Part II

Proposal
for
Corporation Plan and Organization
of
NWPGCL and Bheramara CCPP

Chapter 1. Introduction

1.1 Objectives

As a case example, this report will examine, with Company Act 1994 based on the power sector reform program in Bangladesh, an organizational structure and management system of the corporatized companies, in generation, transmission and distribution. Considering BPDB corporatization plan, and the preceding corporatized cases, the corporate management plans for North West Power Generation Company (NWPGCL) and Bheramara power station are proposed to contribute to promoting a self-reliant, and efficient management system.

1.2 Terms of Reference (TOR)

The terms of reference is covered to support reinforcing the management foundation for NWPGCL and Bheramara power station. The contents of the TOR are as follows;

(1) Support for the institutional setup of Northwest Power Generation Company Limited (NWPGCL)

(a) Support for developing corporate management

Support for developing the corporate management plan, contributing promotion of self-reliant, and efficient management system.

1) Organizational Structure: Organizational chart, Duty and powers for each division and class
2) Human capital Management: Compensation and bonus system, Welfare programs, Human capital development policy, Employment schedule (plan)
3) Finance/Accounting system: Financial and accounting system, Investment and budget plans, Accounting process
4) IT Management system: system operation policy and plan, system investment plan
5) Legal Affairs: Subsidiary loan agreement, Power Purchase Agreement (PPA), Fuel Supply Agreement (FSA), Operation and maintenance Agreement

(b) Identification of risks and proposal for risk mitigation measures

In consideration of the business practice in Bangladesh, business risks are identified and countermeasures for these risks are proposed.

(c) Support for the development of Mid-term management plan for NWPGCL as a whole

In accordance with the BPDB corporatization plan and preceding cases, the corporate management from the perspectives of the mid-term time range (3years) is proposed.

(2) Support for developing the business plan for the Bheramara power station

Support for developing the management plan for the power station, including required rules and system, and contracts and agreements with service providers in order to functionalize the power station activity.

1) Organizational Structure: Organizational chart, Duty and powers for each division and class, P/S service rule
2) Human capital Management: Compensation and bonus system, Welfare programs, Human capital development policy, Employment schedule (plan)
3) Finance/Accounting system: Financial and accounting system, Investment and budget plans, Accounting process
4) IT Management system: system operation policy and plan, System investment plan
5) Legal Affairs (Subsidiary Loan Agreement, Power Purchase Agreement (PPA), Fuel Supply Agreement (FSA), Operation and maintenance Agreement)
6) Mid-term management plan (sales, costs, repayment of debt, etc.)

1.3 Composition of Experts

The following 4 experts have been involved in this study.

Name	Expertise
Noboru SEKI	Business Management Expert (Team Leader)
Kiyoshi KATAOKA	O&M Management Expert
Yasuhisa KURODA	Financial and Accounting Expert
Toshiyuki KOBAYASHI	Organizational Structure Expert

1.4 Field Survey Schedule

- Survey period: February, 2008 to January 2009
- 1st field survey: February 18-29, 2008
- 2nd field survey: June 14-27, 2008
- 3rd field survey: September 15-25, 2008
- 4th field survey: November 17-29, 2008

Chapter 2. NWPGCL Corporate Directivity

2.1 Phase-wise Roadmap

From now on, the management of NWPGCL shall proceed with both the construction of Bheramara thermal power station and corporatization of NWPGCL in a simultaneous and parallel manner. In doing so, they must accurately deal with various issues. Different problems will come up to the surface according to the progress level of the corporatization. Therefore, the time frame is divided into 4 phases in line with corporatization of NWPGCL and the Bheramara power station. Issues are identified and countermeasures for these issues are proposed for each phase.

An explanation of each phase follows;

(a) Phase 0: Preparation period:
From the present to Loan Agreement (L/A), expected to be concluded by June 2009.
Proceed with basic design of Bheramara power station, and place concrete foundation of NWPGCL corporatization.

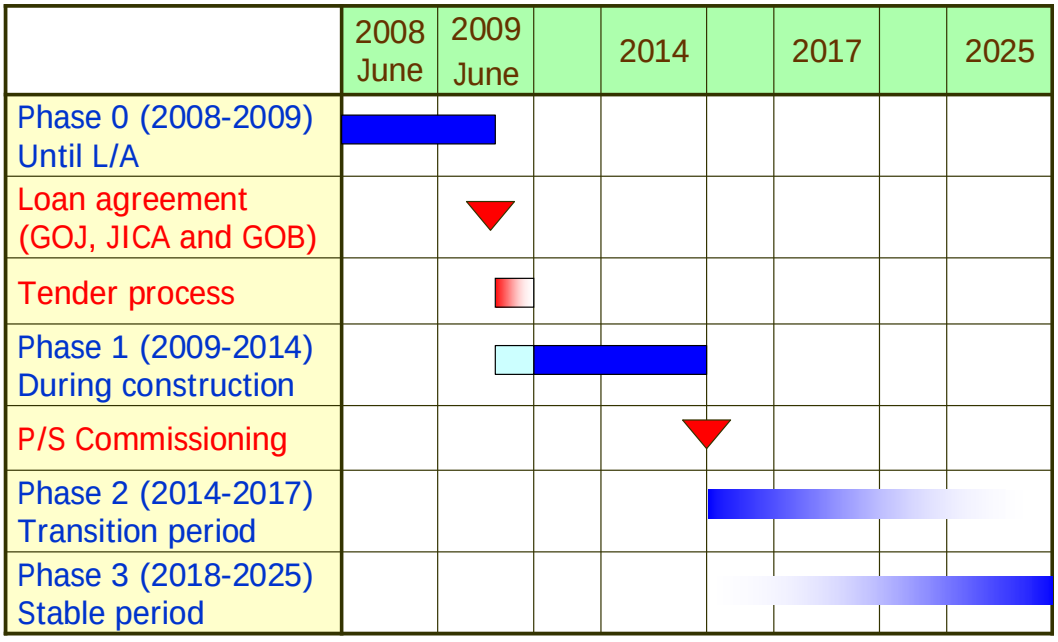
(b) Phase 1: During construction period:
From the conclusion of L/A and tender process, and to the construction stage.
No operation revenues from the Bheramara power station are expected during phase 1.

(c) Phase 2: Transition period (about 3 years from the commissioning)
For about 3 years from the commissioning, unstable conditions in operations at the power station and the management system at the administrative office will be identified frequently due to initial troubles.

(d) Phase 3: Stable period (3 years and more from the commissioning)
When initial troubles are solved, a stable condition in operating and managing will be secured.

Considering the conditions above, a phase-wise corporatization schedule is shown as follows;

Table II-2-1 Time Schedule for Corporatization of NWPGCL



2.2 Phase-wise Ideal Figures of NWPGCL

Carrying out efficient management and human capital development is required in order to develop a company with sustainability. As indicated in the following table, there are few power sectors, or companies, in Bangladesh, which simultaneously attain Independent management and Human capital development. The directivity of NWPGCL is to simultaneously attain both Independent management and long-term human capital development for sustainable development.

Table II-2-2 Case of power sector corporatization in Bangladesh until now

	Independence of management	Long-term human capital development
BPDB P/S	It is completely under the rule of BPDB and all the judgment is based on decision-making by BPDB.	Although maintenance personnel are employed, a training program is not established.
IPP	It is completely based on decision-making by IPP.	Since a long-term maintenance service agreement is established with manufacturers, the maintenance personnel are not employed.
Ashuganj P/S	It is a subsidiary of BPDB and important decision-making, such as scheduled outages for inspections, is completely under BPDB control.	Maintenance staff is secured and personnel training which was only a system has started.
PGCB	Although it is a subsidiary of BPDB, the accounting system is clearly divided, and management authority is delegated to the management.	Since it requires special expertise, training programs have been established.
DESCO	Although it is a subsidiary of BPDB, the accounting system is clearly divided, and management authority is delegated to the management.	Major O&M for distribution line works are outsourced.

Considering the conditions discussed above, the following shows the directivity of NWPGCL, showing the relationship between Independent management and long-term human capital development.

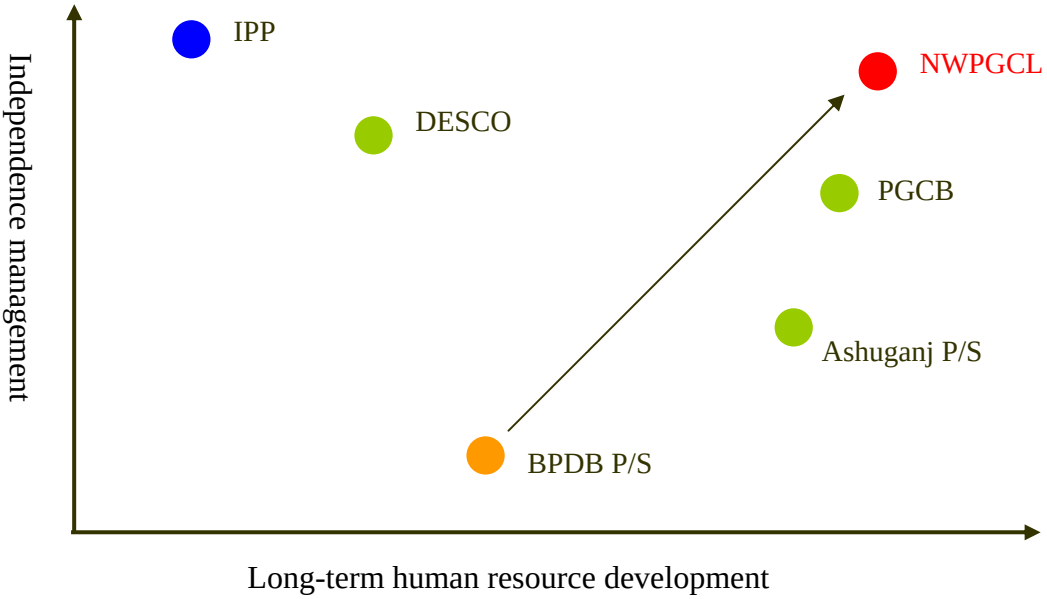


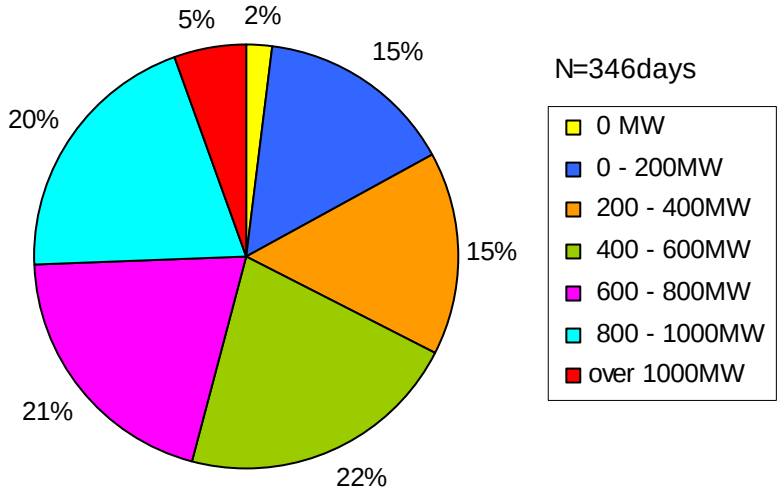
Figure II-2-1 Directivity of NWPGCL

2.3 Factor Analysis of Power Crisis

(1) Status of load shedding

Due to the shortage in power supply, Bangladesh is currently facing a continuous power crisis. Frequency distribution of days when load shedding was conducted in 2007 is indicated below.

As the maximum power output in 2007 was 4130MW, load shedding was conducted for over 400MW of power, equivalent of 10% of the maximum output, across 70% of the year. In addition, for close to 90 days, i.e., a quarter of the year, over 800MW of power, the equivalent of 20% of maximum output was load shedded. The number of days with no load shedding was less than 10. During most of the year, load shedding was done for two to three hours every day during the peak consumption period of late afternoon. The situation has not improved as of October 2008.

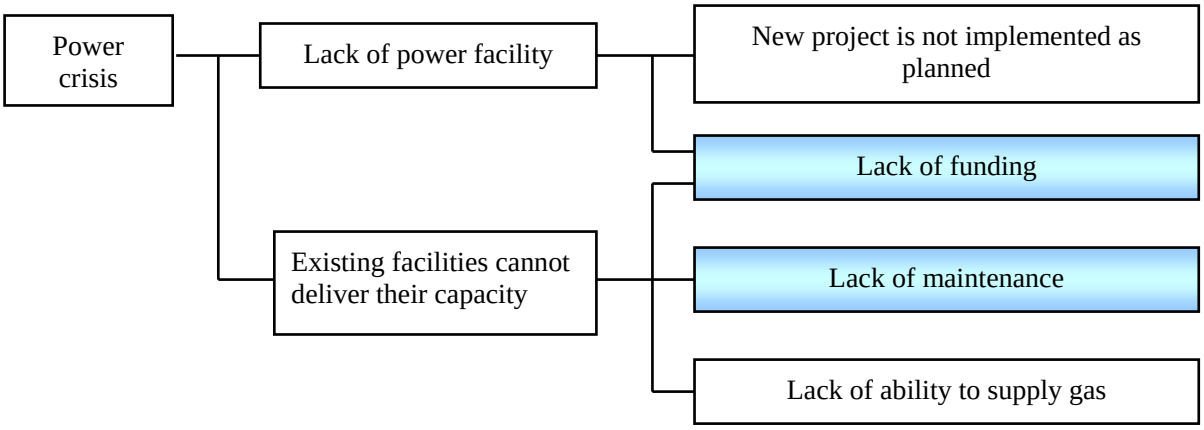


*Prepared by the Investigation Team based on the data obtained from BPDB website

Figure II-2-2 Frequency distribution of days when load shedding was conducted in 2007

As a member of the Power Sector in Bangladesh, NWPGCL is required to play a role in overcoming this ongoing power crisis.

In consideration of the perspectives stated above, factors related to the current power crisis have been analyzed as follows:



Of the factors listed above, such factors as “lack of funding” and “lack of maintenance”, which can presumably be improved within NWPGCL, are further analyzed as follows:

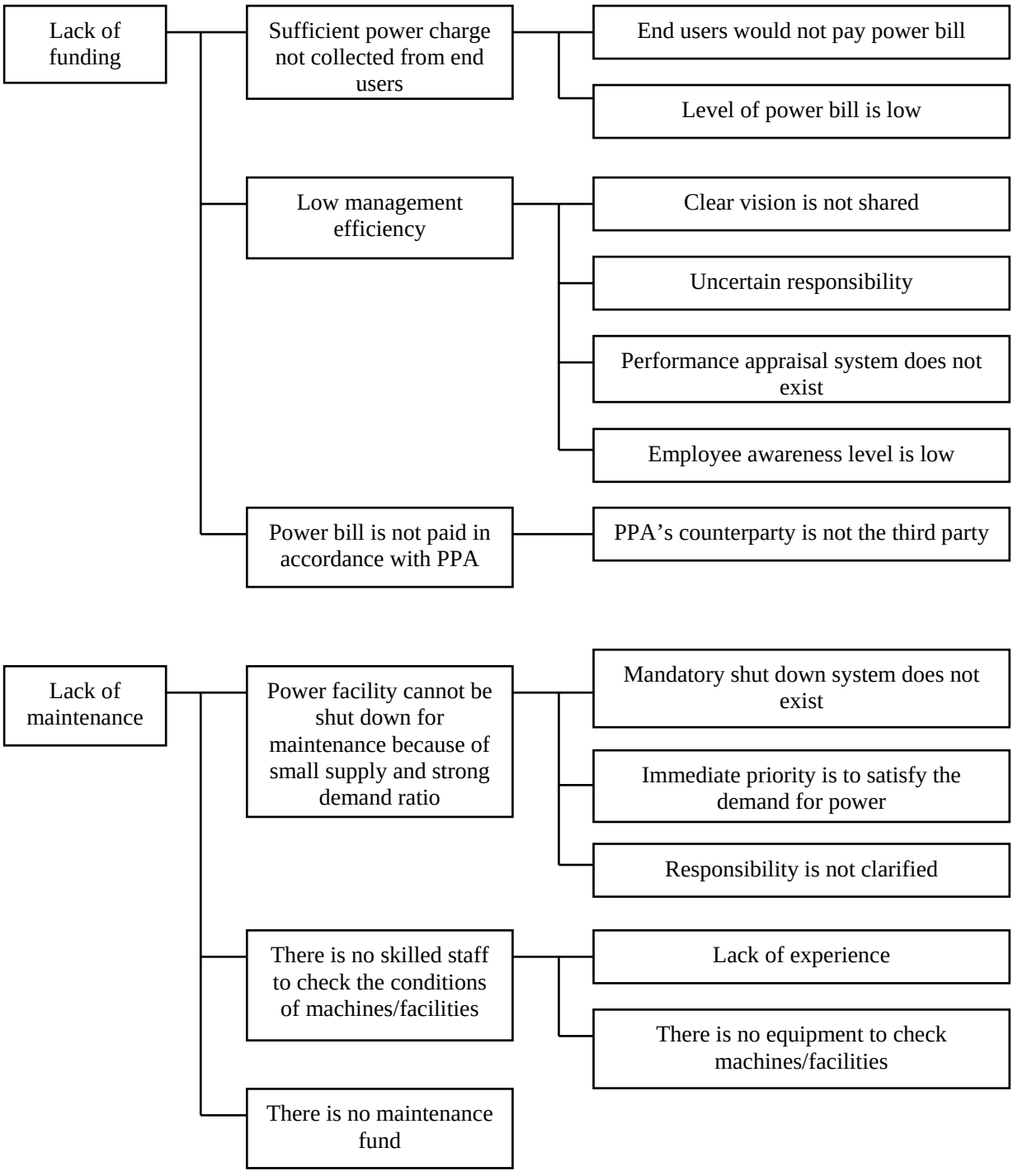


Figure II-2-3 Factor analysis of power crisis

Based on the result of factor analysis, an NWPGCL corporate plan will be proposed to minimize the effect of these constraints.

2.4 Corporate Visions

2.4.1 Inter Linkage with Power Sector Roadmap & NWPGCL Vision

We feel that it is important to duly recognize that the GoB has outlined a Power Sector Roadmap, which indicates the key drivers of the Reform Roadmap for the Bangladesh Power Sector. We note that there are certain overarching themes that will be pivotal in shaping up the policy management related aspects of NWPGCL. In this context we believe that the guidance provided by the Power Sector Road Map 2008-10 is relevant for some aspects provided for existing and new generation, which we represent below.

3 Year Road Map for Power Sector Reform 2008-2010

Existing Generation

1.1. All the existing power stations in the public sector will be converted into profit centers for eventual conversion to a corporatized entity individually or on cluster basis which will be retained by BPDB holding company.
1.3. The business and financial plans will be developed.
1.4. All efforts will be undertaken by GOB so that the emerging entities can start functioning commercially.
1.5. Special plans will be developed to enhance technical and managerial efficiencies and establishing good governance.
1.6. Special attention will be given to Human Resources Development (HRD) program.
1.7. To improve technical and management capability and to establish accountability, special organizational activities like TQM will be introduced

New Generation

For public sector new generation, special attention will be given to good governance, efficient O&M and establishing commercial environment.

2.4.2 Vision Statements for NWPGCL

The corporate structure requirements for NWPGCL are first and foremost to develop a Vision Statement for NWPGCL. Vision statements for NWPGCL as a power utility company which have been formulated based on discussion with a key stakeholders of NWPGCL are described as below:

NWPGCL holds up the three pillars of "independence of management", " Highly reliable power supply", and " Sustainable development" as corporate visions, and NWPGCL aims at realizing these pillars with sufficient balance. The relation of the three pillars of corporate vision is shown in the figure below.

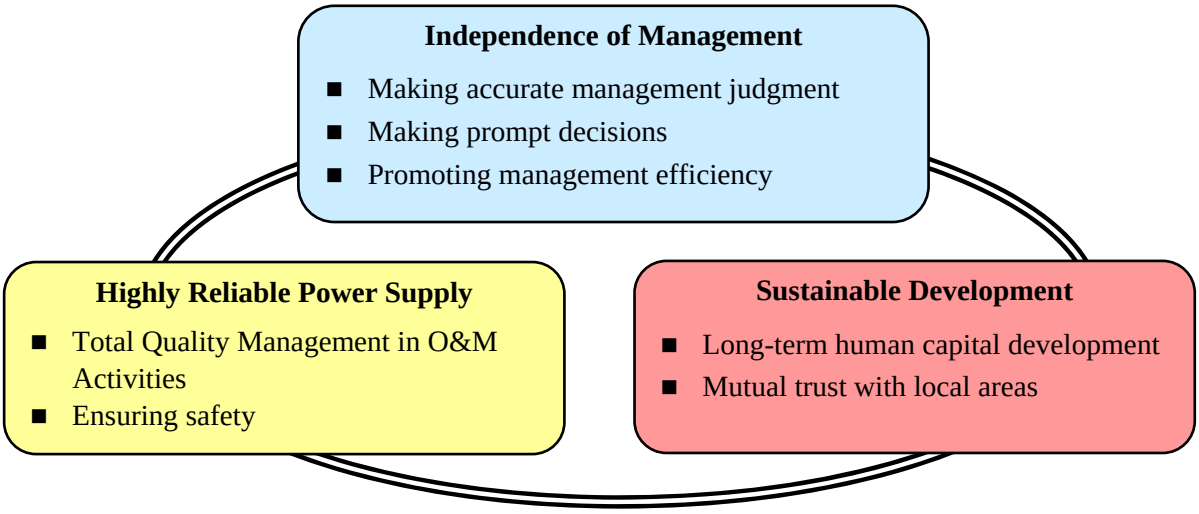


Figure II-2-4 Three pillars of corporate vision

(a) Independence of Management

In order to realize independence of management, the management needs to make accurate management evaluation, and make a prompt decision. In order to do this, employing excellent personnel having a progressive spirit as a secretary to the top managements is important. Also, establishing a management information system (MIS) which extracts important operation and management data at any time for their management decisions, is essential.

Furthermore, the necessary investment should be done at the appropriate time. For this, it is necessary to realize a financial structure that makes it possible to secure revenue and expense balance at an early stage.

(b) Highly reliable power supply

The reliability of power supply in Bangladesh is by no means high. A big reason is due to lack of the absolute number of generation facilities. Another reason is the low awareness of the personnel who belong to the power sector. At NWPGCL, each worker must be very aware and conscious of delivering highly reliable power. In addition, all the workers shall put Total Quality Management (TQM) to practical use in order to establish O&M management system based on fact control. This means the technical judgment shall be determined by actual data. Furthermore, considering equipment and human safety, establishment of a safety management system is a key issue to prevent accidents.

(c) Sustainable development

It is very important for sustainable development and from a long-term viewpoint, that maintenance experts shall be raised in the company, and these personnel shall handle small-scale maintenance work by themselves.

Moreover, if NWPGCL takes into consideration owning the power stations located in the western region of the country where economic development is behind, it is necessary to think about contributing to promotion of regional economic development. Therefore, NWPGCL needs to aim at promotion of local employment and at building good relations with neighbors and the local area.

Chapter 3. Corporate Governance

3.1 Approaches to Realizing the Corporate Visions

In order to successfully realize the corporate vision of attaining the Independence of Management, Highly reliable power supply, and Sustainable development, this chapter proposes the optimum figure of the corporate governance system for NWPGCL.
In evaluating a manager's contribution to the company, one criteria is corporate value. Corporate value is indicated on financial statements and merely improving these numbers is not enough. There must also be consideration for the environment, and Corporate Social Responsibility (CSR) through establishing relations based on trust with local communities near the power stations. .
Therefore, the corporate governance system, which is to be discussed in this chapter, is the most fundamental framework for a company to be able to maximize their corporate value, by realizing the corporate visions.

Corporate Visions: Independence of Management
- Making accurate management judgment
- Making prompt decisions
- Promoting management efficiency

Corporate Visions: Highly reliable power supply
- O&M Total Quality Management in O&M Activities
- Ensuring safety

Corporate Visions: Sustainable development
- Long-term human capital development
- Building mutual trust with local areas

3.2 Fundamental Frame in Corporate Governance

3.2.1 Outline

Corporate Governance has been practiced in a variety of forms in many countries and companies for many decades. Company Acts globally contain provisions for the accurate reporting of business performance, primarily driven for taxation and business disclosure purposes. Over the last twenty years this development has also been accompanied by QA initiatives and the implementation of risk assessment techniques. However, in the last five years or so there has been increased attention to Corporate Governance following several high profile cases of company collapse and a general loss of confidence by shareholders and regulatory shortcomings. The power industry's high profile collapse of the Enron Corporation in particular focused attention on the need for more vigilance, transparent reporting and increased attention on the performance of external auditors and company executive's ethical behavior. The Organization for Economic Cooperation and Development (OECD) has defined corporate governance as "the system by which business corporations are directed and controlled." We feel that Governance aspects need to be customized for every business and organization while ensuring compliance with statutes and corporate governance codes as applicable for the Industry. A good governance plan puts in place the people, systems and controls that will enable the business to deliver on its unique mission, vision and objectives. The governance needs of an organization will also change over time. They need to be regularly reviewed

Effective governance will:

- Allocate responsibilities to parties such as the board of directors and the managers of the organization in such a way as to make them accountable in clear terms;
- Provide the means for setting and pursuing company goals in a transparent and open way; and
- Create the structures to manage risks and monitor performance.

