976 when a planning division was established in the
departments of Water and Electricity respectively. The duties
and responsibilities assigned to each of these two divisions are summarized in the following:

1. Water Planning Division:
   1) Formulating the general policy of the Water Department.
   2) Implementation of the division's plans and coordinating its branches to fulfill the general policy.
   3) Designing special programmes to improve existing or proposed projects. This could be done by sponsoring or conducting economic feasibility studies.
   4) Providing technical advice to the employees as well as inspecting on their performance periodically.
   5) Promoting the technical efficiency of the employees in coordination with the Personnel and Training divisions.
   6) Making studies of the programmes specified for the planned activities as well as defining the required equipment for their implementation.

1/ Report by an internal committee on a team of WSD staff. A Coercion Between Centralization and Decentralization, PUBD, November 1965, p. 3.
7) Formulating budget proposals.
8) Collecting and analyzing statistical data, encouraging research work in the department.

9) Electric Power Planning Division

1) Responsible for planning and programming of electricity works.

2) Designing programmes for improving electricity services in all areas.

3) Designing specific operational programmes for all existing generators in order to ensure the best technological and economic utilization of the generated power.

4) To make studies and programme operations and improve the electricity grid.

5) Define and determine all the equipment and material required for electricity works all over the country, organizing its distribution among the different areas and new projects according to their plans and programmes.

Interviews with members of these two divisions revealed that, they generally understand their role as being one of planning for the provision of water and electricity services in the most economical and efficient way. However, no policy
or strategy defining the objectives to be attained, the
constraints to be avoided or the means to be adopted were
found.

Further, while the Electricity Department was found to
have a long range plan covering all new projects and improve-
ments to the existing system, no such long range plan existed
within the water department.

Electricity Development Planning:

In June 1976 the Electricity Department managed to obtain
technical assistance from British Electricity International
who conducted a comprehensive study of all the existing power
stations in Sudan. The results of the study were included
1978 a Technical Supplement was annexed to the report by the
same British organization containing notes on the 1976 Tech-
nical Assessment of PMW’s Generating stations.

Using these two reports the PMW, Electricity Department
succeeded in establishing a long term plan up to the year
1990.

The information contained in the Technical Supplement
was used to prepare the tables and schedules of the Develop-
ment Plan. Many of the techniques and some of the data used

1/ British Electricity International, Power Market Survey
1975-1990, The Overseas Consultant Service of the
in the preparation of load forecasts and generation assessments in calculating the need for generation and network reinforcements have been taken from the report on the Power Market Survey.1/

This long-term plan was used as a basis for a shorter term plan of 6 year duration starting from 1977 to 1983. This 6 year plan in turn formed the basis for a series of annual plans supposed to be issued each year covering all generation, transmission and distribution developments needed to meet the forecast load over the following 6 years.

New project data was gathered from records of applications for electricity supply, from discussions with government agencies, public corporations, provincial authorities, business and large numbers of consumers. From that data detailed lists of new projects and their estimated demand were prepared for the period up to 1983/84.

**Development Work in Progress:**

The following major generation and transmission/distribution projects were planned in or before 1976/77 to be put into operation in the years 1977/78 and 1978/79:

---

### Table 1

<table>
<thead>
<tr>
<th>Year</th>
<th>Station</th>
<th>No. &amp; Size (MW)</th>
<th>Total (MW)</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977/78</td>
<td>Burri (Khartoum)</td>
<td>3 x 5</td>
<td>15</td>
<td>Diesel</td>
</tr>
<tr>
<td></td>
<td>El Obeid</td>
<td>5 x 1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alsha 3</td>
<td>1 x 3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Port Sudan</td>
<td>2 x 3</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Khamis El Girba</td>
<td>1 x 3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Juba</td>
<td>5 x 1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Station</th>
<th>No. &amp; Size (MW)</th>
<th>Total (MW)</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978/79</td>
<td>Rossire (Q4)</td>
<td>1 x 50</td>
<td>50</td>
<td>Hydro</td>
</tr>
<tr>
<td></td>
<td>Port Sudan</td>
<td>3 x 5</td>
<td>15</td>
<td>Diesel</td>
</tr>
</tbody>
</table>

### Committed Network Development

The first of the projects listed below was part of a major project for the provision of improved supplies for Juba. The remaining projects were associated with the installation of generator 4 at Rossire, the provision of power supplies for the Rahad Agricultural Project and the Kamarana and Hagar Asalara Sugum Plantations and the integration of the isolated Gourash/Mangill system into the Blue Nile grid.
1977/78:
Jubai - New 11 Kilo Volt distribution system and extension of 415 Kilo Volts system, Maridjan to Jabal Fau - 60 Kilo Volt single circuit line.

1978/79:
Sennar to Mays el Sherif - 110 Kilo Volt single circuit line,
Mays el Sherif to Sunkia/Singa - 33 Kilo Volt lines,
Sennar Junction - New 220 Kilo Volt and 110 Kilo Volt switching stations with 55 MVA 220/110 Kilo Volt transformers,
Rosario to Sennar Junction - String second 220 Kilo Volt circuit.
Masidjan - new 17.5/3/17.5, 110/33/11 Kilo Volt transformer.
Rabak - Change 110/33/660 transformers to 2 x 4.2/15/7.5 MVA.
Rabak-Kenama - Permanent 33 Kilo Volt Substation at Rabak.

New Generation Proposals:
A summary of the forecast output of existing and committed plant is shown in Table 2 below. A comparison of columns 2 and 3 shows the increase in the output of the existing generation expected over the period 1977-1980. This
revealed a national increase of 16 Mega Watt, the most dramatic changes being the 4 Mega Watt increase in output at Atbara and the 8 Mega Watt improvement in steam plant performance at Burri. The overall improvement for the Blue Nile Grid as a whole was only 5 Mega Watt because of the intended shut-down of the old diesel plant, which was considered to be too old for economic maintenance.  

As this projected capacity was found to be inadequate, the new generation proposals put forward contain schemes for the installation of 40 generators totalling 226 MW over the 5 year period of the 1977 plan, as shown by Table 3.

A review of the previously mentioned plans shows that the pre-1977 generation, transmission and distribution projects were only partly achieved. Table 4 shows the date of commissioning of these projects which were 2 to 3 years behind schedule.

1/ British Electricity International et al., Development Plan for Electricity 1977, Electricity Department Planning and Operation Branch, April 1977, p.11.

2/ See also 1977 Development Plan for Electricity, EWWC Table 1 and 5 on Generation Shortfall (in non-hydro Systems on the Blue Nile Grid respectively sheet 1 to 3 or 5 and Sheet 1 and 2 or 2.)
### Table 3

**Forecast Output of Existing and Proposed Generators**

<table>
<thead>
<tr>
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<th></th>
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<th></th>
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<tbody>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>(2)</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3)</td>
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</tr>
<tr>
<td>(4)</td>
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</tr>
<tr>
<td>(5)</td>
<td></td>
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</tr>
<tr>
<td>(6)</td>
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<td>(8)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Blue Nile Grid**

- Steam: 253 w; Hydro: 161.94 w; Gas Turbine: 53.96 w; Diesel: 215.44 w; Total: 214.0 w; Diesel: 214.0 w

- Gouraichi: 0.84 w; Bujelm: 0.66 w; Garga: 0.16 w; N licensed: 0.17 w; Albara: 4.21 w; Shendi: 0.81 w; Dongola: 0.32 w; Total: 5.2 w; Total: 5.70 w; Total: 19.93 w; Total: 25.63 w; Total: 24.94 w; Total: 24.60 w; Total: 24.60 w

**Eastern Grid**

- Hydro: 11.66 w; Diesel: 15.75 w; Total: 15.75 w; Total: 20.55 w; Total: 18.45 w; Total: 18.45 w

*Cont....*
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nkasa</td>
<td>1,33</td>
<td>3.0</td>
<td>1.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Malekal</td>
<td>.42</td>
<td>.80</td>
<td>-</td>
<td>.80</td>
<td>.80</td>
</tr>
<tr>
<td>Watt</td>
<td>.46</td>
<td>.74</td>
<td>-</td>
<td>.74</td>
<td>.74</td>
</tr>
<tr>
<td>Juba</td>
<td>.77</td>
<td>.81</td>
<td>4.7</td>
<td>5.51</td>
<td>5.36</td>
</tr>
<tr>
<td>E. Goleid</td>
<td>1.31</td>
<td>1.80</td>
<td>5.65</td>
<td>6.25</td>
<td>6.1</td>
</tr>
<tr>
<td>Run Rusga</td>
<td>1.51</td>
<td>1.18</td>
<td>-</td>
<td>1.18</td>
<td>1.18</td>
</tr>
<tr>
<td>Fashoda</td>
<td>0.98</td>
<td>1.38</td>
<td>-</td>
<td>1.38</td>
<td>1.25</td>
</tr>
<tr>
<td>Nyala</td>
<td>1.53</td>
<td>1.37</td>
<td>-</td>
<td>1.37</td>
<td>1.37</td>
</tr>
<tr>
<td>Total</td>
<td>165.5</td>
<td>205.6</td>
<td>91.3</td>
<td>294.9</td>
<td>292.9</td>
</tr>
</tbody>
</table>

Table 2. Output Capacity (Mega Watt) By 1976/83.
### Table 3

The New Generation Proposals

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel 480 kW</td>
<td>6</td>
<td>7</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>7</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>66 kW Diesel</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|         | 22      | 11      | 3       | 4       |
|**********|---------|---------|---------|---------|
| 40 kW Steam | 120 kW Hydro |

22 kW 87 kW 55 kW 52 kW
Table 4.

<table>
<thead>
<tr>
<th>Station &amp; Project</th>
<th>kW</th>
<th>Type</th>
<th>Plan</th>
<th>Commissioning</th>
<th>Scheduled Commissioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. El Obeid (5 Towns)</td>
<td>5 x 1</td>
<td>Diesel</td>
<td>2 sets Commissioned before 1977</td>
<td>1978/79</td>
<td></td>
</tr>
<tr>
<td>2. El Rosaires</td>
<td>1 x 40</td>
<td>Hydro</td>
<td>3 sets commissioned in 1980</td>
<td>1978/79</td>
<td></td>
</tr>
<tr>
<td>3. El Girba (5 Towns)</td>
<td>1 x 3</td>
<td>Diesel</td>
<td>Transferred to Athara</td>
<td>1978/79</td>
<td></td>
</tr>
<tr>
<td>5. Burri (Power 11)</td>
<td>3 x 5</td>
<td>&quot;</td>
<td>1980/81</td>
<td>1978/79</td>
<td></td>
</tr>
</tbody>
</table>

The major network developments projected before the preparation of the first annual development plan in April 1977, which were mainly associated with the installation of Generator 4 at Bassein, the provision of power supplies for El Rahad Agricultural Project and the Khama and Hagur Assiawa Sugar Plantation, have all been commissioned except the stringing of the 2nd 230 Kilo Volt circuit from Assiawa to Sekon, This was expected to be completed in 1981. 1/

The major failure to adhere to the final programme of the 1977 Development Plan was caused by lack of finance. The approved capital budget was almost wholly confined to on-going construction projects. Thus PWD has been unable to undertake new generation and transmission schemes which require large amounts of foreign exchange, and at the distribution level have only been able to undertake those schemes for which material were already available on order. In some cases, financial support was provided by large consumers or provincial governments to enable work to proceed.

On the other hand, the British Consultancy team have proposed a solution to PWD’s budgetary problems:

1/ PWD 1977.
"It seems likely that rapid progress in providing the necessary generation, transmission and distribution reinforcements can only occur when such reinforcements are grouped together into large formal projects which can only become the subject of a financing study by loan agencies".

A report containing the essential generation and transmission additions to the Blue Nile Grid was assembled with the hope that it would be financed by a loan agency as Power Project III (PP.III). But again, due to delays in the financial formulation of PP.III, EHWG has failed to carry out its final generation and transmission programme. This is shown in the 1978 Development Plan and was carried over to the 1980 Development plan.

11) The Budgeting System

Budgeting was often referred to as planning and this concept was widespread among all EHWG's staff, who referred to the Annual Budget as the annual plan.

The Annual Budget was the responsibility of the Budget Section, which is part of the Accounts Division with the Financial Affairs Department. It was responsible for the preparation of both the operational and capital budgets.

1. **Operational Budget**

The operational budget operates at two levels. The area level (including districts within Areas) and the departmental level (within headquarters). Areas set out their budgets on standardised forms for each project or activity planned for the coming year, broken down to give detail of the required personnel, materials and spare parts. Areas base their budgets on estimates of the growth of existing demand, taking the previous year’s estimate plus up to 15% forecast growth over and above the demand for new connections and anticipated small capital projects. At headquarters each division carried out the same process but on a country-wide basis. When they have received the Areas estimates, these budget proposals were then discussed at all levels in the Corporation. After the proposals have been approved by the General Manager, the next step is to send them in the form of total estimates per area, to the Ministry of Finance and National Economy. Here they are discussed at length and examined before final approval. In most cases the proposals are subject to severe cuts as shown in the following table.
Table 5.

<table>
<thead>
<tr>
<th>Year</th>
<th>Proposed Budget</th>
<th>Approved</th>
<th>Gsts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976/77</td>
<td>21,171,100</td>
<td>19,213,400</td>
<td>2,757,700</td>
</tr>
<tr>
<td>1977/78</td>
<td>24,940,000</td>
<td>21,032,011</td>
<td>3,907,989</td>
</tr>
<tr>
<td>1978/79</td>
<td>32,024,193</td>
<td>25,784,514</td>
<td>7,598,825</td>
</tr>
<tr>
<td>1979/80</td>
<td>48,211,012</td>
<td>40,894,590</td>
<td>1,366,422</td>
</tr>
<tr>
<td>1980/81</td>
<td>46,031,210</td>
<td>45,002,050</td>
<td>1,011,160</td>
</tr>
</tbody>
</table>

Source:
PEAC, Budget Section - Financial Department (Operational Budget) for the mentioned years.
Capital Budget:

Areas were not authorized to carry out any development planning. Thus all capital budgets were prepared at headquarters based on the National Six Year Plan for Economic and Social Development. This was especially true of the water capital budget, where no departmental development planning was carried out.

Water Capital Budget:

In the past a number of development projects were selected each year in the light of the national housing plan. However, even this practice has been abandoned for the past seven or eight years. It has been reported that before 1972/73 development work was more systematic and had a firm basis, because there was a coordinated effort between all the concerned parties. So there were more direct and open channels of communication between the housing authorities, municipalities and other concerned parties and the water projects.
Division of PWDC, and thus a certain degree of integration between the different plans of these different bodies was established. Since then such coordination gradually broke down and it became quite normal for a new residential area to be put up without any prior knowledge of the water plans for the area. This created a situation where water development projects came to be implemented on an individual basis i.e. the inhabitants of each newly established area submitted their applications to the water division. The response to these applications was directly influenced by the amount of pressure brought to bear, either by the individuals themselves or through their popular organizations. The speed of implementation also depend on whether these projects were to be carried out by the PWDC alone or whether self-help schemes were provided by the concerned area.

In the face of the financial problems encountered by the corporation, PWDC had to accept the tradition of

1/ PWDC, Interview with the Chief Engineer at the Water Projects Office - Khartoum Area Water Office - June, 1981.
carrying out projects on an individual basis, to the extent that no attempts at planning could be contemplated. As put by many of the Water Planning officials: Planning! What for? 1 This state of affairs was confirmed by the fact that for the past six or seven years budget allocations to the water projects had no relevance to the size of work to be carried out. According to the Ministry of Finance's directives, work on new projects has recently been severely restricted. The financial appropriation for new water projects was only nominal. The amount granted was hardly sufficient to meet the needs of out going projects. In 1980/81 no appropriation was allotted to water projects, while the proposed budget amounted to two million Sudanese pounds. This sum was the only appropriation for the whole Water Department, while the proposed budget amounted to about eight million. The following reasons were given for the very slow progress made on the development projects; 2

a) Lack of dredgers for laying new works.

b) Shortage of hard currency.

c) Shortage of equipment, cars and trucks.

1/ PWG, Interview with the Head of Planning Section, Water Department - Headquarters, May 1981.

However, no indication that adequate budgeting resources was insight. Again the 1961/62 Budget for all water development projects amounted to about two and a half million Sudanese pounds. This sum was proposed as the requirement for water projects in the Khartoum area alone by the PWO.

Electricity Budgeting:

The same problems existed in the case of the electricity-capital budgets, which were prepared in a similar way at headquarters. Similar problems of lack of information about new development projects and residential areas resulted in a situation where load forecasts could not be determined. Only after a new project was established was an application for electricity supply submitted. Some important examples of such projects were the Maspin Cement Factory in Athara, the Rahad Agricultural Scheme and the Kanaat and Hager Asalaya Sugar Factories. All these placed an increased burden on the annual budget for electricity, which in most cases was completely inadequate for the actual volume of work to be accomplished. This is demonstrated by the following Table.
Table 5.

Annual Budget for Electricity (Le. m.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Proposed Budget</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977/78</td>
<td>40,000</td>
<td>18,552</td>
</tr>
<tr>
<td>1978/79</td>
<td>32,000</td>
<td>15,789</td>
</tr>
<tr>
<td>1979/80</td>
<td>98,350</td>
<td>22,369</td>
</tr>
<tr>
<td>1980/81</td>
<td>110,000</td>
<td>33,798</td>
</tr>
<tr>
<td>1981/82</td>
<td>131,890</td>
<td>15,000</td>
</tr>
</tbody>
</table>

Source: Budget Section - Financial Department, Capital Budget for Electricity, June 1981.

This situation was further aggravated after 1977 with the formulation of the Electricity Development Plan. In this case the actual need for electricity supply was determined on a more systematic basis on which financial cost estimates or budgets were also based.

The total capital cost of all new proposed projects over the plan period was estimated to be one hundred and fifty six million Sudanese pounds divided between generation, transmission, distribution and rural electrification. A sum of forty million was to be spent in 1977/78, divided as follows: 1/

\[
\begin{align*}
\text{Generation} & \quad 27 \quad (\text{Le. x 106}) \\
\text{Transmission} & \quad 5 \\
\text{Distribution} & \quad 6 \\
\text{Total} & \quad 38
\end{align*}
\]

1/ The 1978 Development Plan for Electricity - Electricity Department, p.8.
This demonstrates clearly the heavy investment in
generation which was necessary in view of the present
shortfall and to build up an adequate plant margin.
The following table shows the inadequacy of the approved
capital budget for the estimated expenditure on the
committed and final programme of work over the four
year period of the first electricity development plan,
1977

<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Generation</td>
<td>27 1 29 3,302,000</td>
<td>82 - 74 -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmission</td>
<td>5 - 15 1,523,000</td>
<td>19 - 12 -</td>
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<tr>
<td>Distribution</td>
<td>8 3 10 2,508,000</td>
<td>8 3 43 -</td>
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<tr>
<td>Rural Electrification</td>
<td>- - - -</td>
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<td></td>
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</tbody>
</table>

Source: PEWO, Electricity Development Budget,
Budget Section - Financial Department.

The shortfall in the electricity development budget is
quite clear from the above mentioned table. For this reason
most of the proposed programmes were delayed. Some of these
became out of date and needed a complete overhaul incurring
increasing expenses ever and above the normal escalation or prices. Despite this fact no apparent improvement in the financial resources of PWSC could be expected.

The size of the budgetary problem of the electricity department became clear when the total proposals for the plan period are examined. The total cost of all the new proposals over the plan period was one hundred and fifty six million. This jumped in 1978 to a hundred and ninety six million and then up to four hundred and four million Sudanese pounds in 1980. The annual expenditure of these sums appear in the following table:

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Plan/Programme</td>
<td>Local</td>
<td>Local</td>
<td>Local</td>
<td>Local</td>
</tr>
<tr>
<td>Currency</td>
<td>Currency</td>
<td>Currency</td>
<td>Currency</td>
<td>Currency</td>
</tr>
<tr>
<td>and</td>
<td>and</td>
<td>and</td>
<td>and</td>
<td>and</td>
</tr>
<tr>
<td>Foreign</td>
<td>Foreign</td>
<td>Foreign</td>
<td>Foreign</td>
<td>Foreign</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>28,823</th>
<th>73,036</th>
<th>42,804</th>
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<tr>
<td>Transmission</td>
<td>5,130</td>
<td>16,918</td>
<td>33,017</td>
</tr>
<tr>
<td>Distribution</td>
<td>7,807</td>
<td>7,795</td>
<td>12,459</td>
</tr>
<tr>
<td>Rural Electrification</td>
<td>2,680</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cost</td>
<td>37,266</td>
<td>100,429</td>
<td>4,679</td>
</tr>
<tr>
<td>Final Program</td>
<td>2,802</td>
<td>8,391</td>
<td>98,081</td>
</tr>
<tr>
<td>Grand Total</td>
<td>40,068</td>
<td>108,820</td>
<td>191,036</td>
</tr>
</tbody>
</table>

The table shows that the total estimate for the three mentioned years was about Ls. 246 million. Although the National, Social, and Economic Plan specified a total sum of Ls. 70 million of which only Ls. 22 million was actually received up to 1980, when two thirds of the plan period had already elapsed. The 1977 PENCO plan proposals for electricity for the period 1977-1983 exceeded the central government allocation by Ls. 49 million. It has been assumed that this sum excludes custom costs and cost escalation as shown in the Six Year Development Plan for electricity, and which is shown in Table 9 below.