Corporate governance is a system which helps to direct and govern the company so that it can be maintained and prosper. As indicated in the following figure, it is important to separate the execution and supervisory functions of management, and to establish and implement an internal control system. It is also important to have observation from external sources.

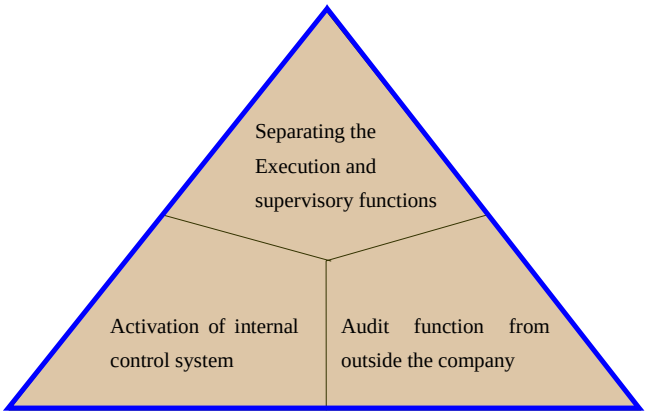


Figure II-3-1 Fundamental structure of corporate governance system

3.3 Applicable Laws and Regulations in Bangladesh

3.3.1 Corporate Governance Code 2004

We believe that given the current context, as an initial beginning, NWPGCL can draw adequate inspiration from the Bangladesh Corporate Governance Code 2004 which lays out the key aspects of Corporate Governance and also indicates certain specific aspects to be followed for State Owned Enterprise which we feel is applicable for the case of NWPGCL as well. In the subsequent non-exhaustive list set out in the table, we indicate the key aspects of Corporate Governance that is relevant and should be adopted by NWPGCL.

Table II-3-1 Bangladesh Corporate Governance Code 2004 Key Highlights

Aspect	Clause Reference	Principles / Guidelines
Duties of the Board	II	▪ Serve legitimate interest of the shareholders and account to them fully ▪ Ensure compliance with all relevant laws and regulations including code of Corporate Governance ▪ Determine, monitor, evaluate strategies, policies, management performance and business plans ▪ Identify and monitor key risk areas ▪ Review and monitor risk management systems ▪ To appoint the MD/ CEO and Top Management Team and set performance criteria for evaluation
Board Membership Criteria	III	▪ An individual director not to hold directorship in more than 6 boards ▪ Directors with less than 50% board meeting attendance not to eligible for re-election
Nomination of New Board Members	IV	▪ Nomination Committee not to preclude shareholders from active participation in the nomination process ▪ Candidates nominated by both shareholder and board along with requisite information to be put before AGM for election
Training	V	▪ New Directors to attend a corporate governance orientation or

Aspect	Clause Reference	Principles / Guidelines
		training offered by a reputed institution or trainer
Separation of Chairman and CEO	VI	▪ Position of Chairman of the Board and CEO should be filled by different individuals
Board Composition	VII	▪ Membership to be within 7 – 15 Directors ▪ Articulation and Implementation of a nomination programme to enable majority of Board to be non-executive and independent directors ▪ Non-executive directors to be included in committees tasked with decisions involving conflict of interest ▪ Quorum to be arrived only when majority of non-executive or independent directors are present
Board Compensation	VIII	▪ Compensation to be sufficient to compensate directors for time and effort required to complete the duties well
Board Agenda	IX	▪ Annual Operating plans and Capital , Overhead Budgets ▪ Internal Audit Reports ▪ Environmental problems ▪ Interest and Principal payment default ▪ Recruitment and remuneration of senior officers just below the board ▪ Labor issues and proposed resolution
Committees	X	▪ Audit , Nomination to be headed by independent directors ▪ Audit Committee to be headed by an independent director with professional qualification and relevant experience ▪ Quarterly meetings to monitor internal and external audits ▪ Annual reporting to Shareholders ▪ Remuneration Committee
Director's Report	XI	▪ Explanation of results ▪ Explain compliance with Code of Corporate Governance ▪ Strategy and future prospects ▪ Material Risk factors and uncertainties which may effect quality of earnings ▪ Ownership Structure ▪ Director's shareholding and details of loan to directors ▪ Critical Accounting policies used in preparation of financial statements , disclosure of basis of estimates used in financial reporting ▪ Statement of Going Concern
Code of Conduct	XII	▪ Directors to review and agree to abide by the Code of Conduct
Company Secretary / Compliance Officer	XIII	▪ Advise on issues of Internal Controls ▪ To maintain annual record of compliance with Code of Corporate Governance
Evaluation of Board Performance		▪ Board to evaluate own performance both collectively and individually including performance of the Chairman at least once a year to ensure it is operating effectively

Besides the above table which sets out the overarching guidelines of Corporate Governance, we also recommend that NWPGCL takes due note of one of the key principle being promulgated by the Bangladesh Corporate Governance Code 2004 for State Owned Enterprise.

III. Statement of Corporate Intent

Principles:
A. A Statement of Corporate Intent (SCI) should be negotiated annually and agreed upon by the directors, relevant government entity, and all shareholders. The Statement should establish specific operational goals and performance targets. Any social, policy, or non-economic arrangements should be detailed in the Statement. A Mission Statement
should be part of the SCI.
B. The board must take responsibility and be evaluated on the progress made towards achieving the mission of the organization.

Guidelines:
C. The Mission Statement or SCI should cover long-term goals and provide the framework for subordinate performance contracts between the Board of Directors and the Board and the CEO/MD. The statement should be set for a particular period, at least three years but not to exceed five years, and must be evaluated annually.
D. Specific operational goals of an SOE should encompass a mission to operate:
1. as a profitably and efficiently as a comparable business that the Government does not own;
2. to the highest standards as a good employer of its own staff; as a good customer for external products and services; and as a good supplier to its customers;
3. as an organisation which demonstrates the highest standards of
Corporate Social and Environmental Responsibility
Source: Bangladesh Corporate Governance Code 2004

We believe that already the spirit and intent has been established in NWPGCL towards serving the above objectives. However to ensure that all future personnel of NWPGCL including the Top Management team is fully aligned a Statement of Corporate Intent needs to be drawn up by the NWPGCL Board at the earliest.

3.3.2 Bangladesh Companies Act 1994

The Companies Act lays down the framework for corporations to operate in the business environment while laying down certain statutory obligations with regards to institutional process and ensuring transparency towards shareholders investors. The Companies Act was in vogue prior to Corporate Governance and is primarily in the nature of a statutory nature while Corporate Governance is more on the lines of best in class institutional and corporate practices. The Bangladesh Companies Act 1994 also lays out certain specific guidelines which we feel should be followed by NWPGCL over course of time in order to adhere to good governance principles. Without repeating the content, we set out in the section below the Clause references of the Company Act 1994

- Clause 83: Statutory Meeting and Statutory Report of Company – Lays down the minimum requirements for conducting general meeting referred to as “statutory meeting” which will be based on the “statutory report” to be sent to members twenty one days prior to the meeting
- Clause 90: Directors obligatory – Lays down the minimum number of directors in a company
- Clause 92: Restrictions on appointment or advertisement of director – Sets out the requirement for Director’s indicating consent with the Registrar for the position with the Company
- Clause 93: Consent of candidate for directorship – Indicates the due process to be followed for obtaining written consent of the Director with the Registrar
- Clause 94: Disqualification of directors – Sets out the regulations for disqualification of directors on issues of insolvency, not meeting the call in respect of shares of the company within a period of 6 months from the date fixed for the payment of the call.
- Clause 95: Notice of Meetings – Ensures that a due process has been followed for duly informing all directors of meetings
- Clause 96: Meeting of the Board – Sets the minimum benchmark (floor) for the Board of Directors as at least four (4) meetings in a year.

- Clause 97: Qualification of Director – Stipulates the requirement for the Directors to hold qualification share as specified in the Articles and the requirement to obtain the qualification within 60 days from the date of appointment.
- Clause 101: Appointment and terms and office of alternate directors – Provides the company with the authority to appoint alternate director in case of a continuous absence of the original director for a period of 3 months from Bangladesh with duration of alternate director to be as per Original Director's with the due provision of vacating the post on the original director's return.
- Clause 102: Avoidance of provisions relieving liability of directors – Sets out the liability of the directors and the indemnity aspects with regards to directors
- Clause 103: Loan of Director – Debars the company from providing loan or guarantee / security against a loan provided by a third party to a director with specific exemptions in case of banking company etc.
- Clause 104: Director not to hold office of profit – Debars the director to hold an Office of Profit without due consent.
- Clause 105: Sanction of Directors for certain Contracts – Prevents the Director from entering into a sale, purchase of goods with the Company.
- Clause 106: Removal of Directors – Stipulates the due statutory process for removal of Directors from Office.
- Clause 107: Restriction on power of Directors – Limits authority of directors in respect of remitting any debt due by a Director or sell or dispose of the undertaking of the company
- Clause 108: Vacation of Office of Director – sets out the rules in which the Director's post falls vacant
- Clause 184: Board's Report – Stipulates the statutory reporting mechanism and requirements of the Company which needs to be presented in the General meeting.

3.3.3 Three (3)-Year Road Map For Power Sector Reform (2008 - 2010)

We also take note of the key governance enhancement initiative being put in place by GoB as outlined in the Government reconstituted board of directors of corporatized entities for good governance. Government discontinued the practice of appointing Secretary Power Division as chairman of the board and the companies formed board committees for Audit, Recruitment and promotion, and procurement to ensure transparency and accountability in the corporatized entities.

3.4 Key Findings from Corporatization Review Phase

Over the Corporatization Review Phase, we had studied the various Corporatization experience with Bangladesh and also held discussions with top management teams of various corporatized entities in Bangladesh. The findings of the Corporatization Review shall be set out in the section below. In terms of arriving at the key findings, we have focused on the aspects like

- Governance Framework
- Board Structure & Composition
- Segregation of Ownership & Management
- Board Committees

In the following table, we benchmark the various key corporate governance aspects. However it needs to be noted upfront that DESCO and PGCB are listed companies and necessarily have to comply with (No. SEC/CMRRCD/2006-158/Admin/2-06) and notification (No. SEC/CMRRCD/ 2006-158/Admin /2-08) issued on 9th January and 20th February 2006 issued under Section 2CC of the Securities and Exchange Ordinance 1969. The findings have been arrived at on the basis of Study of the available relevant previous reports submitted by various consultants and High-level meetings with key stakeholders of NWPGCL

The as-is analysis indicates the following key findings with regard to the governance mechanisms in place for the various utilities

3.4.1 Board Composition

Most of the utilities in Bangladesh have a board size ranging from 9-11 which is within the range of 7-15 as indicated in Section VII of the Bangladesh Corporate Governance Code of being representative of successful governance mechanisms

3.4.2 Governance Framework

The Boards of the utilities (functioning or as suggested in various consultant reports) are having or are expected to have a sizeable representation of independent directors of around 20-30%. In this regard, it may be useful to mention that the PA Consulting Report indicates a minimum 10% representation of independent directors for the BPDB Holding Company.

In most of the cases we note based on the information available that the MD and the Executive Director (Technical) and the Executive Director (Finance) are members of the Board of Directors. However we also note that DESCO has initiated a move to reposition the MD as an ex-officio member of the Board (Source- DESCO Annual Report 2007).

Over the as-is findings phase, we have observed that in most of the cases of the utilities studied, the Top Management Team consists of the Managing Director i.e. the CEO, the Director Finance i.e. the CFO and the Director Technical i.e. the COO of the utility. It has been a common observation across multiple consulting reports and we are also of the same opinion that there needs to be strengthening of the Director level function in terms of representing the key areas of Human Resources and Planning & Development. Over the as-is findings phase, based on the discussions with stakeholders, we have been given to understand that there is a significant requirement perceived within the utilities with regards to planning & development. We feel that both these areas are critical in line with NWPGCL's vision which places due stress on human capital development and sustainable development and highly reliable power supply as some of the key elements and both of these needs to be adequately focused within the organization through Director Level representation.

3.4.3 Segregation of Ownership & Management

In all the cases, we find that there is segregation of ownership and management excluding the case of NTPC and the aspect thus duly recognizes the principle set out in Section VI of the Bangladesh Corporate Governance Code of having separate Chairman and CEO to act as check and balance. We note in the case of the Bangladesh Utilities that most of them have separate Chairman and CEO. Thus in terms of roles while the oversight of the organization as a whole is managed by the Chairman, the daily affairs of the business and the running of the company is entrusted with the CEO who is separated from the chairman.

3.4.4 Board Committees

The utilities are in various stages of evolution with regards to Board Committees being in place. The listed entities like DESCO and PGCB have necessarily got to comply with the SEC guidelines which mandate the Audit Committee. However PGCB has also additional committees in place as indicated in the table above.

Table II-3-2 Comparative Chart on Bangladesh Utilities Corporate Governance Practices

Organization / Utility	Board Composition	Governance Framework		Ownership & Management Segregation	Board Committees
	No. of Directors	% of Independent Directors	Representation of MD & Executive Directors on Board , %	Separate Chairman & CEO	Functional Board Committees
DESCO	8	38%	Yes, 38%	Yes	Audit
PGCB	11	27%	Yes, 27%	Yes	Audit, Remuneration, Procurement & Review
WZPDC	11	27%	Yes, 27%	Yes	INA[1]
EGCB	11	27%	Yes, 27%	Yes	Audit, Governance , HR & Remuneration, Procurement & Technical[2]
APSCL	11	27%	Yes, 18%	Yes	
SZPDC[3]	9	22%	Yes, 44%	Yes	Internal Audit, Human Resource, Governance, Procurement
CZPDC[4]	11	18%	Yes, 45%	Yes	Audit, Nomination, Remuneration, Procurement
NTPC	13	31%	Yes, 54%	No	Audit

Explanatory Notes
The above table is based on the following data

- DESCO
  - The company has 3 independent directors in a total Board of 8 directors leading to (3/ 8) or 38% independent director representation on Board.
  - MD and Director (Tech & Finance) are represented on the Board thus making 3 EDs leading to (3/ 8) or 38% executive director / top management team representation on Board.
  - The company has separate Chairman and CEO

- PGCB
  - The company has 3 independent directors in a total Board of 11 directors leading to (3/ 11) or 27 % independent director representation on Board.
  - MD and Director (Tech & Finance) are represented on the Board thus making 3 EDs leading to (3/ 11) or 27% executive director / top management team representation on Board.
  - The company has separate Chairman and CEO

- WZPDC
  - The company has 3 independent directors in a total Board of 11 directors leading to (3/ 11) or 27 % independent director representation on Board.
  - MD and Director (Tech & Finance) are represented on the Board thus making 3 EDs leading to (3/ 11) or 27% executive director / top management team representation on Board.
  - The company has separate Chairman and CEO

- EGCB
  - The company has 3 independent directors in a total Board of 11 directors leading to (3/ 11) or 27 % independent director representation on Board.
  - MD and Director (Tech & Finance) are represented on the Board thus making 3 EDs leading to (3/ 11) or 27% executive director / top management team representation on Board.
  - The company has separate Chairman and CEO

- APSCL
  - The company has 3 independent directors in a total Board of 11 directors leading to (3/ 11) or 27 % independent director representation on Board.
  - Directors (Tech & Finance) are represented on the Board thus making 2 EDs leading to (2/ 11) or 18 % executive director / top management team representation on Board.
  - The company has separate Chairman and CEO

- SZPDC
  - The company is recommended to have 2 independent directors in a total Board of 9 directors leading to (2/ 9) or 22 % independent director representation on Board.
  - MD and 3 Executive Directors (Director Distribution, Resources and Corporate Planning and Regulatory) are recommended on the Board thus making 4 EDs leading to (4/ 9) or 44 % executive director / top management team representation on Board.
  - The company is recommended to have separate Chairman and CEO

- CZPDC
  - The company is recommended to have 2 independent directors in a total Board of 11 directors leading to (2/ 11) or 18 % independent director representation on Board.
  - MD and 4 Executive Directors (Director Commercial, Operations & Maintenance; Finance; Planning & Development; and HR, Ethics & Total Quality Management) are recommended on the Board thus making 5 EDs leading to (5/ 11) or 45 % executive director / top management team representation on Board.
  - The company is recommended to have separate Chairman and CEO

- NTPC
  - The company has 4 independent directors in a total Board of 13 directors leading to (4/ 13) or 31 % independent director representation on Board.
  - 6 Executive Directors (Director Technical, Projects, Commercial, Finance, Human Resources, Operation) including CMD are represented on the Board thus making 7 EDs leading to (7/ 13) or 54 % executive director / top management team representation on Board.
  - The company has a single Chairman and Managing Director

Table II-3-3 Comparisons of board composition at company in Bangladesh

Company			NWPGCL	DESCO	PGCB	WZPDC	APSCL	EGCB	SZPDC*	CZPDC*
Total Numbers of the Board Member			9	8	11	11	11	11	9	11
Board Members	Non-Executive Directors	Chairman	1	1	1	1	1	1	1	1
		Nominated Directors	3	1 Govt. / BPDB nominated	4 Govt / BPDB nominated	4 Govt / BPDB nominated	5 Govt / BPDB nominated	4 Govt / BPDB nominated	2 Govt./ nominated	3 Govt./ nominated
		Independent Directors	4	3	3	3	3	3	2	2
	Executive Directors	Managing Director (MD/CEO)	1	1	1	1	1	1	1	1
		Director Finance (CFO)		1	1	1	1	1	1	1
		Director Technical (COO)		1	1	1		1	1	1
		Director P&D (CPDO)							1	1
		Director Human Capital (CHCO)								1
Profile of Independent Directors			5	3 Chamber of Commerce (1) University of Engineering & Technology (1) Institute of Chartered Accountants of Bangladesh (1)	3 Chamber of Commerce (1) University of Engineering & Technology (1) Institute of Chartered Accountants of Bangladesh (1)	3 Consumer interest (1) Institute of Engineers, Khulna (1) City Corporation Khulna (1)	3 ICMAB (1) Institute of Engineers (1) FBCCI (1)	3 Professor Electrical & Electronics Department BUET (1) Accountant Rahman & Rahman Haque (1) Chairman Dhaka Chamber of Commerce (1)	2	2

3.5 Establishment of Fundamental Framework in Corporate Governance System

Based on the as-is findings by corporatisation review and the study of the various recommendations of the Consultant in various Corporatisation Reports and soliciting feedback from the NWPGCL management team and key BPDB counterparts, we have firmed up our recommendations for the Corporate Model for NWPGCL.

3.5.1 Board Composition and Governance Framework

NWPGCL was established in August 2007 in line with Company Act 1994 of Bangladesh. General data for NWPGCL as follows:

(1) General data

- Establishment: August 28, 2007
- Governing law: Company act 1994
- Authorized capital: 100 million Tk
- Paid capital: 10,000 Tk
- Articles of incorporations: determined when company is established
- Founders: BPDB represented by Chairman: 93 shares
  Member of Finance, BPDB: 1 share
  Member Generation, BPDB: 1 share
  Member P&D, BPDB, 1 shares
  Retd C.E., BPDB: 1 share
  Retd. Director (SE), BPDB: 1 share
  Business: 1 share
  Engg. Consultancy: 1 shares, total 100 shares
- Chairman: The ex-chairman of BPDB was in charge of the NWPGCL chairman, but according to governmental regulation, ministry of MPEMR and BPDB are not able to become chairman of the subsidiary companies.
- General shareholders meetings: It is required to hold the 1st general shareholder meeting within 18 months after incorporation procedures. Holding a meeting once a year is required henceforth.

(2) Composition of board of directors

An article of incorporations for NWPGCL stipulates that the composition of the board of directors shall consist of nine members. The ADB loan conditions for Sustainable Power Sector Development Program, signed on June 2007 places the following conditions regarding the composition of the board of directors of NWPGCL;

- At least 50% or more of the board members shall not be a former government employee who has retired within 3 years.
- At least 25%, or more of the board members shall be a representative from the consumer or professional experts.
- Recruiting important management positions of the company shall be made according to a competition process.

(3) Recruitment activity for new management team

Currently, the office of NWPGCL is located at the BPDB office where Mr. Alam is acting Managing Director and has an additional post as a BPDB officer. 2 Officers of Managing director and company secretary have been assigned as NWPGCL officers and their personnel expenses are borne by BPDB. In July 2008, advertisements in the newspaper were placed to recruit for the 4 positions of the new management team; Managing Director, Director Finance, Director Technical, and Company Secretary. It is expected that new management team will be appointed by September 2008. (completed as of November 2008)

(4) Composition balance of internal and external board members

Referring to the Comparator Table 3.3, the profile of independent directors in EGCB, APSCL, and newly corporatised entities range from 3 to 7 and that of the nominated directors range from 3 to 6. As per the profile, NWPGCL has a good mix of nominated (5) and independent Directors (4) which if implemented successfully would lead to accurate management judgment, prompt management decision-making and independent functioning of the organization.

3.5.2 Principle of Segregating Execution and Supervisory Functions of Management

Separating the execution and supervisory functions of management creates independent management, and promoting decision-making and accelerating operating activities become increasingly important. Usually, a board of directors consists of directors and non-executing directors. A non-executing director is a director who does not take charge of execution of day-to-day operations. Their main responsibility is to supervise the director's activities. The director is the only person who belongs to the board of directors, and has full responsibilities for the management activities of the company on a daily basis, giving instructions to employees. The corporate officers are not a member of the board of directors, but give appropriate instruction to employees as a head of each department, having responsibility for each operating activities under the director.

Moreover, the execution function of management and the ownership function of the company shall be clearly separated. At the early stage of corporatization, when the company is still small in scale, an owner of the company is a director of the management of the company, so the owner function of the company and execution function of management is done together. However, for seeking sustainable development of the company, which is one of the corporate visions, the owner of the company shall delegate all the administrative powers to an administrative professional. This is because the administrator is expected to have great knowledge and experiences.

The segregation aspect is also a key principle of Corporate Governance that has been laid out as per the Corporate Governance Code of Bangladesh 2004 issued by the BEI which is set out for reference below.

VI. Separation of Chairman and CEO

Principle: The positions of Chairman of the Board and CEO should be filled by different individuals since their functions are necessarily separate. A strong, independent chairman provides the appropriate counterbalance and check to the power of the Managing Director/ CEO

Source: Bangladesh Corporate Governance Code 2004

(1) Activation of internal control system

Introduction and reinforcement of internal control system is essential for the company. Management transparency shall be improved. Appropriate and accurate information for the person concerned, such as a stockholder, an employee, and consumers, shall be provided. Moreover, it is necessary to grasp an employee's activity, and to perform operations efficiently, prevent loss, prevent injustice or illegal acts, and accurately produce financial statement.

(2) Audit function from outside the company (a role of an external director's monitoring function)

An external director will have two functions; a role of an expert who provides the board of directors with accurate and appropriate advice for the company, and a role of an audit function to monitor director's activities. In particular, it is important to have an incentive system so that external directors can monitor management activity properly based on information provided by internal board members.

(3) Clarification of the role of board of directors, and strict observance of rules

The board of directors is an organization made up of individual board members of which installation is imposed by the Bangladesh company law. The board of directors represents the company and makes important decisions for the company. In particular, the point to notice is that the board's function is to discuss and make decisions regarding a large scale of management issues from a macro point of view. This includes selection of the board members and changes in capital and debt. The CEO or MD shall handle the operating management issues, not the board members. This is in line with the principle of the separation of corporate possession and management execution function so the board shall not take part in the decision-making process regarding operation management issues.

The resolution of fundamental board of directors is explained below.

- To select board members including the position of chairman
- To change capital, debt (capitalization of reserve, debenture issue, etc.)
- To determine an important investment plan (the injection of capital, and participation, requires a large amount of money)
- To transfer and dispose of important property, assets
- To establish a new company, etc.

(4) Establishment of the decision-making section regarding important operational management matters (operating-management committee)

When CEO or MD performs operating management, all the necessary judgments shall be discussed and made at the operating-management committee whose head is the CEO. This committee shall be held once a week, and members of the committee are composed of CEO, CFO, COO, CHCO, and two corporate secretaries, totaling 6 executive staff. Although the resolution of the committee is shown below, the CEO will make a final decision based on the discussion on the committee.

- To make management policy and operation plans
- To determine individual operating matters
- To determine the matter about comprehensive grasp of management
- To determine the important reporting matters

(5) Duties of the Board of Directors

In this section we outline our recommendations for the Board of Directors

- It is the responsibility of the Board to ensure that it has a balance of Executive and non-Executive directors (including independent non-Executive directors) such that external oversight is brought to the Board through independent directors and functional expertise through executive director representation on the board.
- The Board should ensure progressive refreshing of its members in accordance with the terms of the Memorandum and Articles of Association and be responsible for devising a formal, rigorous and transparent procedure for the appointment of new directors to the Board.
- All directors should receive induction on joining the Board and be obliged to regularly update and refresh their skills and knowledge in order to support company objectives. The Directors shall also attend a corporate governance orientation or training offered by a reputed institution or trainer
- The Board should submit to BPDB and key stakeholders, including the Multilateral Lending Agencies, a balanced and understandable assessment of the company's position and prospects on a timetable and format agreeable to these entities.
- The Board will ensure that it is supplied in a timely manner with information in a form and of a quality appropriate to enable it to discharge its duties in this regard. Progress against objectives will include performance measurement of high level Key Performance Indicators.
- The Board should undertake a formal and rigorous annual evaluation of its own performance and that of its committees and individual directors.
    - This review should also include reference to a Code of Conduct for all directors and staff, which will be prepared by the Executive for adoption by the Board.
    - The review should also report the findings of a committee, chaired by one of the external non-executive directors, covering matters of Corporate Governance.

- In the event that one or more Board members is found to be ineffective then that member should be replaced by one who is more able to provide a high value contribution.

- The Board should establish and maintain an effective system of internal control and audit to safeguard the company's assets and shareholder/stakeholder investments and interests.
- The Board should establish formal and transparent arrangements for financial reporting and maintain an appropriate relationship with the company's external auditors highlights of which will be reported in each three monthly review.
- It is recognized that a strength the external non-executive Board members should exercise in the company is to provide a role in monitoring and reporting the performance of the company for the benefit of the Government, the shareholder and stakeholders. Transparency, systems of internal control and the capabilities of the executive management are particularly important aspects of this responsibility. It is expected, therefore, that each committee's work would involve a high degree of challenge on the effectiveness of the executive and the Board
- The board should interact frequently with the management and employees and auditors (internal and external) for smooth and transparent operation of the company and ensure that the company complies with all statutory laws, rules, regulations and codes of corporate governance practices and maintains effective and meaningful communications with the existing shareholders, potential shareholders, other stakeholders and statutory authorities.
- The board should involve in only framing and developing strategies and policies (not the day to day management activities of the company), approving business plan, setting performance target for the management and monitoring and evaluating such performance of the management through established and transparent criteria. The board should also set its own performance criteria and target.
- The board should involve in recruiting the top management officials including managing director, other executive directors, chief financial officer, head of internal audit and company secretary and define their respective duties, roles and responsibilities in the company.
- The board should review and monitor risk management system and internal control systems to enable decision making quick and faster and maintain disclosure of information and reports and the accuracy of such information and reports including the financial statements and annual reports.

The board should delegate financial matters to a certain level to the managing director and other management officials according to their job responsibility in the company with a view to managing the company functions efficiently and effectively

(6) Introduction of fixed term of employment system for the board members

In order to clarify a director's responsibility for management, the term of office, or fixed term of employment should be introduced. Fixed term of one year is appropriate, and the reward and penalty system in line with objectivity of remuneration, and transparency, shall be introduced by reflecting performance basis.

(7) Membership criteria

In this section, we set out the membership criteria of the Board Members.

- Every member should have minimum qualification shares to be a director of the board.
- The board will decide the minimum qualification shares.
- Chairman of the board and the Chief Executing Officer or the Managing Director of the company should be separate person and there should not be any relationship between them except the relationship in this connection.
- Directors who have not attended at least 60% of the board meetings during the last year should not be eligible next time for re-election to the board.
- Directors from shareholders will be selected in the annual general meeting. Board shall seek nomination of shareholders' directors prior to the issuance of notice of annual general meeting, so that the notice to the shareholders may also contain the probable candidate list of future shareholders' directors.

- Shareholders should have an opportunity of at least 21 days to nominate board candidates before the notice of the annual general meeting.
- The board should release a list of required information that must be submitted with a director's nomination. The required information should, as a minimum, include qualifications, education, experience, current directorships, and any interest in the company.
- Candidates nominated by both the shareholders and the board, along with the required information on each candidate, should be put before the annual general meeting for election.
- A meeting to reach a quorum, at least 60% of the non-executive and independent directors must be present in the meeting.
- Retirement of directors should be in such time sequence so that the board should always have a good institutional memory of old and new members. A non-executive and independent director should not hold directorship more than 24 months.

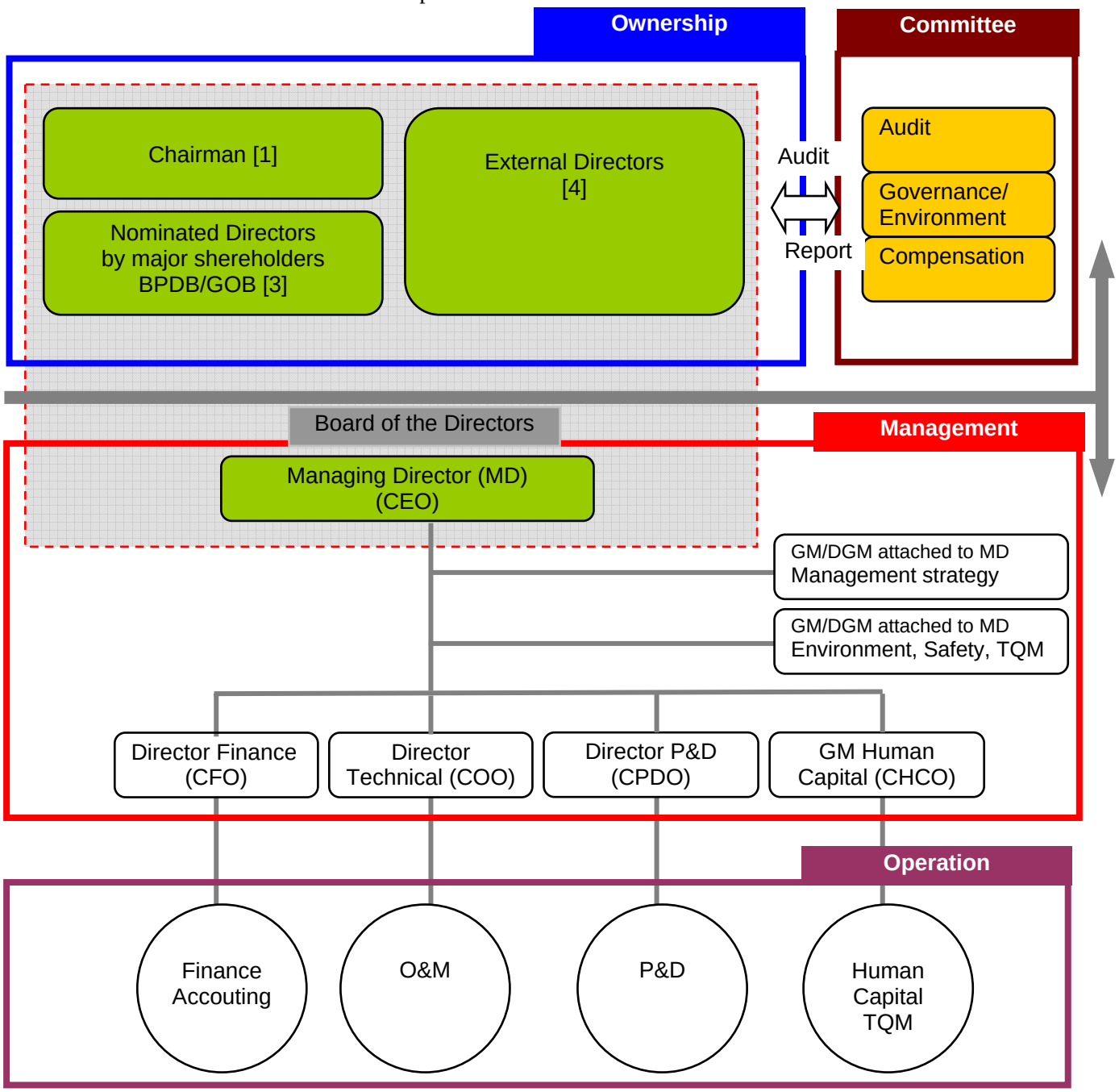


Figure II-3-2 Recommendation of corporate governance system based on the Principle of Separating the Execution and Supervisory Functions of Management

3.5.3 Reorganization to Clarify Management Responsibilities

In order to successfully implement corporatization, a large portion of authority of power from the headquarters to the power station shall be delegated, and when the managerial resources are categorized into three components: human, operational and financial, the organizational structure as indicated in Figure II-3.3 shall be established in order to clarify managerial responsibilities for each activity of human, operational and financial issues. Therefore, the creation and utilization of chief officer positions, such as of CEO, CFO, COO, CHCO is recommended, so that each chief shall take its responsibility for their each management activity with clear definitions.

(1) Capacity Building for Human Capital Management

Human capital is one of the most important management sources among the three components (human, structural (facilities), and financial). The key issue is for the personnel manager to have full responsibility for developing and maximizing the personnel capability. However, under the current BPDB power station, the position of Personnel Manager is a relatively low position, below that of the technical and finance directors. Therefore, capacity building for human capital management is recommended via the creation of the Chief Human Capital Officer (CHCO) position as a core leader, by introducing a human capital management system (Performance evaluation system, and Human capital development).

(2) Capacity Building for Financial Management

Due to the transition to the corporatization, the power station shall transform to Profit Center to produce profits. When the power stations become Strategic Business Unit (SBU), the plant shall implement not only cost and earning management, but also capital control, since the plant will need to evaluate financial feasibility of investment activity, including rehabilitation and repairs, independently. Therefore, in order to cope with these environmental changes, capacity building for financial management is recommended via the creation of the Chief Financial Officer (CFO) position as a core leader.

(3) Capacity Building for Information Management

The individual division manages information and data regarding the human, structural (facilities), and financial resources, so that no specific division comprehensively manages such dispersed data in a cross-sectoral manner. In addition, since only a few personal computers exist at the plant, most of the data is managed via paper-based documentation. Therefore, such dispersed data is not well utilized for management activities. The company secretary should have full responsibility to strengthen information management capability. In order to clarify responsibility for Information Management, the position of Chief Information Officer (CIO) should also be created. Therefore, the company secretary will have the ability to gather, analyze, and compile managerial information and data regarding human, structural (facilities), and financial resources in a comprehensive manner via a database. The company secretary should also be responsible for providing such information promptly and adequately to not only the directors, but to other departments upon request.

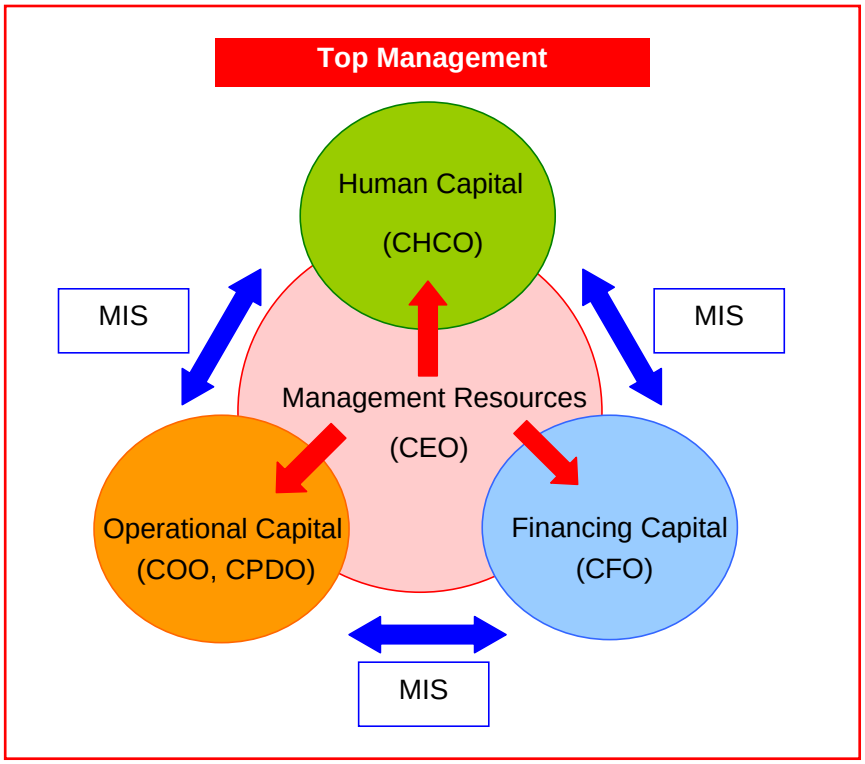


Figure II-3-3 Management Resources

3.5.4 Reinforcement of Audit Function

It is important to understand well the functions of the supervisory function centering on the chairman, and the management execution function centering on the managing director, and to implement the separation of these functions into practice.
Moreover, for reinforcement of the supervisory function of the company, there is the board selection committee, which appoints the board members, and the benefit committee, which discusses remuneration, and the audit committee which judges achievements of operating activities from a neutral position. In addition, each committee shall be made of three or more persons, and more than half the members shall be from the external directors and experienced or academic experts in order to secure management transparency.

The Board should in the first instance ensure that its main activities are subject to transparent review establish four standing Committees. The timing of the establishment and composition of the Committees will be determined by the Board to meet the onset of the major construction programme. It is recommended that the four Committees should each be chaired and attended by the external non-executive directors and that other members and senior management be invited from time to time according to the need including, Audi, Governance, and HR and Remuneration Committees.

(1) Audit Committee
A qualified and independent audit committee shall be set up, subject to the following:
(a) Composition of Audit Committee

- The audit committee shall have minimum three directors as members. Two thirds of the members of audit committee shall be independent directors.
- All members of audit committee shall be financially literate and at least one member shall have accounting or related financial management expertise.
- The Chairman of the Audit Committee shall be an independent director;
- The Chairman of the Audit Committee shall be present at Annual General Meeting to answer shareholder queries;

- The audit committee may invite such of the executives, as it considers appropriate (and particularly the head of the finance function) to be present at the meetings of the committee, but on occasions it may also meet without the presence of any executives of the company. The finance director, head of internal audit and a representative of the statutory auditor may be present as invitees for the meetings of the audit committee;
- The Company Secretary shall act as the secretary to the committee

(b) Meetings of Audit Committee

The audit committee should meet at least four times in a year and not more than four months shall elapse between two meetings. The quorum shall be either two members or one third of the members of the audit committee whichever is greater, but there should be a minimum of two independent members present.

(c) Powers of Audit Committee

The audit committee shall have powers, which should include the following:

- To investigate any activity within its terms of reference.
- To seek information from any employee.
- To obtain outside legal or other professional advice.
- To secure attendance of outsiders with relevant expertise, if it considers necessary.

(d) The role of the audit committee

The role of the audit committee shall include the following:

- Oversight of the company's financial reporting process and the disclosure of its financial information to ensure that the financial statement is correct, sufficient and credible.
- Recommending to the Board, the appointment, re-appointment and, if required, the replacement or removal of the statutory auditor and the fixation of audit fees.
- Approval of payment to statutory auditors for any other services rendered by the statutory auditors.
- Reviewing, with the management, the annual financial statements before submission to the board for approval, with particular reference to:
    - Matters required being included in the Director's Responsibility Statement to be included in the Board's report in terms of clause (2AA) of section 217 of the Companies Act, 1956.
    - Changes, if any, in accounting policies and practices and reasons for the same
    - Major accounting entries involving estimates based on the exercise of judgment by management
    - Significant adjustments made in the financial statements arising out of audit findings
    - Compliance with listing and other legal requirements relating to financial statements
    - Disclosure of any related party transactions
    - Qualifications in the draft audit report.
- Reviewing, with the management, the quarterly financial statements before submission to the board for approval
- Reviewing, with the management, performance of statutory and internal auditors, adequacy of the internal control systems.
- Reviewing the adequacy of internal audit function, if any, including the structure of the internal audit department, staffing and seniority of the official heading the department, reporting structure coverage and frequency of internal audit.
- Discussion with internal auditors any significant findings and follow up there on.
- Reviewing the findings of any internal investigations by the internal auditors into matters where there is suspected fraud or irregularity or a failure of internal control systems of a material nature and reporting the matter to the board.
- Discussion with statutory auditors before the audit commences, about the nature and scope of audit as well as post-audit discussion to ascertain any area of concern.
- To look into the reasons for substantial defaults in the payment to the depositors, debenture holders, shareholders (in case of non-payment of declared dividends) and creditors.

- Carrying out any other function as is mentioned in the terms of reference of the Audit Committee.

(e) Review of information by Audit Committee

The Audit Committee shall mandatory review the following information:

- Management discussion and analysis of financial condition and results of operations;
- Statement of significant related party transactions (as defined by the audit committee), submitted by management;
- Management letters / letters of internal control weaknesses issued by the statutory auditors;
- Internal audit reports relating to internal control weaknesses; and
- The appointment, removal and terms of remuneration of the Chief internal auditor shall be subject to review by the Audit Committee.

(2) Governance and Environment Committee

(a) Overall Responsibilities

The Governance and Environment Committee shall:

- Develop and recommend Governance Policies to the Board of Directors;
- Recommend Director qualifications criteria and identify individuals qualified to become Board members;
- Oversee the Board recruitment process, including the retention and oversight of search firms;
- Recommend to the Board Director candidates for election and re-election to the Board of Directors and nominate the Chairman of the Board;
- Oversee management transition planning;
- Ensure that non-management Directors meet regularly in executive session;
- Oversee the annual evaluation of the Board and senior management team; and
- Recommend Director Compensation to the full Board of Directors.
- Review the compliance with environmental norms at the power station
- Recommend to the Board of Directors strengthening of environmental management systems and monitoring frequencies if any requirement.
- To Seek advice from the independent technical experts on environmental aspects.

(b) Structure and Membership

- Number. The Governance Committee shall consist of such number of Directors as the Board of Directors shall from time to time determine.
- Independence. Each member of the Governance Committee shall be an “independent director” as defined by such rules.
- Chair. Unless the Board elects a Chair of the Governance Committee, the Committee shall elect a Chair by majority vote.
- Compensation. The compensation of Governance Committee members shall be determined by the Board of Directors.
- Selection and Removal. Members of the Governance Committee shall be appointed by the Board. The Board of Directors may remove members of the Governance Committee from such Committee, with or without cause.

(c) Authority and Specific Responsibilities

- Governance Policies of the Board of Directors:
  - The Governance Committee shall develop and recommend to the Board of Directors a set of Governance Policies applicable to the Company.
  - The Committee shall, from time to time as it deems appropriate, but at least annually, review and reassess the adequacy of such Governance Policies and recommend any proposed changes to the Board of Directors for approval.
- Board and Committee Membership
  - Selection of Director Nominees. Except where the Company is legally required by contract or otherwise to provide third parties with the right to nominate Directors, the Governance Committee shall be responsible for

        - (i) identifying individuals qualified to become Board members, consistent with criteria approved by the Board, and
        - (ii) recommending to the Board the nominees for election as Directors at any meeting of stockholders and the persons to be elected by the Board of Directors to fill any vacancies on the Board of Directors. In making such recommendations, the Committee shall consider candidates proposed by stockholders.
    - The Committee shall review and evaluate information available to it regarding candidates proposed by stockholders and shall apply the same criteria, and shall follow substantially the same process in considering them, as it does in considering other candidates.
    - The Governance Committee shall also nominate the Chairman of the Board for election by a majority of the Board of Directors.
- Criteria for Selecting Directors.
    - The Board's criteria for selecting Directors shall be set forth in the Governance Policies of the Board of Directors. The Governance Committee shall use such criteria and the principles set forth in such Policies to guide the Director Selection process.
    - The Committee shall be responsible for reviewing with the Board, on an annual basis, the requisite skills and criteria for new Board members as well as the composition of the Board of Directors as a whole.
    - The Committee may adopt, and periodically review and revise as appropriate, procedures regarding director candidates proposed by stockholders.
- Search Firms.
    - The Governance Committee shall have the sole authority to retain and terminate any search firm to be used to identify Director Nominees, including sole authority to approve the search firm's fees and other retention terms.
    - The Committee is empowered, without further action by the Board of Directors, to cause the Company to pay the compensation of any search firm engaged by the Governance Committee.
- Selection of Committee Members. The Governance Committee may recommend to the Board the Directors the members to be appointed to each committee of the Board of Directors.
- Succession Planning Succession of Senior Executives.
    - The Governance Committee shall present an annual report to the Board of Directors on succession planning, which shall include transitional Board leadership in the event of an unplanned vacancy.
    - The Committee shall identify, and periodically review and reassess, the qualities and characteristics necessary for an effective Chief Executive Officer, Chief Financial Officer, and other executive officer positions of the Company.
    - With these principles in mind, the Committee shall periodically monitor and review the development and progression of potential internal candidates against these standards.
- Evaluation of the Board and Management; Board Compensation
    - The Governance Committee Chairman shall be responsible for overseeing an annual self-evaluation of the Board of Directors and each Board committee to determine whether the Board and its committees are functioning effectively.
    - The Governance Committee Chairman, together with the Chairman of the Board and Chief Executive Officer, shall determine the nature of the evaluation.
    - The Governance Committee Chairman will supervise the conduct of the evaluation and convey his or her assessment to the Chairman of the Board and Chief Executive Officer. The Governance Committee Chairman shall provide a committee-specific assessment to the Chairman of each Board committee.
- Evaluation of Senior Executives.
    - The Governance Committee shall be responsible for overseeing an evaluation of the Company's senior executives. In conjunction with the Board's Compensation Committee and, in the case of the evaluation of the senior financial management, the Board's Audit Committee, the Governance Committee shall
        - determine the nature and frequency of the evaluation,
        - determine the persons subject to the evaluation,

- supervise the conduct of the evaluation and
- prepare assessments of the performance of the Company's senior executives, to be discussed with the Chairman of the Board, the Chief Executive Officer, and the Board periodically.

- Board Compensation. The Governance Committee shall be responsible for assessing Director Compensation plans at least annually and making recommendations to the Board with respect to Director Compensation, including director compensation guidelines.
- Environmental Management
  - The committee shall from time to time review the environmental performance of the stations and the adequacy of the environemental monitoring systems and recommend to the Board any changes if necessary in consultation with technical experts.
  - The committee shall apprise the Board of the frequency of environmental performance monitoring.
  - The committee shall recommend to the Board for a communication plan regarding environmental compliance both to the local stakeholders and to shareholders.

(d) Procedures and Administration

- Meetings. The Governance Committee shall meet as often as it deems necessary in order to perform its responsibilities. The Committee may also act by unanimous written consent in lieu of a meeting. The Committee shall keep such records of its meetings as it shall deem appropriate.
- Subcommittees. The Governance Committee may form and delegate authority to one or more subcommittees (including a subcommittee consisting of a single member) as it deems appropriate from time to time under the circumstances.
- Reports to the Board. The Governance Committee shall report regularly to the Board of Directors.
- Charter. The Governance Committee shall periodically review and reassess the adequacy of this Charter and recommend any proposed changes to the Board of Directors for approval.
- Independent Advisors. The Governance Committee shall have the authority to engage such independent legal and other advisors as it deems necessary or appropriate to carry out its responsibilities. Such independent advisors may be the regular advisors to the Company. The Committee is empowered, without further action by the Board of Directors, to cause the Company to pay the reasonable compensation of such advisors as established by the Committee.
- Investigations. The Governance Committee shall have the authority to conduct or authorize investigations into any matters within the scope of its responsibilities as it shall deem appropriate, including the authority to request any officer, employee or advisor of the Company to meet with the Governance Committee or any advisors engaged by the Governance Committee.
- Director Orientation and Continuing Education. The Governance Committee shall ensure that management conducts an appropriate orientation program for new directors and that each director receives appropriate continuing education.
- Annual Self-Evaluation. At least annually, the Governance Committee shall evaluate its performance. The Chairman of the Governance Committee, together with the Chairman of the Board, shall determine the form and nature of the annual self-evaluation

(3) Compensation Committee

(a) Overall Responsibility

The purpose of the Compensation and Personnel Committee is to discharge the responsibilities of the Board of Directors relating to compensation of the Company's executive officers and to review Company strategy for recruiting, retention and employee development.

(b) Structure and Membership

- Number. The Compensation and Personnel Committee shall consist of at least two members of the Board of Directors.

- Independence. Each member of the Compensation and Personnel Committee shall be an "independent director".
- Chair. Unless the Board of Directors elects a Chair of the Compensation and Personnel Committee, the Compensation and Personnel Committee shall elect a Chair by majority vote.
- Compensation. The compensation of Compensation and Personnel Committee members shall be as determined by the Board of Directors.
- Selection and Removal. Members of the Compensation and Personnel Committee shall be appointed by the Board of Directors. The Board of Directors may remove members of the Compensation and Personnel Committee from such committee, with or without cause.

(c) Authority and Responsibilities

- General
  - The Compensation and Personnel Committee shall discharge its responsibilities, and shall assess the information provided by the Company's management, in accordance with its business judgment.
- Compensation and Personnel Matters
  - CEO Compensation. The Compensation and Personnel Committee shall, in conjunction with the Governance Committee, annually review and approve corporate goals and objectives relevant to the compensation of the Company's Chief Executive Officer (the "CEO"), evaluate the CEO's performance in light of those goals and objectives, and, either as a committee or together with the other independent directors (as directed from time to time by the Board of Directors), determine and approve the CEO's compensation level based on this evaluation.
  - Board Chair Compensation. The Compensation and Personnel Committee shall annually review and approve the compensation of the Chairman of the Board.
  - Executive Officer Compensation. The Compensation and Personnel Committee shall periodically review and approve, or (with respect to compensation of executive officers other than the CEO) make recommendations to the Board of Directors with respect to, executive officer compensation, including salary and bonus levels; deferred compensation; executive perquisites; equity compensation (including awards to induce employment); severance arrangements; change-in-control benefits and other forms of executive officer compensation.
- Evaluation of Senior Executives. The Compensation and Personnel Committee shall coordinate with the Governance Committee the evaluation of the Company's senior executives.
- Plan Recommendations and Approvals.
  - The Compensation and Personnel Committee shall periodically review and make recommendations to the Board of Directors with respect to incentive-compensation plans and equity-based plans.
  - In addition to any recommendation provided by the Compensation and Personnel Committee to the full Board of Directors, the Compensation and Personnel Committee, or a majority of the Company's independent directors, shall approve all equity compensation grants, plans and amendments that are not subject to shareholder approval.
- Incentive Plan Administration.
  - The Compensation and Personnel Committee shall exercise all rights, authority and functions of the Board of Directors under all of the Company's stock option, stock incentive, employee stock purchase and other equity-based plans, including without limitation, the authority to interpret the terms thereof, to grant options thereunder and to make stock awards thereunder; provided, however, that, except as otherwise expressly authorized to do so by a plan or resolution of the Board of Directors, the Compensation and Personnel Committee shall not be authorized to amend any such plan.
  - To the extent permitted by applicable law and the provisions of a given equity-based plan, and consistent with the requirements of applicable law and such equity-based plan, the Compensation and Personnel Committee may delegate to one or more executive officers of the Company the power to grant options or other stock awards pursuant to such

equity-based plan to employees or officers of the Company or any subsidiary of the Company who are not directors or executive officers of the Company.