All costs shown in electricity plans are calculated up to 30th June of the year concerned i.e. the 1977 plan costs only cover the period up to the 30th June 1977 and so on. This meant that any delay in implementing the plan programmes resulted in an escalation in costs which was not covered by estimates.
Table 3
Effect of Cost Escalation on the Value of the Proposed Plan

<table>
<thead>
<tr>
<th>Programme</th>
<th>Total Cost (Rs. x 10^6)</th>
<th>1976/77</th>
<th>1977/78</th>
<th>1978/79</th>
<th>1979/80</th>
<th>1980/81</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
<td>Escalation</td>
<td>Increase</td>
<td>Cum. LP</td>
<td>LPC</td>
</tr>
<tr>
<td>Committed</td>
<td>10.9</td>
<td>10.9</td>
<td>Nil</td>
<td>4.5</td>
<td>9.9</td>
<td>0.2</td>
</tr>
<tr>
<td>Final</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation and transmission</td>
<td>97.5</td>
<td>119.1</td>
<td>21.6</td>
<td>12.5</td>
<td>16.3</td>
<td>31.4</td>
</tr>
<tr>
<td>Distribution</td>
<td>8.4</td>
<td>2.4</td>
<td>Nil</td>
<td>6.5</td>
<td>8.4</td>
<td>-</td>
</tr>
<tr>
<td>Electricization</td>
<td>2.9</td>
<td>3.9</td>
<td>1.0</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
</tr>
<tr>
<td>Total Final</td>
<td>108.8</td>
<td>135.4</td>
<td>22.6</td>
<td>19.0</td>
<td>24.7</td>
<td>31.5</td>
</tr>
</tbody>
</table>

*Source: PEMP, 1978 Development Plan for Electricity, Schedule 7 – Possible effect of cost escalation on value of Final Programme.*
The table above shows that cost escalation raised the total cost of the final plan by some Rs. 23 million, which could reach the sum of Rs. 127 million by 1981. When the effects of cost escalation were applied to the 1977 costs, the increase in the total cost of the final programme reached a sum of Rs. 5 million. When these same figures were applied to the total cost of the plan programmes up to 1983/84 (the 6 years period of the plan), the total cost was estimated to be Rs. 404 million instead of Rs. 196 million estimated in 1978.

Therefore any delay in implementing the planned programme may invalidate the plan itself. Because of this situation it has been suggested that the 6 year electricity plan should be used as a basis for seeking external sources of finance.1/

However budget formulation of financial plans for the corporation’s activities and programmes is only one side of the financial problem. In the next section of this chapter an attempt is made to examine the financial problems which hinder the corporation’s performance.

1/ The 1980 Development Plan for Electricity. Electricity Department, PWD, p.29.
iii) Financial Planning

All financial affairs within PWJC were administered by the Financial Department. This department regulated all monetary transactions according to the circulars and directives issued by the Ministry of Finance from time to time, prepared the annual budget, initiated loan procedures and controlled expenditure. The department's objectives were stated as follows:

1. To direct all financial resources towards production and to develop the Corporation's services by controlling budgets and reducing unnecessary expenditure.

2. To improve efficiency in order to use the profits to increase the corporation's return.

3. To provide advice to the other departments in all financial matters.

4. The function of the commercial division is to implement the corporation's policy on a commercial basis by defining and raising tariffs; to enhance energy sales and to improve and control the service to consumers.

It is clear that all these functions aim at the efficient utilization of the corporation's resources, the securing of adequate returns in order to be able to increase
production and improve services. All this would contribute towards the achievement of the corporation's wider objectives of providing satisfactory electricity and water services to the Sudanese public.

In the following pages an attempt will be made to assess the function of the financial department and to see whether any planning is carried out towards the achievement of the objective of minimizing expenditure, maximizing return and improving services.

Expenditure:
PSWC's expenditure is of two types: 1) Direct expenditure, which consists of four parts:
 a) Production expenses,
 b) distribution expenses,
 c) administrative expenses, and d) financial expenses.

These are further itemized into salaries and wages, fuel, operating material, repairs and maintenance.
2) Indirect expenditure, i.e. expenses incurred in running the corporation's departments and offices in the areas.

No plans to direct expenditure can be found within PSWC except for the annual budget, which, as we have shown, is no more than a forecast. It does not provide any definite plan, or a firm basis for achieving the stated objectives. The evidence shows that expenditure in PSWC was growing continuously as shown in the table below.
### Table 1C.

**Annual Budget Expenditure**

(Le. Million Pounds)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch. &quot;1&quot; Salaries and wages</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>13</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>Ch. &quot;2&quot; Operational budget (Electricity and water)</td>
<td>20</td>
<td>22</td>
<td>28</td>
<td>40</td>
<td>45</td>
<td>51</td>
</tr>
<tr>
<td>Ch. &quot;3&quot; Capital budget (Electricity and water)</td>
<td>15</td>
<td>19</td>
<td>23</td>
<td>25</td>
<td>36</td>
<td>90</td>
</tr>
</tbody>
</table>

**Source:** PWMO Approved Budget for Water and Electricity - Budget Section, Financial Department.

This growth in expenditure was caused by a number of factors which may be summarized in the following:

1. An increase of twelve per cent in production cost due to the increase in salaries and wages after the implementation of the new organizational set up of PWMO. In addition the implementation of the Job Classification and Evaluation Scheme (JCES) of 1978 led to an increase in the overtime expenses. This is exemplified in the following table which shows the rate of cost increases in the Khartoum area office:
Table 11: The Rate of Increase in Salaries and Wages.

<table>
<thead>
<tr>
<th>Year</th>
<th>Overtime</th>
<th>% Annual Increase</th>
<th>Basic Salary</th>
<th>Total Gross Salary</th>
<th>% to Basic</th>
<th>% to Gross</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974/75</td>
<td>39,391</td>
<td>22%</td>
<td>2,327,337</td>
<td>3,207,532</td>
<td>23%</td>
<td>17%</td>
</tr>
<tr>
<td>1975/76</td>
<td>655,741</td>
<td>8%</td>
<td>2,697,104</td>
<td>3,792,022</td>
<td>26%</td>
<td>19%</td>
</tr>
<tr>
<td>1976/77</td>
<td>706,568</td>
<td>23%</td>
<td>2,582,591</td>
<td>3,796,779</td>
<td>27%</td>
<td>19%</td>
</tr>
<tr>
<td>1977/78</td>
<td>969,014</td>
<td>16%</td>
<td>2,814,641</td>
<td>4,304,927</td>
<td>31%</td>
<td>20%</td>
</tr>
<tr>
<td>1978/79</td>
<td>1,009,623</td>
<td>11%</td>
<td>3,282,179</td>
<td>4,903,469</td>
<td>37%</td>
<td>20%</td>
</tr>
<tr>
<td>1979/80</td>
<td>1,242,127</td>
<td>14%</td>
<td>3,663,247</td>
<td>5,303,311</td>
<td>41%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Source: PWG, Financial Department - Statistics Section.
The growth in overtime pay created a problem for PWG. It was recorded that for the year 1979/80, the number of employees who received an amount for overtime which was more than double their wages increased by 406 from the previous year, where the amount they received for overtime amounted to Le. 141,122 over and above their wages, which totalled Le. 55,364. The most recent incidence of excessively high overtime was recorded in Wadi Medani where overtime pay amounted to Le. 16,000 in 1981 while the total wages were only Le. 12,000. This might reflect a lack of financial control. Evidence showed that generally there was a sort of latent sympathy for overtime pay; many people believed that it was paid to people who really needed it, especially those who received the minimum wage. The idea was that if these people did not feel financially secure they would not be productive.

Many engineers believed that work might come to a standstill if overtime pay was stopped. This created a situation where some workers, (especially at the unskilled categories) would not even do their usual daily work unless they were promised overtime. Many examples

were cited by both the Electricity and Water Departments. In other cases people tried to offer a justification for such practices, for example it was found much cheaper to resort to overtime pay than to hire labour from the open market or assign the task to a contractor. However this has only aggravated the situation, since the workers do not do their daily work. They leave it for overtime hours when they will be paid overtime rates.

As mentioned above, another cause of the increase in the salaries and wages burden was the implementation of JSSS. Chapter One of PEMC’s budget was increased by about three and a half million Sudanese pounds.

Still another area where a considerable financial burden was placed on PEMC was that of fuel and materials. Since PEMC was wholly dependent on the world market for the supply of its fuel and its operation materials and spare parts, the inflation of international prices constituted another inevitable burden. The following table shows the increase in fuel and operating materials costs in Khartoum Area over the past 3 years:-
Table 12.
Increase in Fuel and Operating Materials costs in Khartoum Area over the past 3 years
(1978/79-1980/81)

<table>
<thead>
<tr>
<th>Area</th>
<th>1978/79</th>
<th>1979/80</th>
<th>1980/81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>1356.27</td>
<td>792.00</td>
<td>1839.00</td>
</tr>
<tr>
<td>Water</td>
<td>566.28</td>
<td>158.00</td>
<td>566.20</td>
</tr>
<tr>
<td>Total</td>
<td>1922.55</td>
<td>950.00</td>
<td>2405.20</td>
</tr>
</tbody>
</table>

Production and distribution

<table>
<thead>
<tr>
<th>Area</th>
<th>1978/79</th>
<th>1979/80</th>
<th>1980/81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>3879.23</td>
<td>4260.18</td>
<td>1142.80</td>
</tr>
<tr>
<td>Water</td>
<td>562.90</td>
<td>1149.10</td>
<td>989.50</td>
</tr>
<tr>
<td>Total</td>
<td>4442.13</td>
<td>5409.28</td>
<td>2132.30</td>
</tr>
</tbody>
</table>


The sudden rise, after 1979, in fuel prices which increased seven-fold (and more than thirty-fold in the case of electricity and water production respectively) was found to be due to the drastic increase in fuel prices in January 1979 which amounted to an average of about 40% for the different types of fuel used by PEWCI.

In view of the uncontrollable inflation of international prices, PEWCI could have sought alternative solutions to reduce its fuel consumption. A proposed alternative had already been suggested by the British Electricity International.
This was to resort to hydro-power schemes which were much cheaper to run, although the initial installation costs were much higher. Because PWGC did not carry out any long range planning before 1977, this alternative had not been considered seriously. Even now, since such schemes take longer periods to become operational—from 8 to 10 years—it is not possible to see any probability of reducing current expenditure. Thus the increasing burden on PWGC's expenditure may make the idea of adopting hydro schemes in the near future impossible.

The same was also true for the costs of materials. PWGC used to import all materials from the smallest nail up to the biggest generator. Proper planning would entail relieving PWGC's budget from such a heavy reliance on imported equipment and materials. This factor has hindered PWGC's operations, since shortages of spare parts are quite common. This occurred to such an extent that the public were subjected to frequent power reductions. The most recent example was recorded in August 1981 when a key was damaged at Burrel Station and there was no replacement, so there had to be a continuous power cut for 3 consecutive days.

1/ 1977, Development Plan for Electricity, PWGC, p.36.
2/ This was at the very time that this research was being written, August, 1981.
PEWU did not seem to have any plans at present to reduce such total reliance on imported materials. An attempt has been made by PEWU to develop a central workshop at headquarters with the aim of providing local facilities for the maintenance and manufacturing of preliminary instruments as a step towards self-satisfaction. However, practical problems, such as the inadequacy of finance and lack of manpower resources have always been an obstacle to the success of such efforts, in spite of the fact that many technicians at the central workshop seemed to be very enthusiastic and ambitious. All their efforts, as expressed in the different memoranda submitted to the administrative director have come to nothing.\(^1\) No priority was given to such a project in PEWU's plans. An example in this area might be cited from Egypt which succeeded in attaining self-sufficiency to a large extent in spare parts requirements and simple instruments as shown by the latest attempt by PEWU to import water meters from Egypt.\(^2\) For the last 3 years PEWU's stock of water meters has been exhausted. All

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1/ Interview with the Chief Commander - Central Workshop, PEWU, Headquarters, July 1981.

2/ Interview with the Head of the Planning Section - Water Planning Division - Water Department, PEWU, May 1981.
attempts to make new orders failed because of problems involving hard currency, although 80% of the water meters in Khartoum Area have been reported broken or completely out of order. The effect of this on FWC’s revenue will be considered below. Currently applications for new water connections can only be considered if the consumer can purchase his own water meter and all the necessary pipes before the water department makes the connections.¹ /

Alternative solutions to the problem of the unavailability of hard currency and efficient operating materials, could have been sought through cooperation with other national facilities, such as the Sudan Railways Corporation Workshop or the People’s Armed Forces Workshop.

In spite of these difficulties, the problem of the ever-increasing expenditure of FWC could have been eliminated if it was able to secure enough income to cover the cost of its activities. The next part of this chapter will be devoted to an examination of the availability of revenue for the FWC.

¹/ Interview with the Chief Water Officer, Khartoum Area Office, FWC, May 1981.
Sources of Income:

PEWD income comes from two main sources:

1) Revenue from sales of water and electricity.
2) Loans and grants from local and international agencies.

1) Loans and Grants:

These are through two channels:

a) Directly between PEWD and the concerned organization or body — through tenders. However, the availability or such a loan is determined by the central government, as represented by the Bank of Sudan. The rate of the bank is vital because unless it opens a letter of credit, the loan cannot be secured. Delays in taking this action would in most cases invalidate the contract, change its terms, incur high interest rates etc.

b) Indirect loans were usually channelled through the Ministry of Finance and National Planning to which PEWD should submit all its development plans for approval. The approved plans would then be added to the long list of projects within the Ministry of Planning. The Ministry was authorised to determine priorities for all projects included in the different plans of the various governmental bodies and organisations. These usually consisted of large construction and establishment projects which required large amounts of capital investment which could not be provided by local resources.
Before 1969 PEWC was able to use its own corporate identity to obtain direct loans with more favourable conditions with a guarantee from the central government. This has now changed and all loans have to be channelled through the Ministry of Finance and National Planning to PEWC. Most of PEWC's large projects have been implemented through loans as shown in the following table.

A common problem which faced the implementation of all PEWC's projects was the failure of the Ministry of Finance to secure enough finance or even to overcome the difficulties involved in transportation or materials between Port Sudan and Khartoum, or from Khartoum to project localities. The non-availability of construction materials like cement, iron rods, cables, water pipes was another constraint.

The result of all these problems is complete stagnation at all stages of development. Most of the projects listed in Table 4 were supposed to have been implemented by 1969 or before, but until 1980 PEWC was still working on projects which were planned for completion in 1977 or before.

1/ Interview with the Assistant Financial Manager, PEWC, June 1981.
<table>
<thead>
<tr>
<th>Project</th>
<th>Sources of Finance</th>
<th>Date</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rosairs</td>
<td>British Electric and Steam System.</td>
<td>1972</td>
<td>4) Substations at Marsa, Assiut, Massawa, and Kilo X,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5) Hydro-generators 90,000 kW at Rosairs Dam.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6) Turbine at Kilo X, 15,000 kW + 500 kW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1) High voltage.</td>
</tr>
<tr>
<td>Power II</td>
<td>World Development Corporation.</td>
<td>1975</td>
<td>3) 240,000 kW.</td>
</tr>
<tr>
<td>Projects</td>
<td></td>
<td></td>
<td>A) 3 generators.</td>
</tr>
<tr>
<td>Power II</td>
<td></td>
<td>1979</td>
<td>1) A four shaft turbine at Rosairs,</td>
</tr>
<tr>
<td>Projects</td>
<td></td>
<td></td>
<td>4) Hydro-generators at Surri each 5,000 kW.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5) 3 heavy diesel generators at Juba, each 1,000 kW.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B) 72 km, 110,000 Volt transmission line between Assiut and Kilo X.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C) Second 220,000 Volt, 173 km, transmission line between Rosairs and</td>
</tr>
<tr>
<td>Pattern</td>
<td></td>
<td></td>
<td>3) Strengthening the distribution network at Juba.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4) Studies for reorganization of Corporation and designing a long term</td>
</tr>
<tr>
<td>Pattern</td>
<td></td>
<td></td>
<td>5) Development Plan for electricity.</td>
</tr>
<tr>
<td>Bahad Electrification.</td>
<td>World Development Corp.</td>
<td>1975</td>
<td>A) 72 km, transmission line 110,000 Volt between Marsa and Assiut.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B) 2 substations at Assiut and Kilo X.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1) High voltage.</td>
</tr>
<tr>
<td>Project</td>
<td>Source of Finance</td>
<td>Date</td>
<td>Remarks</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>------</td>
<td>---------</td>
</tr>
</tbody>
</table>
| Electrification of 5 towns | African Development Bank Le.1,664,000 | 1976 | A) 2 Diesel, heavy, 3,000 KW at Fort Jordon.  
B) Diesel Generator 30,000 KW at Khormouz El Ghina.  
C) 3 Diesel Generators at EL Obeid, 1,000 KW each.  
D) Diesel Generator, 3,000 KW at Atbara.  
K) 2 Diesel Generators 1,000 KW each for Madani New Power Station, later to be transferred to EL Obeid after merging Eastern Grid with Blue Nile Grid. |

B) 2 x 10 Hydro.  
D) 2 x 10 Hydro.  
E) 2 x 10 Steam.  
F) 1 x 30 Steam.  
G) 1 x 50 Steam.  
H) 1 x 75 Steam.  |

E) Improvement of Burri Power Station by 10,000 KW + Installation of 2 Diesel Generators at Madani, 60,000 High Voltage Transmission between Sennar and Khartoum, 110 Volt 275 Kms. |

**Sources:**  
a) FWC, a Memorandum on FWC by former General Manager to the High Planning Council, 25 November, 1976.  
b) 1960 Annual Development Plan for Electricity, by Electricity Department, Planning and Operation Branch, et. al., April, 1960.
The shortage of capital budget constituted the main obstacle. This is illustrated in the following table, which shows the wide gap between the proposed and approved budgets:

Table 1a:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed</td>
<td>01.05</td>
<td>01.94</td>
<td>01.12</td>
<td>03.05</td>
<td>03.35</td>
</tr>
<tr>
<td>Approved</td>
<td>01.25</td>
<td>01.52</td>
<td>01.52</td>
<td>01.52</td>
<td>01.52</td>
</tr>
</tbody>
</table>

Source: PWG Capital Budgets for 1975/76-1980/81, Budget Section, Financial Department.

However, this was only one side of the issue. The most interesting part of PWG's financial problem resided in the fact that it was supposed to be a commercially viable concern, earning enough revenue to meet its operational expenses. In addition, according to clauses 17, Chapter Six of the 1978 Act, it should secure enough profits to finance its developmental plans.

Given this commercial feature of the corporation, it would be expected that attention should be directed towards financial resources—revenue collection, maximization of
profits and the efficient utilization of revenues. This means in other words that part of the planning process of the corporation should be directed towards profit maximization, but the fact is that no commercial policy nor plans were found to exist, despite the fact that a commercial division existed within the corporation. This division played no visible role in promoting the commercial cause within the corporation. Moreover, at present, the division is working as part of the Electricity Department carrying out routine tasks such as receiving customers' applications for new connections for new buildings etc. No serious effort towards updating and promoting water and electricity tariffs were made nor were plans to ensure additional revenues were formulated. Consequently the corporation was found to be moving in a vicious circle, changing tariffs which were uncommercial, adopting an ineffective collection system and so on.

This brings us to the other source of PENG's income. A brief account of the revenue raising and collection system of PENG will give more insight into the problem.

21. PENG's Revenues

This was provided by the return on PENG's investments, i.e., return from sales of water and electricity produced by the corporation. The following tables show the annual amount of water and electricity produced by all PENG's power and water stations.
Table 25.
The Annual amount of Water and Electricity Produced and Sold by PEMC.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electriciy Generated (KWh)</td>
<td>x</td>
<td>x</td>
<td>775,821</td>
<td>835,629,000</td>
<td>934,759,000</td>
<td>934,759,000</td>
</tr>
<tr>
<td>Sales</td>
<td>594,900</td>
<td>523,900</td>
<td>607,166</td>
<td>633,926,000</td>
<td>634,275,215</td>
<td>634,275,215</td>
</tr>
<tr>
<td>Loss</td>
<td>17%</td>
<td>24%</td>
<td>32%</td>
<td>32%</td>
<td>32%</td>
<td>32%</td>
</tr>
<tr>
<td>Average $/kms.</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Water Production</td>
<td>95,172</td>
<td>101,102</td>
<td>90,316,547</td>
<td>95,745,788</td>
<td>100,281,757</td>
<td>100,281,757</td>
</tr>
<tr>
<td>Sales</td>
<td>70,976</td>
<td>74,913</td>
<td>67,209,547</td>
<td>79,725,037</td>
<td>76,600,910</td>
<td>76,600,910</td>
</tr>
<tr>
<td>Revenue</td>
<td>2,782</td>
<td>4,335</td>
<td>4,588,330</td>
<td>4,728,328</td>
<td>11,435,400</td>
<td>11,435,400</td>
</tr>
<tr>
<td>Loss</td>
<td>25%</td>
<td>26%</td>
<td>25%</td>
<td>17%</td>
<td>24%</td>
<td>24%</td>
</tr>
<tr>
<td>Average $/kms.</td>
<td>30</td>
<td>37</td>
<td>67</td>
<td>59</td>
<td>146</td>
<td>146</td>
</tr>
</tbody>
</table>

Source: PEMC, Statistics Division, Financial Department.

* No records were found for the years preceding 1977.
The revenue is obtained by multiplying the average price per unit by the amount of water and electricity sold respectively. The losses indicated in the table refer to the amount of water and electricity produced, (i.e. expenditure on these losses were included in the total cost of production), but not sold. Part of these losses were inevitable since they occurred during the actual process of generation in the case of electricity and during the process of actual production of water. By international standards these losses should amount to about 18-20 per cent \(^1\) and 10 per cent \(^2\) of the total electricity and water produced respectively.

In the case of Lusong these losses were found to exceed the international level of inevitable losses by 12 per cent and 16 per cent. However in the case of electricity it seems that this figure was just an estimate and that the actual losses might be less or possibly even greater. No accurate measurement had been carried out at the generation stations and instruments for registering these were not functioning.\(^3\) Although this was not admitted.

\(^1\) Interview with the Head of Planning Section, PEMO, Electricity Department, June 1961.
\(^2\) Interview with the Chief Water Purification Engineer, PEMO, Hidram Water Station, May, 1961.
the same may be true for water losses. However, the main point here is that no allowances were made for these losses by PSWC, thus they may be simply considered as lost revenue.

The most chronic problem of PSWC is the non-availability of adequate revenue. Since 1973 PSWC's Balance Sheet has shown a continuous deficit. This situation started at the time when the Rosetta Power Station was being constructed. The corporation had to resort to borrowing from the Bank of Sudan to cover the deficits incurred to pay for this. By 1975, the corporation's debts to the Bank reached Ls. 825,000. The debt was attributed to the following:

1) The deficit caused by merging the public utilities with PSWC.

2) Financing of development projects, especially water projects, which were supposed to be covered by the central government.

3) The world wide escalation of prices of materials.

All these factors raised the operating expenses of PSWC considerably. However, if a proper commercial policy had been pursued by PSWC plans for the revising, updating etc. of the water and electricity tariffs to meet or minimize the burden on the corporation's expenditure would have
been undertaken. It was noted within this context that since the sixties the tariff was raised only three times; in 1969, 1975 and 1979. The last change was vigorously urged by continuous requests from the World Bank Consultant and the British Electricity International Board team. Both believed that the PWJ should revise its tariff so that the revenue from water and electricity should be sufficient to meet its financial requirements. Any change in the tariff would usually involve a continuous and systematic evaluation of the existing and probable effect of current prices, probable inflation, trend of the consumer demand curve etc. It would also involve an evaluation of existing services and the probable increase of load forecasts. This usually entails a lengthy process which might extend over three years before an effective tariff could be produced. No such information was found to exist within the commercial division nor had it the proper machinery to carry out this task.

2/ 1981 Development Plan for Electricity, PWJ, p.4.
3/ Interview with the Financial Manager, PWJ, June, 1981.
Revenue Collection:

Raising PEMCO’s revenues was not the only problem facing the corporation. Another major problem is the system of revenue collection, since most of the corporation’s revenue was in the form of suspended money. Consumers owed the corporation eighteen million Sudanese pounds, of which fourteen million was owed by the public sector. Two million was owed by the private and a similar amount by individual consumers. 1/

The Financial Department had no clear policy for collecting the revenues. The function of the existing Account Section was to keep the consumers accounts, prepare their bills and to settle the consumers accounts monthly. Since the early seventies, as the number of consumers has increased considerably, the manual system of billing proved burdensome and resulted in delays and confusion. So a decision was taken to introduce a computer system to take over this task. The growth in the number of consumers is demonstrated in the following table:

Table 16.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>180,000</td>
<td>130,000</td>
<td>156,041</td>
<td>170,821</td>
<td>181,762</td>
<td>211,914</td>
</tr>
<tr>
<td>Water</td>
<td>110,541</td>
<td>126,718</td>
<td>187,017</td>
<td>187,057</td>
<td>193,821</td>
<td>205,383</td>
</tr>
</tbody>
</table>

Data: PEMCO Statistical Section - Financial Department.

1/ Interview with the Assistant Financial Manager, PEMCO, June 1981.
It is worth mentioning here that this increase in the number of consumers was not accompanied either by any increase in the number of staff, improvement in their quality, nor were the facilities such as offices and equipment improved. Some of the employees had been working with the Electricity Company since the fifties and continued to use the same outdated system of accounting techniques. The office layout itself was quite unsuitable for the type and amount of work conducted, with very little space available.

The system adopted for assessing consumers accounts involved the actual reading of meters, but this again is one of the problems of PSWC.

Problems of Meter Reading:

In the first place PSWC had a severe shortage of meter readers. At present the section employs about fifty meter readers, while the actual number required was estimated to be three times this figure. Moreover the facilities were severely limited especially as regarded transportation. In the following table the deficit in both manpower and transportation facilities is reflected.
Table 17.
Deficit in Manpower and Transportation Facilities

<table>
<thead>
<tr>
<th>Item</th>
<th>Existing Number</th>
<th>Required</th>
<th>Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Readers</td>
<td>50</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td>Vehicles</td>
<td>2</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: FRWC, Assistant Financial Director, Accounts Section, June 1961.

In this situation of lack of transportation facilities and the shortage of manpower, offices and proper incentives and proper control, motor reading could never be in a position to determine the actual revenue due to the corporation. In such unfavourable conditions, such as the lack of office facilities, many of the motor readers did not care to work and nobody could blame them. This in turn weakened the process of control and their rate of absenteeism has increased to the detriment of the work. Likewise, because no transportation were provided, a substantial proportion of the motor reading had to be left to the good will and honesty of the motor readers themselves. Sometimes a lot of walking was involved and sometimes they even had to pay for their own transportation. So it was generally believed that many of them just saved themselves the trouble and resort to guessing the reading. These guesses probably
would not favour the corporation, for the simple reason that the consumers would not let it pass if their charges exceeded the normal rate. To be on the safe side these guesses would just come as close as possible to the minimum charge. An example here was given from one of the bills of the Pepsi Cola Company, which is entirely dependent on water for its production. The registered figure for its water consumption charge over one period of time was only the minimum charge.1

Practically it was generally believed that the problems of meter reading were most evident in the case of water meters. Problems such as the installation of the meters themselves contributed to the great losses of water revenue. Water meters are usually vulnerable to all sorts of interference and damage, e.g. by children, servants or damage by dust, mud or other factors. In such cases, the only way out was to charge the consumer at the minimum rate, thus incurring losses for the corporation.

Meter inspection within the corporation seemed to be rather rare and very often avoided although when it was applied the results were found to be rather commendable.

It was noted that during 1980 a special campaign was

1 Interview with Assistant Financial Manager, Accounts Section - Financial Department, PNGO, June 1981.
mounted, resulting in the collection of some Le. 80,000. 

This was found to be revenue which would otherwise have been lost, due to broken meters, unregistered accounts and improper readings. It was estimated, at the time of this study that 80 per cent of the water meters within the Khartoum area were damaged.

No clear policies or plans, to improve the situation were found to exist within the Financial Department. Similar problems of lack of transportation and inadequate manpower also hindered the process of distributing bills even when the problem of issuing the bills could be overcome.

The computer was first introduced with the main objective of relieving the accounts section of bottlenecks enabling it to meet the increased volume of billing and to produce more accurate consumers accounts. However in practice since its installation, problems with consumers bills have increased, as was evident from the continuous complaints received about faulty accounts, incredible charges, etc...

As already mentioned, the computer system was not functioning properly. For the last four years no cost accounting analysis had been made. The reason given for this was that the computer was working beyond its capacity, and so it could hardly meet the work load placed on it by
the billing and salaries, let alone performing cost
analyses.

To lessen the burden on the computer PENCO has resorted
to a system of flat estimates of bills on the basis of
previous readings to avoid the trouble of monthly readings
and issuing of bills. A quarterly system was adopted where-
by a reading was taken every three months, and the other
two months estimated on this basis.

A quarter bill was issued four times a year, but this
again aggravated the problem of availability of cash. This
problem actually had two faces:

1) Depriving the corporation of a continuous flow of
   cash.

2) Frustrating the consumers, who in most cases found
   it difficult to pay such large sums of money at one
   and the same time.

To relieve the consumers PENCO adopted a policy of
accepting payment of up to two-thirds of the consumers'
bill, but this too affected the revenue of PENCO adversely.
This is shown in the following table:

1/ Interview with the Chief Accountant, Computer Centre,
PENCO, July 1981.
### Table 18.

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue Collection Compared to Total Billing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Billing</td>
<td>17,391,576</td>
</tr>
<tr>
<td>Total Collection</td>
<td>9,761,776</td>
</tr>
<tr>
<td>% of Total</td>
<td>54%</td>
</tr>
</tbody>
</table>


An examination of the amount collected monthly showed that it has never coincided with the billing. In some cases PESC had to apply cuts in supplies in order to enforce payment, although this policy was not effective because it was not often used. Moreover, it was not applied in the case of water supply for social reasons. However, this does not mean that we approve of the policy of supply cuts, because there should always be more positive means of regular cash collection. Here it must be emphasized that solving the problem of cash collection would also solve the problem of the inadequacy of PESC's revenue. Unfortunately it has been admitted that even if a hundred per cent cash collection was achieved PESC would not be able to secure the funds required for its stated objectives. An almost identical statement was made by the dissolved High Planning Council, to which the former general
manager provided the following answer.¹/

"The total revenue of the corporation, even if all the revenue from sales of water and electricity was collected would not be enough to meet the operation budget. The corporation would still lack the surplus that would enable it to carry out maintenance and replacement work, let alone to contribute to its development projects. This was over and above the fact that the corporation often found itself obliged to finance its ongoing projects itself with no help from anyone in the corporation.

Yet no plans for improving or increasing PSEGC's income were found within the corporation.

CHAPTER IV.

PEOU's PLANNING SYSTEM: AN ANALYSIS.

This chapter attempts to analyze the planning process as it is practiced by PEOU. The focus will be on the shortcomings of the system which have led to interruptions in operations, an atmosphere of great uncertainty, inability to achieve stated objectives and hence inefficient performance. At the same time some of the factors affecting the performance of the corporation will be examined. This performance will then be assessed in view of the problems created as a result of the failure to adopt a proper planning system.

It is worth mentioning at this point that what we were looking for was a systematic, comprehensive and continuous process that would pin-point the positive role of PEOU's management in determining the corporation's objectives and the means and ways of achieving them and finally we were looking for a process that would show us that the corporation's direction is being controlled.

1. Evaluation of PEOU's Planning

Taking the characteristics of effective planning already mentioned, we can safely say that planning within PEOU does not exist. This point will be clarified if we examined the main features of PEOU’s planning.

1/ See Introductory Chapter above, p. 10.
Main Features of FRWU's Planning I

1) Annual Budget:

The only type of planning recognized by FRWU's management is the annual budget, usually referred to as the annual plan. However, even if budgeting is accepted as a possible approach to planning, FRWU's approach to budgeting itself is surely not the right one. The system adopted is the traditional approach commonly known as the incremental approach. In this approach the previous year's figures are taken and the expenses trend projected, and such items as might increase during the year are added. This approach has been criticized, because it usually implies a degree of stability in such a way that the relationship between the different variables involved is maintained. Such an assumption is of course completely rejected because of its simplicity and its inadequacy in such an ever-changing and uncertain world. This may explain the wide discrepancy between the annual projections and the actual budgets of the corporation. In the incremental approach, the assignment of resources has no direct relation with the corporation's objectives. This usually happens because the stated objectives are not considered as the crucial factor for resource allocation.

One might consider at this point that budgeting would provide an element of control and in fact this is how it is used by PEMO: to adjust the balance sheet at the end of each year. But this too undermines the nature of budgetary control, reducing it to a rigid constraining device. Since budgetary control at PEMO involves allocations, whereby a total amount of money is divided up and earmarked for certain functions over a period of a year, it becomes a constraining device because activities dependent on available funds must be curtailed if the funds run out. This is a common phenomenon within PEMO where funds allocated to certain divisions wholly run out long before the end of the financial year.

According to Kant and Rosenweig: "The control process is typically one of ascertaining expenditure over time as measured against some planned data." Kant and Rosenweig further continue to say that a typical problem in organization of this type is that of running out of funds before the budget period expires. Funds must be either transferred from other projects, or activity in the part of the organization affected must be curtailed. Another less common but evident problem is that coming to the end of a budgetary period with excess funds on hand. At this point there

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is often a mad scramble to expend the funds so that the budget appropriating agency will not interpret efficient performance as a lack of need and hence cut down the supply of funds in future. For this reason most writers advocate flexibility in the process of matching needs with the available resources to allow for adjustment according to changes in the environment. The case at PESU is that even if environmental factors are considered they are often miscalculated. This explains the innumerable short falls of the actual operating budgets against the proposed ones in the last four years. These shortfalls are attributed to the world exalvation of prices - although for the last eight years inflation has become a well known factor which should be taken into consideration.

On the other hand, the system of extrapolating the previous year's budget has often been criticised because it entails the acceptance of previous year's figures, with little or no scrutiny at all and each figures may well hide the inefficiencies of past performance. Goshner explains this as follows:

"Concurrent planning ... can usually be identified by looking through a company's planning documents. Graphs of projected future performance also tend to follow a predictable pattern, i.e., if recent performance has been good, the forecast calls for more and more of the same on into eternity. On the other hand, if performance has been poor, the
Other types of budgeting have been accepted by different writers as appropriate approaches to planning, such as Zero-base budgeting. Here a zero-base is assumed and funds are allocated based on the merits of each program in competition with others at that point in time. Another type is the Planning-Programming Budgeting System (P-P-B-S), where the overall philosophy and emphasis are on measuring the results or outputs of the various programs rather than merely on the budgetary process of determining and controlling the financial inputs. Thus one may certainly say that the budgeting approach adopted by PMU is not what is required of a proper system, since it does not provide the corporation with a target to aim at. All it presents is a forecast.

Argenti's explanation for this is that:


A target is what the company wants to happen. A forecast is what it expects will happen. . . . This may be excellent or execrable, it all depends on how much effort each executive thinks he will make. Surely this is an up-side-down tail wagging-dog charade (‘bottom-up’ versus top-down management). It represents an abdication of management by director to employees, while the directors should tell the employees what profit the company will make next year and hence what effort each man has to make to achieve this. 1/ This could provide an explanation of the rather obscure role played by PEWC’s management.

11. Departmental Planning

Although PEWC identifies itself as conducting departmental planning it was rather difficult to identify this function within any of the corporation’s departments. This was in spite of the fact that within the two main technical departments, water and electricity, planning divisions seemed to exist. As shown in Chapter III, these two divisions are both structurally inadequate and functionally incapable of performing their tasks. This is despite the fact that the Electricity Department has managed to seek and mobilize external assistance in drawing up a long range development plan up to the year 1990. In spite of the obvious effort which has been put into the presentation

of this plan it is unfortunately misplaced. Of course the value of the plan cannot be denied, nor should it be disregarded, but it should be pointed out that the production of a sound plan is not the whole story, nor should a plan be the only end product of planning. As put by Geeks:

"Plans alone cannot make an enterprise successful. Action is required, the enterprise must operate - plans can, however, focus action on purposes - they can forecast which actions will tend towards the ultimate objective of economic efficiency; which tend away, which will likely to offset one another and which are merely irrelevant. Managerial planning attempts to achieve a consistent, coordinate structure of operations focused on desired ends". 1/

This quotation actually explains what we want to apply in the case of the Electricity Development Plan, which pin-points the source of the dilemma within the department. The executives in the department believe that they have no planning problem and always refer to their development plan as being the best that could ever be produced. It seems that they regard the plan as being an end in itself. If this is the case one must question why five years after the formulation of the plan no part of it has been achieved?

All the projects for improving the existing generation stations, installing new ones remain on paper. Here one can say that it is not the plan which is lacking. Action seems to be the key word. For this reason writers like Egerton and Brown denied the value of plans as end results. They go on to say:

"Elaborate plans do not necessarily guarantee sound planning .... I am suspicious of planning systems that produce big handsome books of plans .... Voluminous books of plans and back-up details are no signs of poor planning. Good plans can be presented very simply". 1/

This actually highlights the fact that planning is needed as a guide for action, which has led the same writers to affirm the fact that:

"If plans are presented as predictions of end results, they will never have much value — they will always be wrong. But plans developed as directions will show the way and chart the course of planning as a continuous process of thought". 2/

In the following section we will assess the validity of PPGC’s planning.


b) The Validity of PWG's Planning:

It is appropriate here to know why planning is desired. We do not plan only for the sake of planning, but rather for some desired end. Argenti defines the purpose of planning as:

"Enabling the decision-maker to make the next choice with the necessary knowledge of the future. The more that one knows of the future, the more that one knows of the future of the factors affecting a decision, the better that decision may be." 2

In the same context he continues to define a plan as "a list of actions that one "intends" to take and which one arranges in the best way to achieve a given objective". Hence it becomes evident that a plan is nothing more than a declaration of intent, nothing is altered by it, nothing is done by anyone to commit the enterprise to anything - Commitment occurs only when an action is taken and this is where action differs from a plan. Argenti says:

"Indeed the whole purpose of any action is to alter the future to bring about some circumstance that might not otherwise have occurred and which is "thought" to be beneficial to the corporation in some way." 3

The word "thought" in this sentence implies an act of decision-making. A decision is basically a resolution of alternative choices, but it is not a plan.

Decision-making result in a course of action.

In the case of PPRC, the decision to put the plan into action is not departmental, nor is it the corporations'. Action here involves the commitment of the corporation's resources, so the corporation's decision is not crucial, since other external parties are involved. As shown earlier, the corporation is wholly dependent on the state's resources for financing its developmental tasks and to some extent to subsidize its operations. This in turn affects the planning function of the corporation; Friedmann explains this phenomenon as follows:

"Different degrees of autonomy and dependency in decision-making tend to be mirrored in a hierarchy of planning authorities which stand in more or less systematic technical and political relation to one another, each level having its appropriate function and decision power, since each higher level is capable of changing some of the relevant conditions for decisions at all lower levels and under every change of this sort represents some change of policy, policy planning tends to be emphasised at higher decision levels and programming - the detailed specification of investments in volume, time and place at lower levels, or, put another way, developmental planning tends to shade off into policy-making, adaptive planning into programming. In fact, however the two become mixed in varying proportion according to the"
point on the autonomy dependency continuum
where planning occurs".  

This quotation sums up the main problem of PEMC's
managerial planning, which affect the corporation's
performance.

PEMC's management realize their problem as being
one of inability to meet the growing demand on their
services. However they believe that under the prevail-
ing conditions of very limited resources, the situation
is quite out of their hands. Therefore instead of trying
to make an effort to improve it they only take action
when forced by an emergency. Anthony says in this
connection:

"... Most companies react to changes in
their environment after they experience the
changes; they do not have an organized means
of attempting to foresee changes and to take
action in anticipation of them". 2/

This criterion actually distinguishes a good manage-
ment which is able to control its organization's affairs
from one that "muddles through". Such muddling through
can be seen throughout PEMC. As surveyed in Chapter III
of this thesis, this organization is continuously increas-
ing in size and scope, as showed by its diversified

2/ Friedmann, John, "A Conceptual Model for the Analysis
of Planning Behaviour" in Denning, B.N., Corporate
activities, uncontrollable operational expenses. The actual requirements of the corporation are not identified.

This growth is coupled with the problems of a declining standard of services, shortage of revenue and a restrictive expenditure policy, absence of commercial policy, an ineffective computer system and revenue collecting system, all of which offer a good example of an organization which is growing in size but at the same time becoming less and less able to function efficiently. This could either be the result of uncontrolled growth, or of an unanticipated demand. But whichever the case, both are problems which could have been dealt with through corporate planning.

To find out how this could be brought about, the following part of this discussion will be devoted to how the absence of corporate planning has affected the corporation's performance. Finally several other factors will be considered in the hope that they may throw some light on the problems facing the planning process within FWO.

C. Factors Affecting FWO's Planning:

1) Internal Factors:

1. Absence of Corporate Planning: According to Argenti, corporate planning springs from four basic premises: 1/

1/ Argenti, John: OP, chs. 1, 13.
1) Before drawing up a plan which is designed to do something, decide what it is you want to do.

2) In these days of rapid change it is necessary to look ahead as far as possible to anticipate these changes.

3) Instead of treating an organization as a collection of departments, treat it as a corporate whole.

4) Take full account of the organization’s environment before drawing up any plans.

These four premises are considered the foundation of any effective planning system. Thus as a corollary, the omission of any of these premises will result in an ineffective planning system, which may well weaken the whole management system and consequently the corporation’s performance.

Two important aspects of effective planning need to be discussed here in an attempt to show how their absence has affected PSW’s performance.

a) Nuclear Objectives: As mentioned before, PSW’s objectives, as stated in the 1975 and 1978 Acts respectively, are rather wide and vague. As such they set out the general trend to be followed by the corporation without providing any specifications as to what exactly the objectives were and how or when they should be attained. More specifically, PSW’s objectives as they appear in the two Acts do no more than spell out a general government policy towards the provision of water and electricity,
although objectives are generally required to provide a focus for the organization’s action. Such a focus of course is usually created by deliberate management action.

Objectives are needed in every area where performance and results directly affect, and form a vital factor in the survival and prosperity of the organization, such areas within PEWC are the financial and the manpower requirements, which are of vital importance to the proper functioning of the corporation, since they both constitute the means through which the corporation may attain its objectives. Unfortunately no planning effort is found to exist in either of the two areas, in spite of the fact that they form the centre of management activity and the main source of the corporation’s strength or weakness.