- Compensation and Personnel Committee Report on Executive Compensation. The Compensation and Personnel Committee shall annually prepare for inclusion in the annual report in requisite form.
- Recruiting, Retention and Employee Development. The Compensation and Personnel Committee shall periodically review management's strategy for recruiting, retention and employee development.
- Additional Powers. The Compensation and Personnel Committee shall have such other duties as may be delegated from time to time by the Board of Directors.

(d) Procedures and Administration

- Meetings. The Compensation and Personnel Committee shall meet as often as it deems necessary in order to perform its responsibilities. The Compensation and Personnel Committee may also act by unanimous written consent in lieu of a meeting. The Compensation and Personnel Committee shall keep such records of its meetings as it shall deem appropriate.
- Subcommittees. The Compensation and Personnel Committee may form and delegate authority to one or more subcommittees as it deems appropriate from time to time under the circumstances.
- Reports to Board. The Compensation and Personnel Committee shall report regularly to the Board of Directors.
- Charter. The Compensation and Personnel Committee shall periodically review and reassess the adequacy of this Charter and recommend any proposed changes to the Board of Directors for approval.
- Consulting Arrangements. The Compensation and Personnel Committee shall have the sole authority to retain and terminate any compensation consultant to be used to assist in the evaluation of executive officer compensation and shall have sole authority to approve the consultant's fees and other retention terms. The Compensation and Personnel Committee shall also have authority to commission compensation surveys or studies as the need arises. The Compensation and Personnel Committee is empowered, without further action by the Board of Directors, to cause the Company to pay the compensation of such consultants as established by the Compensation and Personnel Committee.
- Independent Advisors. The Compensation and Personnel Committee shall have the authority, without further action by the Board of Directors, to engage such independent legal, accounting and other advisors as it deems necessary or appropriate to carry out its responsibilities. Such independent advisors may be the regular advisors to the Company. The Compensation and Personnel Committee is empowered, without further action by the Board of Directors, to cause the Company to pay the compensation of such advisors as established by the Compensation and Personnel Committee.
- Investigations. The Compensation and Personnel Committee shall have the authority to conduct or authorize investigations into any matters within the scope of its responsibilities as it shall deem appropriate, including the authority to request any officer, employee or advisor of the Company to meet with the Compensation and Personnel Committee or any advisors engaged by the Compensation and Personnel Committee.
- Annual Self-Evaluation. At least annually, the Compensation and Personnel Committee shall evaluate its performance. The Chairman of the Compensation and Personnel Committee, together with the Chairman of the Board, shall determine the form and nature of the annual self-evaluation.

3.5.5 Visualization of Management and Operation System

(1) Introduce various rules, regulations, documents, manuals and tools for the better management

In order to manage and control the activities towards the fulfillments of the goals of the organization, NWPGCL should introduce various rules, regulations, documents, manuals and tools for the better management of the company. These include General power of attorney, delegation of financial authority to directors and other management officials up to managers, Service rules, Accounting and Auditing manual along with policies like Procurement, Training TQM policy, Safety and O&M manuals and Management Information System (MIS) to cover reports on all aspects of business operations and planning.

(2) Preparation of shareholders' handbook

The company should prepare a shareholders' handbook, which must highlight the roles, responsibilities and rights of the shareholders in respect of participation in annual general meeting, voting rights, procedures, description of various classes of shares and the description of organizing the Annual General Meeting (AGM) and shareholder's role therein. The preparation of shareholder's handbook is in compliance with corporate governance code 2004.

(3) Preparation of Directors' Report to Shareholders

Along side the Annual Report, NWPGCL also needs to ensure incorporation of the following additional statements in the Directors' Report prepared under section 184 of the Companies Act, 1994 viz. relating to maintenance of proper books of accounts, application of appropriate accounting policies, soundness of internal controls, reaffirming the company's ability to continue as a going concern and explanations for any significant deviations in operating results vis-à-vis last year's., reasons for not issuing dividend, significant investment plans and shareholding patterns..

(4) Issue of Annual Report

The company should prepare an Annual report periodically including the contents of Directors' Report to Shareholders in terms of sending corporate activities to the public by both paper base and via Internet.

I. Audited Financial Statements including:
   a. Balance Sheet
   b. Profit and Loss Accounts (Income Statement)
   c. Cashflow Statement

II. Auditors' Report, including fees paid to the audit firm for audit and non-audit work.

III. Annual Directors' Report should include the following items presented in a narrative format:
   a. Directors' information
   b. Ownership Information
   c. Company Information
   d. Compliance
   e. Financial and Accounting
   f. Corporate Governance
      i. Corporate Governance Statement which explains compliance and/or non-compliance with the Code of Corporate Governance.
      ii. Disclosure as to how a shareholder may receive a Shareholders' Handbook or other source of information explaining the rights of shareholders and how to exercise those rights.

3.5.6 Transfer of the project

New Top Management Team of NWPGCL has been established in November 2008, and already started functioning. Hence, to avoid duplicacy in the management, the 360 MW CCPP project should be transferred from BPDB to the management of the NWPGCL without any further delay.
The transfer of the project requires the transfer of full authority for execution and implementation of the Bhermara Power Project to NWPGCL.

3.5.7 Transfer of the existing BPDB P/S

The following key issues should be considered/solved regarding taking over of the existing BPDB power stations into NWPGCL. NWPGCL TMT recognizes the importance of the issues and states its position that;

(1) For the items controllable to NWPGCL
NWPGCL has already started preparation and undertaken to complete the following items by itself:

- Organizational Structure,
- Sarary and Compensation Package,
- Employment Terms and Conditions,
- Job Descriptions, Service Rules, and
- Delegation of Power.

(2) For the items un-controllable to NWPGCL
NWPGCL shall start negotiation with BPDB and relevant entities as soon as possible to solve the issues in order to implement the transfer of existing plants as planned.

- Vender's Agreement with BPDB,
- Power Purchase Agreement with BPDB,
- Fuel Supply Agreement with BPDB and fuel company, and
- Settlement of Retirement Benefits at BPDB in favor of the retirees from BPDB who will be joining NWPGCL.

Chapter 4. Human Capital Management

4.1 Approaches to Realizing the Corporate Visions

In order to successfully realize the corporate vision of attaining the sustainable development, this chapter proposes the long-term human capital development in the field of the Human capital management.

Corporate Visions: Sustainable development
- Long-term human capital development

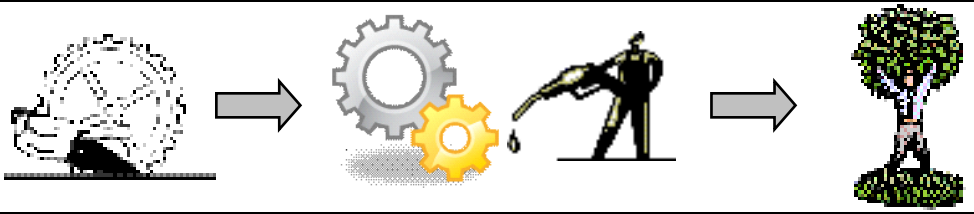
4.2 Directivity of Human Capital Management

4.2.1 Basic Concept of Human Capital Management

As indicated in the chart below, tracing back the relationship between manpower and company (management) within developed countries, the company hiring the manpower had superiority at first stage and the manpower was employed by the company, was subject to the order of the company and was positioned as mere labor power working within organization. After that, the manpower began to gain power and to be called as the “human resource”, and a new perspective has been developed by focusing on ability of individuals and on efficient utilization of the human resource, considering the manpower not merely as “human power” but as “fuel = human resource” which is infused with “company=machine/engine”. However, the resource is a concept, which is based on the assumption that it will be consumed during a long-term period and will be depreciated year by year, and the focus is on the efficient use of it at certain period of time; there was not so much discussion on the development of such human resource. In the next level of discussion, the company has also started to recognize in an economical and financial way of thinking that the human resource is its capital (asset) and it should gradually increase the value and return (output) by proper investment; in another words, the company has changed its attitude and started to consider that the company should respect the human resource as the asset and that it is the responsibility of management to increase the value of human resource.

For work-ready human resource which has high performance and adaptable working ability, the power balance between the company and human resource is reversely working and it is now considered that human resource chooses the company. Therefore, the company must be more attractive in order to invite excellent human resources and, at the same time, although the company strives to maximize the existing human asset, it is still required to narrow down the minimum necessary human asset through the evaluation of value including potential value and to pay higher salary to the human resource with high performance; it is now necessary to make a shift to the salary system based on performance.

Table II-4-1 Concept of human management (stage-wise)

Stage 1	Stage 2	Stage 3
		
Human Power	Human Resources	Human Capital

4.2.2 Direction in Human Capital Management which should be Aimed for by NWPGCL

We have evaluated the level of human resource management within other precedent companies in Bangladesh from two points of view: (i) long term human capital development and (ii) incentive system (relationship between the evaluation of performance and salary). The result is as shown below. In the BPDB P/S, there are training center and several education programs and necessary training is provided in order to achieve short-term targets, but there is no individual human capital development plan based on a long-term standpoint and no systematic performance evaluation and incentive system. The IPP P/S has introduced salary system based on performance and the incentive system has been established for almost every staff. However, if considered from viewpoint of human capital development, the IPP P/S depends on employment of work-ready human resource and does not perform internal human capital development; on the other hand the IPP P/S maintains standard of salary, which is significantly high, compared to the BPDB. The Ashuganj Power Station Company Limited has just introduced systematic human capital development plan and incentive system and there is not yet any actual achievement. The PGCB has no human capital development plan but it provides systematic human capital development because specialized technology, which is not required within other companies, is required for PGCB. The DESCO is outsourcing main works such as electricity distribution line works and places little emphasis on the development of internal human resource, but it has introduced systematic incentive system.

We believe that the direction of human resource management aimed for by NWPGCL should not place an emphasis on rather “quick-in-running-away business” like IPP which focuses on pursuit of efficient management and light-weight business operation with as little as possible asset; we believe that it should keep an eye on growth potential of human resource in order to secure independent business operation and to perform management as an organization having high management power and technology, which is based on local community.

Therefore, we believe that the human resource management of NWPGCL should be based on the position that, under the concept of human capital management, it must clarify the role and responsibility of each individual, evaluate the working performance through transparent and fair process, pay compensation properly according to the evaluation, see the human resource as an asset, invest to and maximize the asset and thus maximize the organization.

Table II-4-2 Transition of relationship between human resource and company

Company	Concept of human capital	Long-term human capital development plan	Incentive system
BPDB P/S	Stage 2: Human resource = resource	△ Implementation of training as needed basis. There is no particular development plan, etc.	× There is no systematic performance evaluation and incentive system.
IPP	Stage 3: Human resource = asset	× No long term human capital development is provided. On the other hand, the salary standard is high.	○ The salary system based on the performance is introduced for almost every staff.
Ashuganj P/S	Transitional stage from stage 2 to stage 3: Human resource = resource	△ Systematic human capital development is just introduced.	△ Systematic incentive system is just introduced.
PGCB	Stage 3: Human resource = asset	△ Implementation of training as needed basis. There is no particular development plan, etc.	○ Systematic human capital development is provided, because it needs specialized technology which is not required for other companies.

Company	Concept of human capital	Long-term human capital development plan	Incentive system
DESCO	Stage 3: Human resource = asset	× The main works such as electricity distribution line works are outsourced.	○ Introduction of organized incentive system.
Direction which should be aimed for by NWPGCL	Stage 3: Human resource = asset	◎ -Formulation of individual long term development plan -Implementation of feedback on performance evaluation -Implementation of human capital development based on performance evaluation	◎ -Clarification of role and responsibility of each individual -Introduction of fair and transparent system of performance evaluation -Establishment of salary system based on performance

4.2.3 The Job Description concerning the Career Development Program of the Head Office and Power Station

A career development program consists of four systems shown in the following figure. These 4 systems, such as what kind of talented person being secured, they being arranged to the right man in the right place, and what kind of standard evaluating capability and achievements, and proper remuneration based on the evaluation results, collaborate each other and enable to achieve and realize management visions.

Among these, as a head office function, from the viewpoint of a broad view, a personnel training plan and an employment plan are to be established, and arrangement of the personnel, performance evaluation, determination of remuneration, and implementation of training are performed as a power station function. All the data regarding human capital shall be kept and managed by the head office.

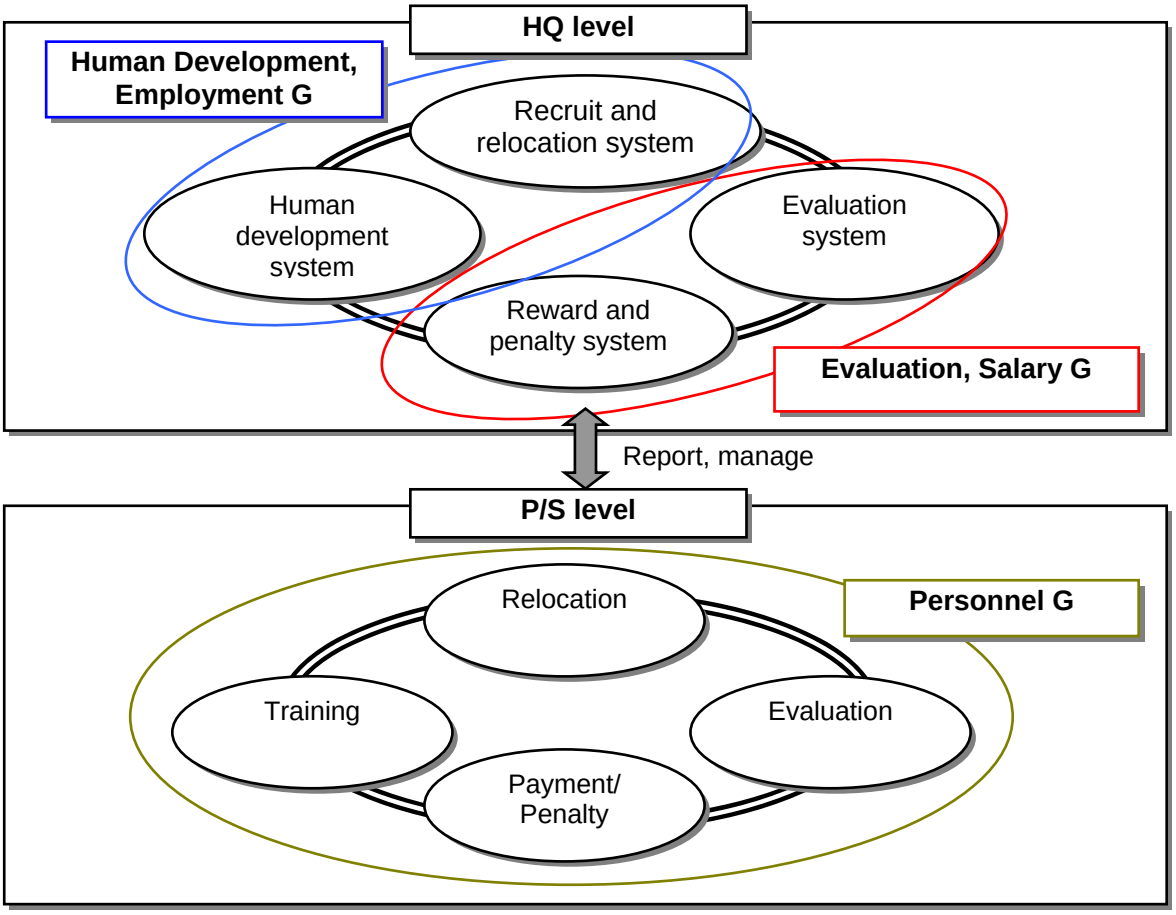


Figure II-4-1 Functions between HQ and P/S for HCM

4.3 Organizational Management System

4.3.1 General Concept of Organization Structure

Organization restructuring is a management tool to align the organization with the changing organization goals and strategy. Organization design involves activities that are undertaken to put in place an organization to achieve the Strategic Objectives identified in its Business Plan effectively and efficiently. Organization design is much more than structures alone, it also includes encompassing the roles and accountabilities of organization units and their people, the measurement of organization performance, the definition of how workgroups will operate together and the mechanisms required to support their effectiveness.

4.3.2 Corporate Level Structure

In the Corporatization review and the inception phase, we also examined the existing and approved Organogram of various utilities. At the onset it is important to mention that we have considered the context of Bheramara and though we noted that there is a rich repository of proposed organization structure by various consultants, we had chosen APSCL and EGCB as benchmark organizations for designing the corporate structure of NWPGCL as the context of the organizations is similar to that of Bheramara in the context of the Power Sector Reforms of Bangladesh. To compare it with a leading utility in the region, we have compared the structures with the corporate structure of NTPC – India's premier generation utility.
In the subsequent table we present a quick comparison of the organization structure at the corporate levels for the various utilities

In the subsequent table we present a quick comparison of the organization structure at the corporate levels for the various utilities.
The key areas of concern that have been identified as a part of the gap analysis are:

- Human Resources are not given adequate weightage through Director Level representation in the organization. Also in most of the Bangladesh generation utilities the functional head of human resource is reporting to the Director Finance
- Planning & Development also needs to be given higher focus given that for cases like EGCB the Director Technical's role will also get expanded to monitor running assets besides the projects under construction

Table II-4-3 Comparative Matrix of Corporate Organization Structure

Focus Areas	NTPC	APSCL	EGCB
Phase	Operational with Projects under Construction	Operational with no Projects under Construction	Primarily 2 Projects under Construction and 1 Operational Asset transferred recently
Technical	Headed by Director (Technical), who reports to CMD	Headed by Director (Technical) who reports to MD	Headed by Director (Technical) who reports to MD
Finance	Headed by Director (Finance), who reports to CMD	Headed by Director (Finance) who reports to MD	Headed by Director (Finance) who reports to MD
Operation	Headed by Director (Operation), who reports to CMD	A function under Director – Technical Headed by a General Manager-O&M	Siddhirganj 210 MW General Manager reports directly to MD and Director Technical
Human Capital (HC)	Headed by Director (HR), who reports to CMD	A function under Director-Finance	A function under direct control of MD

Focus Areas	NTPC	APSCL	EGCB
or, Human Resource(HR)		Headed by a Deputy General Manager- HR	Staffed by a Manager HR currently reporting to Director Finance
Procurement	A function under direct control of CMD Headed by an Executive Director- (Contracts & Material)	A function under Director- Finance Headed by DGM – Procurement & Stores	A function under Director - Technical Headed by an Manager – Procurement who reports to the DGM- P&D
Commercial	Headed by Director (Commercial), who reports to CMD	A function under Director- Finance Headed by a DM/AM/JAM- PF & Commercial Operation who reports to Manager- Finance, Budget and Budgetary Control	A function under Director – Technical Headed by an Manager – P&D/ TQM/ PPA/ Contract who reports to DGM- P&D

4.3.3 Recommendation of Corporate Level Structure

(1) Required workforce

As for the head office function, the management capitals are divided into three parts, [Human], [Operation] and [Finance], and the basic policy of it is to construct the incentive mechanism and the business management system so that each resource can be maximized.

In the following table, the organization of head office function and the number of required staff are examined. In Phase 0, a small number of member system which consists only of top management and key management personnel of O&M will be organized. During the construction in Phase 1, the number of staff will be increased gradually and, in Phase 2 in which Bheramara P/S starts the operation, 40-member system will be organized.

Table II-4-4 Workforce for NWPGCL HQ

Division	Position	Manager Class	Supporting Staff
Top Management Team (TMT)	MD, Chief Executive Officer	1	-
	Director Finance	1	-
	Director Technical	1	-
	Director P&D	1	-
	GM Human Capital	1	-
	GM/DGM attached to MD (MGT Strategy, Info MGT System)	1	1
	GM/DGM attached to MD (Safety, TQM, Environment)	1	2
	Company Secretary DGM	1	1
Internal Audit	Auditor	2	-
Human Capital Dept.	Employment & Develop., DGM	1	1
	Evaluation & salary DGM	1	1
Finance& Accounting Dept.	Finance DGM	1	3
	Accounts DGM	1	4

Division	Position	Manager Class	Supporting Staff
O&M Dept.	Operation & Maintenance, GM	1	3
	Procurement DGM	1	3
P&D Dept.	Planning & Design DGM	1	4
Total		17	23
		40	

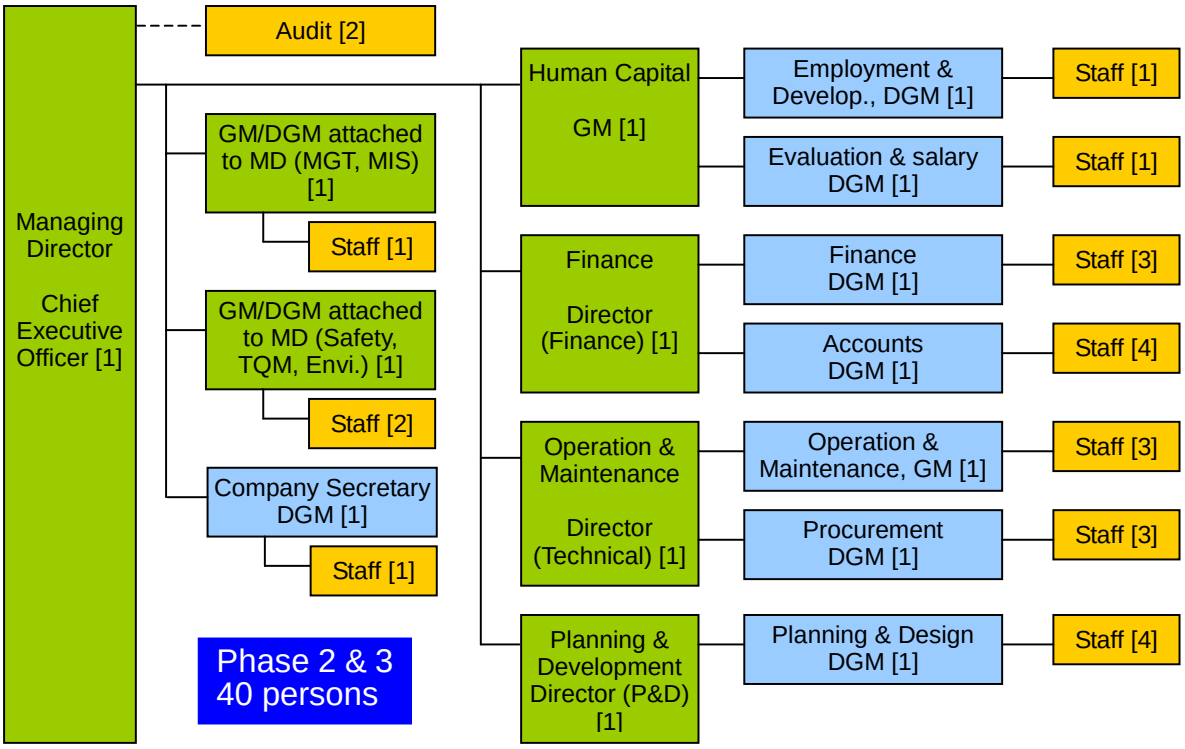


Figure II-4-2 Organogram for NWPGCL Headquarters

(2) Segregation of duties at power station

Segregation of duties at the power station is shown as below.

Table II-4-5 Segregation of duties for NWPGCL Headquarters

Dept	Section	Division of duties
Top Management Team (TMT)	MD (CEO)	Establishment of long-term business objective in power company Establishment of indicator of annual operation objective in power company Chairperson of management committee Chairperson of regular meeting of head of affiliated P/S Guidance and advice for head of affiliated P/S
	GM Human capital (CHCO) Director Finance (CFO) Director Technical (COO) Director P&D (CPDO)	Assistance of president Supervision of, advice for and inspection of a person in charge of each department Window for generalization of external business

Dept	Section	Division of duties
Secretary	Secretary (MGT, MIS)	Special mission of Top management Generalization of operation relating to each department Generalization of medium- and long- term plan of power station Editing bureau of annual report Inspector of operation of each department
	Secretary (Safety, TQM, Environment)	Guidance and advice of personal security in construction and quality control of construction relating to operation and maintenance of equipment Sub-Chairperson of investigative committee of large-scale outage accident Chairperson of safety and health committee Chairperson of environment management committee

4.3.4 Plant Level Structure

The JICA Study Team also benchmarked the organization structure of various utilities at the Power Station Level. The Team has given due consideration to the fact that Bheramara 360 MW is a CCGT station. Hence for the purpose of comparison, we selected a portfolio of plants.

- Chittagong Power Station
- Ghorasal Power Station
- Khulna Power Station- Unit I only
- Siddhirganj Power Station
- APSCL- CCPP only

In the following table we present a comparison of the organization chart at the plant level. The key observations with regards to the organization structure at the Plant level are,

- The Deputy director level positions shall be established to play an important role in gathering and analyzing environmental data through day-to-day operations such as setting the goals of power station and assessing and reviewing performance, as well as management strategy to support the plant head.
- Human resource should be more effectively represented through individual departments reporting to the plant head.