In PEWC, nearly all the top management staff is comprised of technicians, who concentrate on the tangible results to be achieved to the detriment of other intangible factors such as management development and organization, worker’s productivity and attitudes, responsibility to the public etc. Even the most tangible objective which in the case of PEWC is profitability, is not being achieved. Profitability does not appear to be an objective of PEWC, in spite of its importance as the prime measure of how well the corporation carries out its role. If the corporation had been more successful in the financial area many improvements
might have taken place.

As put by Egerton and Brown:

"A manager is responsible for the contribution his component makes to the larger unit above him and eventually to the enterprise. His performance aims upward rather than downward. This means that goals of each manager's job must be defined by the contribution he had to make to the success of the larger unit of which he is a part."

This definition denotes a hierarchy of goals; each lower-level or short-term objective is a step towards a long-term or corporation objective. Such a breakdown of objectives is particularly valuable in the case of corporations such as FERC, where the installation of a new power plant, for example, is lengthy and complicated undertaking. It requires the forecasting of demand, location of generation stations, and transmission lines. All this has to be done on the basis of technical, economic, and political considerations, the building of stations, ordering of equipment, fixing of rates, and the acquiring of a staggering amount of capital. In such work, unless each unit knows how much is required from it and when, it becomes difficult whether anything can be achieved. Cases of delays in ordering materials and equipment or in construction work have often occurred within the corporation. Running out of stock before making new orders is quite common. A remarkable example of

\[\text{Egerton Henry C. and Brown James K., "Perspective on Planning" in:} \text{Orntz O'Donnell; Management: A Book of Readings, North Lip, 1962.}\]
such a case occurred in 1979 when untreated water was supplied due to shortage of Alum, sulphate.

When each unit knows what is required of it, it has a tangible and meaningful objective in the near future. This is important because the long-term view is filled with uncertainties. Besides short-term objectives provide a means of bridging the gap between expected achievements and long-term objectives. The setting of short-term objectives which are part of the long-term ones provides a benchmark for measuring progress, thereby motivating the employees and facilitating control measures.

**Strategic Planning**

Cameron argues that:

"Of all contrasts between successful and unsuccessful businesses, or between the corporate leader and its followers, the single most important differentiating factor is strategy. Differences in research achievements, in product development, in quality of manufacture, in sales penetration, in net profit and in return on investment are all amenable in whole or in significant measure to the calibre of business strategy and its execution. Strategy is the catalyst, the main thread and warp of the business."

Indeed strategy is considered the instrument for vitalizing a corporation by giving it an objective and setting it on the right path. Strategy determines the

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them in light of policies, plans and programmes. These are all questions which need to be dealt with at the strategic level of the corporation, not at the departmental or divisional level. Unless actions at other levels of the corporation are predicted neither the Electricity Development plan, nor any other departmental plan can ever materialize.

As shown earlier, although implementation of the Electricity Development Plan was supposed to commence in 1977, until now, nothing has been accomplished. If we consider the fact that most of these projects were supposed to have been completed within a period of two years which in the time required for installing a generation station, any delay of one year in commencing implementation work will result in a three year delay in meeting the projected demand and so forth.

In such a situation, unless there is a reliable process for the updating of existing plans according to new information about consumer demand, the plans will simply become out of date. Even if they are actually implemented they will not yield the required results. This is what is likely to happen in the case of the electricity development plan. To start with, it is not part of a strategic plan. It has been initiated by a departmental effort and designed by foreign
The expenses involved in its preparation amounted to tens of thousands pounds. But as it is not part of a master strategy, it completely neglects the time factor. The initial work on the plan should have started in August of the previous year, but work on the 1977 plan did not start till November. This undue delay resulted in the plan not being presented to the annual budget meeting of the Board of Directors, so the annual budget was passed without the inclusion of the 1977 project proposals.

Ideally of course, the two plans would be submitted and discussed simultaneously. But astonishingly a similar sentence indicating a late start on the plan preparation work is shown again in the 1978 Development Plan and for the same reason the plan missed the Board’s meeting for the second time. One would expect here that if FMC had a clear corporate strategy the timing of the different activities should have been adjusted. This is what Cannon meant when he said:

"Business strategies are the directional action decisions". These include all established and accepted objectives, plans, policies, together with their implementing or committing decisions which provide and initiate
a direction for the business as a whole and its essential functions. Strategy also includes the ever-present factor of timing and the decision to take a step or adopt a set of objectives, plans and policies.

This timing factor actually is a pressing problem at PEMEX. The most obvious sign of it appears in the shortages of supplies and materials and of fuel. Materials are often stranded at Port Suden waiting to be transported. In 1979 the Water Projects implementations division had to turn down its share of the budget allotted to it, because it did not have the required materials for construction work. In fact most of these materials were piled up at Port Suden, but because the corporation either could not or did not want to think of an alternative means of transportation they made no effort to move the goods.

Going back to strategic planning we may say that none of these problems can be solved except by means of a strategic plan in which all problems may be carefully examined and alternative solutions weighed by comparing the implications of each on the future course of the corporation so that finally the best solution be chosen.

Hence we may say that strategies are means for initiating the actions needed to achieve the ends or purposes of the enterprise. Thus to be effective strategies must be
solidly based and fully consistent with such purposes. It must therefore be sufficiently sensitive to the corporation's purposes and in turn to its entire environment.

This is indeed true of PWOC since the corporation does not choose its purposes, nor the means of achieving them, both are decided outside the corporation by general government policy or in the Ministry of Finance, Bank of Sudan, Central Purchases Bureau etc. So it is clear that not only PWOC's output, but also its input are fixed by external factors. Thus PWOC is inevitably not only subject to changes in consumer tastes and trends, but also to the instability of the environmental inputs. So the ability to predict the action of these environmental forces is vital if the corporation is to be able to determine its own course of action. This is one of the most acute problems of PWOC since it causes great uncertainty regarding the resources with which it is working.

Forecasting and long-range planning are specifically required to reduce the environmental uncertainty affecting the organization and provide the framework for managerial decisions that make the best of situations as they arise. But both forecasting and long-range planning require a firm basis of information and this is what PWOC lacks.
PWUC’s Information System:

Information within PWUC is of two types:

1. Technical information which involves all engineering and technical details concerning the operating, maintenance and improvement of all the Water and Electricity services.

2. General and administrative information concerning the available materials and financial and manpower resources to provide these services.

The communications system adopted by PWUC consists mainly of monthly reports which each section or division is supposed to submit to the planning division in his parent department. Similarly, outstations are supposed to submit monthly reports to the appropriate division within the headquarters. All the information in these reports constitutes the division’s reports.

The information conveyed in these reports is mainly technical in nature, including specific details about the operating condition of certain machines, the drawbacks of a certain system and any problems and complications of a recurrent nature. The reports are usually identified as providing formal feedback on the operating system. As Karl and Rosenweig put it:
"Information is often evaluated in terms of its puneance to decision making. Facts, numbers and data are processed to provide meaningful information, an increment of knowledge that alter the degree of uncertainty in a particular situation."  

If this is so, our quest is for a systematic system of information flow that reaches the relevant decision points in time and contains the appropriate type of information.

As mentioned before, monthly reports are the only formal means of conveying information and even this system is falling into disuse. Since the mid seventies this convention began to be neglected. The only example of such comprehensive reports was found within the Water Department dating back to 1974. These reports have now stopped, although technical information is still passed on in the form of reports. However these technical reports are intermittent and usually only submitted when there is a pressing problem which requires a decision by headquarters, the only exception is at the time of submitting the annual budget, because these reports form the basis of the budget proposals.

Experts report on the corporation described PEMO communication system as being the weakest area.

"For PEMO, communication is one of the weakest, if not the weakest area. There is no basic concern on who is to send information, what types of information are necessary, where it goes, and when. There also seems to be a complete unawareness of the importance of communication, especially in written form." 1/

In view of such lack of information, crises arise when any new action is about to be taken or a new plan is to be designed. Every thing becomes dependent on the veracity of the individual or individuals concerned. A clear example can be cited from the Electricity Planning Section. It is worth mentioning here that the British Electricity International Team, who were responsible for the 1977, 1978 development plans for electricity have drawn up a plan for communication chart 2/ demonstrating the flow of information network needed for the execution of the plan. The chart shows a lengthy and complex process for the main events in the preparation of the plan. 2/ It

3/ See Appendix No. 3.
pints out the interrelationship of the headquarter planning system, with areas, the commercial department, the finance department and the generation division. The chart shows the need for consultation and obtaining information from outside bodies and departments, such as government ministries, corporations, provincial authorities, existing and potential consumers and consultants engaged in survey activities on behalf of EWSO. These factors are called by all writers in the field, environmental information. East and Rosenweig\(^1\) identified three types of information; competitive, environmental and internal.

However no evidence of easy access to the required information is clear within EWSO; either internally or externally as admitted by the planning officials in the Electricity Department. Information was available if they requested it, but the requests had to be made numerous times which entailed much time and effort being spent on this. Usually they have to go personally to the relevant section and search for the information they need.\(^2\)

Furthermore, to obtain information from the outstations those responsible for planning at the headquarters often had

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\(^1\) East, P. R. and Rosenweig, J. R., Energy, 4, 699.  
\(^2\) Interview with the Acting Head, Planning Division, EWSO Electricity Department, June, 1981.
to go and collect it themselves, thus wasting considerable time and effort. Equally there was no evidence that information from outside bodies, mentioned above, was obtainable either. One very important source for the future electricity load forecast in the national development plan (especially that part concerning new housing, industrial and agricultural schemes). It has been the convention that PEEO should be represented on the housing committees of the People's Executive Council. However it was rather difficult to determine whether or not this procedure was actually followed. While some of the interviewees said that this did occur, others said that this was some years previously ago. Some referring the practice back to the early seventies.

However even those who said that there was representation also admitted that their role has been a passive one, since their opinion often comes too late and is in most cases neglected. In the face of political and social pressure PEEO often agreed to undertake unforeseen projects, to fulfill their role as the sole supplier of the service they cannot refuse.

Whatever may be the case, the end result is always the same; that PEEO is not meeting its responsibilities, firstly by being unable to satisfy the demand, secondly,
because of the lack of sufficient capacity, the frequency of power cuts is continuously growing, thereby driving customers to rely on private generation. Yet this is not the only external factor which affects PEMS. Other factors which PEMS should take into consideration are: the population growth trend, governmental actions and decisions, material and equipment suppliers, space parts suppliers, labour supply, public and political attitudes towards the corporation, etc.

As a matter of fact, each of these areas taken alone constitute a host of problems for the corporation. Each requires the detailed attention of the corporation if it is to remain in equilibrium with its environment. But the only way to maintain this equilibrium is to be aware of these problems, thereby to be prepared to meet them. This can only be done through planning. As Katz and Kahn put it:

"In adapting to their environment systems will attempt to cope with external forces by ingesting them or acquiring, control over them... Social systems will move however towards incorporating within their boundaries the external resources essential for survival." 1

But such moves towards taking external forces into account do not only involve the availability of information, but also the accuracy of this information. PEMS suffers

not only from the lack of information, but from the uncertainty of the available information itself. Although most of the information handled by the corporation deals with figures, yet at no level were actual figures obtainable. This meant that assumptions and estimates had to be used, but these too needed to be firmly based in knowledge and information. However, one finds that recording procedures in PEWC were completely neglected. This could be best illustrated by the following quotations from the "Power Market" Survey by the British Electricity International Team, concerning some of the outstations. 1/ 

a) Atbara Power Station: Basic operating information is returned to Khartoum Headquarters on a monthly summary sheet. The station log sheets are kept in a most unsatisfactory manner being a great pile of paper heaped on the floor of the switchboard gallery. Only with much difficulty were certain log sheets extracted to obtain a daily load curve and certain engine details.

b) El Dasein Power Station: Operation records are virtually non-existent and those which are really available were on poor system of poor quality paper. The log sheet readings were overdrawn. Consumers Accounts sheets. It was

1/ PEWC, Power Market Survey, 1975-1980, by British Electricity International Team, Electricity Department Appendices 5.4, 5.3, C.9, 4 and 93, see. Respectively.
difficult to extract the most simple operation figures.

No maintenance records at all. The station mechanical foreman claims to keep it all in his memory.

a) El Fasher Power Station: Maximum demand recorded is 601 K.W., of which there is some doubt about the method of determination. No system of recording engine running hours. The only records are kept by the mechanical foreman either as a note in the notebook or by memory. His routines are not very well based as he gave a figure of 1500 hours between oil changes on the engine which seem excessive.

These are but a few of the many examples listed in the "Power Market Survey", which are intended to give some insight into the type of information problems existing within PEWC. At the same time they may give some clues about the nature of most of PEWC's operation problems, because rarely does the required information reach the right decision point in time. This in fact was one of the main problems, not one of weak planning alone, but one of a weak control system too.

An important factor of the information problem within PEWC lay in the fact that no system of data analysis existed in the corporation, nor were there the instrument for effectively collecting and analysing the data. Although in principle a statistical division is supposed to exist,
in fact, neither the structure nor the composition of the division shows any sign of proper functioning. The division is poorly staffed and poorly equipped. This may well explain why it has not been possible to obtain data beyond the year 1977, since records are not kept. Yet this is not the point, what is more important is that, as the word "statistics" denotes, one would have expected that some processing and analysis of the data collected might be carried out. All data received are usually tabulated, sometimes percentages are calculated, but no further analysis of them is conducted. So there is no way of discovering the relationships and interrelationships between the figures obtained, which could be used to calculate trends of future action. Variations were often noted down without any explanation or justification. No analysis of a sudden drop in the rate of consumption or a sudden rise in operating costs was made. As already explained all rises in operating cost were usually blamed on world market inflation. In fact in some cases the reason may be excessive oil consumption due to the continued uneconomic running of a machine. It is believed that at present thirty per cent of the existing working machines in the field of electricity are rated as scrap.  

1/ Interview with the Senior Electric Engineer, Clarming Division - Electricity Department, PMO, June, 1961.
One important area within PEAC which requires considerable statistical surveying and analysis is that of finance. The financial resources of PEAC are extremely meagre and completely insufficient. This imposes the necessity for rationalizing and utilizing every particle in the optimum ways. The only means of doing this is through financial analysis, which allows for the weighing and comparison of different expenditure formulae and finally, the choice of the one which will best serve the corporation's purposes. It is worth mentioning here, that for the last five years no financial analysis has taken place. This task has been assigned to the computer system, which is itself described by the Business Administration Survey Team as being inadequate. 

b) External Factors:

Environmental forces have a direct impact on the way the organization structures its activities.

The environment is defined as "everything external to the organization's boundaries". 

E.M. Hall believes it is useful to think of the environment in 2 ways:

1) The societal (general) environment which affects all organizations in a given society.

2) The task (specific) environment, which affects the individual organization more directly.

A number of classification schemes have been suggested for characteristics that affect all organizations. Such characteristics are: cultural, technological, educational, political, legal, natural resources, demographic, sociological and economic.

These general characteristics have an important effect on the determination of the resources, the specific mission of the enterprise, the most appropriate transformation process and acceptability of organizational outputs.

The task environment is defined as the more specific forces which are relevant to the decision-making and transformation processes of the individual organization. Examples of these specific forces are:

Customer component, which includes the distributors of a product or service and its actual users. Suppliers component, including suppliers of new material, equipment, product parts, labor supply. Socio-political component, including government regulatory control over the industry, public attitude towards the industry and its particular product and so forth.
The task environment has an impact on the goals and values, structure, technology, human relationships and managerial processes within organizations.

In this section some of these environmental factors or forces influencing the corporation will be examined.

**Socio-Political Forces**. The effect of this factor is observed for the most part in the statement of the corporation’s objectives themselves. A detailed examination of these objectives reveals that the task assigned to the corporation is vast as the Sudan itself. As stated in the 1978 Act it is to provide water and Electricity services to all sectors of the community, for all types of consumers, for all purposes in all parts of the Sudan with the greatest possible efficiency and in the most economic way.

Judging merely by its size, this objective would prove to be a tremendous burden requiring unlimited resources and unlimited time and effort. In view of the financial and material resources available to the corporation this objective is simply unattainable. Therefore the corporation should always be subject to criticism for not achieving its objectives. Such criticism is in fact widespread, and signs of dissatisfaction with the corporation’s performance are common places. Nevertheless this is not the way to look
at the problem. It has been reiterated throughout this study, PWD's management has neglected one of its most important functions, i.e., planning, which could well have solved this problem of vague objectives. Yet this is not our point at this juncture, rather our interest here is in putting PWD in its socio-political context, to see how these forces have affected the corporation's ability to structure its activities properly, since the organization can be nothing more than the product of its own environment.

When the history of the organizational development of PWD is examined, it is found that the Sudan Light and Power Company was a commercial private company owned and managed by British shareholders and British staff respectively. Its objective was to provide electricity and water services to a particular sector of the community, but as a private enterprise its primary goal was to maximize profit to satisfy its shareholders. For this purpose alternative sources of income were sought in ice production and tram services, which needed less capital investment, but yielded faster profits. Thus the company was able to meet its financial obligations and make a profit. The question of development in the field of water and electricity services received no consideration during that time.
This was the case even after Sudanisation. Although the two companies were left on the British Register of Joint Companies, in the hope that such a status would help in raising loans in England, it seemed that the new Sudanese Government, still inexperienced showed no commitment towards such developmental strategies, so no advantage was derived from the legal status of the two companies. Instead of adapting the newly Sudanized company to meet the new social developments, the government added a new branch to it, whose function was to meet the deficiency in services. This new department was established within the Ministry of Works, to provide water and electricity to the main towns within the nine provinces of the Sudan. This resulted in the same service being duplicated by two different departments without any good reason. The result of this was of course the dispersal of the meagre resources available at that time and subsequently the eventual outcome was a situation where neither utilities proved effective in the field. The public utility proved completely unable to improve its services or to maintain the existing ones, while the SUCO although its performance was somewhat better, it lacked both the qualified manpower and the proper financial resources.

The following period was no better, as it was characterized by its political instability, the impact of such
Instability in the organization came through a series of unplanned decisions mostly taken for political expediency. The first of these was the rejection of the corporate form of organization proposed after independence by the 1958 Military Government. Being a military government no tolerance of autonomous organizations was expected. The complete centralization of authority meant that a departmental form of organization for water and electricity services was adopted, from 1959–1966 under the name of the Central Electricity and Water Administration "CEWA". This was only an executive body, whose function was to generate, distribute and sell electricity and store, purify and sell water. New markets for its services were opened up as dictated by the Council of Ministers. From that time onwards, the tasks imposed on the CEWA have increased continuously.

What is important at this point is to note that all these developments and additions to the administration's responsibilities were made in isolation from CEWA itself. The formal organization remained the same as that of SIPC. The function of all the top administrators was purely executive. They adhered closely to the rules dictated by the minister concerned. No planning function was carried out by CEWA's management and eventually all decisions were
taken by the Minister, who was the executive as well as the political head in whom all authority was vested. Yet there seemed to be no problem at the time for several reasons. The volume of capital investment was still comparatively small and the overall pace of development was rather slow and could take place smoothly. The operational expenses were not problematic since the rate of inflation was nearly nil. Imported equipment and materials were available and operating fuel easily obtainable. In addition all of CWA's equipment and machines were almost new, having being installed either in the mid or late fifties, thus no depreciation was involved and their performance was good. In short one could say that the situation was much easier, with no rush on demand. In such a situation the importance of planning was not perceived. The minister could always obtain the required funds at the top political level as need arose.

All these factors helped to confine the task of CWA's management to the executive side of the work, which was mainly technical in nature. Generally speaking it was commonly believed that the running of the administration during that period was relatively smooth. It was based on the fundamentals laid down by the British predecessors and maintained by those who remained behind. Some of these rules and regulations are maintained up till the
Present, especially those which regulate the stock supply.

The other major change which has affected the stability of the administration was a result of the purge policy adopted by the October Revolutionary Government after 1964, when many of CEMA's employees were removed. Some of the employees were indefensible, according to many sources, and a state of chaos was created by this policy. In this chaotic atmosphere and under pressure from CEMA's formal trade unions, a decision was taken to subsidize all technical and administrative posts in the country. Since both these actions were unplanned and taken suddenly, a complete disruption in the administrative chain of the organization occurred. Many Sudanese administrators and technicians were appointed to key technical and administrative posts for which they had neither the proper qualification nor the required skill and experience. This was observed in the appointment of many of the Khartoum Technical Institute Engineers and graduates of other junior technical schools, who as described by the Irish Electricity Board Consultant as follows:

"Although sufficiently knowledgeable to run the technical affairs, but lacked the proper skill (or the 'X. Engineers') that enable them to take over the technical management of the corporation."  

Ever since that time there has been a latent conflict between the ETI and the graduates of other technical colleges and between the engineering graduates of the U. of K. This is one of the main management problems of the corporation, which has lately been identified as being one of the reasons for the lack of cooperation and distorted information flow within PWOC.

Later when the same trade unions called for the PWOC to be transformed into a public corporation after 1966, the change was not for the better. As stated by one observer:

"Although the advantages of a public corporation were the apparent basis for their argument they seemed to be equally motivated by self-interest to gain the fringes benefits and special privileges of public corporations".