Table II-4-6 Comparative Matrix of Plant Organization Structure of Bangladesh Utilities

Focus Areas	Chittagong	Ghorasal	Khulna (Unit 1)	Siddhirganj	APSCL (CCPP)
Operation	▪ Headed by Manager- Operation who reports to CE ▪ Manager- Opn. Is assisted by DM-Opn., Chief Chemist and 5 Executive Engineers (Shift)	▪ Headed by two Managers- Operation who reports to CE ▪ Managers- Operation are assisted by three Deputy Managers ▪ There are five Executive Engineers for shift operation who reports to Manager- Operation	▪ Headed by Executive Engineer –Operation who reports to Manager, Unit 1. This Manager in turn reports to the CE ▪ There are 4 other Executive Engineers for shift operation who directly reports to Manager, Unit 1 ▪ The Executive Engineer- Opn. is assisted by 12 SDE/ AEs	▪ Headed by Manager- Operation who reports to CE ▪ Manager- Operation is assisted by a Deputy Manager and Ex. Engr- Oprn. and Ex. Engr.- Efficiency ▪ There are five Executive Engineers for shift operation who directly reports to Manager- Operation	▪ Headed by DGM-Operation/ Generation reporting to GM (O&M) ▪ For CCPP, headed by Manager who reports to DGM (Opn) ▪ Manager assisted by 4 Sr. Engr/ Engr
Maintenance	▪ Headed by Manager –Maintenance who reports to CE ▪ Manager- Maint. is assisted by six Executive Engineers for different functions	▪ Headed by two Managers- Maintenance who report to CE ▪ Managers- Maintenance are assisted by two Deputy Managers. There are also fifteen Executive Engineers who look after different sections and they all report to Manager- Maintenance	▪ Headed by 3 Executive Engineers, one each for Mechanical, Electrical and I&C divisions. ▪ All the Executive Engineers report to Manager, Unit 1 ▪ Each Executive Engineer is supported by 4/5 AEs.	▪ Headed by Manager- Maintenance who reports to CE ▪ Manager- Maintenance is assisted by a Deputy Manager ▪ There are eight Executive Engineers in charge of eight maintenance modules. All these Ex. Engrs directly report to the Manager- Maintenance	▪ Electrical & Mechanical Maintenance headed by 2 separate DGMs who report to GM (O&M) ▪ 2 dedicated Managers for CCPP, one each for Electrical and mechanical. ▪ Each manager assisted by 2 Sr. Engr/ Engr/ Jr. Eng
Finance	▪ Headed by Assistant Director Accounts who reports to CE ▪ Assistant Director Accounts is assisted by one Assistant Accountant	▪ Headed by Assistant Director- Accounts who reports to CE ▪ Assistant Director Accounts is assisted by two Assistant Accountants	▪ Headed by Assistant Accountant who reports to the Manager ▪ Assistant Accountant is assisted by SR Accounts Assistant	▪ Headed by AD- Accounts who reports to CE ▪ AD- Accounts is assisted by a SAA	▪ Headed by DGM- Finance who reports to Director (Fin) ▪ DGM- Finance is assisted by 2 mangers
HR/ Admin	▪ Headed by Deputy Director- Admin. who reports to CE	▪ Headed by Deputy Director- Admin. who reports to CE	▪ Headed by Assistant Director- Admin. who reports to Manager ▪ Assistant Director – Admin is assisted by three UD Assistant	▪ Headed by DD- Admin who reports to CE ▪ DD- Admin is assisted by one AD- Admin	▪ Headed by DGM-HR & Social services who reports to Dir- Finance ▪ DGM- HR is supported by one Manager-HR
Procurement / Stores & Inventory	▪ Headed by a Store Officer who reports to DM- Maintenance ▪ Store Officer is assisted by two Store Keepers	▪ Headed by Deputy Director- Store ▪ Deputy Director- Store is assisted by three Store Officers	▪ Headed by Store Officer who reports to Deputy Manager ▪ Store Officer is assisted by Store Keepers	▪ Headed by Store Officer who reports to Deputy Manager –Maintenance ▪ Store Officer is assisted by two Store Keepers	▪ Headed by DGM- Stores & Purchase who reports to Dir- Finance ▪ DGM is supported by Manager-Procurement and Manager -Stores
MIS/IT	▪ No IT system in the Plant	▪ No IT system in the Plant	▪ No IT system in the Plant	▪ No IT system in the Plant	▪ Headed by Manager/DM- MIS who reports to Dir- Finance ▪ Manager/DM-MIS is supported by three AM/ JAMs

4.3.5 Recommendation for Plant-level Structure

(1) Comparison of required personnel as a benchmark

To estimate the number of staffs needed as a benchmark for Bheramara P/S, the current organizations of BPDB Baghabari P/S and Haripur IPP were investigated. As a result, it was found that the number of staffs per MW at BPDB is 0.8, and is approximately 6 times the number of Haripur IPP of 0.14. When adaptable fighting potential ratio is defined as the ratio of engineer-class numbers over the whole staff number, the ratio of BPDB is 28%, which is lower than that of IPP, 71%. It indicates that quite a number of inefficient lower general staffs including logistic staffs are deployed compared to IPP P/S.

Although in Bheramara, a small-scale organization with well trained experts and the staffs with adaptable fighting potential are deployed basically like IPP, direct control of maintenance department is aimed and the maintenance staffs needed for the section are secured to accomplish the corporate vision, long-term human capital development. Based on the discussion with NWPGCL top management team, 94-member system for the Bheramara P/S has been proposed.

Table II-4-7 Comparison of P/S personnel as a benchmark

	BPDB（Baghabari P/S）	New Bheramara (proposal)	IPP（Haripur IPP）
Total output	171MW	360MW	360MW
Management/total	28%	66%	71%
Total employee	140* *Adjusted by supposing 1 unit is 120	94	51

(2) P/S management organization chart

The organizational framework at P/S management level should consist of vertical organization including personnel affairs, finance and accounting, operation and maintenance on one hand, and the lateral organization on the other, which coordinates the information provided by these groups laterally. As a line post to support the P/S manager, it is proposed to assign a P/S secretary in charge of management strategy and information management, and a P/S secretary in charge of environment, safety, and total quality management. As shown in the Figure below, 94-member system at the power station in Phase 2&3 is proposed.

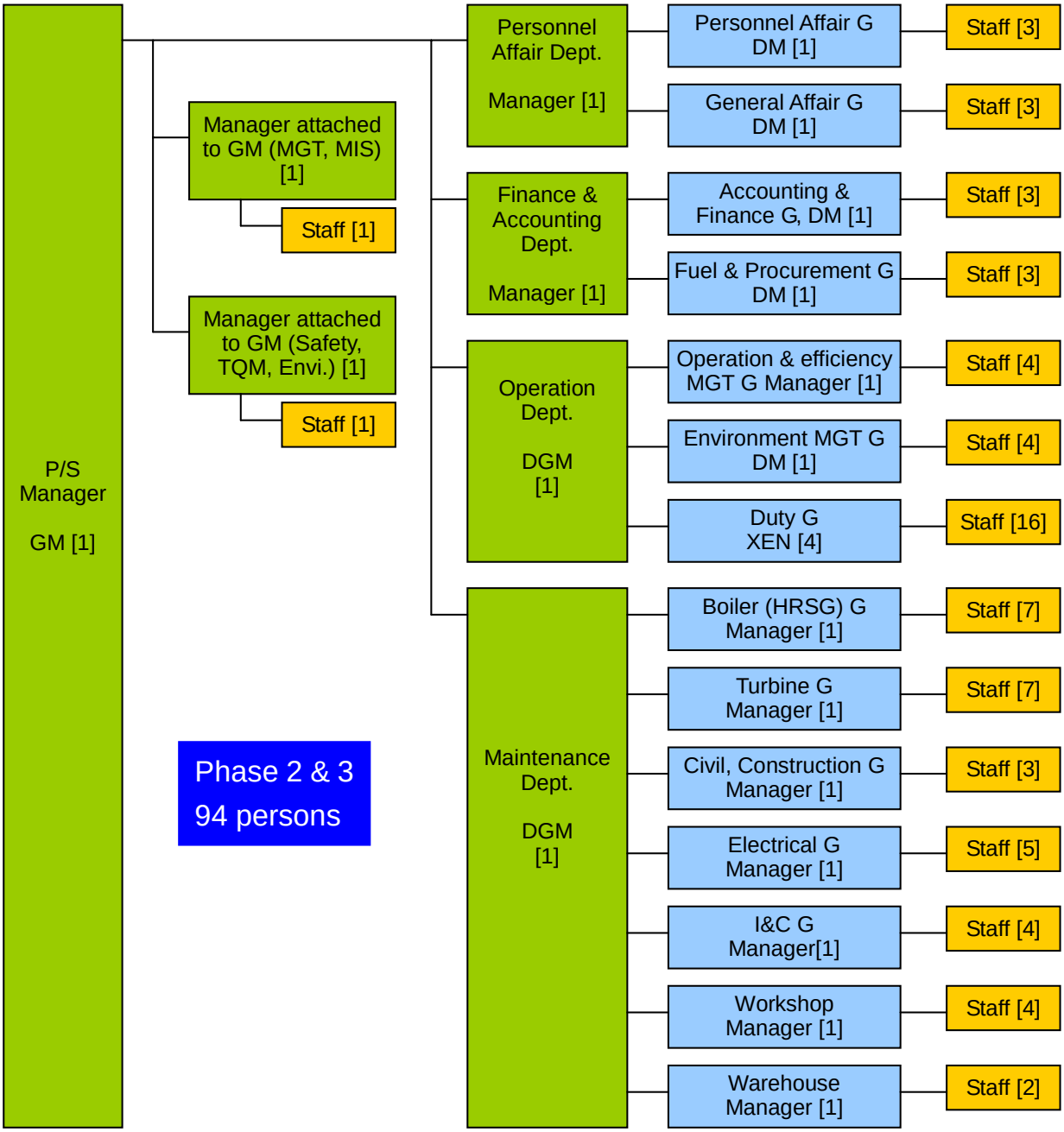


Figure II-4-3 Organogram for Bheramara Power Station

(3) Segregation of duties at power station

Segregation of duties at the power station is shown as below.

Table II-4-8 Segregation of duties at power station

Dept	Section	Division of duties
Top management	P/S principle manager	Establishment of long-term business objective in power station Establishment of indicator of annual operation objective in power station Chairperson of management committee in power station Guidance and advice for head of each department
Secretary	Secretary (MGT, MIS)	Special mission of principle manager Generalization of operation relating to each department Generalization of medium- and long- term plan of power station Editing bureau of annual report Inspector of operation of each department
	Secretary (Safety, TQM, Environment)	Guidance and advice of personal security in construction and quality control of construction relating to operation and maintenance of equipment Member of investigative committee of large-scale outage accident Member of safety and health committee
Chief of general affair department	Human senior manager	Assistance of P/S principle manager Chief of operation in the department Generalization of medium- and long – term plan Creation and development of annual business plan Presentation of indicator of annual plan and check of achievement Personnel recruitment, Transfer, Awarding Material and external affairs Window of negotiation with union Window of improvement of welfare and life environment
	Finance senior manager	Assistance of P/S principle manager Chief of operation in the department Generalization of medium- and long – term plan Creation and development of annual business plan Presentation of indicator of annual plan and check of achievement Management of budget and account settlement Check of financial indicator Person in charge of control of spare Investigation and assessment in the large purchase of equipment
Chief of operation department	Operation senior manager	<General> Assistance of P/S principle manager Chief of operation in the department Generalization of medium- and long – term plan Creation and development of annual business plan Presentation of indicator of annual plan and check of achievement Operation of generated electricity, management of generating technology Repeated practice of basic training, Fostering of OJT trainer <Operating> Establishment of annual generating plan and operation performance Generalization of reanalysis of annual generating plan / actual performance of generated electricity <Technical Management> Management of head efficiency and performance Environment of affiliated P/S unit: chemical management Trend management of main item of unit Generalization of performance test and heat balance check if required Understanding of performance of environment load ratio according to unit and actual condition of operation

Dept	Section	Division of duties
Chief of maintenance department	Maintenance senior manager	Assistance of P/S principle manager and chief engineer Chief of operation in the department The operation in the department is machine department : Electric measurement department Establishment of annual repair plan and allowance budget Guidance of keeping of construction schedule Analysis and search of unplanned stop Understanding of equipment diagnosis data by which large-scale repair time is judged (weak area, annual development of remaining life assessment) <Boiler, Turbine, Civil, Architecture> Annual repair plan, Budget, Plan of procurement of replacement part Guidance and advice for the machine department Investigation of technology and skill of external contractor Compensation of trouble which is considered as construction error of external contractor and judgment of defect Management of work period of regular check and maintenance <Electricity, I&C> Annual repair plan, Budget, Plan of procurement of replacement part Guidance and advice for the department of electricity, I&C Investigation of technology and skill of external contractor Compensation of trouble which is considered as construction error of external contractor and judgment of defect Management of work period of regular check and maintenance Chief Engineer <Mechanical> Supervision and inspection of equipment safety and security relating to maintenance and operation of machine and equipment Technical guidance and advice relating to maintenance and operation of machine and equipment Technical guidance and advice relating to operation and maintenance of machine and equipment Chairperson of investigative committee of large-scale outage accident (machine) Chief Engineer <Electrical> Supervision and inspection of equipment safety and security relating to maintenance and operation of electric equipment Technical guidance and advice relating to maintenance and operation of electric equipment Technical guidance and advice relating to operation and maintenance of electric equipment Chairperson of investigative committee of large-scale outage accident (electricity)

4.4 Recruitment and Relocation Management

In order to fill in positions that are identified based on the organization structure and manpower estimation, it is necessary to recruit persons from various sources. The selection of the right choice of candidates in the organization plays a vital role in its effective functioning and thus it is necessary that NWPGCL adopts some of the best practices of recruitment prevailing in various utilities as detailed below:

4.4.1 Positions

(1) BPDB

The Positions at BPDB are filled through Direct Recruitment (for Class I & II), Promotion (for Class I & II), Promotion (for Class III – Non Technical posts), except for entry level posts and Promotion /

Appointment from the Trained Apprentices / Direct Recruitment (for Class III – Technical posts). Recruitment begins after advertising the position(s) in daily newspapers.

(2) APSCL

The Positions at APSCL are filled through direct recruitment, Promotion or Absorption of existing BPDB employees working in the company under Lien. In order to fill in vacancies advertisements are published in at least two widely circulated national daily newspapers.

(3) EGCB

Positions at EGCB are filled through direct recruitment, promotion or absorption of existing BPDB employees with mutual understanding. Recruitment begins after advertising the position(s) in at least two widely circulated national daily newspapers. Advertisement contains all relevant information of the position including designation, pay scale, educational qualification, criteria for eligibility, service conditions, last date for receiving applications and values of postal order/demand draft. All applications received are given a scroll number and are immediately acknowledged.

4.4.2 Selection Procedure

(1) BPDB

Candidates need to appear for Written, Oral and practical examinations and tests (wherever necessary), decided by the Selection Committee. Candidates are selected based on:

- Comprehensive marks given by the Members of the Selection Committee and their marks from written, oral and practical examinations & tests
- Candidates (except Class IV posts) also need to clear a Physical Fitness test, conducted by a Medical Officer, nominated by the appointing authority. Before appointment, candidates also need to obtain a satisfactory report from the police about his antecedents

(2) APSCL

The candidates need to appear for Written and/or Oral test(s), as decided by the Selection Committee. Candidates are selected based on:

- Comprehensive marks given by the Members of the Selection Committee and their marks from written and/or oral tests
- Physical Fitness test, conducted by a registered Medical Practitioner

(3) EGCB

The Selection process begins with screening out unqualified candidates and screening in those who meets the initial selection criteria. Then the candidates need to go through a written test, followed by interview(s) and a medical check up. For Class IV employees, only interview and medical check ups are conducted. The format for the written test is as follows:

Table II-4-9 EGCB Written Test Format

Areas	Points	Time
Questions on Analytical Ability	15 points	15 min
Questions on Relevant Subject	25 points	30 min
Questions on General Knowledge	10 points	15 min
Total	50 points	1 hour

Candidates securing less than 30 point (i.e. 60%) are rejected. Successful candidates are invited to appear for an interview, that tests the following aspects as per the table indicated below:

- Candidates securing less than 30 point (i.e. 60%) are rejected.
- List of successful candidates is prepared on merit basis, i.e. by adding the scores from the written test and the interview.
- The candidates are then invited to appear for a second and final round of interview, which ensures that the selection process has been followed properly and the selected candidates are acceptable.
- The successful candidates need to obtain a satisfactory report from the police about his antecedents.
- Candidates also need to clear a Physical Fitness test, conducted by a Medical Officer, nominated by the appointing authority.

Table II-4-10 Selection Interview Aspects

Aspect	Assessment Mechanism	Marks
Communication & Presentation Skills	Assessed by a Psychologist	12 points
Human Relations Skills		8 points
Knowledge about Subject Matter	Assessed by a Subject Matter Expert	10 points
General Knowledge	Assessed by a General Knowledge Expert	10 points
Overall Impression / Appearance	Assessed by the Chairman	5 points
Ability to work in teams through the candidate's degree of involvement in sports, cultural/social works, etc.		5 points
Total		50 points

4.4.3 Tenure and Conditions of Appointment

(1) BPDB

At BPDB, the tenure and condition of appointment is as follows:

- Candidates selected for appointment by direct recruitment is generally appointed on probation for a period of one year (subjected to extension)
- A candidate should be aged between 18 – 30 years to be considered for appointment (the Board may relax the upper limit of age on the grounds of special technical qualification or experience

(2) APSCL

At APSCL, The tenure and condition of appointment is as follows:

- Candidates selected for appointment by direct recruitment is generally appointed on probation for a period of one year, which is subjected to extension
- Employees get a maximum of five years of contract on successful completion of probationary period (inclusive of probationary period)
- A candidate should be minimum 18 years old to be considered for appointment

At EGCB, The tenure and conditions of appointment Candidates selected for appointment by direct recruitment is generally appointed on probation for a period of one year (subjected to extension).
According to the Centre for Management Development Report on the 'Management System of EGCB', it was recommended that a three to five year contract as decided by the authority on year to year review considering performance of employee will be signed with the successful candidate. The contract is treated as renewed if any adverse decision of the authority is not communicated.

4.4.4 Selection Committee

It has been observed that in BPDB, APSCL, EGCB, SZPDC, CZPDC, PGCB and DESCO, posts (total number of vacancies and filled in positions) are created by the Boards of the respective companies.
In order to fill in vacancies through direct recruitment, advertisements are published in the print media. The selection procedure is through a combination of written, oral, practical test and/ or evaluation by the selection committee. In the case of BPDB, EGCB and PGCB, a medical fitness certificate from a certified medical officer is also required. In case of EGCB, a detailed assessment procedure is laid out. The following is a comparison of some of the constituents of the Selection Committees in some of the Utilities of Bangladesh.

Table II-4-11 Composition of Selection Committee in some Bangladesh Power Sector entities

BPDB	APSCL	EGCB	DESCO	PGCB
Class I Officers are selected by Board Members	Concerned Director – Technical/Finance as Chairman, and other Director – Technical/Finance as Members	Chairman, EGCB, as chairman, MD, EGCB, Director Technical and Director Finance EGCB as members	GM to Deputy Manager are selected by MD and other Directors	MD & full time Directors are selected by the Chairman & other directors
Class II Officers are selected by a Board Member & 2 senior officers nominated by the Board	Concerned GM/DGM as Chairman, and other GMs/ DGMs as Members	Chairman is one senior official in EGCB, One Subject Matter specialist and one Psychologist	Positions below Deputy Manager selected based on decision take by the concerned directorate	GM to AM are selected by full time Directors
Class III / IV are selected by committee formed by CE / SE whosoever is competent				Positions below AM are selected by the concerned GM & 3 other GMs

4.4.5 Key Learnings from the Previous Experience

As indicated in the following table, key learnings from the previous corporatized experience has been examined in terms of recruitment and employment types, employment period, selection process, and relocation system.

(1) Recruitment type

Although many companies utilized the newspaper advertisement for job offer, PGCB successfully utilizes Internet Homepage not only to put advertisement on the page but also to send a wide range of information such as scheduled-outage, resulting in reinforcement of relationship between the local communities and the company. Therefore, for the NWPGCL, the good practice from the previous experience shall be taken over. Establishment of NWPGCL homepage on the Internet to send a wide range of information from the company for reinforcement of relationship with the local communities and the company is recommended.

(2) Employment type

When vacant seats are available, supplementation is to be made by the promotion from the direct employment from the outside, and an internal employment, or transfer from BPDB is taken at the most

companies. For the case of the EGCB and the Ashuganji, such vacant has been filled by the transfer of employees on deputation ('lien') from BPDB to the company. However, the company where lien basis employees are accepted has double standard for salary, performance evaluation, and promotion systems. Under the circumstance of the Bangladesh, intensify of labor union activation can been seen, and such double standard system causes ramification of smooth transfer of the employee from the existing to new company. In addition, differentiation of standards creates the gap among the employees, resulting in the lower organizational strength and lower morale.

(3) Employment terms

At the previous corporatized companies, a trial employment period for one year of the beginning is introduced, and it will make an official employment agreement only when the employees' performance satisfies with the expected standard. At EGCB, PGCB, and DESCO, a next contract will not make if the performance for the contract terms of 3 to 5 years as a full-time employee, does not reach to the criteria. Therefore, for employment of NWPGCL personnel, single standard of employment condition by new direct employment from job market or BPDB (retirement and newly join to the new company) shall be employed. Introduction of the non-lifetime guaranteed basis employment system is able to link between the performance evaluation and salary systems, and create an incentive to work as efficiency as possible. Therefore, for the NWPGCL, the good practice from the previous experience, determination of 3 to 5 year contract to link their performance and salary system to provide incentive to work, shall be introduced.

(4) Selection Process

In selection method, most of the companies carried out Technical Test, Behavioral Test, Practical Test, and Fitness Test. In addition, some companies even carry out background checks. In EGCB case, an adoption applicant is burdened with a written examination as the first selection. The outline has three composition of the examination, which asks analysis ability, technical knowledge, and general educational background, and especially technical knowledge occupies 50% of the whole point. Not less than 60% of a response rate will be determined as an acceptance line, and a successful candidate will progress to an interview as the second selection. The interview estimated the adaptability to talent for making presentations, communications skills, technical knowledge, general education, and a group, etc., and not less than 60% is determined as the acceptance line by it. Whereas at the most corporatized companies, they have introduced multilateral evaluation systems such as testing technical knowledge, technical skills, and moral tests, in particular, the EGCB is superior than other systems in terms of showing fair and transparent numerical evaluation system by setting score point and acceptance line. Therefore, for the NWPGCL, the good practice from the previous experience, or a multilateral, fir and transparent evaluation systems shall be introduced.

(5) Personnel relocation system (Job rotation system)

The Personnel relocation system has two objectives: placing the right person in the right job and fostering people through personnel distribution. This approach is aimed at maximizing human capitals by placing the right person in the right job where the person can fully demonstrate his ability. It is also used to attract human capitals by enhancing a new project or the organization. As for human capital development, it is also possible to help people acquire higher skills by placing new graduates with potential and mid-ranking engineers under new recruits with adaptable fighting potential and skilled people in order to provide on-the-job training. Furthermore, it is necessary to appoint a young person to a management position for the purpose of fostering a candidate for future top executive within the company, and to foster a generalist by placing a person in various jobs in rotation.

At the previous corporatized companies, whereas a training program based on OJT has been implemented, there are few companies which utilize the job rotation system to foster human capitals by having a wide range of experience. This is caused by a lack of the long-term manpower planning and career visions for each employee. Therefore, for NWPGCL, manpower and career vision planning for individual employees with job rotation system shall be introduced from the long term perspectives.

Table II-4-12 Comparison of Recruitment Process of Bangladesh Utilities

Company	Selection Procedure										Conditions and tenure of Appointment	
	Vacancy Filled by			Advertisement Medium		Selection Mode						
	Direct Recruitment	Promotion	Deputation	Newspaper	Online	Technical Test	Behavioral Test	Practical Test	Fitness Test	Background Check	1 yr probation	Contract Based
APSCL	✓	✓	✓	✓		✓	✓		✓		✓	
BPDB	✓	✓		✓		✓	✓	✓	✓	✓	✓	
EGCB	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓
PGCB	✓	✓			✓	✓	✓	✓	✓		✓	✓
DESCO	✓	✓		✓		✓	✓		✓		✓	✓
CZPDC*	✓	✓		✓		✓	✓	✓			✓	
SZPDC*	✓	✓		✓		✓	✓	✓	✓	✓	✓	

* As recommended by Consultant

4.4.6 Recommendation of NWPGCL Recruitment and Relocation Management

The following proposals are for recruitment and relocation system in the new power station under NWPGCL.

(1) Qualification requirements

Since new Bheramara power station is the newly constructed plant, all the plant workers are to be employed as a new employment policy in principle. Therefore, a preferential treatment, special to the existing Bheramara power station worker is not given, but provides all the applicants with the chance of equal adoption including other existing BPDB plant and IPP plant workers. The applicant should be hired newly through fairness and the high selection process of transparency.