This observation has also been indirectly confirmed by the Business Administration Survey Team, when they noticed a lack of "corporate identity" throughout the corporation. Equally this has been among the most striking observations within the context of this study. Every one in the PWOC talks of themselves as "being a Central Administration,


More astonishingly some of the divisions still write their correspondence on paper headed "Central Electricity and Water Administration". In my opinion this lack of recognition of their own identity is an important factor in the organization's lack of autonomy and may be responsible for the corporation being subject to civil service rules and procedures. Even the internal regulations for the "Employee Terms of Service" which were formulated by the corporation itself, were in total nothing more than a copy of the civil service department's regulations. In short, in spite of the fact that an autonomous public corporation was created, this was not reflected in the administration. The tasks of the newly formed corporation - "The Central Electricity and Water Corporation - 'CEWA'" - extended to cover those of the CEWA as well as responsibilities for introducing and developing electricity and water services all over the country. This implied that the responsibility for providing water and electricity services to the provincial capitals and big towns, previously carried out by the Ministry of Works was also to be added to CEWA's tasks. The corporation continued to work on a commercial basis on the understanding that the annual revenue should be sufficient to meet all its ongoing expenditures. Even so, from the mid-sixties till the early seventies, no financial problems were perceived. The Balance Statement showed continuous profits and the world prices were still within the reach.
Generally speaking this period was often referred to as the Corporation's "Golden Age", judging by the smooth operating of the corporation at that time. However this is not to say that the corporation had a firm basis on which to plan its future course, because this would imply that it had a clear policy and a sound strategy, which was not the case. As mentioned above, the corporation since independence underwent continuous changes from one type of organizational form to another and from one type of leadership to another. Such changes prevented the emergence of one consistent policy or the commitment of the management to a sound strategy. The reason in fact seems to have been the presence of an effective General Manager, Sayed H. V. Salimander, an enthusiastic energetic and committed young engineer, dedicated to his task. Although this may not necessarily be the best style of leadership in other situations, in his case it worked extremely well. Effective leadership is defined as:

"When the style of a leadership is appropriate to a given situation it is termed effective,"[1] meaning that the effectiveness of a leader depends on how his personality interfaces with the situation in which he operates.

As a great believer in centralisation of authority, he exercised all authority to manage, direct, and control.

He was present all the time and throughout the corporation and acted as a centre of information and decision-making, defining the role of each of his subordinates and closely supervising their actions. Although his orders were obeyed out of fear of punishment, to his subordinates he was at the same time a great man. Many staff member comments on this as follows:

"We used to have no problem, just a word from him and every door would fly open." 1/

Those who worked with him believe that he knew what he wanted as well as being able to design means of achieving it. In this connection Jast and Rosenzweig says:

"Good leaders are typically seen by subordinates as helpful in both setting goals and in structuring or designing means of achieving them." 2/

This seems to be true in the case of Sayed/M. A. Gallander. He was the first Sudanese appointed to the post of Deputy Manager in PEN and was therefore well acquainted with the organization and its purposes and the means of achieving them. It is worth mentioning here that during his time, the corporation had no problem with regard to hard currency. He was able to obtain from the Ministry of Finance a sum

1/ Personal interview with PEN's staff members, 1981.
2/ Kast, Rosenzweig, op. cit., p.326.
of half a million dollars annually for the spare parts and operating materials required from abroad.

However, in spite the value of such leadership it may well become a liability the moment it ceases. In an organizational context long term effectiveness is as important as short term - both are indispensable. By autocratic leadership Sayegh/Ellender encouraged dependency and lack of a sense of responsibility. Thus the moment he left the corporation, the same chaotic state that had prevailed prior to his appointment again predominated.

In a study by White and Lipitz on the impact of three leadership styles in task oriented groups, they found that:

"Although the quantity of work in autocratic groups was slightly more, the quality in democratic groups were constantly better. When the leader left the room, the autocratic groups collapsed completely, whereas the performance in democratic groups decreased only slightly." 1/

To sum up this section one may say that the corporation, being a product of its own environment, has been greatly affected by the instability and frequent changes in its own environment. Such instability, as reflected in the corporation's management function and structure, deprived the corporation of a clearly designed task to aim at and

a clearly designed route to follow. As we have seen above, the corporation’s functions were gradually expanding till they came to cover the whole of Sudan. All these were imposed on it by political decisions while it is clear that the corporation’s management played no positive role in determining those objectives nor in finding means and ways to attain them.

This has created a situation in which the corporation entered a state of imbalance between its social obligations and its available resources. This is expressed in a statement of financial affairs:

"Since its commencement in establishing the Rosaires Generation Station, the corporation has been suffering from financial shortages". 2/

It should not be forgotten that the Rosaires scheme was the only viable development scheme to be carried out by the corporation at that time.

The situation was further aggravated after 1970 with the declaration by the May Government of the period from 1970-1980 as the epoch for development. This declaration conflicted with the corporation’s previous expectations, reversing their priority system and committing it to commercially non-profitable projects. This in turn led to

2/ A memorandum on PESC’s Financial Affairs to the High Planning Council, by the former General Manager, 1976, p.9.
a heavy increase in operating expenses and a decrease in revenue and profit margins. The dilemma lay in the fact that electricity and water services are part of the basic infrastructure for developing backwards areas, and promoting new agricultural and industrial schemes. To encourage development in these fields, it was government policy to charge such schemes at preferential rates for any services provided. In view of their high consumption rate, it became inevitable that FEWC should operate on diminishing return.

On the other hand, being committed to agricultural and industrial development as a high priority, the government ranked the services sector as a fourth priority after these two and transportation, in its national economic plan. FEWC, as part of the services sector, received only a minimal share of the annual budget considering the tasks it was supposed to perform. To give but one example, its share of the Six Year Economic Development Plan budget amounted to only seventy million Sudanese pounds, while the proposed budget for the Six Year Electricity Development Plan alone amounted to one hundred and fifty-six million Sudanese pounds. This is typical of the state of financial imbalance in which the corporation found itself.

6,019,135 Sudanese Pounds, including expenditure on new water projects, compensation for expropriation of rural lands, interest on loans etc.. This led the corporation to appeal to the Minister of Finance to cancel these debts in order to keep the corporation's accounts balanced. However up to the present, throughout the corporation one of the main complaints concern, the burden which has drained the corporation's resources and which was placed on it by the merger of the provincial public utilities into PWD. This indeed may be the main reason for reconsidering the merger by the separation of water services from electricity which recently occurred.

2) Governmental Policy and Regulations:

PWD was originally intended to be a public corporation, that is, a free and autonomous body on the assumption that these qualities render Public corporations more effective in terms of Practical achievement, organisational set up and managerial functions, as Neston puts it:

"Whatever the ultimate perspective may be, the country decided to develop economically has no alternative but to use Public enterprises on a considerable scale, at the very least, in order to get things going". 2/

For this reason Public corporations were always preferred over other forms of enterprises, for the purpose of providing electricity and water services in Sudan. 3/

The Ranson Seminar enumerates some of the differences which distinguish public corporations from other types of public enterprises:

1. Freedom from the annual appropriation process, at the very least for operating expenses.
2. Freedom to receive and retain operating revenue.
3. Freedom from general governmental restrictions, particularly in the field of expenditure.
4. Freedom from governmental appropriation accounting.
5. Freedom from central purchasing and contracting requirements.
6. Freedom from normal governmental audit of operations.
7. Freedom to pay salaries, hire and fire.¹

In short we may say that public corporations are supposed to be free from the regimenty, bureaucracy and red-tape traditionally associated with government departments. Sherwood says:

"In general, the autonomy of the public enterprise is interpreted to mean freedom from the constraints of the civil service system."²

It therefore follows that it is this freedom from such constraints, bureaucratic procedures and close government

surveillance that gives public corporations their distinctive character and allows them to operate with optimum effectiveness. In the case of BWC, it is obvious that it lacks those attributes, since the corporation has always been subject to civil service rules and regulations. All policies pertaining to recruitment, training, promotion incentives, severance pay, etc., closely adhere to those of the civil service. The personnel manager himself is a civil servant seconded to the corporation from the civil service department. Here we have a clear case of transplanting of the rigid civil service system on an autonomous body with all the inefficiencies involved. This may be observed in the lengthy and cumbersome procedure of recruitment through the civil service commission. This is an automatic process carried out according to the government's general policy which leaves no room for the corporation to hire those who are most suitable for its purposes. This may well account for the problem of overstaffing in certain job categories and understaffing in others. Here one may say that the objectives adopted by the personnel management seem to be oriented towards a traditional civil service with little relevance to the objectives of the corporation. Ideally, of course, this policy should aim at efficient staff utilization, development, effective motivation, and control. To clarify this point, we may refer to the corporation's shortage of qualified technical staff. It is worth mentioning, here that such staff is usually recruited from higher technical schools and colleges,
but because the type of skills required by the corporation are unique, staff are for the most part trained by the corporation. Unfortunately after such costly training, most of trainees then leave the corporation. The reason is that this category of employees eventually find their prospects for career advancement closed. According to the Queen Civil Service Regulations, this category can not be promoted to any group higher than the group seven scale within the employment ladder. Therefore they will remain at this level regardless of their qualification, skills or talents. So those who are ambitious tend to leave the corporation, while those who remain behind are usually less skilled, frustrated and apathetic. The same can be said of other personnel policies and regulations. While they should aim at utilizing such skills and talents and motivate the employees towards effective performance, the trend within ESEC is to implement civil service rules. Thus an automatic system of incentives attached to posts, regardless of the abilities of those who actually occupy the posts is applied. This system has been criticized by the Business Administration Survey Team in the following words:

"The primary purpose of incentives is to motivate employees to put forth their best efforts. General formulas in stimulating motivation include increases in pay for performance, provisions for security on the job, special awards or promotions and future retirement benefits. The civil service
1. Financial Aspects

As mentioned before, financial shortages constitute one of the main problems of PWSC. Currently the corporation functions as a quasi-government organization under the direct control of the Ministries of Finance and Planning. Such control is affected by a lengthy and complicated process which involves approval of a plan, then approval of the required funds. Very often the budget is subject to severe cuts, so that PWSC is placed in a critical position. Such cuts impede the implementation of whole projects, parts of others etc. It is therefore difficult to blame PWSC for not meeting its obligation, since its actions are dependent on the decisions of external agencies.

On the other hand, the collecting of funds for development work itself is problematic. Very frequently PWSC is faced with the problem of receiving approval for its development projects, but finding the money not available, when it comes to cashing it. Very often they only receive an apology for the fact that there are no cash funds. The size of this problem might have been more tolerable if it were only confined to postponement of PWSC’s plans and projects. However it may also cause additional loss of funds, especially when the work is being handled by private contractors. Any delay in paying the contractor his monthly dues may postpone implementation, and the contractor will demand compensation.
for the losses he suffered due to the delay. The most striking example which can be quoted here is the case
ruined by Adel and Company, private contractors. This company is carrying out work on the Reebak water
station, which was completed thirty-two months behind schedule. The contractors were not held responsible for
late delivery because they sued the corporation for all the extra expenses incurred. They demanded compensation
of one hundred and fifty thousand British Pounds, using the corporation's failure to pay its dues at the
appropriate time as a plea. This is only one of dozens of cases which not only cause embarrassment to the corpora-
tion, but also as various staff members have commented may cause the contractors to avoid any future cooperation with
the corporation.

The problem is further aggravated when foreign currency
is involved. Here double the time and effort is required,
with the Bank of Sudan involved as a third party. In view
of the prevailing economic conditions in the country, the
majority of the requests for letters of credit are rejected.
Dozens of complaints by foreign suppliers are similarly found
within the corporation.

1/ Interview with the Legal Counsel of PDW, July, 1961.
2/ Interview with the Head of Civil Construction Division,
Water Department, PDW, May, 1961.
3/ Interview with the Distribution Manager, Purchasing Department,
PDW, August, 1961.
Likewise, similar problems extend to the operational budget itself. A number of directives may be found within the budget division defining the allocation for public expenditure. Thus PWG often finds itself obliged to cut its expenditure on fuel, oil products etc., which results in operation problems, since oil consumption at the corporation is rather high due to the deteriorating state of its equipment and machines and the lack of substitutes. Hence disruption of the whole operation system results. This is really only a simplified picture of PWG's working and implementation problems, which constitute part of a vicious circle, starting with shortage of equipment and material supplies, leading to deterioration in the operating machines, leading to the uneconomic running of these machines leading again to an increase in expenditure. This further strains the corporation's resources, so that it is unable to meet its running obligations and so on.

2. Limitations of Purchases

The procedure followed here allows the General Manager to authorize purchases up to Rs. 20,000, while orders exceeding this are usually subject to the approval of the Finance Minister through the central purchases bureau. Purchases within the 20,000 limit and which are locally available constitute no problem, except when no funds are available in the approved budget.
The real problem arises when the orders require larger sums of money. According to government regulations these purchases must be made through tenders. Yet the main constraint is faced when purchases are to be made from the world market. Besides the usual delay involved in the process of making out the tender, the long and cumbersome process of convincing the central purchases bureau of the importance of the order, before final approval is granted, has to be undergone. In the course of this lengthy process, the validity of the letter of credit at the bank or the import licence may expire. Each of these steps involves considerable time and effort and may ultimately prove unsuccessful, or else it may also happen that while certain items in the order are approved, other associated ones are not, which delays whole operations. Since 1974-75, when the government started to tighten its grip on foreign trade facilities, a real problem concerning the availability of spare parts has arisen. Unfortunately most of PWCO's generation stations were installed sometime in the mid or late fifties or early sixties. The time when their working life span approached and they required either complete or partial replacement coincided with the time when the country's balance of payment problems became pressing. In addition, at the

\[1/\] Interview with the Head of External Purchases Division, PWCO, July, 1981.
has diverted the country from the right strategy because I believe PMUs should have been treated as one of the country's top priorities. As mentioned before, electricity is not only a service utility, but is an important and basic infrastructure for all development projects. One of the reasons why the Rahad Agricultural Scheme did not start to function is because its electricity system is not yet complete. The reason why Borana and the Flaming and other factories are not functioning to capacity is because of the insufficient electric supply.1

1. Transportation Problem

The transportation procedures followed by PMU entails that the corporation should adhere to government regulations applicable to the process of transporting government goods and materials from Port Sudan to Sharons and to sites of project. This means that the corporations imported goods and materials should stand in the long queue at the Sudan Government Cargo office at Port and again wait in the even longer and slower queue for transport on Sudan Railways. If we consider the delays resulting from the inability of Sudan

Railways to meet the pressing need for its services one may ask why REWC should not seek other means of transporting its goods and materials such as hiring trucks. It might even be possible to seek more radical solution to this recurring problem, but the answer given to this question has always been "that's" government regulation.

The continuous government surveillance and regulation of all these areas has led the corporation's management to direct its attention more and more towards adjusting to those rules and regulations as if they were an end in themselves and not a means to an end, as stated by Katz and Kahn:

"Those towards tighter integration and coordination are made to assure stability, when flexibility may be the more important requirement." 1/

Coordination and control are not seen in the context of adjusting the system to its environment but as desirable goals within a closed system. In fact however, "every attempt at coordination which is not functionally required may produce a host of new organizational problems." 2/

Such problems may be found in all departments of the corporation, the best known being the case of the water rates which have been waiting in Fort Sable since 1974 and

2/ 1bid., p. 45.
until now no effective means of transporting them has been found.

Katz and Rein, in their discussion of such behaviour in other organizations, have reached the conclusion that blind adherence to rules and regulations, which are not functionally required leads to a misconception of the role they play in coordinating and controlling the organization's functions. They say:

"One error which stems from this kind of misconception is the failure to recognize the equifinality of the open system, namely that there are more ways than one of promoting a given outcome... the general principle which characterizes all open systems is that there does not have to be a single method for achieving an objective." 1/

As they have ascertained under certain conditions there is one best way to do the job, but the conditions must first be fulfilled. The condition here being that Sudan Railways is really capable of fulfilling all the requests for its services. In fact Sudan Railways itself is beset with dozens of problems that hinder its own performance.

1/ [Note, p.46]
rendered to the public, which were the main objectives stated in the corporation's Act.

2. Productivity

PEWC has seventeen independent electricity systems which supply 860 million kWh of energy to about 182,000 consumers, with a national maximum demand of about 165 MW.1

The location of all existing supply systems is shown geographically in Appendix VII, and the two transmission systems, the Blue Nile Grid (BNG) and the Eastern Grid are shown geographically in Appendix VIII.

The BNG, the main source of power supply for the most of the industrial areas in the country, accounts for 85% of the total electricity generation in Sudan. It stretches from North of Khartoum to Roseries with major branches, Sennar-Rabak on the White Nile, Sennar-Mina Al Sherif and Karasheh, El Fau transmission lines. It links the hydro-electric power stations at Roseries and Sennar with thermal power stations in Khartoum and the Red Sea, Haaba, El Fau, Mina El Sherif.

The remaining fifteen systems are essentially 11 KV or 215 Volt distribution networks based on a single diesel power station and serving a "town" area of about 2.5 kilometer diameter.

1/ Public Relations Office, PEWC, Public Electricity and Water Corporation in Service or Development, PEWC, (An Arabic Pamphlet), 1975, 2.9.
<table>
<thead>
<tr>
<th>Area</th>
<th>Capability</th>
<th>1979/80 1978/79 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Nile Grid</td>
<td>4</td>
<td>198</td>
</tr>
<tr>
<td>Gourashi</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Managil</td>
<td></td>
<td>0.84</td>
</tr>
<tr>
<td>Dusi</td>
<td>1.7</td>
<td>1.16</td>
</tr>
<tr>
<td>Goteina</td>
<td>1.2</td>
<td>0.25</td>
</tr>
<tr>
<td>Eastern Grid</td>
<td>13.5</td>
<td>15.8</td>
</tr>
<tr>
<td>Kassala</td>
<td>1.9</td>
<td>0.4</td>
</tr>
<tr>
<td>Athara</td>
<td>1.2</td>
<td>6.91</td>
</tr>
<tr>
<td>Shendi</td>
<td>1.9</td>
<td>6.61</td>
</tr>
<tr>
<td>Dongola</td>
<td>1.2</td>
<td>0.39</td>
</tr>
<tr>
<td>Malakal</td>
<td>0.4</td>
<td>0.18</td>
</tr>
<tr>
<td>Wau</td>
<td>0.4</td>
<td>0.37</td>
</tr>
<tr>
<td>Juba</td>
<td>2.6</td>
<td>0.77</td>
</tr>
<tr>
<td>Owie</td>
<td>1.3</td>
<td>2.52</td>
</tr>
<tr>
<td>Ua Ruwaha</td>
<td>1.5</td>
<td>1.12</td>
</tr>
<tr>
<td>Fashor</td>
<td>1.1</td>
<td>0.75</td>
</tr>
<tr>
<td>Nyala</td>
<td>1.5</td>
<td>1.26</td>
</tr>
<tr>
<td>Port Sudan</td>
<td>3.2</td>
<td>7.55</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>235.08</td>
</tr>
</tbody>
</table>

KEY: 

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A comparison of the peak load and generation figures show that, while the Blue Nile Grid possesses adequate generation power to meet the demand shown (i.e. an adequate plant margin), the peak demand of several systems was restricted by lack of generation capability and load shedding was necessary at peak times. This also happened in the Eastern Grid when, because of severely limited water availability in peak months, the peak demand had to be met largely by diesel plant.

In these cases where the maximum demand appears greater than the generator capability this simply indicates that the generator capability declined since the peak time in 1972/73. This was exemplified in the above table by the reduction in sales in 9 of the existing systems, while in some of the remaining systems which are able to meet the peak demand at present, load shedding would be needed at peak times if the largest machine is taken out of service (i.e. there is inadequate "firm" generator capacity).

At present it is estimated that the reduction in output amounts to some 48 mega watt for the whole of Sudan (including broken down plant). The following table shows the rate of deterioration in the generation system of PEGC.

<table>
<thead>
<tr>
<th>Maximum Demand</th>
<th>Forecast 1980-1984</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Nile Grid</td>
<td>1.57</td>
</tr>
<tr>
<td>2) Aswan</td>
<td>0.85</td>
</tr>
<tr>
<td>3) Kassala</td>
<td>0.20</td>
</tr>
<tr>
<td>4) Sub-total</td>
<td>1.35</td>
</tr>
<tr>
<td>5) Eastern Grid</td>
<td>5.93</td>
</tr>
<tr>
<td>6) Kassala</td>
<td>1.39</td>
</tr>
<tr>
<td>7) Sub-total</td>
<td>7.32</td>
</tr>
<tr>
<td>8) Sub-total</td>
<td>145.32</td>
</tr>
<tr>
<td>9) Atbara</td>
<td>5.1</td>
</tr>
<tr>
<td>10) Baworsi</td>
<td>0.88</td>
</tr>
<tr>
<td>11) Dongola</td>
<td>0.26</td>
</tr>
<tr>
<td>12) Port Sudan</td>
<td>7.8</td>
</tr>
<tr>
<td>13) Malakal</td>
<td>0.4</td>
</tr>
<tr>
<td>14) Wau.</td>
<td>0.2</td>
</tr>
<tr>
<td>15) Juba</td>
<td>0.64</td>
</tr>
<tr>
<td>16) El Obeid.</td>
<td>1.25</td>
</tr>
<tr>
<td>17) Um Suak</td>
<td>0.62</td>
</tr>
<tr>
<td>18) El Fasher</td>
<td>0.88</td>
</tr>
<tr>
<td>19) Kyala.</td>
<td>0.95</td>
</tr>
</tbody>
</table>

The above table shows an over-all national growth rate of 13% p.a. for energy and maximum demand respectively.

In 1977, for the first time an attempt at comprehensive planning was started by the Electricity Department of PEMC. Eventually a six-year Plan, 1977-1982 was produced which identified the forecast growth in energy sales and the maximum energy generated in the seventeen existing supply systems as follows: 2

<table>
<thead>
<tr>
<th>Year</th>
<th>National Total</th>
<th>Blue Nile Grid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kWh</td>
<td>kW</td>
</tr>
<tr>
<td>1975/76</td>
<td>530</td>
<td>119</td>
</tr>
<tr>
<td>1976/77</td>
<td>1201</td>
<td>303</td>
</tr>
<tr>
<td>1982/83</td>
<td>1780</td>
<td>416</td>
</tr>
</tbody>
</table>

The Plan covers all the existing generation systems in the Sudan serving about 180,000 consumers distributed among some forty towns and about sixty five villages in Khartoum, Central and Northern areas. 2

However there are still about fifty other towns which do not have an Electricity Supply. A town is defined as

---

2/ Annual Development Plan for Electricity, 1977, PEMC, P. SUMMARY of the Plan.
2/ Public Relations Office, PEMC, 1975, Cites, P.10.
having more than five thousand inhabitants. At present there are about forty-five such towns in Sudan without electricity supply. Other places with fewer inhabitants are classified as towns if they are centres of local government. These towns are listed in Table 22.

As a long term policy, PEMC plan to provide electricity supply for all towns listed in Table 22, with five thousand inhabitants or more. The 1973 plan provided for the electrification of six towns in the period 1981-84, but in the absence of a clear commercial policy it has not been possible to specify which towns. Therefore an estimated sum of one million Sudanese Pounds was included in the plan towards this.

If this plan could be achieved, some 525,000 of the urban population would have access to electricity services. This would make up the difference in the total number of urban population without electricity supply. Table 23 shows the total urban population as well as those with access to electricity facilities.

This meant that about 60% of the Sudan's urban population have access to electricity supply, while it was also estimated that about 8% of the total non-nomadic

<table>
<thead>
<tr>
<th>No.</th>
<th>City</th>
<th>District</th>
<th>Code</th>
<th>Area (km²)</th>
<th>Population</th>
<th>Year</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abenak</td>
<td>SKO</td>
<td>?</td>
<td>5.7</td>
<td>1,773</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>2</td>
<td>Agua</td>
<td>SKO</td>
<td>?</td>
<td>4.3</td>
<td>1,680</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>3</td>
<td>Alau</td>
<td>SKO</td>
<td>?</td>
<td>2.7</td>
<td>1,050</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>4</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>5</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>6</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>7</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>8</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>9</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>10</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>11</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>12</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>13</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>14</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>15</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>16</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>17</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>18</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>19</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>20</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>21</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>22</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>23</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>24</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>25</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>26</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>27</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
<tr>
<td>28</td>
<td>Anuak</td>
<td>SKO</td>
<td>?</td>
<td>2.2</td>
<td>1,650</td>
<td>1985</td>
<td>T</td>
</tr>
</tbody>
</table>

Cont..
Table 32 (Cont.)

<table>
<thead>
<tr>
<th>Town in order of Population</th>
<th>Province Key</th>
<th>Electrification Year</th>
<th>Survey</th>
<th>Source: Development Plan for Electricity, 1977</th>
</tr>
</thead>
<tbody>
<tr>
<td>29) M. Bansa</td>
<td>BN</td>
<td>1998/99</td>
<td></td>
<td>L.G. = Diesel Generators provided by Local Government.</td>
</tr>
<tr>
<td>30) Karuma</td>
<td>WHN</td>
<td>1998/99</td>
<td></td>
<td><em>(g)</em> = <em>NONN</em> - a name of a German Consultant.</td>
</tr>
<tr>
<td>31) Auglaad</td>
<td>EGO</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32) Salgani</td>
<td>EGO</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33) Yemibio</td>
<td>EGO</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34) Sinkat</td>
<td>EGO</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35) Jengo</td>
<td>EGO</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36) Wadi Halfa</td>
<td>EGO</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37) Kurmut</td>
<td>EGO</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38) Keposta</td>
<td>EGO</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39) El Dinder</td>
<td>EGO</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40) El Fula</td>
<td>WHN</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41) El Muda</td>
<td>WHN</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42) Abu Kuruhasha</td>
<td>WHN</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43) Jebelt</td>
<td>WHN</td>
<td>1997/98</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Development Plan for Electricity, 1977

Table No. 6 - Rural Electrification

Towns with Public Electricity Supply.
<table>
<thead>
<tr>
<th>Province</th>
<th>Number of Urban Population</th>
<th>Number of Electrified Towns</th>
<th>Population in Electrified Towns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khartoum</td>
<td>850,000</td>
<td>1</td>
<td>86,000</td>
</tr>
<tr>
<td>Blue Nile</td>
<td>509,000</td>
<td>2</td>
<td>167,000</td>
</tr>
<tr>
<td>Darfur</td>
<td>319,000</td>
<td>2</td>
<td>149,000</td>
</tr>
<tr>
<td>Kassala</td>
<td>235,000</td>
<td>5</td>
<td>200,000</td>
</tr>
<tr>
<td>Kordofan</td>
<td>262,000</td>
<td>2</td>
<td>90,000</td>
</tr>
<tr>
<td>Red Sea</td>
<td>169,000</td>
<td>1</td>
<td>138,000</td>
</tr>
<tr>
<td>Northern</td>
<td>169,000</td>
<td>6</td>
<td>138,000</td>
</tr>
<tr>
<td>Equatoria</td>
<td>149,000</td>
<td>1</td>
<td>97,000</td>
</tr>
<tr>
<td>Bechar El Gezal</td>
<td>105,000</td>
<td>1</td>
<td>11,000</td>
</tr>
<tr>
<td>Upper Nile</td>
<td>37,000</td>
<td>1</td>
<td>37,000</td>
</tr>
<tr>
<td>Total</td>
<td>2,698,000</td>
<td>114</td>
<td>2,172,000</td>
</tr>
</tbody>
</table>

Source: Ministry of Finance and Economics 1973 Census, Department of Statistics.
rural population have access to electricity supply. Compared with other African countries, this was considered to be a fairly high figure. In Zaire, only about 2% of the population have access to electricity, while in Cameroon and Kenya only about 1% and 4% respectively. In Ivory Coast, where the Gross Domestic Product per capita is 730 compared to 110 in Sudan, the same percentage of population as in Sudan have electricity supply. In geographical terms, electrification in Sudan is concentrated in Khartoum, Gezira and Blue Nile provinces which were considered to be the main consumption areas where most of the industrial and agricultural and governmental activities were concentrated. Table 24 shows the distribution of consumers by category.

It is evident from the table that more than 70% of PDG’s electricity consumption is in the Khartoum and Blue Nile areas which both rely heavily on the Blue Nile Grid for their power supply. However, the power supply in this Grid is not reliable for almost half the year, during what is known as the critical months from May to July and October. Table 25 shows the generation shortfall during these months.

Table 36.
DISTRIBUTION OF ELECTRICITY CONSUMERS.
( BY CATEGORY OF CONSUMERS).  

<table>
<thead>
<tr>
<th>Area</th>
<th>Residential (T.1)</th>
<th>Commercial (T.1)</th>
<th>Heavy Industry (T.2)</th>
<th>Agriculture</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khartoum</td>
<td>2,551</td>
<td>1,033</td>
<td>275</td>
<td>949</td>
<td>4,799</td>
</tr>
<tr>
<td>Blue Nile</td>
<td>1,564</td>
<td>6,390</td>
<td>71</td>
<td>227</td>
<td>8,392</td>
</tr>
<tr>
<td>Eastern</td>
<td>523</td>
<td>1,339</td>
<td>13</td>
<td>98</td>
<td>1,984</td>
</tr>
<tr>
<td>Northern</td>
<td>466</td>
<td>2,392</td>
<td>3</td>
<td>296</td>
<td>3,065</td>
</tr>
<tr>
<td>Kordofan</td>
<td>246</td>
<td>66</td>
<td>6</td>
<td>-</td>
<td>318</td>
</tr>
<tr>
<td>Darfur</td>
<td>132</td>
<td>366</td>
<td>2</td>
<td>-</td>
<td>546</td>
</tr>
<tr>
<td>Red Sea</td>
<td>330</td>
<td>490</td>
<td>30</td>
<td>-</td>
<td>750</td>
</tr>
<tr>
<td>Southern</td>
<td>63</td>
<td>385</td>
<td>-</td>
<td>-</td>
<td>448</td>
</tr>
<tr>
<td>Damascus</td>
<td>124</td>
<td>62</td>
<td>-</td>
<td>5</td>
<td>291</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>191,512</strong></td>
<td><strong>5,968</strong></td>
<td><strong>12,512</strong></td>
<td><strong>324</strong></td>
<td><strong>21,888</strong></td>
</tr>
</tbody>
</table>

---

Source:
FERG Statistical Report 1979/80
Financial Department Statistics Division
p. 30.
Serious shortfalls in generation occur in the Blue Nile Grid every year. As indicated in the above table, the total shortfall was 39, 142 and 272 Mega Watt for the critical months over the years 1978-81. The most recent example was the 1979 hydro generation shortfall in the (BNG) during which generation dropped to about 40 mega watt instead of the 147 mega watt designed capacity.

Water Productivity:

Data about water supply production and growth was not available in the water Planning division and any requests made to the newly created planning division were passed on to the different divisions concerned. At the moment all that is being done in the planning division is the final preparation of the annual budget of the Water Department so it was inevitable that the information obtained would be inconsistent.

Water purification and production in the three towns of Khartoum, Khartoum North and Omdurman is carried out at the four main stations located in the three towns. These are shown in the following table:

1/ Annual Development Plan for Electricity 1973, PEC
   Technical Supplement, p.10
2/ Incident of the Roseires Dam Sedimentation, 1978
### Table 26

**Daily Production of water at the Four main Stations (in Gallons).**

<table>
<thead>
<tr>
<th>Station</th>
<th>Location</th>
<th>Daily Production (in Gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nogran Water Station</td>
<td>Khartoum</td>
<td>15</td>
</tr>
<tr>
<td>Durn Water Station</td>
<td>Khartoum</td>
<td>3.75</td>
</tr>
<tr>
<td>Omdurman Water Station</td>
<td>Omdurman</td>
<td>3.25</td>
</tr>
<tr>
<td>Khartoum North Old Station</td>
<td>Khartoum North</td>
<td>2.5</td>
</tr>
<tr>
<td>Khartoum North New Station</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

**Sources:**

Chief Water Purification Engineer
Nogran Water Station

The biggest was the Nogran Water Station, which supplies Khartoum Area and part of Omdurman. Durni, Omdurman, and the old Khartoum North Stations supplied only their own localities.

The New Khartoum North Station was originally designed to supply eight million Gallons per day during the first stage which was completed in 1979. This was intended to satisfy present demands both in Khartoum North and part of Omdurman, but because of faulty estimations it produced only four million gallons per day. This was scarcely
enough to meet present maximum demand in Khartoum North, let alone supplying Ordeman.

All these stations were situated on the Nile, and took drawn water from the river. In addition there were also about twenty artesian wells. Two of the wells were closed because of their insufficiency, while the remaining eighteen were directly connected to the distribution network in the Capital. They were meant to assist the main stations in meeting local demand for water in supplying areas such as Halfa - Geriefs etc.

There were also about thirty-seven boreholes distributed as follow:

a) From Jebel Awlia in the South to Jall in the North
b) From Garef Ring and Sorowab West to Ua Dwan-ban and Basilat East.

The production of all Artesian Wells and boreholes together totalled about fourteen million gallons per day. The total volume of water produced in Khartoum Area therefore amounted to about forty-two million gallons, a greater volume than in any other area of the Sudan.

At present it is believed that about forty Sudanese towns have access to urban Water Services. The distribution of these is shown in the following table:
### Table 27

Number of Towns with Access to Urban Water Facilities

<table>
<thead>
<tr>
<th>Province</th>
<th>No. of Towns</th>
<th>Annual Water Production (m³)</th>
<th>Number of Consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khartoum</td>
<td>3</td>
<td>51,675,456</td>
<td>59,794</td>
</tr>
<tr>
<td>Blue Nile</td>
<td>9</td>
<td>12,129,786</td>
<td>38,689</td>
</tr>
<tr>
<td>Eastern</td>
<td>4</td>
<td>6,374,998</td>
<td>10,589</td>
</tr>
<tr>
<td>Red Sea</td>
<td>4</td>
<td>9,203,277</td>
<td>15,676</td>
</tr>
<tr>
<td>Northern</td>
<td>7</td>
<td>5,860,132</td>
<td>16,314</td>
</tr>
<tr>
<td>Kordofan</td>
<td>5</td>
<td>4,094,829</td>
<td>11,669</td>
</tr>
<tr>
<td>Darfur</td>
<td>3</td>
<td>1,432,438</td>
<td>7,789</td>
</tr>
<tr>
<td>Southern</td>
<td>7</td>
<td>4,275,252</td>
<td>5,634</td>
</tr>
<tr>
<td>Damazin</td>
<td>1</td>
<td>1,043,211</td>
<td>1,823</td>
</tr>
</tbody>
</table>

---

5 other towns no data.

**Source:** FIFA, Extracted from 1975/66 Statistical Report - Statistics Division.

The five towns for which no data were available were Al Hillatiyya, Al Kowa, Al Kamelina, Al Gotiena and Furka. 1/ Three other towns were supposed to have water supply by now, but there are no data as to whether

they have started production or not. These towns were Ma’an, Qum, Ma’an and Madaba. In three other stations, Rabah, Bedlah, and Fajad, work started in 1976/77, but was still not completed by 1981.

It has been estimated that the actual amount of water produced covered an area of population of about 90,000 – 1,000,000 m³ out of a total urban population of 2,470,000 i.e. about 5% of the urban population have access to water facilities. No data as to the actual demand for water supply was available in the Corporation. Since 1978 major water construction projects have been turned down because of the inadequacy of budget allocations.

In spite of the fact that no data on the development plans for water services were available it should be mentioned that efforts to increase water productivity and improve the capacity of existing stations was not wholly lacking. Recently an urban water station was established in the village of Shuwek on the Abara River to supply Garadif town with a total capacity of 2 million Gallons per day.

In Al Fashir 8 boreholes were sunk to solve the town's water problem. A power station to operate these boreholes was established, but work stopped at the stage of the water pipe because of the problems involved in transporting the pipe.

A reservoir was also established at Khor Bagara and 2 haffirs were constructed to increase the water sources for Al Fashir town. Studies were also made on the sinking of a third haffir. This would allow for the construction of a new purification station to meet both the present and future demand for water in the town. The existing water station has now reached its maximum capacity. Other studies are also underway to assess other feasible water sources.

Other similar efforts were underway at Port Sudan to secure 10,000 m³ per day of water in order to meet the town's demand up to 1981. At Al Fashir the capacity of the water has been doubled and new water pipes were connected to improve the distribution network and allow the connection of the new extensions of the town. In Nuban the original capacity of the water purification station has been improved by 57%.

1/ Ibid., p.10.
In Khartoum area twelve new boreholes are being constructed at present to relieve the shortage of water in the three towns of the capital. Although this is not part of PWG programme, it is mentioned here because of its contribution to water productivity in the area.

In spite of all these efforts, there is a notable shortfall in the water supply. This shortage is a direct result of the tremendous and continuous increase in the number of consumers. The following table shows the growth in the number of water consumers, which indicates that a much faster rate of growth in water productivity is needed to keep pace.

### Table 26.

<table>
<thead>
<tr>
<th>Areas</th>
<th>1975/76</th>
<th>76/77</th>
<th>77/78</th>
<th>78/79</th>
<th>79/80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khartoum</td>
<td>82,153</td>
<td>88,012</td>
<td>95,417</td>
<td>97,651</td>
<td>99,794</td>
</tr>
<tr>
<td>Blue Nile</td>
<td>32,930</td>
<td>31,124</td>
<td>32,555</td>
<td>36,729</td>
<td>39,429</td>
</tr>
<tr>
<td>Northern</td>
<td>14,488</td>
<td>15,979</td>
<td>15,187</td>
<td>15,430</td>
<td>15,944</td>
</tr>
<tr>
<td>Eastern</td>
<td>11,100</td>
<td>11,123</td>
<td>11,699</td>
<td>12,438</td>
<td>12,977</td>
</tr>
<tr>
<td>Red Sea</td>
<td>14,000</td>
<td>14,997</td>
<td>15,018</td>
<td>15,018</td>
<td>15,018</td>
</tr>
<tr>
<td>Kordofan</td>
<td>8,762</td>
<td>9,010</td>
<td>9,098</td>
<td>10,978</td>
<td>11,669</td>
</tr>
<tr>
<td>Darfur</td>
<td>3,022</td>
<td>3,251</td>
<td>3,463</td>
<td>3,467</td>
<td>7,769</td>
</tr>
<tr>
<td>Southern</td>
<td>2,529</td>
<td>2,981</td>
<td>3,427</td>
<td>4,646</td>
<td>3,904</td>
</tr>
<tr>
<td>Damazine</td>
<td>0,504</td>
<td>1,010</td>
<td>1,170</td>
<td>1,174</td>
<td>1,323</td>
</tr>
</tbody>
</table>

**Source:** Statistics Reports for the different years.

**Note:** This is a joint effort of the Ministry of Irrigation and Water Provision Corporation under the sponsorship of the High Academic Council, Chief Construction Engineer, Khartoum Water Office, May, 1981.
The table shows that, the number of consumers has grown from 1975/76 to 1979/80 by about 28%, while the growth of productivity has been only at 7% over the last five years. This increase in the number of consumers had to be met at the expense of individual consumer's supply. This resulting in a decrease in the amount of water supplied per consumer. This can be seen in the very weak water pressure and the very frequent cuts in the water supply especially to upper stories. In more comprehensive terms this can be illustrated by the fact that all the existing reservoirs in Khartoum area are functioning as Balance high level tanks and not as distributing tanks. Water passing out of the water stations enters the distribution network directly. It does not rise into the reservoirs except when the pressure inside the distribution network is high enough. In the last five years the main reservoir in Khartoum did not register any reading, meaning that no water was entering it. This may also be true of reservoirs in other towns and villages. It has been estimated that the present supply of water needs to be increased by 50% in order to meet the existing demand alone.

1/ Statistical Report for the different years 1975/76
2/ Interview with the Chief Water Engineer - Nogran Water Station, WUIC, Khartoum, May, 1981.
2- Profitability:

PFWC set the following financial objectives:

1. To achieve an 8% return on its net assets in Electricity Services.
2. To achieve a 4% return on its net assets in Water Services.

These returns were intended to provide the corporation with sufficient money to carry out its operational tasks plus some surplus which could be used to partly finance future development projects.

However, the actual situation since the early seventies has been that the corporation did not make any mentionable surplus. On the contrary, it was scarcely able to cover its operating expenses. It has been admitted that before that date PFWC had been a profit-making organization. This is shown in the following table which reflects the period before 1973.

Although the table shows that PFWC did not require funds from external sources since it never experienced losses in the period 1960-1973, yet it is obvious that its financial position was continuously deteriorating. Although the gross revenue rose from D3 2.54 million to D3 11.33 millions over a period of thirteen years, its total expenditure over the same period rose at a faster
This decision was considered by many of PEAC's employees to have been completely unplanned. Indeed, many referred to the incident as one of the main reasons for the conflict between the General Manager at that time and the Minister of Works, who was responsible for the administration of the Corporation. This situation was aggravated by the simultaneous dissolving of the Board of Directors and the transfer of all its responsibilities and authority to the Minister of Local Government. No changes or amendments in the Corporation's Act were made to adjust to the new position. As stated by the former General Manager:

"Eventually this led to a great disruption in the corporation's performance, where the commercial nature of work automatically ceased. This led for the first time to the appearance of losses." This is shown in the following table.

As shown in the table, PEAC started to make losses in the early seventies, which have been attributed to the moribund state of the public utilities with the Corporation.

The most apparent reason for this belief was the fact

1/ Interview with Heads of Departments and Divisions - PEMO, 1981 - May, September
2/ A memorandum on the policy of planning and implementation of projects, updated and unbiased deliberations of the High Planning Council, a draft file.
3/ Interview with different Heads of Departments of PEMO, May-September 1981.

<table>
<thead>
<tr>
<th>Year</th>
<th>Income</th>
<th>Expend.</th>
<th>Surpl./Deficit</th>
<th>Lm.</th>
<th>Lm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>74/75</td>
<td>9,708,524</td>
<td>7,914,688</td>
<td>1,793,836</td>
<td>(2,739,677)</td>
<td>(930,453)</td>
</tr>
<tr>
<td>75/76</td>
<td>11,326,444</td>
<td>11,120,592</td>
<td>2,045,852</td>
<td>(576,839)</td>
<td>1,648,022</td>
</tr>
<tr>
<td>76/77</td>
<td>14,288,930</td>
<td>13,784,592</td>
<td>5,704,338</td>
<td>39,458,338</td>
<td></td>
</tr>
<tr>
<td>77/78</td>
<td>16,799,443</td>
<td>13,572,815</td>
<td>3,226,628</td>
<td>21,959,532</td>
<td></td>
</tr>
<tr>
<td>78/79</td>
<td>19,156,446</td>
<td>18,514,247</td>
<td>6,042,199</td>
<td>27,057,623</td>
<td></td>
</tr>
<tr>
<td>79/80</td>
<td>21,938,425</td>
<td>20,999,970</td>
<td>10,238,824</td>
<td>50,655,287</td>
<td></td>
</tr>
</tbody>
</table>

that in all the stated years, shown in the table above, Water Services continuously showed a loss. This was true even for the three years in which the corporation made a net profit. In the first two of these three years, water losses almost erased the profit margin. As for the third year (1979/80) although Water still showed a loss, this had little effect on the net profit as the margin was comparatively big. The high profitability achieved in 1979-80 was not due to increased productivity, but because of the increase in water and electricity tariffs.