(2) Employment type

An employment type has two, "recruiting on potentiality recruitment" which raises a new graduate from a long-term viewpoint over many years, and is raised to future core and management leader, and another is "work-ready capability recruitment " which employs a person who can step in and be effective immediately by mid-career recruitment. Since this new Bheramara power station is a newly established work place, most of management class employment will be done based on "work-ready capability recruitment. For general worker level, a combination of both recruitment systems shall be taken place in term of long-term human capital development, through on the job training, or OJT.

(3) Selection process

From a viewpoint of excellent capability person's recruitment, a job offer shall be performed through a newspaper or the Internet, and two-step selection by the written examination and interview should be performed. In this selection process, examination shall contain, not only technical knowledge, but also analytical ability, the comprehensive capability of general educational background to check if he has comprehensive knowledge. Moreover, it is necessary to perform multiple evaluations by plurality and to clarify criteria for selection points with high transparency. The recruitment examination of EGCB is shown in the following table.

Table II-4-13 Recruitment examination (EGCB case)

1st examination: paper based writing test		
Section	Point	Time
Questions on Analytical Ability	15	15 min
Questions on Relevant Subject	25	30 min
Questions on General Knowledge	10	15 min
Sub total (A)	50	60 min
2nd examination, interview		
Communication & Presentation Skills	12	
Human Relations Skills	8	
Knowledge about Subject Matter	10	
General Knowledge	10	
Overall Impression / Appearance	5	
Ability to work in teams through the candidate's degree of involvement in sports, cultural/social works, etc.	5	
Sub total (B)	50	
Grand total (A+B)	100	

(4) Employment system

In employment system, a trial employment period for one year shall be made for the first time, and the employment agreement for three years as a full-time employee shall be concluded when a trial employment of one year has successfully been completed. After 3 years, the employment contract will be renewed depending on performance evaluation results.

Under the existing BPDB employment policy, lifetime employment is fundamentally guaranteed. If some existing BPDB power stations are determined to transfer into NWPGCL, it is likely that many workers advocates lifetime employment as well as the BPDB employment policy.

However, in order to provide employees with working place by the company, the company has to have existed and grown continuously, and from the viewpoint of independence of management, and sustainable development as indicated in the management visions, implementation of an efficient management in human capital management is an inevitable way. Therefore, from a viewpoint of an employee's mindset for their working environment, a performance based employment contract for 3 years shall be introduced, and only person who work for the company shall be taken for not only company's sustainable development, but also employee's sustainable development.

(5) Job rotation

(a) Strengthen partnership between the Labor and Personnel Division and the Business and Affairs Division (information sharing)

It is essential to establish partnership with the business and affairs division (on site side) in order to place the right person in the right job or to use job rotation as part of human capital development. This is because the content of job to which a person to be appointed and the ability of the person must be evaluated. To make the recruitment and personnel distribution system function, it is absolutely necessary for the labor and personnel division to draw up a long-term human capital development plan from the macro perspective, for every division to design a short-term career path for the person concerned from the micro perspective, and for the administrative division and the implementation division to share information and work together. For that purpose, NWPGCL needs to develop information infrastructures to enable sharing of personnel data and to establish a structure to implement personnel distribution and human capital development from both the long-term and short-term perspectives through partnership and collaboration.

(b) Realize the personnel distribution system that makes people grow (job rotation)

To place the right person in the right job, the person is required to develop the ability to do that job. This means that it is necessary to develop a person to secure human resources required for the job. People develop their ability through their jobs. Not only on-the-job training but also being placed in the job with more responsibilities help them increase their awareness and bring about their potential. Therefore, NWPGCL should introduce a concept to develop human resources through job rotation in order to evaluate both the ability of human resources that is constantly changing and their current and future potential.

(c) Formulate a career path plan (Clarify a career path for all staff)

NWPGCL should draw up a career path for all staff from the perspective of long-term human capital development and use the personnel distribution system as a way to help them achieve their respective career path. All staff at P/S should consult their immediate superiors to decide on their career path. When consulting a superior, staff must discuss their career including what they should be doing one year, three years, five years and ten years later and their targets. An immediate superior prepares a report on his subordinate's career path and submit it to Assistant General Manager of the Labor and Personnel Division at P/S. Assistant General Manager and General Manager at P/S prepare a report on career path of all staff at P/S and submit it to Chief Human Capital Officer (CHCO) at the head office in the form of "P/S career path plan". The head office conducts a "career path conference", in which CHCO acts as Chairperson and Assistant General Manager of Human Capital Development and Employment Plan Group, Assistant General Manager of Evaluation and Compensation Group, General Manager of Labor and Personnel Division at P/S act as members of the conference, to

establish a career path for all staff. The career path conference formulates an action plan to help staff achieve the career path and use on-the-job training, individual training and job rotation as appropriate. The conference should be held once a year and information should be updated annually. The degree of achievement should be monitored and all staff should be given feedback.

Table II-4-14 Career path conference

<table>
<tr><th colspan="4">Career path conference (once per annum)</th></tr>
<tr><th colspan="3">Power station</th><th>Headquarters</th></tr>
<tr><td>  </td><td>  </td><td>  </td><td>  </td></tr>
<tr><td>P/S
general
workers</td><td>P/S
Site
leader</td><td>Personnel dept.
Senior manager
Junior manager</td><td>Member of career path conference
■ Chief Human Capital Officer (CHCO)
■ Human develop, employment G Manager
■ Evaluation, salary G, manager
■ P/S Personnel dept. Senior manager
■ P/S Personnel dept. Junior manager</td></tr>
</table>

Table II-4-15 Career path planning report

Career path planning report		
Date		
Name		
Section		
Name of your leader		
Name of your manager		
Your career path	Time frame	Your visions, ideal figures, desired positions, directions, etc. (write anything what you want to)
	1 year later	
	3 year later	
	5 year later	
	10 year later	
*Remarks by leader		
*Remarks by P/S manager		
*Remarks by HQ manager		
* Remarks by determination of conference		

4.5 Performance Evaluation System and Promotion System of Individuals

A performance management system is an all-encompassing system which tracks the performance of employee through his/her work and also to match the right person to the right job. The performance management process aims to measure the performance of the employee through given targets and thereby suitably reward the employee for his actions. A typical performance management system is given below.

In the figure above, the areas in red are broadly the areas of improvement for the power Utilities in Bangladesh. Critical areas that need improvement are linkage between Corporate Goal and Performance Expectations, Measuring the performance objectively, giving feedback to employees, linking performance and rewards and appropriate usage of available skill set for the right job.

- Targets to be set and agreed with individual on identified KPIs at the start of the year
- Mid-term evaluation of the performance against the target
- Promotion, compensation, reward, training & development to be linked with Performance Appraisal

Performance Management may be said to be a process by which an organization involves its employees in improving organizational effectiveness in the accomplishment of its mission and strategic goals. The performance management process is used to communicate organizational goals and objectives, reinforce individual accountability for meeting those goals, and track and evaluate individual and organizational performance results. It reflects a partnership in which managers share responsibility for developing their employees in such a way that enables employees to make contributions to the organization. It is a clearly defined process for managing people that will result in success for both the individual and the organization.

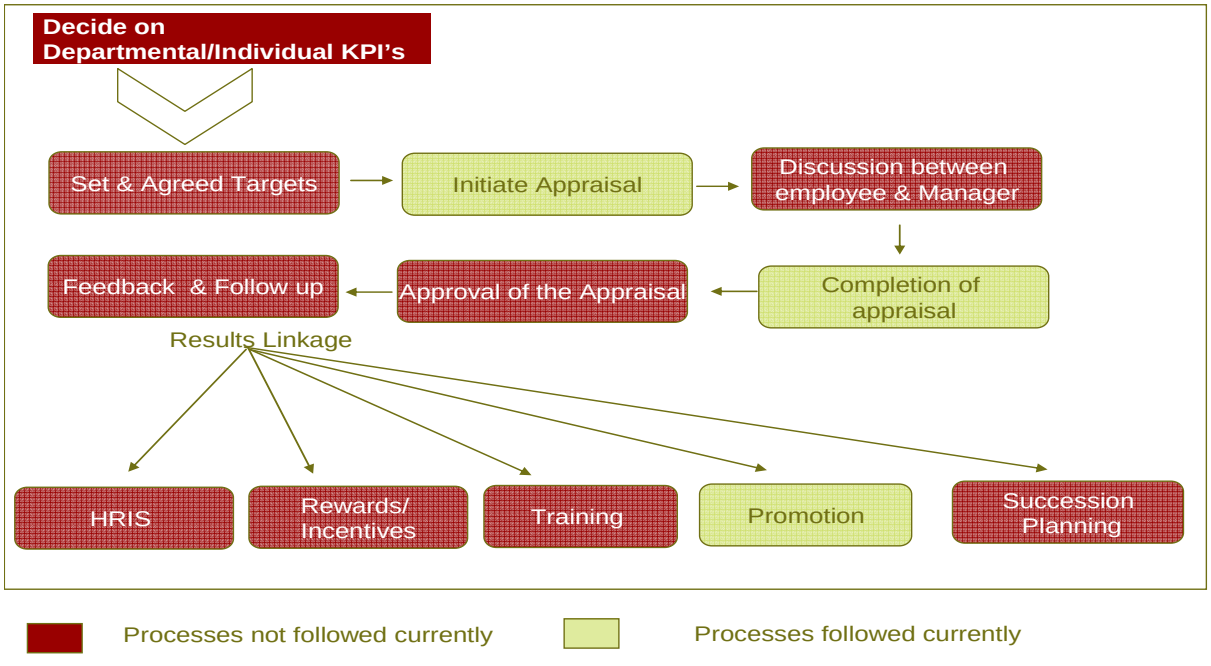


Figure II-4-4 Performance Evaluation Systems

Table II-4-16 Key Elements of Performance Evaluation Systems

Performance Management System			
Business-PMS-Linkage	**Performance Appraisal:**	**Ongoing PM activity:**	**PM Linkages:**
Link the PMS process with the business goals	Employee communication & expectation setting	Providing informal feedback	Training Need Identification
Key Performance Indicators (KPIs) are formed	Training Managers on critical aspects of the PM process	Monitoring	Career Development
KPIs should be Specific, Measurable, Accurate, Reliable & time bound	Conducting the PM process & closing the appraisal discussion through a participative process		Rewards & Recognition
	Performance Counseling		Succession Planning
			Competency Mapping

Having an effective performance management system will help WBSEDCL in several ways ultimately resulting in better, more efficient, services.

- Firstly, it means employees have a comprehensive understanding of what the organizational goals are, as there is a clear focus on key objectives and priorities.
- Secondly, it makes life more satisfying for employees because they know what is expected of them, and how this fits into the bigger picture, but also that they can call on extra support to help them to perform well.
- Thirdly, because the whole emphasis is on meeting set criteria and meeting targets, it is easier to monitor how services are being performed and to take action to intervene and improve where necessary.

4.5.1 As-is Analysis on Previous Cases

(1) BPDB, DESCO, and PGCB

They follow a system of Annual Confidential Ratings (ACR) where the appraiser rates the appraises on a 100- point scale on 20 different attributes. It is a subjective rating system and since it is confidential and not informed to the appraises, it reduces the level of accountability.

The Current Rating System is classified as follows:

- 95 to 100 – Excellent
- 85 to 94 – Very Good
- 61 to 84 – Good
- Less than 60 – Average

(a) Interval for evaluation

The evaluation is annual, hence carried out once a year. It was found out during discussions (without any analysis), in most cases gathered that 70 – 75 % obtain a Very Good rating, 10 – 15 % obtain Good and very few employees get an adverse report. Adverse reports need to be communicated to the employee with reasons for the same.

(b) Evaluation Authority

The Evaluation Authority would be the next higher authority in every grade and every level.

(c) Promotion Criteria

Posts in the cadre of Chief Engineers, Additional Chief Engineers and Superintending Engineers and Directors, Additional Directors and posts with equivalent time-scale of pay and such other posts as may be specifically notified as such by the Board, from time to time, is treated as selection posts and

is filled in by promotion from the immediate lower cadre. Posts in the cadre of Executive Engineers, Deputy Directors and other equal ranks may be filled in by promotion from the immediate cadre. The criteria for promotion are as follows:

- For promotion to selection post, outstanding merit is the sole criteria, seniority in the cadre being taken into consideration in the cases of indistinguishable merit only
- For promotion to other posts, merit-cum-seniority is the criteria. All promotions up to the ranks of Superintending Engineer and Director are subjected to the examination and test, as per BPDB rule.

(2) EGCB

The performance appraisal process of EGCB is as follows: Executives are appraised partially on the quality, quantity and time of completion of special assignments, given during the appraising period, on a scale of 1-100.

- If performance is exceptionally well considering time, delivery and quantity, rating may be between +75 to +100. For good performance it is +50 to +74, for moderate performance it is +25 to +49 and for poor performance, it is +1 to +24.
- If a special assignment is not performed, a rating of -1 to -24 is given. For not performing and showing lack of interest the rating is -25 to -49, for refusing to perform, the rating is -50 to -74, and for refusing and abuse, the rating is -75 to -100.
- In addition, unauthorized absence from work is also counted in the performance appraisal.
- Executives are also given a rating on the initiatives taken at work. A rating of 75 to 100 is given for exceptional contribution to the company at own initiatives, 50 to 74 for good contribution, 25-74 for moderate contribution and 1 to 24 for poor contribution.
- If special assignment rating is nil, initiative rating is nil and scores are less than 60% in skill rating (minus leave factor if any), the service contract is not renewed or extended. If such rating is equal or more than 60% contract is extended and minimum routine annual increment of 2% is allowed.
- Executives are appraised on demonstrating certain skills/behaviours as well (as shown below)

Table II-4-17 Skill Set Evaluation Table

Ratings	95-100 Excellent	85-94 Very Good	70-84 Good	60-69 Average	Below 60 Poor	Total	Initial	Remark
Leadership								
Discipline								
Sense of Responsibility								
Foresightedness								
Loyalty to the organization								
Communication skill								
Personality								
Professionalism								
Quality of work								
Quantity of work								
Total								
Average								

(a) Interval for Evaluation

Performance appraisal for executives is carried out three times in a year, and for support staff, it is conducted twice in a year. An Annual Performance Report s maintained for the entire year.

(b) Evaluation Authority

The evaluation authority is the next higher authority at every grade and every level. Promotion authority is the MD based on the recommendation of the Selection Committee.

(c) Promotion Criteria

Promotion at EGCB is made keeping in view the long-term organizational and individual goals. Promotion is fair and free from any influence. The main policy behind the promotional activities is to ensure that employees continue to make efforts to improve themselves and help others improve. Key highlights are:

- Promotion to any post is on the basis of merit and seniority. Merit is treated as a combined function of performance, and competence.
- Promotion is applied without any discrimination by sex, caste, creed, locality, etc.
- Promotion to the senior position is subject to the fulfilment of the required length of service and vacancy
- Competence is judged through a written test and interview. An official, on completion of the required period of service appears for a written test to assess his competence for promotion. Such a test carries a total of 100 marks as follows: Any person securing less than 60% marks is not eligible for promotion.

Table II-4-18 Written Test Evaluation Basis EGCB

Written Test Aspects	Points
Knowledge about department rules, regulations, policies and practices	40 points
Professional knowledge (Job in EGCB)	30 points
Analytical ability and general knowledge	30 points
Total	100 points

Table II-4-19 Promotion Interview Assessment Basis

Assessment Authority	Aspect	Weights / Marks
To be assessed by the Psychologist	Communication and presentation skills	30 points
	Leadership ability	30 points
To be assessed by an EGCB expert	Vision and understanding about EGCB	20 points
To be assessed by the Chairman of the interview board	Overall impression	20 points
Total		100 points

- The performance of an employee is ascertained through annual performance rating. Rating for the entire period of services in the previous post is averaged out of 100, for the promotion to the next higher post.
- For promotion, 5 point is credited to an employee for each completed year of service in his/her present post to a maximum of 100. Total marks for promotion of an employee are counted out of 400 as shown below:
    - Marks obtained in written test: max 100
    - Marks obtained in interview: max 100

- Average ratings in APR: max 100
- Seniority: max 100

- A gradation list is prepared on the basis of set criteria specified above and promotion is administrated in order of merit. Any one securing less than 50% on an aggregate will not qualify for promotion. An incumbent may sit for written test (and also interview) again if he desires to improve his performance for promotion. The gradation list is continually updated.

4.5.2 Key Learnings from the Previous Cases

(1) Individual Performance Evaluation

The table shows that EGCB, SZPDC, and CZPDC have their performance of individuals tied to the company performance, in case of EGCB and CZPDC the performance management system is also linked to the other HR systems such as promotion, training etc. This means that the employee performance appraisal of companies like CZPDC, SZPDC and EGCB are linked to the target setting and KPI of the Company at the beginning of the year. This overall corporate targets and KPIs would be set for the company as a whole in the beginning of the year and that would be linked to the departmental and the individual performance target set for a particular year.

(2) Evaluation Type

The Evaluation in most cases such as PGCB and BPDB are subjective, while the newly formed companies are increasingly progressing towards an objective assessment system. In most cases, while reviewing the Performance Appraisal Forms of BPDP and PGCB, it was found that the parameters and indicators used for assessing the technical and behavioural areas of improvements were based on subjective parameters such as for example: one of the parameters being– 'Knowledge of work' and the ratings are based on excellent, very good, good, average and so on. Hence the indicators and parameters used for assessments are neither quantitative nor objective because they are not based on KPI's and quantitative targets set at the beginning of the year. Hence most ratings are based on subjective assessment of the appraiser.

On the other hand, it is suggested that an employee performance appraisal should be based on objective assessments, such as for example: All departments of the company would have some targets linked to this target. Below is an example, of one of the department's targets linked to the above company target.

The company's objective/target:

- To reduce costs by (x) percent.

The HR Departments target:

- Optimize HR Operational expense by (y) percent
- Optimize employee cost by (z) percent.

The Indivisual target:

- Number of cost cutting measures taken for optimizing HR operational expense (n)
- Percentage reduction in HR expense at year-end (a%)

(3) Evaluation Interval

The Evaluation interval is mostly annual, except for APSCL where it is twice a year and at EGCB, it is thrice a year for executives and twice a year for staff (though averaged out for a year).

Performance feedback to employees is given only when there are adverse comments, especially in cases of BPDB, APSCL and EGCB. However in SZPDC and in CZPDC, the consultants have suggested a regular feedback on performance of employees.

(4) Promotion Criteria

The promotion of an employee is based on his performance. In almost all companies, performance is treated as one of the most important criteria. But in most companies the criteria for promotion also has a minimum age requirement. Also seniority is also given due importance.

Table II-4-20 Performance evaluation Comparative Matrix for Bangladesh Utilities

Company	Performance of individuals tied to		Evaluation Type		Evaluation Interval			Performance Feedback to Employees	Promotion Criteria	
	Company Performance	Other HR systems	Subjective	Objective	Annual	Twice	Thrice or more		Seniority	Performance
APSCL*		✓		✓		✓				✓
BPDB			✓		✓				✓	✓
EGCB	✓	✓		✓	✓*				✓	✓
PGCB			✓		✓				✓	✓
SZPDC*	✓			✓				✓	✓	✓
CZPDC*	✓	✓		✓				✓	✓	✓

* As recommended by Consultants

4.5.3 Recommendation of NWPGCL Performance Evaluation System

The followings show the recommendation for performance evaluation system for NWPGCL

(1) Performance evaluation system in line with the Corporate visions

The following are the key highlights of Performance evaluation system in line with the Corporate visions

- First and foremost, based on the Vision of NWPGCL, company strategies should be formulated.
- Based on the strategies, organization level KPIs should be formulated.
- Identification of Critical Success Factors & the goals of the organization – which would be the target for the MD & Directors
- Define the business plan to achieve those goals
- Identifying measurable Key Result Areas and the corresponding measures / Performance Indicators for each department which would lead to achievement of those goals through the steps in the business plan (Functional KPIs)
- Define the departmental targets for those measures
- Define individual (Individual KPIs) measures & targets from the departmental targets using the Job Descriptions
- Mid term evaluation of performance against the targets and corrections for the later term
- Evaluation of annual performance

- Final performance appraisal in joint concurrence of appraiser and appraisees
- Feedback for development & improvement for the next year

(2) Clarification of office regulation

It will become necessary to clarify job content and roles of individual employees and responsibilities that come along with their jobs by preparing rules and regulations on authority and job description. NWPGCL must introduce a mechanism to appropriately and multilaterally evaluate employee performance as to how well the employee fulfilled their responsibilities and to pay appropriate compensation.

(3) Performance evaluation under the principle of a PDCA Cycle

Whereas evaluation is implemented on a monthly basis, the Performance Evaluation System shall function as a check against the Plan based on the Plan-Do-Check-Action (PDCA) Cycle by right. Therefore, implementing performance evaluation two times per annum at a maximum is recommended based on the PDCA Cycle.

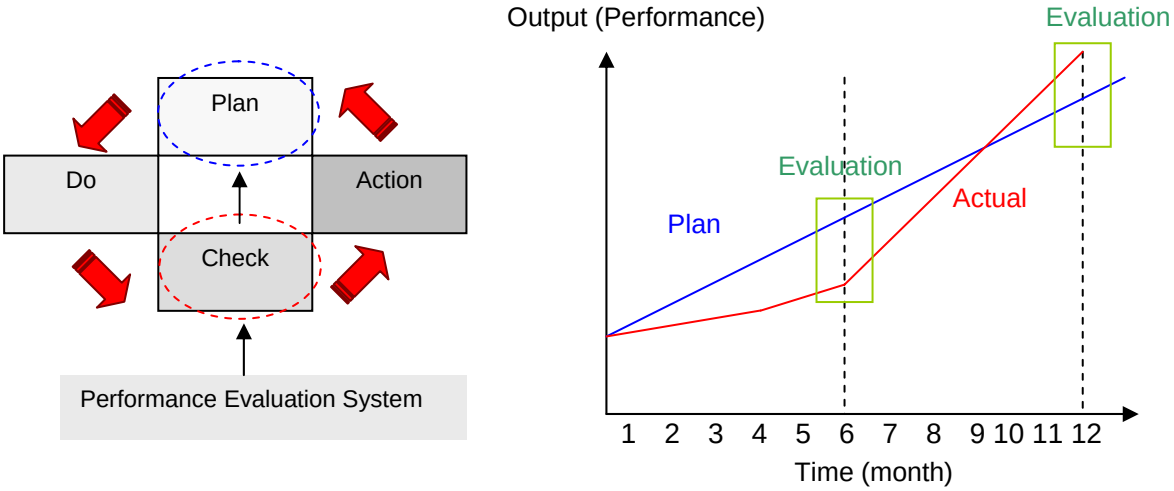


Figure II-4-5 Performance Evaluation based on the PDCA Cycle

(4) Performance evaluation as a function of human capital management

Human Capital Management (HCM) consists of three components: Performance Evaluation System (PES), Human Capital Development (HCD), and Delegation of Authority. Human Capital Management is worked out only when such three components are interconnected. Therefore, the performance evaluation system shall play a key role as one function in Human Capital Management.

However, at the BPDB plants, the performance evaluation system for individuals has not been carried out. Therefore, under this system, the three components (PES, HCD, and Delegation of Authority) are not related to each other as part of Human Capital Management.

As a result, it is necessary to restructure the performance evaluation system such that it reflects on human capital development as feedback.

(5) Introduction of personal achievement evaluation system based on self-certification, multilateral evaluation and Management by Objective (MBO)

BPDP P/S has the division evaluation system. It has not established a system to evaluate personal achievement. Fair and appropriate evaluation of personal achievement creates incentives for employees to work hard, thereby improving business performance of P/S. In the meantime, evaluation of business performance will make it easier to formulate a human resource development plan. Therefore, personal achievement evaluation plays the most important role in the human resource management cycle (business performance, evaluation, reward and penalty, and human resource development). When introducing personal achievement evaluation, it is important to use not only objective evaluation but also subjective evaluation to determine how the employee evaluates himself

and identify the gap between objective assessment and subjective assessment as the figure below shows. Requirements for the Management by Objective (MBO) system are as follows.

- All staff set a personal achievement target for every fiscal year after consulting their immediate superior and in consideration of breakdown of the "career path plan" described in the preceding section and the vision for (and the goal of) the organization as a whole.
- Individual employee is left with as much freedom as possible to choose an approach to achieve the target.
- Employees report the degree of achievement of the target to their superiors at the end of the term.
- Superiors evaluate employees' personal achievement, give feedback to them in an interview and raise points that need to be improved in the next term.
- The management by goal system functions not only as a tool to evaluate performance, but also as a tool of communications between a superior and subordinate, and as an effective management tool to achieve the organizational target and human capital development.

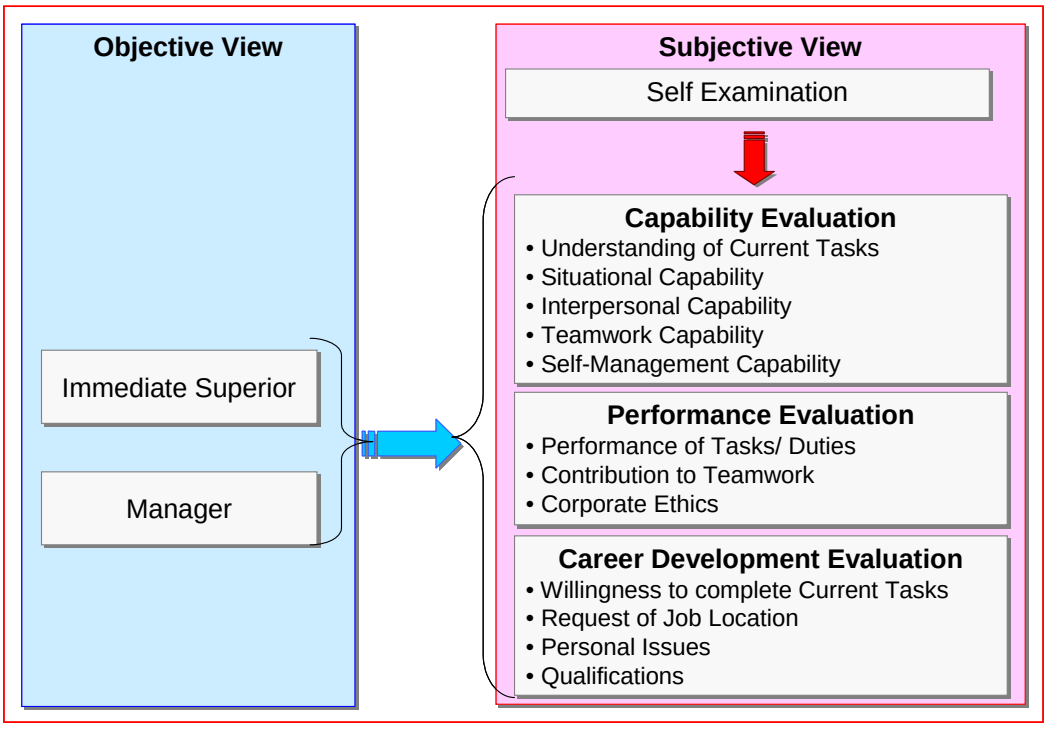


Figure II-4-6 Performance Evaluation System for Indivisual

4.6 Compensation and Incentive System

The following section details out the pay practices, compensation components and incentive schemes of the power entities. The objective is to benchmark against key comparators and not to suggest the compensation structure that needs to be adopted.

4.6.1 Basic Pay

(1) APSCL

The following are the key components of the pay structure of APSCL. Basic pay is the fixed compensation paid to an employee for performing specific job responsibilities. Earlier (before Corporatisation) APSCL employees had very low basic pay, compared to other power utilities in Bangladesh. However, they had several other pay components like Shift Allowance, Leave

Encashment, Income Tax Exemption, Festival Allowance, and Electricity Allowance. At 2003, Nexant suggested to remove all these pay components to reduce administrative burden, and instead, increase the basic pay to make up for these pay losses. They suggested a 1.5 to 2 times the earlier levels depending on officer and staff classification. After discussion with current officials of APSCL, it was however found out that the salary levels actually increased by 20-30%. They also included incentive payouts, power station allowances which have considerably improved the pay packets of the employees of APSCL. The following is a break up of the basic pay of the employees of APSCL.

Table II-4-21 Basic Pay Structure of APSCL

Salary level	Employee Level	Basic Pay
3	Managerial Level I	35000
4	Managerial Level II	30000
5	Managerial Level III	26000
6	Managerial Level IV	22000
7	Managerial Level V	18000
8	Managerial Level VI	14000
9	Staff Level I	14000
10	Staff Level II	10000
11	Staff Level III	9000
12	Staff Level IV	7000
13	Staff Level V	5000

(2) BPDB

The key components of the salary structure at BPDB are shown below;

Table II-4-22 BPDB Pay Scales

Levels/Designations	BPDP- Pay scale	Basic Pay
CE	16800-650-20700	16800
SE	15000-600-19800	15000
EE	13750-550-19250	13750
SDE	11000-475-17650	11000
AE	9000-405-15480	9000

(3) EGCB

The key components of the pay structure of EGCB are shown below;

Table II-4-23 EGCB Basic Pay Scales

Levels/Designations	EGCB- Basic Pay
General Manager/CE	50000
DGM	40000
Manager	30000
Deputy Manager	22000
Assistant Manager	16000
Junior Assistant Manager	11000
Staff – Grade IV	9000
Staff – Grade V	8000
Staff – Grade IV	7000
Staff – Grade III	6000

Levels/Designations	EGCB- Basic Pay
Staff – Grade II	5500
Staff – Grade I	5000

(4) Comparisons

The following analysis can be derived out of the comparison table:

- BPDP pay structure is amongst the lowest level in the power utilities,
- Salary level of EGCB CE/GM class is 3.0 times as same as BPDB's equivalent position.
- Salary level of EGCB EE class is 2.2 times as same as BPDB's equivalent position.
- Salary level of EGCB AE class is 1.8 times as same as BPDB's equivalent position.

Table II-4-24 Comparison Matrix of Basic Pay of Bangladesh Utilities

Designation	BPDP	EGCB	APSCL	DESCO	PGCB
CE/GM	16800	50000	35000	40000	40000
SE/DGM	15000	40000	30000	35000	35000
EE	13750	30000	26000	28000	28000
SDE	11000	22000	22000	22000	22000
AE	9000	16000	18000	18000	18000

4.6.2 Incentive and Benefit

(1) APSCL

The other components of the pay structure of APSCL are as follows:

- House Rent Allowance: HRA is allocated for house rent for the accommodation of the employee and his family. At APSCL, it is 25% of the basic salary for all.
- Medical Allowance: Employees at APSCL receive Tk 800/- per month (for EE & below, for others, it is based on actual) for medical expenses which the employee or his family members may incur.
- Overtime Allowance: This is as prescribed by GOB, and not to exceed 8 hours/week per employee.
- Traveling Allowance: Following kinds of traveling allowances are available at APSCL (varying by grade of employee):
  - Traveling Allowance
  - Fuel Allowance
  - Daily Allowance
- Contributory Provident Fund: Upon joining APSCL, each employee should contribute 2-10 percent of his monthly basic pay – depending on classification – to an interest earning Provident Fund. The contributions will be repaid if he does not complete his probationary period. APSCL will contribute a matching amount to the fund. At cessation of employment, total value of the fund is paid out in a lump sum, equaling the sum of the employee's contributions and interest earned. CPF is paid out regardless of the length of service.
- Gratuity: Nexant suggested that employees leaving APSCL before completing 3 years of service would not receive any pension/gratuity. However, if an employee dies before completing 3 years of service, his beneficiary will receive 2 months' basic pay for every year of completed service since joining APSCL.
- Pension: Employees with a minimum 3 years of service would be eligible for pension. Nexant suggested that pension at APSCL would be non-contributory (i.e. no APSCL contribution).

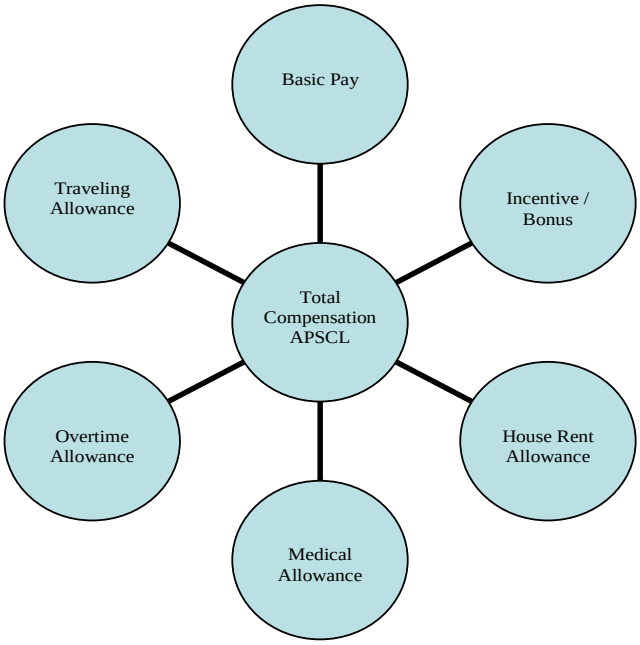


Figure II-4-7 Other components of the pay structure of APSCL

(2) BPDB

- Incentive / Bonus: Employees at BPDB are eligible for an annual incentive based on the performance of their respective departments. In addition, employees receive a festival bonus twice a year (equivalent to one month's basic pay) to celebrate important festivals.
- The other components of the pay structure are:
- Compensatory Allowance: At BPDB, an employee draws compensatory allowance attached to his post. The compensatory allowance is also admissible during the leave including leave preparatory to retirement.
- The house rent support may be drawn during temporary transfer for a period not exceeding four months provided the authority ordering the transfer certifies in the order that the employee is likely to return to duty to the same station on expiry of such transfer. The house rent support may also be drawn during leave preparatory to retirement.
- Medical Allowance: Employees at BPDB receive Tk 500/- per month for medical expenses which the employee or his family members may incur.
- Honorarium: The competent authority may grant an honorarium to an employee for work performed which is occasional in character and either so laborious or of such special merit as to justify a special reward. The work needs to be undertaken with the prior consent of the competent authority and the amount, wherever possible, is settled in advance.
- Overtime Allowance: Overtime allowance for extra hours of work is allowed by the controlling officer at such rates as may be prescribed by the Government to the employees when required to work beyond the normal working hours in operation. The total overtime hours is not to exceed eight hours in a week. However, this limit may be relaxed in case of emergency with the consent of concerned Member of the Board.
- Shift Duty Allowance: The employees, when required to work regularly on rotating shift, is allowed shift duty allowance at such rates as prescribed by the Government.
- Annual Increment: The annual increment in the time scale of pay is drawn as a matter of course, unless it is withheld or forfeited by the competent authority as punishment under chapter XVII of these rules. If the increment is withheld, the withholding authority states the period for which it is withheld. An employee may, in the case of first appointment in recognition of special qualifications or experience, and in other cases, in recognition of outstanding performance or merit, be granted one or more advance increments in a time scale of pay with the prior approval of the Board.

- Retiral Benefits: The following retiral benefits are provided at BPDB:
  - Contributory Provident Fund & Gratuity: Employees can contribute towards the Contributory Provident Fund (CPF) which is set at 10% of basic pay. Gratuity is paid as two months basic pay for every year of service.
  - Pension: In BPDB, employees can opt for Pension in lieu of CPF and Gratuity as per the latest pension rules. On completion of 25 years of service, the employees are entitled to full pension.

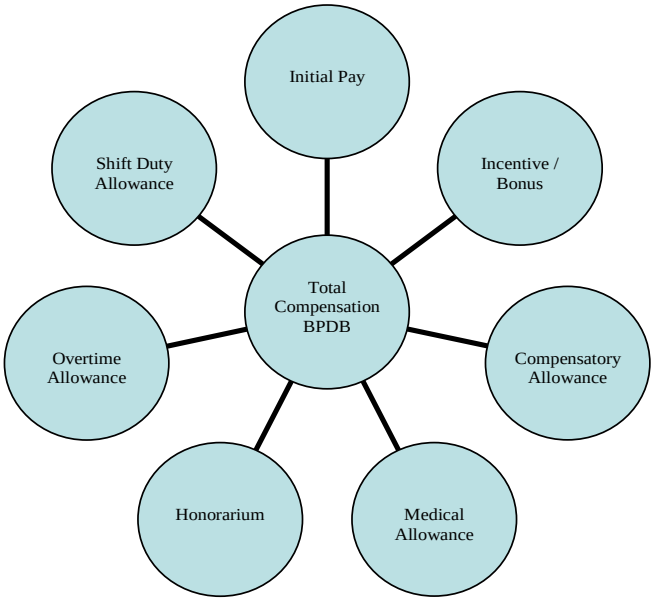


Figure II-4-8 Other components of the pay structure of BPDB

(3) EGCB

- House Rent Allowance: At EGCB, HRA is not admissible wherever company accommodation is available. The incumbent is obliged to avail company accommodation. House Rent for area outside Divisional Headquarters and Narayanganj is 15% lower than stipulated i.e. 35%.
- Festival bonus: Paying incentive bonuses is not a bar in paying festival bonus at EGCB. Festival bonus is admissible as conventionally practiced in Bangladesh.
- Medical Allowance: Employees at EGCB are eligible for Medical Allowance, (varies from grade to grade). In addition, employees facing any accident resulting in temporary or permanent injury while on duty get full medical treatment at the cost of the company.
- Electricity Charge: General Managers and below level employees at EGCB are reimbursed 300 units + VAT + meter rent per month. For Director level employees and above, the electricity bills are reimbursed on actual basis.
- Shift Allowance: This is paid provided the incumbent is assigned to work in shift. This is not paid during the period of leave or absence from duty.
- Annual Increment: At EGCB, minimum annual pay increases by 2% over basic pay. Additionally, annual pay may increase maximum up to 6% over basic pay based on performance appraisal as stipulated in the relevant system.
- Gratuity: Employees at EGCB are eligible for gratuity, which is equivalent to 2 months basic pay for every year (payable after a minimum of 3 years of service).
- Group Insurance: All employees at EGCB are covered under a group insurance policy. The coverage is equivalent to 50 months last basic pay.

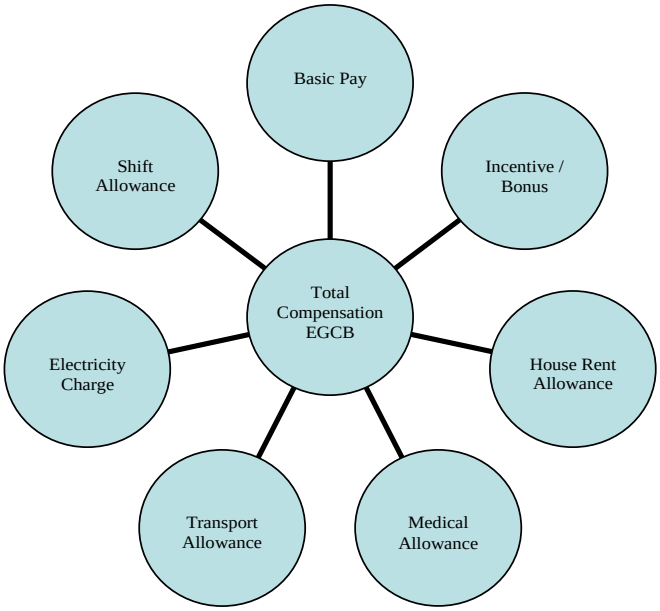


Figure II-4-9 Other components of the pay structure of PGCB

(4) Comparison of Incentive and benefit

(a) House Rent Allowance (HRA)

This is a component of the compensation & benefits package which is allocated for house rent for the accommodation of the employee and his family. It is usually provided as a % of the Basic Pay. The HRA for similar organizations in power sector are provided below as % of Basic pay as defined by the organization:

The following analysis can be derived out of the comparison table:

- In most cases, HRA is not permissible if employee avail the housing facilities of the Company. This is true for APSCL and EGCB. In case the company cannot provide accommodation to its employees, then the HRA would be to the tune of 25% for APSCL and 35% of EGCB. In case of DESCO, the HRA is the up to 50% of the basic salary.
- For BPDP and PGCB, the HRA component is varied across the levels of cities, since the spread of the network requires that employees living in different geographies should be remunerated differently depending on the cost of living and rental accommodation available in the city.
- Since generating companies like APSCL are location based, the HRA component can be flat as depending on the rental and cost of living of that area. But companies like EGCB and NWPGCL might have different locations, in such a case, a varied HRA should be decided upon by NWPGCL depending on the area/city where the power station is located.

Table II-4-25 HRA Comparative Matrix for Bangladesh Utilities

Designation	BPDP				APSCL	EGCB	DESCO	PGCB
Basic pay range	Upto 2800	2800-6000	6001-12000	12001 and above				
Dhaka	65%	60%	55%	50%	25% basic for all	35% basic for all	50% basic for all	45%
Metro Cities	55%	50%	45%	40%				30%
Others	50%	45%	40%	35%				25%

(b) Medical Allowance

Medical allowance is a component of the compensation and benefits allocated for medical expenses, which the employee or his family members may incur. The medical allowance for similar organizations in the power sector is provided below as defined by the organization:

- Medical allowance of APSCL and EGCB is quite low level as compared to DESCO and PGCB.
- Medical allowance level of APSCL and EGCB is as same as BPDB.
- In case of APSCL and EGCB, the medical allowance are adequate to take care of day-to-day needs, it does not provide for the high expenses which the individual or his dependents may incur for critical medical care due to hospitalization.

Table II-4-26 Medical Allowance Comparative Matrix

BPDB	Tk 500 per month
EGCB	Varies between free medical for spouse and family for Directors and GM/CE to Tk 1000 for all employees from DGM and below
DESCO	Varies from Tk. 30000 to Tk. 100000 per annum for Assistant Manager to General Manager
APSCL	Tk. 800 per month for EE & below For others, it is based on actuals
PGCB	12000 p.a for AE to EE, for officers above EE, it is as per the rules defined

(c) Festival Bonus

This component is paid to the employees by the organization to celebrate important festivals. Festival Bonus is paid out twice a year as 1 month's basic pay in each case in BPDB, DESCO, PGCB, APSCL and EGCB.

(d) Other Benefits

- Group Insurance is provided for all employees in BPDB, DESCO, PGCB, APSCL and EGCB.
- In DESCO and PGCB, Transport facilities, residential telephone bill reimbursement, electricity usage up to a certain defined limit are also provided for certain categories of employees.

(e) Retiral Benefits

Retiral benefits include components such as provident fund, gratuity and pension. These are amounts which are accumulated in a fund to be disbursed to the employee at the time of his retirement as a saving to be used after retirement.

The following retiral benefits are provided in BPDB, PGCB, APSCL, EGCB and DESCO.

- Contributory Provident Fund & Gratuity: Employees can contribute towards the Contributory Provident Fund (CPF) which is set at 10% of basic pay. Gratuity is paid as two months basic pay for every year of service.
- Pension: In BPDB, employees can opt for Pension in lieu of CPF and Gratuity as per the latest pension rules. On completion of 25 years of service, the employees are entitled to full pension. Almost all the employees in BPDB have opted for the pension option. Pension facility is not available in DESCO and PGCB.

4.6.3 Recommendations for Compensation Incentive and Benefits System

(1) Introduction of compensation system linked to personal performance

Responsibilities must be proportional to compensation and that the ratio of base pay and that of pay linked to the individual's performance should change depending on the individual's position. For general staff and management (middle), the ratio of base pay should be about 80% and the ratio of pay linked to the individual's performance should be about 20%. For management (upper), the ratio of fixed portion and performance basis should be 60% to 40%. Fixed portion of pay consists of base pay, merit pay, seniority wage and other pays.

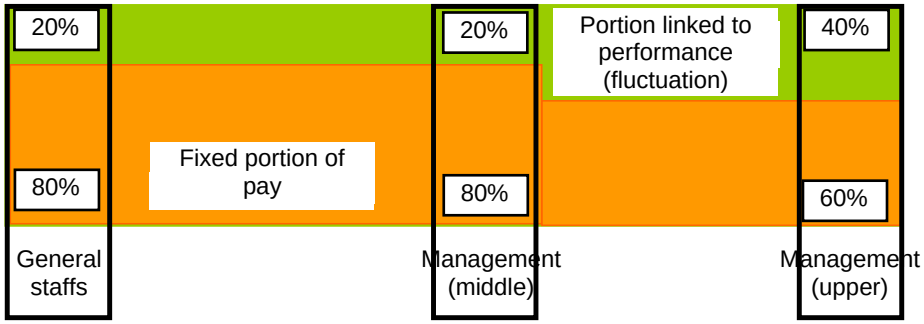


Figure II-4-10 Compensation system linked to personal performance

(2) Examination of Adequacy of Pay Standard

The table below shows pays standards for several companies. As for those converted to a joint stock corporation, the pay standard for employees in the chief engineer class is about 2.4 times more the pay standard at BPDB. As described in Chapter 6, the number of personnel required at Bheramara P/S is estimated at about half of that at BPDB P/S. In view of the high level of performance required and heavy responsibilities, sufficient incentives should be provided. The pay standard at Bheramara P/S therefore should be about three times more the existing pay standard at BPDB P/S. In this regard, however, and as described above, more responsibilities mean that a larger portion of pay is linked to performance. Thus, more responsibilities do not necessarily guarantee high pay.

(3) Retirement Benefit Plan

BPDB adopts three benefit plans, including Pension Plan, Contributory Provident Fund, and Gratuity Fund. The structure of each plan is described below.

(a) Pension Plan

The type of pension plan which BPDB adopts is a defined benefit plan. BPDB employees are obliged to participate in the plan and make certain payments of pension premium every month to the Pension Fund or the Government continuously during their period of employment. The amount of premium is calculated based on the salary of each employee (the rate of pension payment is determined by the Pension Fund by actuarial method). In the same manner, the employer makes contributions of certain amount calculated on the basis of employee's salary (by not necessarily the same rate as that of individual pension rate).

The employees who satisfied the period of employment stipulated in the pension system will receive after retirement and after reaching a certain age the amount of pension through their retirement life, which is determined based on the salary level at the time of retirement. Usually, pension is paid out throughout the retirement life of an employee and his/her spouse. While the advantage of a pension fund is that regardless of the amount of contribution the employees made, they are guaranteed of a lifetime income, employers may need to make up balance of capital for pension payment, if retirees live longer than assumed. In consideration of an aging society, it is necessary to calculate pension premium by actuarial method at a regular intervals and make adjustments in the amount of annual contributions to be made (both by employees and employer).

(b) Contributory Provident Fund

The contributory provident fund is a lump-sum payment system. Usually, employee participation is on a voluntary basis. In case the employees participate in the system, they declare and pay the amount of contribution within a limited amount to be deducted from their salary by the employer. Whereas the employer makes certain contribution based on the amount employees pay and in line with a certain standard (in case of BPDB, the amount of contribution to be made by the employer is the same as the amount employees pay) and deposit the contributions in the trust account specified by the Fund. At the time of retirement, employees will receive the total of their own contribution, company contribution and any profits earned from fund management.

(c) Gratuity Fund

The gratuity fund is a lump-sum payment system. The employees join the system automatically at the time of employment. They are not required to make any contributions.

When the employees who satisfied the set period of service retire, they will be granted the gratuity fund equivalent of certain months' last salary, the amount of which is determined according to their years of service.

The pension plan is a defined benefit plan, while the rest of the two plans is a lump-sum payment system. With respect to a defined benefit plan, it is essential to carry out actuarial valuation based on the forecast of pension payout in the future and calculate required sum of contribution in order to balance out the difference between the contributions made so far and the required amount. However, BPDB does not adopt actuarial valuation nor does it forecast the total amount of contribution in the future. Therefore, in the process of aging society, BPDB may encounter payment burden on an unexpected scale.

In the preparation of basic accounting policies, it is critical to take into consideration the following principles and develop policies in line with them.

Retirement Benefit Plans are structured usually either by defined benefit scheme or defined contribution plan. In case of adopting a defined contribution plan, a financial statement should report the amount of net assets deposited for the benefit plan and related contribution policies in order to satisfy the reporting requirements.

The "International Accounting Standards" and "Bangladesh Accounting Standard," which Bangladesh adopts stipulate that a financial statement should comply with either one of the following principles, in case a defined benefit plan is adopted.

- The amount of net assets deposited for the benefit plan, present value of total benefit and excess or shortage of deposits resulted from the difference between the deposited amount and paid-out amount should be reported on the statement of account.
- The amount of net assets deposited for the benefit plans should be reported on the statement of account. The present value of benefit obtained by actuarial valuation and committed to employees should also be reported on the statement of account or an explanatory text on the actuarial valuation report should be inserted.

The present value of committed pension benefit through actuarial valuation is calculated in consideration of the employment period up to the end of current period and based on the current level of salary or projected level of salary at the time of concerned employee's retirement. The amount of contribution to retirement benefit funds will be reported in market value. In case the retirement benefit obligation reported on the balance sheet does not present the current value of projected pension payments, the company should disclose that it does not satisfy the accounting standards. Actuarial valuation of retirement benefits is an essential step in principle.

It is important for the management to acknowledge that retirement pension is a contingent liability which may become a management risk, and to take appropriate measures to manage pension plans. APSCL, a preceding model case, manages gratuity funds and provident funds but does not adopt a defined benefit plan. Similarly, IPP adopts only two lump-sum payment plans and postponed the introduction of defined benefit plan. Also the trend in developed countries is for the companies to terminate and shift from defined benefits to defined contribution. It is advisable that corporate management should strive for ways to avoid uncontrollable risks as much as possible.

(4) Transition of benefit to incentive system

As the figure below shows, compensation consists of fixed pay, pay and bonus that are linked to performance, and benefits.

Like other companies that are already providing benefits excluding pension and retirement allowance which has been discussed in the previous clause, company housing, financial aid to cover medical cost and electricity should be offered to follow the cultural habit of Bangladesh and to provide the same level of benefits as other companies to employees. However, an employment contract does not

guarantee lifetime employment and the period of employment is, in principle, five years. In addition, some portion of the base pay is proposed to be a performance basis. For this reason, introducing a mechanism to reduce benefits and place increased focus on incentives is considered an option.