In more comprehensive terms it has been reported that PEMC inherited a financial deficit of L$2.2 million when the Public utilities were merged with it in 1971. This resulted in an actual loss of L$200,000 by the end of 1971/72. The following table shows the actual deficit after the merger.

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970/71</td>
<td>2,000</td>
</tr>
<tr>
<td>1971/72</td>
<td>200</td>
</tr>
<tr>
<td>1972/73</td>
<td>780</td>
</tr>
<tr>
<td>1973/74</td>
<td>980</td>
</tr>
<tr>
<td>1974/75</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Source: A memorandum by the former General Manager to the High Planning Council PEMC, 1977.

A memorandum on amending the Electricity Tariff, by the former General Manager to the High Planning Council PEMC 1977.
Combined with this factor was the sudden rise in operating costs after 1973, which was attributed to the rise in the prices of local and imported materials, especially fuel in which the increase was estimated at £5 1,100,000. Due to these combined factors, the annual returns on fixed establishments declined to 4% instead of the 8% originally envisaged for electricity returns. It is worth noting here that the international rate of return varies from 5% to 10%.

This led the corporation to review its price lists in 1975, with the aim of securing adequate returns to make up for the above-mentioned deficit and to secure the required funds. For this purpose the assistance of the World Bank was sought in tying down the basic economic and technical foundations for a sound pricing policy. Accordingly all the necessary information and statistics for designing new price lists were collected and analyzed and a new price list was issued. Here too, a British expert from the British Electricity Council, offered advice. The effect of applying this new tariff was quite considerable, when measured by the rise in the value of sales in Khartoum area. It was found that the value of sales in the second half of the year 1976 exceeded those of the previous year.

1/ Ibid. p. 1
2/ Ibid. p. 1
by 56%. No comparison could be made for other areas because of the insufficiency of the available data. However it was generally believed that there was also a rise in the value of sales in those areas. It is worth mentioning here that Khartoum area was one of those areas usually supplied by the Blue Nile hydro power stations. This was the cheapest source of power since the cost of Electricity unit was only twenty millims, while generation at other steam and oil stations was very expensive. It has been estimated that generation costs in areas like Darfur or the South (i.e. areas out side the Blue Nile Grid) might amount to LS 1 and at best 20 mm. This meant that the whole burden of subsidising the cost of production in these other areas fall on the Blue Nile Grid. It was believed that the ENU provided an annual subsidy amounting to more than forty percent of actual income. It also provided a subsidy of about 3.5 mm per unit from its sales to cover production cost in other areas.

As for the water tariff the rate adopted for the 1975/76 financial year was intended to secure a net income of LS 4,360,000. The proposed operating budget for that same year amounted to LS 4,360,000 i.e. it exceeded the expected income by LS 20,000. This meant that the proposed tariff

1/ Interview with Financial Director, PSW 3 June 1981
### Annual Deficit of FMC Areas (Figures up to 30th June) (Ls.)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern</td>
<td>277,222</td>
<td>175,501</td>
<td>314,614</td>
<td>245,957</td>
<td>129,374</td>
<td>623,390</td>
<td>218,206</td>
<td>237,780</td>
</tr>
<tr>
<td>Eastern</td>
<td>92,339</td>
<td>101,701</td>
<td>271,563</td>
<td>195,663</td>
<td>153,679</td>
<td>326,990</td>
<td>1,265,600</td>
<td>902,920</td>
</tr>
<tr>
<td>Red Sea</td>
<td>306,104</td>
<td>236,495</td>
<td>181,244</td>
<td>282,167</td>
<td>173,445</td>
<td>366,160</td>
<td>1,524,000</td>
<td>310,660</td>
</tr>
<tr>
<td>Kordofan</td>
<td>356,020</td>
<td>341,144</td>
<td>311,759</td>
<td>487,888</td>
<td>164,012</td>
<td>627,320</td>
<td>1,00,103</td>
<td>113,241</td>
</tr>
<tr>
<td>Darfur</td>
<td>347,377</td>
<td>146,289</td>
<td>202,041</td>
<td>294,051</td>
<td>935,190</td>
<td>532,712</td>
<td>82,590</td>
<td>906,670</td>
</tr>
<tr>
<td>Damail</td>
<td>241,352</td>
<td>31,351</td>
<td>1028,317</td>
<td>132,513</td>
<td>449,550</td>
<td>448,550</td>
<td>193,925</td>
<td>203,960</td>
</tr>
<tr>
<td>Southern</td>
<td>554,770</td>
<td>217,478</td>
<td>615,481</td>
<td>255,059</td>
<td>1057,920</td>
<td>1,657,920</td>
<td>2,708,800</td>
<td>957,920</td>
</tr>
<tr>
<td>Khartoum</td>
<td>---</td>
<td>106,701</td>
<td>---</td>
<td>825,684</td>
<td>---</td>
<td>---</td>
<td>1,162,380</td>
<td></td>
</tr>
<tr>
<td>Blue Nile</td>
<td>---</td>
<td>788,250</td>
<td>---</td>
<td>1035,280</td>
<td>---</td>
<td>---</td>
<td>1,75,470</td>
<td></td>
</tr>
</tbody>
</table>

**Total Deficit**: 1,759,462 2,235,991 3,233,052 3,629,792 3,495,866 9,718,716 2,356,470 9,771,930

Table 33
Financial Performance of the Blue Nile Grid and Khartoum area for the years 1977-1981 (Le.)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Khartoum</td>
<td>3,654,407</td>
<td>2,636,180</td>
<td>2,187,860</td>
<td>1,506,850</td>
</tr>
<tr>
<td>Blue Nile</td>
<td>1,191,805</td>
<td>1,258,751</td>
<td>3,554,050</td>
<td>8,703,880</td>
</tr>
<tr>
<td>Total Surplus</td>
<td>4,846,212</td>
<td>3,894,931</td>
<td>5,741,910</td>
<td>9,209,730</td>
</tr>
</tbody>
</table>

3. Services

PAWG was originally designed to be a service organisation. It was intended to provide Water and Electricity Services to all the population of the Union for all domestic, commercial, agricultural and industrial purposes. This entailed the distribution of the Water and Electricity produced by PAWG to all categories of consumers, as well as providing the necessary connections, including Electricity poles, water pipes, transmission wires, water and electricity meters etc...

Initially all the mains connections for both water and electricity were provided by PAWG free of charge. As for consumers' internal connections, involving the provision of Electricity and Water meters, internal networks for big buildings and factories and agricultural schemes, these also used to be provided by the corporation but on payment of a nominal charge, or a deposit. These deposits were meant to provide contributions to the financing of the corporation's developmental tasks, and to maintain the standards of the services.

Since the mid seventies there has been an evident deterioration in both the quantity and quality of the...
services rendered by the corporation. Since that time the connection service has been minimal, and signs of dissatisfaction inside and outside the corporation were indicative of the poor services. Connection schemes dating back to 1972 or 1973 are still waiting to be completed.

The reason given for such slow progress in connection work were the shortage of manual workers, inadequate financial resources and unavailable materials. Nevertheless it was admitted that some of the required materials were available at Port Sudan, but the corporation had failed to transport them to the work sites. This led to frustration on the part of the engineers who directly supervised the work; such frustration was reflected in the signs of indifference with which they carried out their work. A striking example of such indifference was observed in the Khartoum area Water Projects office. Piles of scheme maps were thrown all over the office. Some were heaped on the ground and all covered with dust. This may have been the cause of lost information, since some of the original data concerning project designs were found to be missing. Applications for new connections were received on an individual basis and consequently kept individually. No application file was found so it was not possible to

1/ Interview with the Chief Engineer, Water Projects Implementation, Water Department Khartoum Area. May 1981.
find a systematic data on the size of actual service requirements. However it was quite evident that the corporation was not in a position to provide the required services. This would be seen from the comments of different heads of divisions: The corporation for the last five or six years has been working as a contractor with the service being provided only for those who could provide the materials. Priority was given to those who were ready to pay first." The domestic consumer is now charged up to about Ls 30 for the connection of water to the house and about the same amount for single phase electricity connection. The charge may be even higher according to the complexity of the work required. These charges include the meters and other materials which the consumer has to purchase from the free market because they are not available from the corporation. In addition the consumer may further be charged the cost of the labour involved in providing the connections.

However the consumers seemed to be willing to pay for these services as was quite evident from the long waiting lists at the electricity department. On the contrary, there would have been no problem if the quality of the service provided was up to the standard.
The quality of the services provided by the corporation has given the public a very bad impression of the corporation. There is general dissatisfaction with electricity and water cuts, late and inaccurate billings etc.

The failure of Power to provide an adequate supply of water and electricity, together with its inability to run the existing services has resulted in frequent cuts. As put by the Business Administration Survey team, "This often made the corporation the object of jokes and abusive statements.

Cuts were detrimental both to the social and economic life of the public. The cancellation of lectures, films, important meetings etc... were quoted from different places all over Khartoum. Additional financial burdens on householders were caused when they had to dispose of rotten food, spoiled meat etc... The effect of electricity cuts on the economic life of the community was cited by one of the oil factories in Khartoum North. This is shown in the following table.

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1/ Interview with the Chief Electricity Engineer, Planning Division Electricity Department Power, June 1981.

Table 34.

Most working hours in the Pigeons Oil and Grain Factory

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of cut</th>
<th>Lost:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Light Hours</td>
<td>Minutes</td>
</tr>
<tr>
<td>January</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>February</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>March</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>April</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>May</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>June</td>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td>July</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>August</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>September</td>
<td>12</td>
<td>170</td>
</tr>
<tr>
<td>October</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>November</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>December</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
<td>200</td>
</tr>
</tbody>
</table>

Source: Production Manager of Ebaroua North
Pigeon Oil Factory—July 1979

The number of working hours lost during 1979 totalled about 1.4% of the annual working hours. Although there are no concrete estimates of the real size of the problem caused by electricity cuts to the national economy, yet an indication is given by the different protests Memorandum submitted by the Ministry of Foreign Affairs, the Ministry of Industry and others to EMO. These two concentrated
on the negative effect which the unreliable supply of power had on foreign capital flow and business activities.

The size of the problem of electricity cuts and unreliable power supply was best described by the British International Electricity Board Consultancy Team:

"It is estimated that there may be at least 70 mega watt of private generation within towns presently supplied by PEG".

Private generation have grown by more than 50% since 1977. The reason for this, as diagnosed by the same consultancy team, was the shortage of generation capacity.

More important than all this was the fact that power cuts directly affected the economy of PEG itself. It has been estimated that a power cut of two hours a day might cost the corporation a loss of £50,000 annually. An example of this was the incident of generation shortfall at Mussa in 1979, where the financial losses incurred to PEG

1/ Interview with head of Electricity Planning Division, PEG, July 1981.
2/ Electricity Development Plan 1980, PEG, p.1
3/ ibid., p.5
4/ Interview with the Financial Manager, PEG, July 1981.
amounts to LS 6,000,000. Here it is relevant to quote the following comment by one of the members of the dissolved Board of Directors, who said:

"The production losses in this country due to power outages may be valued in millions of pounds, while the remedy could be obtained for a sum of LS 50,000".

If we refer back to the recurrent problem of silts and other deposits at Damazine, it has been said that if PWC could provide a "floating dredger" to clean the deposits, the problem would have been solved. A floating dredger costs about LS 2 million, so that PWC could have saved the other possible future losses, if more positive policies and programmes toward the solution of its recurrent problem were adopted.

1/ A summary of the Board of Directors deliberations on an "Evaluation of the role and performance of the Board of Directors. 11th meeting, 4th March 1980.
2/ Interview with the Chief Engineer, Generation Division, Electricity Department, PWC, July, 1981.
CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

This thesis has been concerned with the study of planning as a management function that affects PWC's performance. In Chapter Three planning within PWC has been examined.

As has been found, no planning system in the proper sense exists within the corporation. Denning in the preface to his book "Corporate Planning" comments on this phenomenon in other organizations in the United Kingdom, and he refers to it as "mistaken assumptions, from the proposition that the sole important output of planning is a plan or a set of plans". Such an assumption he believes, leads some to concentrate attention on the technical aspects of planning particular activities, ignoring the fact that planning any important activity in any real organisation is as much a political activity as a technical activity. Although Denning accounts for other types of confusion, this seems to be the most applicable in the case of PWC, where every one refers to the Electricity Development Plan as being the corporation's plan.

This type of confusion could be the main reason for the prevalent ignorance of planning as a function that embrace the whole corporation.

\[1/\] Denning, R.W., Greas, Preface.
Those managers who managed to survive for a year or more were completely preoccupied with short term achievements in response to the pressing need for services and to prove themselves in the post.

Little or no thinking has gone into the corporation's actual purpose or the reason for its establishment and no thought is ever given to the corporation's future. This has resulted in the odd case of public corporation which though corporate in name, is yet almost completely controlled by the central authorities as well as by the different ministers who were responsible for it during the different phases of its development.

Hardly any planning as a systematic and comprehensive function of PEMC's management could be identified such planning as did exist was practised on an ad hoc basis to fulfill the requirements of an urgent project, or under pressure from international organisations. Such as the World Bank in order to obtain external financial assistance. This is exemplified by the Electricity Development Plan.

Even this plan was not prepared by the corporation's management but by an expert team from the British Electricity Board. It is the only material document that shows that there is planning, as other types of planning exist. The role of management as planners, at the different levels of the corporation was not recognised.

1/ See Chapter Three above p.37.
Operational planning has in practice been substituted by general instructions and directives issued when the need has arisen. Budgeting is done in a traditional way on an incremental basis, providing only a forecast of what will happen, not a projection of what should happen. Budgeting is actually used as a measure of control for adjusting the annual balance sheet.

Personal and Financial Planning are completely lacking. These two areas are generally administered according to civil service rules and procedures. While this situation is a permanent problem of the corporation as an independent and autonomous entity, these activities at the same time constitute an important factor for the corporation's viability, since they are the means of achieving the corporation's objectives. Their control by external forces has greatly weakened the corporation's position. Coupled with the problem of too broad and unqualified objectives, this has placed the corporation in a very critical situation in which it sometimes responds to planning under pressure or sometimes to quick decisions in the face of recurrent crises. This has led to further straining of the corporation's resources and placed it in a position where it is static unless forced by an emergency to move. Obviously such problems are of the type that need to be dealt with by top management.
So the next part of this chapter will deal with the possibility of introducing a corporate planning system into P&G as a possible means of dealing with its untackled problems. As put by Argenti: "Corporate Planning is concerned with problems of the kind that can only be tackled by the top levels of the company management." 1

A/ The need for a Systematic Planning Approach

Besides providing the corporation with an action plan, the introduction of corporate planning into P&G would also greatly help to solve problems in the following areas:

1. Pressure for short term results. As Argenti says, "The urgent always receives more attention than the important." P&G is under a continuous pressure to achieve short term results. This in turn has affected the executive ability to give enough thought to long term results. So the most effective counter is for senior executives to set aside a portion of their time to discuss matters of strategic importance.

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2- The Personality of the chief executives:

Argenti says: "One of the characteristics of men who achieve high executive positions is their ability to get things done". This seems to have been the case with PWC in the past, especially during the late sixties and early seventies. The chief executive at that time seems to have had this quality of preferring to do action rather than thinking about getting things done. This meant that when he left, his successors had to work in a vacuum. Since they themselves were subject to considerable and frequent changes, they found themselves trapped again by the pressure for short-term results.

3- The size of the Corporation and the complexity of decisions:

PWC has grown considerably, both in size and complexity of operations, especially after the merger with it of the public utilities and the introduction of new and advanced technologies. Argenti says:

"Now a decision taken by a manager in a large organization will commit more resources than one taken by his opposite number in a smaller organization."

As a consequence this implies that even more detailed planning is necessary before any decision can be taken.

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2/ Argenti, John, Ibid, p 27
3/ Argenti, Ibid, p. 27
4- The rate of change and the time span of decisions

The rate of change in modern times is much more rapid than ever before, as new technologies and new social patterns replace old ones. The new trend of migration in Sudan have created a new pattern of consumption. New consumers have a very high and unpredictable propensity to use the services of PWD. The consequence of this for the decision-maker is that he cannot be less confident that a decision which is correct today, will still be valid tomorrow. However, experience has shown that decisions taken five or six years ago within the corporation have lost their validity. The reason as given by the chief control engineer is that the propensity of the population to consume has increased dramatically. For example, those who possessed one refrigerator now own two or three, television and video sets have become common. In such circumstances, the decision maker has to examine what would happen if his decision becomes invalid, which requires an increase in the range of alternatives before him. Thus he must obviously spend more time on planning.

5- Societal growing interest and concern

As mentioned above, one important function of corporate planning is the clarification of corporate objectives.

1/ Interview with the Chief Control Engineer, Control Room PWD, Electrical Department, August, 1981.
As Argenti put it: "by the late Sixties, the debate over corporate objectives for companies, nationalised corporations, certain professional bodies, some of the organised churches, some charities and even the nation state itself became the subject of considerable public debate."

The fundamental role of these organisations in society came under scrutiny, not only from the press, politicians, sociologists or academics, but more directly from protest groups and even the man in the street.

Although growing concern with corporate objectives has only started very recently in Sudan, it has affected all public corporations, nationalised and governmental bodies. It has resulted in the dissention of many bodies, e.g. the Sugar Corporation and the decentralisation of others like the Sudan Railways Corporation. Others were brought together; PNEC as one of these corporations has lately come under close public scrutiny and was like wise affected by public opinion. One result of such growing concern about its role is that the long awaited decision to separate the Water and Electricity Services was considered towards the mid of 1982. As put by Argenti:

[Argenti, Jahn, 1972, p. 19]
"It is because this debate has so far been both sterile and even at times heated that many chief executives now have to devote much more time and resources to that part of corporate planning in which corporate objectives are clarified." This is specifically true of PwC. Many consultancy reports have emphasised the need for PwC to have more clarified objectives. The World Bank Consultants have also indicated the need for PwC to revise and update its profit objective it was not clear.

II/ How to apply a Corporate Planning System to PwC

The introduction of corporate planning into PwC would not require any major readjustment in the corporation’s structure, because the process itself involves nothing more than a decision to give more attention to strategic problems and to do so more systematically. So all that happens is that those responsible for strategic decisions meet more formally, call for information more regularly and spend more time on these matters than they did before.

1/ Argenti, John. Intd. pp. 29-30

See also the report on “Organisational and Management Skills, A Preliminary Survey by Management Development and Productivity Centre, June 1974, pp. 4-5."
What is required, after all, is merely some mechanism designed to invite an organization's senior managers to take the following steps. These steps as put by Ageati are:

- Decide purpose and select a suitable return on shareholders capital target.
- List the major etiological targets and constraints.
- Carry out an internal and external appraisal.
- Decide the Strategic Structure.
- Select suitable operational objectives and project specifications.
- Set up a monitoring system.
- Revise targets and strategy when necessary.

These are the major steps in any systematic corporate planning process.

In 1976 an attempt was made by the late Dr. E.M.A. Bamisile to introduce a systematic approach to corporate planning in PENCO. As a result a Steering and Planning Committee was established as an advisory body to the Minister, but neither the size nor the composition of that committee was appropriate for the task.

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Although most of its members were eminent public figures and able Civil Servants, Corporate Planning is a scientific technique which requires specialized knowledge and experience. Thus it is not surprising that the effort of this committee did not produce any concrete results. It failed to draw up a viable policy and strategy for the corporation.

The Corporate Planner:

Argenti lists a set of qualifications which should be held by the Corporate Planner. These are:

a) Ability to discard all previously held sectional or specialist views, in favour of an overall corporate vision.

b) Profound interest and some knowledge of long term trends in a wide selection of areas, including social, political, technical and economic.

c) Knowledge of the techniques of Corporate Planning.

d) Personal characteristics consistent with advising and collaborating with senior executives and advisers.

Most writers on the subject talk about only one man, "the Corporate Planner." For Argenti it is preferable that he should be one individual if the organization is small.

Argenti, John (1964). p.126
For bigger organizations he proposes the appointment of one or two assistants. As for P&G, we propose that a qualified man with the above-mentioned qualifications, with a strong character and who is also acceptable to his colleagues. Preferably he should be chosen from among the top executives of the main functional departments. If the required qualifications can not be found within P&G, then an outsider should be sought, provided that P&G's management accept him and the required cooperation thus guaranteed.

The Corporate Planning Department

Some schools have put forward the view that Corporate Planning is a line function that should be carried out by line executives. This of course is the normal procedure considering that planning is part of the executive function. Nevertheless as evidence has shown, the line executives in P&G seem to be preoccupied with urgent and pressing problems to the detriment of planning. For this reason we propose the appointment of a full-time corporate planner, but also in view of the size of the corporation which is dispersed over a wide geographical area covering the whole of the Sudan, the corporate planners need to be assisted by at least 5 other employees. Argenti says
"As a rough rule, then no permanent assistant if the company employs less than say 1,000 people; a temporary assistant seems to be part-time if the company employs 1,000 and full time if it employs more than 3,000; more than 3,000 employees suggest a need for a full-time assistant. Two or more if it employs more than say 5,000.

The number of assistants, however, is best determined by the volume of work to be accomplished.

Position of the Corporate Planner in the Organization Structure

It is suggested that the corporate planner and/or his department should fit into the organization in one or two ways shown below: in each case he would report directly to the Managing Director.

Diagram (a)

Organization Chart (a): Corporate Planner as one of the different departments of the organization.

Diagram (b)

Organization Chart (b): Corporate Planner as a personal advisor to the Chief Executive.

The first diagram shows the corporate planner operating in a permanent position as one of the very senior members of the management team. He is one of the directors reporting to and responsible to the chief executive. This is a very common configuration and the one most commonly used. It is the position preferred by most writers on the subject, but he should be firmly backed by the chief executive. As Argenti says:

"At this stage the chief executive must give strong backing to corporate planning and most authors agree that the corporate planner should report directly to the chief executive."

This position for the corporate planner is preferred rather than the position shown in chart "A" above, although in the second case his position would be extremely strong as a personal adviser to the chief executive. However, this position is often avoided since it is liable to cause resentment among the other senior executives. This resentment could largely be avoided if the following configuration is adopted.

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1/ Argenti John. Systematic Corporate Planning Ch. 9, p. 111
2/ Argenti John. Ibid., p. 132
Here the chief executive forms a corporate planning committee (of which he would probably be chairman), composed of an appropriate selection from the senior executives and serviced and advised by the corporate planner. As either of these two configurations are equally acceptable, I would suggest the first one, since the second constitutes an unnecessary additional step which might complicate the system.

The task to be carried out by the Corporate Planner

As stated by Argenti:

"A corporate planner need do only two things:
1. Get the Corporate Planning system going
2. Be in, after all, a specialist in a particular field, but the managing director: he is there to show an organization how to do something they are not doing, not to run the organization as an executive." 1/

Thus if we consider what the corporate planning process is, we find that it is nothing more than a systematic way of running the corporation, as put by Argenti:

1/ Argenti John, Corporate Planning, A Practical Guide On Clrt, p. 214
It is not a new way of making a take-over bid, or a better way of carrying out research— it is a way of relating take-over bids or research to the totality of the company's affairs. It is a way of bringing method into the process of making decisions about bids or research etc. 

This means that the corporate planners task is to introduce a decision-making system, not to take the decisions.

**Determine Objectives:** Thus the corporate planners first job is to help the directors to determine their corporation's objectives. He does not tell them what its objective is, but as put by Argenti:

"He asks his colleagues what they think it is. He does challenge their answers if he is not satisfied with them, just as any other junior employee would do".

However, the corporate planner should be in a position to present them with the most acceptable objective because he is the one who is concerned with studying the purpose of the organisation, its ethos and

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3/ Purpose is defined as: the reason why the organisation was first formed and why it now exists; all organisations are originally formed to provide a specific benefit for specific groups or beneficiary.

4/ Ethos is defined as: how an organization behaves towards its employees and all other people or groups of people with whom it interacts. These include customers, the State, local community, employers, suppliers and even including even casual visitors. The way in which it has decided to behave constrains and modifies the reach it can to achieve its purpose.
Such information has proved to be completely lacking in PEMC. Here the assumption is that since the shareholders are the intended beneficiaries of PEMC, their demands upon it should have priority over all other demands. But PEMC as a social institution and a public organization is concerned mainly, with providing Water and Electricity Services to the population for all purposes in the most efficient and the most economic way. Thus it has set itself a very high ethical standard which greatly reduces the benefit to the shareholders - Argenti says:

"Where an organization adopts an ethos that reflect a very high standard of morality then its intended beneficiaries will receive less benefit than if it adopts a lower standard". 2

In the case of PEMC the shareholders are the government. Lately there has been much discussion about the losses suffered by such public organizations.

1. Means is defined as: how the organization proposes to carry out its purpose and ethos. If an activity is thought likely to contribute to its purpose or ethos then that activity will be undertaken, if not, not. Some activities which might contribute to the purpose have to be rejected or modified because of the organization's ethos.

In President Jumieri's latest speech to the executive and public work leadership, he enumerated such losses and the damage they have caused to the Sudanese economy. PEWO, as one of these organizations was severely criticized for its ineffective performance. Profit as an objective has no priority in PEWO and this is the cause of the dilemma, since it is considered a key objective; the corporation is supposed to be self-financing. In my opinion profit indeed is a key corporate objective in the case of PEWO. More specifically I would say that it is one of the main reasons justifying the existence of a public corporation.

This is where a corporate planner is needed to help the directors to find out what the corporation is really trying to do, the actions it would take to achieve and the actions it would not allow itself to take even if it made the job harder. He should also help in quantifying the social objectives of the corporation, i.e., to set specific targets. A target as defined by Argenti is:

"The statement of an objective in quantified terms. Thus increased sales turnover is a possible objective for a sales manager, and to increase sales turnover by 20% before August could be his target."

1/ Argenti, John: Systematic Corporate Planning, 1969, p. 43
Similarly "to provide Water and Electricity Services" could also be quantified, e.g. by phasing of services, by categorising consumers, or by specifying certain percentages of the different types of consumers to be covered in a stated number of years. As Argenti maintains:

"The statement must include a target level at which the company may aim over a period of several years and the target must be stated in such terms that the company's progress towards that level can be empirically verified." 1/ 

When the objectives are quantified in this way then each manager, each department and each division will be able to know exactly what is required and consequently can adjust their plans to the level stated in the target. Similarly they can easily control any deviation from the target. As put by Argenti "The act of quantifying, both clarifies the objective and assists in its unequalled communication to other people". 2/

Thus a hierarchy of objectives can easily be built with each lower target leading to the next upper level in the hierarchy. Thus a unified notion at every level of the corporation is maintained.

The next step involves determining the manner in which the corporation is to achieve towards its customers, employees, suppliers, the State, etc. While pursuing its aims. This is both an important and complicated part of the corporate planner's job. It involves appraisals of the internal organisation to identify its weaknesses and strengths and of the environment to identify constraints and opportunities as well as studying the organisation's past records and preparing forecasts for its future venture.

1/ Argenti. Ibid. p.63
2/ Argenti. Ibid. p.63
Argenti argues that:

"When profits are also under pressure, the incentive to reduce the moral restraints is considerable". 1/

This is clear in the case of PKC, where the standard of the services has been greatly reduced; the attitude towards consumers has become one of indifference and the social obligation to provide its services to all who need it has changed into contractual relationships; those who are ready to pay first and supply the materials get better service etc.

The need for the corporation to decide where it stands on these issues becomes pressing. At this point Argenti gives four reasons why an organization must decide what moral attitude it is going to adopt. 2/

1) A company must decide which constraints are valid in its opinion and which are not, so that it can gauge how difficult it is going to be to make a satisfactory profit (or any other target).

2) Only when it has decided what constraints to adopt can it give instructions to its executives to guide their course of action when faced with a moral problem. This is very clear in the case of PKC. Its continuous lack of liquid money can be mainly attributed to the rather loose policy it adopts towards revenue.

1/ Argenti, Ibid, p. 141
2/ Argenti, Ibid, p. 141
collection, although most of its revenue is suspended
in the form of consumers' debts. If the corporation
could decide where it stands as far as this problem
is concerned, then it could have solved one of its
intrinsic problems.

3) Only when it has decided what its moral
attitudes are, can it select suitable staff.

4) The employees need to know what sort of
organization they are working for so that they can
decide whether to go on working for it. Customers and
suppliers need to know this so that they can decide
whether to trust it. Sooner or later everyone who
deals with the company will find out what sort of
company it is, so it is as well for the company to
decide what it wants them to think of it.

The importance of determining constraints lies
in the fact that they are a key factor in determining
the means by which the corporation will be able to
achieve its objectives and whether such means are likely
to prove difficult or not.

Once the corporate planner has helped to determine
the corporation's objectives, defined the constraints,
and made his appraisals of the strengths and weaknesses
of the corporation and of the environment; to determine
opportunities and constraints, he would then be in a
position to make a forecast or model by means of which he can gauge the corporation's next action or actions. A forecast is intended to show how fast the corporation should proceed or how much it should do. The forecast is compared with the stated target and the gap between the two will indicate which tasks remain to be carried out.

So the next step to be tackled by the corporate planner is how to close the gap between what is wanted and what is expected. This step is probably the most difficult and complex part of the corporate planning process and the one in which a thoroughly systematic approach is vital.

The first step is to make clear what this part of the process is intended to do, and this can be stated quite simply: it is to prepare a list of actions that the corporation might take in order to achieve the stated target, bearing in mind the limitations imposed by the constraints.

What is required is to find ways and means of adding to these forecasts to bring them up to the target level, i.e., to find ways and means of closing the gap (in profits or otherwise).

1/ A forecast is defined as: A prediction about the future, reflecting someone's opinion of what will happen.
The problem of the corporate planner at this stage is to find out what changes in the present way of running the corporation, which new capital expenditure and what new commitments are necessary in order to close the gap. \(^1\) He has to examine the merits of each possible action, whether obvious or less obvious to discover which of them would be likely to close the gap.

Having selected the appropriate actions from amongst all available alternatives (which are drawn up through a lengthy process of reviewing the possible means, and all the possible business areas, both existing and potential), policy statements may be drawn up. This show what the corporation intend to achieve (the objective), some of the things it will not do, even if that makes the objective harder to attain (the constraints) and some of the things that it is going to do (the Means). It is its long term strategy. \(^2\)

ii) Draw up the Plan:

This is the final step of corporate Planning. The policy statement is a list of all possible actions that would lead to the attainment of the corporation's objectives. But these must be arranged according to a system of priorities and specific assignments. So what is required at this stage is to turn the list into a plan.

\(^1\) Ibid, p. 157
\(^2\) Ibid, p. 172
As defined by Argenti

"A plan, then, is a list of actions very carefully rearranged so as to obtain a desired effect."

The purpose of the plan of action is to show what is to be done, when, where and why, as specified by the corporate Planner. However he will not say how this is to be done, which is the decision of the experts in the field. Although he does not specify this, he does have to ensure that the required effect takes place. If not, then he must report to those to whom he is responsible (whether the General Manager or the Board of Directors). He is equally responsible for ensuring that everyone in the corporation knows exactly what his task is and that he is responsible for achieving it, that he knows why this target has been set and whom to coordinate with and when and to whom he may report his progress. Care must be taken to phase each part of the plan so as not to overload or underutilize a part of the corporation's resources.

This also represents the end of the corporate planning process. The corporation knows what it wants to do over the next few years (whatever figure it chooses), it knows what would happen if it did nothing, it knows

1/ Ibid., p. 134
2/ Ibid., p. 134
what it is in fact going to do and that there is a very

good chance of its chosen actions resulting in it

achieving its targets, each senior executive has been
told exactly what is expected of him and the Board
knows that they will receive monthly reports on the
progress the corporation is making towards its goals.

Corporate Planning is a continuous task. 

This is because the corporate planner's task does
not end with the preparation of a plan of action.
Some writers believe this to be the beginning of the
corporate planner's work, not the end. It is only half
the work, and is the remaining part which gives impetus
to action. In an ever-changing world, everything is
subject to change as new trends emerge, such as inflation
rates, stock exchange valuation etc. Argenti says:

"When a new trend emerges or an event occurs
that was not a forecast at all or which was
forecasted to occur but not at the
time that it did, All these parts of his work
can suffer from this instability; the target
the forecast and the plans." 2

The target based on such unstable factors may need
revision if any of these turn out to be significantly
different from the assumptions made about them. The
same is true of forecasts and plans. It is very

2 Ibid. p. 182
important to keep the planning going once it is started, so a large part of the corporate planner’s work is concerned with monitoring, revising and timing of plans. Monitoring

Every important assumption underlying the target, every factor affecting profit and all expected results of every plan must be monitored continuously. Monitoring here implies an element of control, i.e. the collection and evaluation of information concerning progress towards the targets.

The corporate planner as a source of information about all the variables that affect targets and the expected effect of plans, can always record the actual results obtained during the course of the plan. If these are found to lag behind the expected figures, and the effect of this on the stated target is visible, then he should report it to his Board, together with an explanation of why the result is lower than expected and what actions are necessary to counteract its effect on the target. In this way corrective action may always be taken at the proper time. This is what is lacking at PEGO. No information about the plan’s progress reach the decision-making points, which usually results in delayed action.

\[\text{Ibid, p. 190}\]
Argent says:

"It will be appreciated that the later
information is available - i.e. the greater
the time-lag between an event occurring and
the knowledge of its occurrence - the less
likely it is that corrective action can be
taken." 1/

This is usually the case at PNOC. The importance
of a corporate planner to PNOC would be to ensure that
he knows and that the Board is informed about these
events as soon and as often as necessary to maintain
control.

Revision 1:

This follows from the previous step if it is found
that the actual results yielded by the plans are less
than expected by a significant amount, then part of
the plan should be revised as put by Argent:

"However revision of the forecasts will take
place frequently, and of the targets less frequently.
But while revisions of targets and forecasts are simple
merely a matter of reporting and recording, systematically
revisions to plans are more difficult. This may be one
reason why no revision of the 1977 Electricity Develop-
ment Plan has taken place, although the British
Electricity team have emphasized that this should

1/ loc. cit., p. 192
2/ Ibid., p. 194
occur so that the information contained in it can be updated. This may also be the reason why the 1979 and 1981 Development Plans for electricity have not been issued.

This is actually why I suggest that a corporate planner, who should report directly to the General Manager or Board of Directors, be appointed in P&O. He would then have the knowledge, experience and responsibility to handle the work effectively. He will be in a position to know whether the gaps are expected to become as large in any particular year, that new plans to close them will have to be proposed. Again his position of direct responsibility to either of the two chief executives brings him closer to the decision-making points so that any time he may obtain their approval for any suggestion. It is rather strange to note that the Board of Directors have not even seen the 1977 Electricity Development Plan. Similarly it was obvious that the Board had been suffering from the scarcity of the periodic reports from the Corporation’s executives on performance, budgets and development projects.

1/ During these years no assistance was obtained from the British Electricity Board in issuing the plan.


3/ See Annex Report, Section 3 on Periodical Reports
My own belief is that a corporate planner would have
centered for all these aspects, since, as Argenti has
put it.

"It is very much part of the corporate planner’s
duty to set up the necessary reporting and
communication system such that he, and when
necessary, the Board are informed of those changes
that they need to know about, but not of those
they do not."

This leads us to the next role to be assumed by the
corporate planner.

Timing:

One important duty of the corporate planner is to
ensure that the volume and timing of reports to the
Board are conveniently phased. As suggested, the
Corporate Planner here performs a prescreening role,
so that only important and relevant information reach
the Board. Argenti suggests that reports to the Board
should only be made when the matter to be reported
seems to affect profits by three to four percent. However
this role could be adjusted according to the appropriate
circumstances of PWJ. In my opinion, proper delegation
of authority should be granted to PWJ’s executives so
that they are given the responsibility for taking
decisions in routine matters, thus leaving the Board the
time and energy to handle large problems of strategic
importance.

Argenti, op cit, p. 161
Closely linked to this function of information screening is the timing of decisions, which is in an intrinsic problem of PEWJ. Most of their actions come after the event, usually too late to avoid disruptions and chaos. This explains the continuous state of disorganization in which the corporation functions. As noted by Argenti:

"To give order to build a factory in September of 1967 when it is required to be in operation that year is obviously a situation to be avoided."

This happens in PEWJ, not only in the case of non-programmed decisions, but also with the programmed ones. The example which immediately springs to mind is clearing the entrance of the Rossires Dam. This problem is a recurrent one, that arises every autumn, but usually action to start the clearing does not commence until after whole region of the country fall into complete darkness. The reason may be as suggested by Argenti, that:

"Decisions are often taken too late because the calculations, discussion and examination necessary to determine what action to take is after a protracted process."

1/ Argenti, op. cit., p. 195
2/ Ibid., p. 195
As we have seen, FMC has no body to undertake such a troublesome function, while the line executives are wholly immersed in their daily problems of how to secure the minimum standard of efficiency in their services. Since a decision is the act of choosing between alternative actions, in order to make the proper choice it is logical that the effect of many possible actions on the future of the corporation should be considered. FMC's executives seem to underestimate the time required for such lengthy processes. However, this problem may largely be solved if a corporate planner was always there to initiate discussions and evaluations early enough.

Ordering the timing of decisions is at the centre of the Corporate Planner's work. This is the only way in which the corporation can ensure that its policies are being put into action systematically and that sufficient time is allowed for careful consideration of each project before a final decision has to be made. In this way, every factor is accounted for, including the less probable events or the "less likely trends and events," as Argenti would call them. Precautionary planning could also be carried out to cater for the "less likely trends or events."
There are often known as "contingency plans" and are usually prepared after the main policy has been approved, to cater for the "if not" question. This is why corporate planning is described as comprehensive, systematic and continuous.

Of course the corporation cannot use the corporate planning approach until the system has been created and this is certainly part of the corporate planner's job. In essence corporate planning is a detailed, systematic study of the corporation's size and means and the corporate planner's job is to ensure that the organization can and does carry out such a study but he cannot do either unless the Managing Director and the Board want him to, indeed they must be fully behind him in all his work.

One important area in which he needs their backing is the communication network within the corporation. They may urge the introduction of a more effective information system. The whole corporate planning task is based primarily on the accuracy of the information received. The planner appreciates the strengths and weaknesses of the corporation and ensures that they are fully taken into account in the designing of new strategies.
requirement etc., covering every aspect of the corporation. We must also be concerned with environment-
al conditions and forces that constrain the corporation's activities and available opportunities. The choice of
appropriate objectives and the most appropriate strategy to achieve them. This requires a continuous flow of
reliable information. As we have seen above FASU lacks such a system. So it may be suggested here that this
should be given priority if any planning within FASU is to yield effective results.

One last point to be mentioned at this juncture concerns executive action. Argenti says that

"Organisations need three constituents in their make-up: an objective to aim at, the
means of achieving this and the executive action necessary to give effect to these
means. A corporation blessed with an objective, the means and a vigorous executive will almost
certainly be successful. If any of these three are absent it may fail. However, corporate
planning is supposed to be concerned with the objective and the means. But an objective can
not be achieved, even if the means are at hand, if the executive action is lacking in strength."

\[1/\]

Argenti, ibid, p. 236
PEWJ seems to lack this executive action, since a large part of its decision-making power lies outside the corporation's domain; in the Ministry of Finance or in the Central Purchasing Bureau.

My own judgement is that PEWJ is a public corporation, i.e. a body corporate which means an autonomous body having freedom of action. This is exactly what it was meant to be when it was first established. It was expected to function as such. Both the 1975 and 1973 Acts granted it the right to work on a commercial basis. Hansen says:

"Something called self-contained finance is another feature of independence".

To secure its financial independence, the efficiency criterion for its financial performance was that its annual revenue should be sufficient to cover its operational costs as well as to contribute in its development tasks. Thus, to be financially independent and hence an autonomous body, PEWJ should fulfill the above efficiency criterion.

As we have already seen in Chapter Five of this study, the corporation, since the early seventies has been making losses.

As most writers assert, financially dependent organizations are more vulnerable to outside control.

So we may say that PEMD does not have the right to decide on its own action because it is financially dependent. Hanson affirms this fact when he says:

"He who pays the piper calls the tune."

Hence it is needless to say that if PEMD could become financially independent it would be in a better position to bargain for adequate freedom in its operations. In other words, if PEMD could attain the financial objective (meaning that it performs effectively) it would have gained more autonomy. This line of thinking goes with the conclusion of Emmanuel J. Nnewu:

"If therefore, as is the general consensus, public enterprises are expected to operate effectively, the instruments establishing such enterprises should forestall the abuses inherent in organizational links that link public enterprises to the array of strings of government political or administrative units such as the ministries. This will ensure that such public enterprises are not funded via the ministries and that the top officials of the enterprises should not owe any allegiance to the Civil Service or to any political/military group, once the policy and objectives (targets) for such enterprises have been formulated in unchallengeable terms." 2/

Another important area in which PEMO should seek freedom from government rules and regulations is the personnel management. As we have seen PEMO adopts the same terms of personnel employment as that of the Civil Service. This entailed the adoption of rigid practices as regards the policies of recruitment, training, promotions and incentives, which greatly limited the corporation's action in this field. Thus we suggest that PEMO should try to have a separate personal laws and regulations that aim at, the proper utilization of its personnel, management development and proper motivation which leads to the effective performance.

However one would expect that the introduction of corporate planning would bring with it the need of the corporation's effectiveness since it is an objective oriented system. It would be responsible for clarifying the corporation's objectives, seeking ways and means for their attainment and monitoring progress towards these aims.

So we may conclude that this, the least that Corporate Planning could bring to PEMO. If it could not secure effective performance directly, at least it could aid in regaining the corporation's lost autonomy which would be the dawn of effectiveness.
APPENDIX 5:
THE MAP OF THE SUDAN
THE MAIN TOWNS WITH ELECTRICITY AND WATER SUPPLIES

KEY:
- Electricity and water
- Water only
MAIN EVENTS IN PREPARATION OF P.W.C. ANNUAL DEVELOPMENT PLAN

1. Market Analysis
   - Review of market demand and trends

2. Financial Analysis
   - Review of financial performance

3. Technical Assessment
   - Review of technical feasibility

4. Economic Feasibility
   - Review of economic viability

5. Policy and Regulatory Analysis
   - Review of policy and regulatory impacts

6. Risk Management
   - Assessment of potential risks and mitigation strategies

7. Strategic Planning
   - Development of strategic objectives and plans

8. Implementation
   - Coordination and execution of implementation plans

9. Evaluation
   - Evaluation of project outcomes and impacts

10. Reporting
    - Preparation of reports and presentations

This comprehensive approach ensures a thorough and well-informed decision-making process.
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