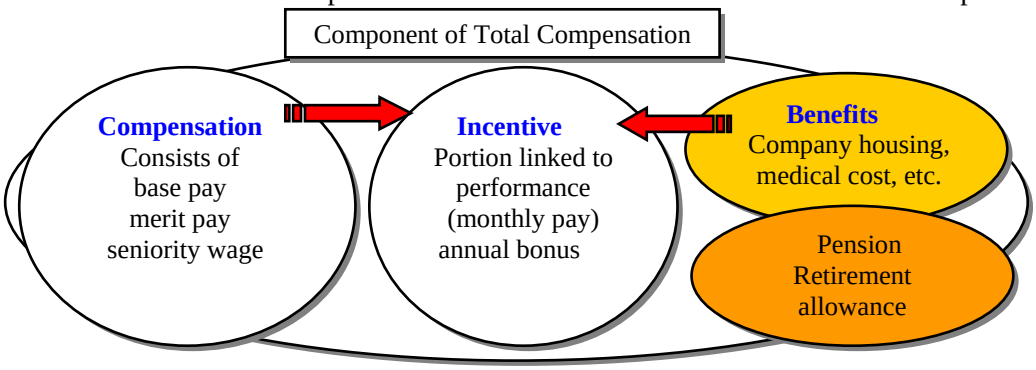


Figure II-4-11 Component of Total Compensation

4.7 Career Development

4.7.1 Approach to Career Development

Career development and Training deals with the design and delivery of learning to improve performance, skills, or knowledge within organizations. Organizations to a large extent emphasize the importance of learning for the individual and the organization. Due to worldwide development of companies and altering technologies, most Organizations have realized the importance of corporate training. Training is considered as more of withholding tool than a cost. The training system in the most Industry has been changed to create a smarter workforce which can yield the best results. With increase in competition, every company wants to optimize the utilization of its resources to yield the maximum possible results.

In addition to the traditional training required for a trade, occupation and profession, organizations recognize today the need to continue training beyond initial qualifications: to maintain, upgrade and update skills throughout working life. Primarily training takes place as either On-the-job which is done through a normal working situation by the usage of the actual tools, equipment, documents or materials that trainees will use when fully trained. Off the job training is arranged away from normal work situations. Off-the-job training allows people to get away from work and concentrate more thoroughly on the training itself.

Therefore training is the process of upgrading the skills, technical and behavioural/ managerial, of employees in order to improve their effectiveness on the job and increase their performance levels. While training involves skill up gradation for the current job which the incumbent is holding, development involves the same for a future job, where the incumbent is likely to get promoted.

4.7.2 As- is Analysis

(1) BPDB

- BPDB has a well-defined training policy.
- BPDB has a policy of minimum training to be provided to every employee which has been defined as at least 5 training days in 2 years, non compliance of which would lead to a summon for explanation.
- The Training Directorate and functional heads jointly carry out the training needs analysis once in 5 years and review it annually to develop the training calendar. However, the Training Need Identification is based purely on the subjective inputs by superiors. BPDB does not have a system of capturing training needs based on performance evaluation or job descriptions.
- BPDB has both in-house, external training and a system of “On the job Training” and a concept of mentoring. BPDB has good training infrastructure.

- BPDB develops its own training calendar and well defined training modules. The training courses are both behavioural and technical courses. It also conducts compulsory induction courses for new joiners.
- It may be noted that though immediate evaluation post training is captured, the effectiveness of the training provided on the job or its impact on performance is not measured or captured.

(2) APSCL

- APSCL does not have a sound training policy.
- APSCL has a training centre. Regarding the new employees, they can receive the training on the job together with much experienced people. Therefore, the training centre is not well utilized.

(3) EGCB

- EGCB does not have a sound training policy.

(4) PGCB

- It has a well-defined training policy.
- Training program target links to the corporate target.
- There will be long-term plan (5 years) and an annual short-term plan for implementing training programs at PGCB.
- All personnel and functions in PGCB will be included in the training plan. It will be the responsibility of all functional heads (GM, DGM, Manager) to ensure that all personnel under his/her control are included in the relevant plan.
- A person shall undertake at least 3 days (18 contact hours) training in every year in his/her field of work in order to maintain competency. Functional heads will ensure that all personnel under his/her control fulfill this minimum requirement.
- To fulfill the need for human resource development PGCB may utilize the training facilities of BPDB and other power sector utilities on payment. PGCB can alternately build up its own training institutions.
- Training outcomes will be measured by applying suitable methodology. Corrective and preventive measures will be initiated accordingly.
- PGCB develops members of its own staff as trainers in different areas to provide professional input in large number of training courses to be implemented in its training facilities. At PGCB, efforts are made to develop and maintain at least 30 professional trainers from various disciplines. The broad fields to be covered are as follows:
    - Management: 3 trainers
    - Transmission: 12 trainers
    - Finance & Accounts: 3 trainers
    - Computer Applications: 3 trainers
    - Industrial Relations: 3 trainers
    - Occupational Health & Safety: 3 trainers
    - Others (Dev. Planning, Engineering Management): 3 trainers

4.7.3 Gap Analysis: Career Development and Training

The comparator table on training procedure and policy suggest that most newly corporatised entities have stressed the need and importance of training and development of its resources. The have paid due emphasis on a systematic training approach and increasingly trying to move towards aligning the training objective with the overall objective of the organization. Most entities have identified training budget, necessary man-days and infrastructure requirements as part of the Training Policy adopted by them. Most of the corporatised entities have on the job training and classroom training as methods of imparting training. Their calendar includes both technical and behavioural training imparted to employees. The need for training evaluation has also been given due importance.

Table II-4-27 Training Comparative Matrix for Bangladesh Utilities

Company	Training Approach		Aligned w/ company objective	Training Policy Components			Training Need Analysis	Mode of Training			Types of Training		Training Evaluation
	Ad-hoc	Systematic		Man-Days/yr	Budget	Infrastructure		OJT	Classroom Training	Online / CBT	Technical	Behavioral	
APSCL		✓			✓		✓	✓	✓		✓	✓	
BPDB	✓			✓		✓		✓	✓		✓	✓	
EGCB*		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
PGCB		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
DESCO		✓		✓		✓		✓	✓		✓	✓	
SZPDC*		✓	✓				✓	✓	✓	✓	✓	✓	
CZPDC*		✓		✓	✓	✓	✓	✓	✓		✓	✓	✓

* As suggested by Consultant

4.7.4 Recommendations for Career Development and Training

(1) Long-Term Human Capital Development Planning/ Human Capital Portfolio

Under the current status of BPDB power stations, a majority of Human Capitals is likely to belong to Category 4, implementing routine work accurately and efficiently within the existing framework. Therefore, the power station focuses on developing operation and maintenance personnel.

When the plant becomes under NWPGCL, and delegation of authority is enhanced, not only a degree of freedom in management is enhanced, but also responsibility and self-autonomy in management will be required. At the same time, the business management plan should be prepared based on thoughts regarding management. Hence, adapting such changes to the business environment will diversify Human capital not only from a technical aspect, but from the aspect of management capability as well.

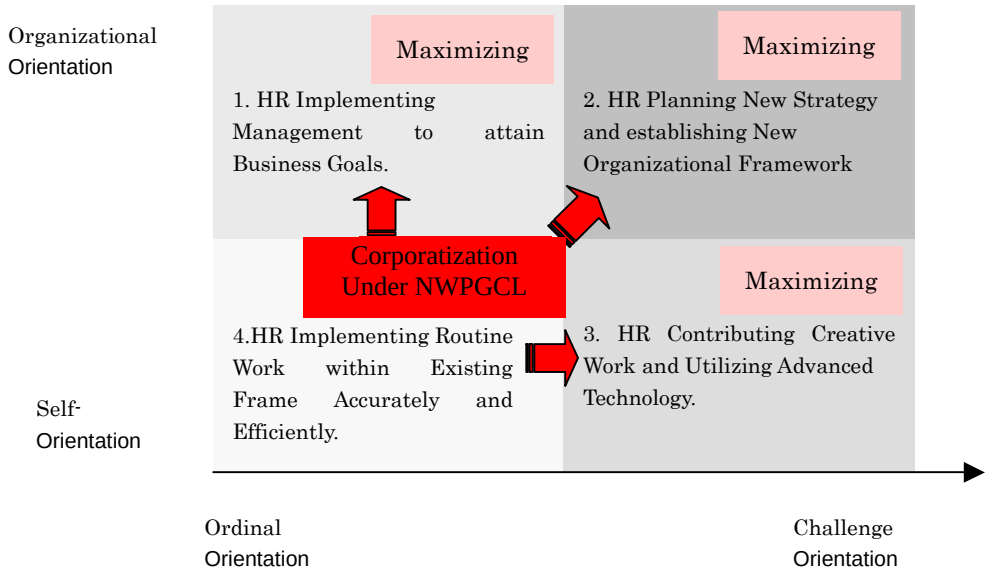


Figure II-4-12 Human Capital Portfolio

(2) Introduction of training system for TQM promotion

(a) Basic Management Training

Management is generally defined as all activities utilized for managerial resources (human, operational, financial, and informational) effectively, economically, and with sustainability. For the first stage, enhancing the management capabilities of middle-class managers is a top priority. Therefore, a training program on Basic Management is recommended.

Two core principles exist for this training program, "Work Management" and "People Management". These core elements are respectively subdivided into two aspects: "Managing Tasks" and "Improvement Tasks" under the principle of "Work Management" and "Enhancing Interpersonal Relations" and "Training and Instructing Members" for "People Management".

(b) Training for Problem-Solving Capabilities

The most important task for middle class managers is to improve daily tasks continuously in order to enhance the quality of work. Therefore, problem-solving techniques (QC Story) for enhancing the ability to improve the quality of work is recommended as a key tool to develop Problem-Solving Capability at the Plant level. The following is a list of the seven major steps required for establishing a QC Story; Theme Selection, Grasping Status and Goal Setting, Establishment of Activity Plan, Cause Analysis, Examination of Countermeasures and Implementation, Assessment of Effectiveness, Standardization and Permanent Fixture.

4.8 Acceptance of Existing Power Stations and Simulation of Manpower Planning

4.8.1 Simulation of Manpower Planning

(1) Simulation Conditions

In consideration of the current personnel conditions at the existing power stations located in northwestern part of Bangladesh, NWPGCL manpower planning simulations have been conducted.

(a) Number of personnel at each power station

The current number of personnel working at each power station as of July, 2008 and its future target [1]are described below.

Table II-4-28 Current number of personnel working at each power station and future target

Name of power stations	Output (MW)	Current manpower	Future target	Target policy
Baghabari	171	140	87	In consideration of this station being equipped with two unautomated facilities, the future manpower target is planned at 87, which is 1.2 times of the manpower at the Sirajganj (New) station.
Barapukuria[2]	250	417	250	As this station is automated, output per manpower is assumed to be 1MW.
Bheramara (Existing)	60	177	101105	In consideration of this station being equipped with three unautomated facilities, the future manpower target is planned at 105, which is 1.4 times of the manpower at the Sirajganj (New) station.
Khulna (Existing)	166	840	332	Output per manpower is assumed to be 0.5MW (equivalent of 40% of the existing manpower)
Bheramara (New)	360	-	94	See Section 4.3.5
Sirajganj (New)	150	-	72	Contrary to the Bheramara (New) station, this station is not equipped with a boiler. So manpower is reduced by 22.
Khulna (New)	150	-	72	
NWPGCL HO (New)		-	40	See Section 4.3.3

[1] Target at the existing power station is determined based on manpower planning simulation. Thferefore, a detailed examination is required for actual manpower transfer.

[2] The current manpower is: BPDB Regular Actual working =145 Nos., Outsourced = 228 Nos., Chinese Expert = 44 Nos.

(b) Assumed natural reduction of manpower due to retirement (at existing power station)

The number of workers at the existing Bheramara power station to be retiring in each fiscal year is shown below

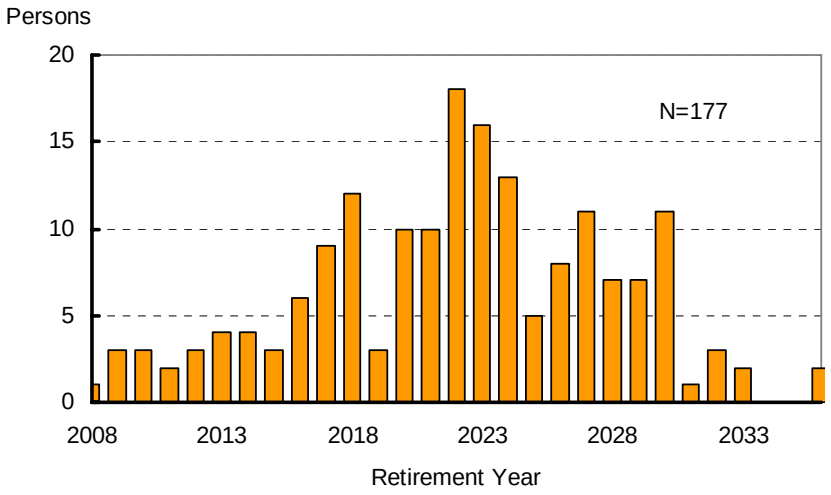


Figure II-4-13 Number of workers at the existing Bheramara power station due to retire by year

During the period between 2009 and 2015, the number of retiring staff is three to four per year, i.e., 2% of the total manpower is expected to decline every year. In a similar fashion, about 2% of the total manpower at other existing power stations was envisaged to decline every year due to compulsory retirement.

(c) Transfer period of existing power stations and running-in period of newly-built power stations

The transfer period of existing power stations and the running-in period of newly built power stations are shown below. The existing Bheramara power station will be operating until 2013 and cease operation in 2014, when the new Bheramara station is scheduled to start operation.

In terms of the existing Khulna power station, the basic assumption is that it will not be transferred to NWPGCL.

Table II-4-29 Transfer period of existing power stations and running-in period of newly-built power stations

Baghabari	2009
Barapukuria	2009
Bheramara (Existing)	2010
Khulna (Existing)	-
Bheramara (New)	2014
Sirajganj (New)	2012
Khulna (New)	2012

(d) Other conditions

- No new personnel will be hired at the existing power stations.
- Upon the transfer of existing power stations to NWPGCL, only the future manpower target will be recruited.
- In regards to the personnel to be working at new power stations and NWPGCL headquarters, recruitment activity will start before the commencement of operation and ensures required number of manpower by gradually increasing the number.
- The hired manpower to be working at the new power stations and NWPGCL headquarters will be publicly recruited from a broad range of employment markets. Thus, about 20% of the

positions will be filled with those outside of the current manpower working at the existing power stations.

- Except for 44 Chinese experts, about 80% (182) of 228 outsourced manpower at the Barapukuria power station will be considered as target candidates.

(2) Simulation of manpower forecast

(a) Basic case

The simulation of manpower forecast of a basic case is indicated below.

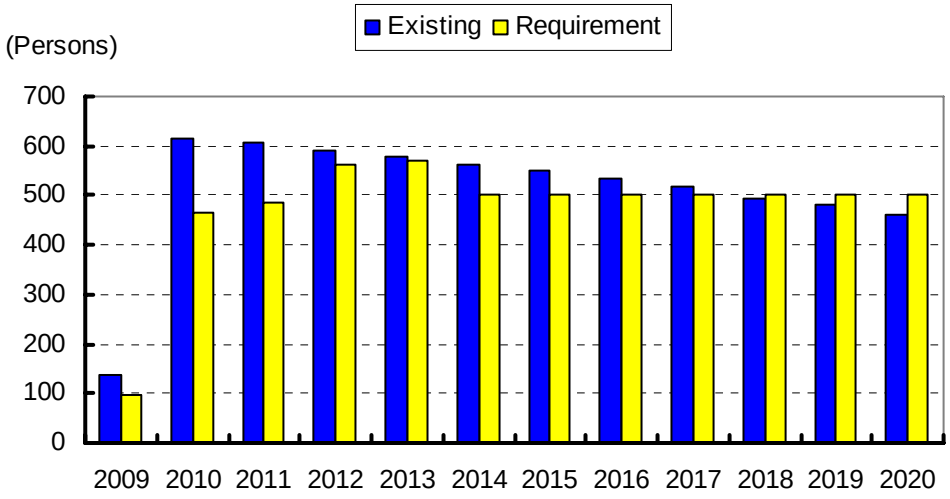


Figure II-4-14 Result of simulation of manpower forecast (base case)

When the Barapukuria and Baghabari power stations are transferred (to NWPGCL) in 2009, the number of manpower working at the existing power stations will be drastically reduced, creating about 100 unfilled positions. In 2012, however, as the new Sirajganj and Khulna power stations start operation, a demand for required manpower will arise and open positions will be filled in just proportion. Yet, this number will be balanced out with natural retirement and in time, manpower demand will increase gradually.

(b) The case in which the existing Khulna power station is also transferred to NWPGCL (2012)

The result of the manpower simulation in the event the existing Khulna power station is also transferred to NWPGCL in 2012 is shown below.

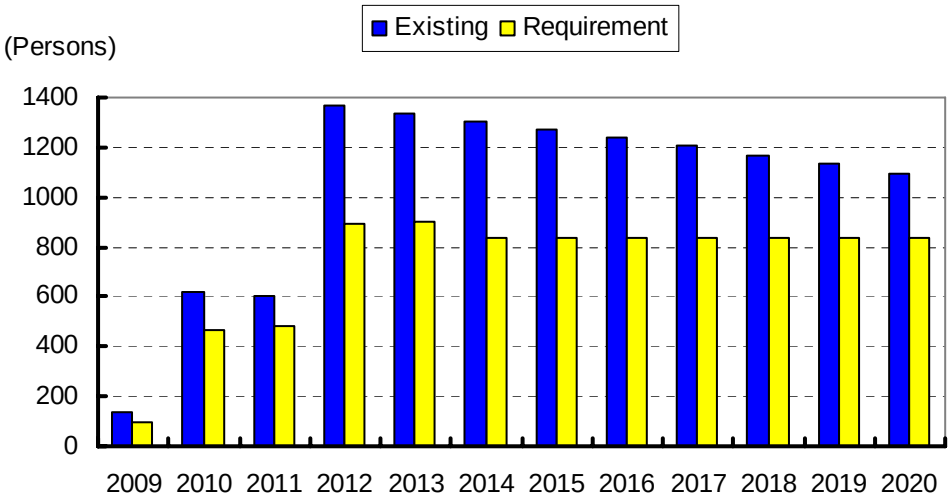


Figure II-4-15 Case in which the existing Khulna power station is also transferred to NWPGCL

There is a big gap between the current and required manpower at the existing Khulna power station. Thus during the period between 2012 and 2016, there is assumed to be a large redundancy with more than 400 excess personnel. Though in the following years, retirement creates natural decline in the workforce, yet large excess will not simply be eliminated.

(3) Recommendation based on the simulation result

Based on the result of manpower simulations, the NWPGCL manpower planning including that for existing facilities to be transferred to NWPGCL is proposed as stated below.

(a) Secure manpower with required skill level

The current simulation assessed simply the excess and shortage of manpower. The result indicates that there will be excess in total manpower. Practically, however, the required manpower is determined for each area of specialization and/or by level of positions. Therefore, in some cases, there is a potential shortage of manpower in certain areas of specialization or level of positions. To secure the manpower which requires expertise, it is preferable to recruit the talent with required knowledge from a broad range of employment markets, without moving the personnel working at the existing facilities to other locations by changing their job.

(b) Personnel assignment at the existing facilities

Many of the personnel working at the existing facilities are fully familiarized with the characteristics of existing facilities. It is not possible for newly hired workers to operate and maintain the existing facilities transferred to NWPGCL by themselves. Thus it is essential to secure the manpower currently working at these existing facilities to some extent. In addition, no matter if the manpower who knows the characteristics of the existing power stations is gathered, reducing the number of personnel to a required level immediately after the transfer may bring about the possibility of lowering operational and maintenance skills, unless the performance and skill levels of each person improves. To cope with this problem, it is preferable not to reduce manpower to the required level for the time being but secure a slightly excess level of manpower, and then reduce the number gradually, after the performance and skill levels of each person has improved.

(c) Transfer of existing Khulna power station

As indicated in the simulation, the existing Khulna power station retains many personnel with a large gap between the current and required numbers of staff. Upon the transfer, many challenges concerning the treatment of excess personnel are expected to arise. Because of this, it is recommended not to incorporate the existing Khulna power station into NWPGCL, if it is feasible.

(d) Continuous acquisition of freshman employees (imbalances in age structure)

There is a high possibility of creating large imbalances in age structure, if recruitment relies only on screening from among the adaptable workforce potentials who are currently working at the existing facilities and on open recruitment from employment markets in accordance with the area of specialty and level of positions. To avoid such situations, it is necessary to continue hiring and training new graduates, who cannot be an immediate workforce, but have a large potential ability.

4.8.2 Considerations on the Acceptance of Existing Power Stations

The advantages and disadvantages of the acceptance by NWPGCL of the existing power stations located in northwestern Bangladesh, during the period when the Bheramara power station is being built are summarized below.

(1) Advantages

(a) Existing power stations bring about income while new Bheramara power station is being built

Managing existing power station(s) and obtaining income from selling power establish a financing framework. With corporate efforts, a virtuous cycle will be created to obtain greater profit.

On earning and expense, the management of existing power station(s) is inefficient as there are more personnel than necessary. Under the current system, however, the sum of necessary expenditure and compensation is assured as an income of power sales, it is assumed that NWPGCL can secure profit, if it takes over any existing power stations as they now stand.

(b) Scale of NWPGCL operations become larger at an early stage

By accepting existing power stations, NWPGCL's asset and employee number will increase and its operational scale expands. Larger operational scale streamlines the structure and system of the administration departments at the headquarters.

(c) The actual entity as a corporation shall be established at an early stage

Since accepting existing power stations can create operatin revenue by selling electlicity at the power stations, the actual and visual corporate entity can be established.

(2) Disadvantages

(a) There will be necessity to prepare conditions concurring transfer as NWPGCL at an early stage

1) Preparation of manuals

In concurrence with the transfer of power production facilities, workers are also transferred from BPDB to NWPGCL. Thus original manuals need to be prepared by NWPGCL before transfer.

- Organization structure
- Compensation package
- Employment conditions
- Job descriptions
- Service rules
- Delegation of power

It is possible to use the BPDB manuals for these without change. However, originality as NWPGCL cannot be emphasized in this case, and it is highly likely that the BPDB corporate culture may also be succeeded entirely. On the other hand when original NWPGCL manuals are to be developed, the current BPDB manuals shall be examined sufficiently to make improvements. Originality of NWPGCL may not be delivered if sufficient time cannot be ensured for manual examination and preparation and transfer is implemented too speedily.

Furthermore, the above manuals are the least necessary manuals. It is possible to use the BPDB manuals as other manuals (such as safety manuals) for the time being, but it is necessary to prepare the NWPGCL original manuals eventually.

2) Necessity to settle the employee retirement benefits concurring with transfer

According to BPDB Service Rules, the employees are entitled to retirement benefits at their retirement. All employees who will be transferred to NWPGCL at facility transfer will retire from BPDB and become NWPGCL employees. Therefore, BPDB will require a large amount of cash in one time as retirement benefit at the time of transfer. It is an extremely serious problem for BPDB which has little cash at hand, and it may take a long time before this issue is solved.

If transfer is implemented without solving this issue, retirement benefit liabilities may also be transferred to NWPGCL and cause serious adverse effects on the NWPGCL management environment. It is thus necessary to discuss the methods of settlement regarding retirement benefit for employees with BPDB before transfer and solve this issue.

3) Necessity to start consultation on contract as soon as possible

It is necessary to conclude the following contracts in concurrence with the transfer of power stations:

- Vender's Agreement (BPDB)
- Power Purchase Agreement (BPDB)
- Fuel Supply Agreement (Fuel company)

Regarding Vender's Agreement, it is necessary that all assets to be transferred be assessed. BPDB implements Identification Verification Valuation Recording (IVVR) on all existing power stations. This process is planned to be completed in December 2008, and the asset values for all power stations will be determined at that point. Thus it is expected that conclusion of Vender's Agreement will be concluded smoothly.

Regarding PPA, it is expected that it can be concluded relatively easily if conclusion of Vender's Agreement is completed smoothly and the direction of the contract between APSCL and BPDB is followed. However, the operable output shall be checked properly regarding the dependable capacity specified by PPA before transfer, and measures such as reduction of the asset value need to be taken depending on the values if the operable output is smaller than the facility output.
Furthermore, FSA has already been concluded between the fuel company and BPDB and thus there is no need for special discussion on its details. It will be sufficient only by changing the contracting party from BPDB to NWPGCL.

(b) Building a unique NWPGCL corporate culture becomes difficult

NWPGCL aims at recruiting highly motivated employees publicly and managing self-reliant power stations run by a small group of elite staff.
If it takes over existing power stations at an early stage, many of BPDB personnel working at the existing power stations will join NWPGCL before it builds its own corporate culture. As such, there is a danger of NWPGCL taking over the current BPDB culture as is, which in turn may be rooted in NWPGCL, negatively influencing the process of building NWPGCL's own culture.
As a method to avoid these risks, it is desired that the director of the power station and several top supervisors be employed by public recruitment and that a new employee of NWPGCL shall be placed at the top of the power station to nurture the original corporate culture of NWPGCL.

(c) Securing competent human resources as the new manpower at the Bheramara power station is difficult

The new Bheramara power station is located in northwestern Bangladesh. If the personnel are publicly recruited, it is highly possible that a majority of the applicants might be those already engaged in power industry in northwestern Bangladesh (i.e., those who are currently working at the existing power stations in north western Bangladesh). If NWPGCL takes over the existing power station(s) before it starts public recruitment for the new Bheramara power station, the personnel who have worked at the existing power station(s) will already be an NWPGCL employee, making them less motivated to apply for the positions at the new Bheramara power station. Thus it becomes difficult to select the best human resources from among the potentially many applicants for the new Bheramara power station.

(3) Proposed treatment of staff at the existing power stations

There may not be a serious problem if only the owner of the power facilities changes at the time of transfer. In the event of personnel cut or lowered level of welfare program, however, a large problem including labor related issues such as accelerated union activities and filing of law suits may develop.
It is not a good idea for NWPGCL to accept the existing power station(s) as is, as it may takeover the makeup of BPDB without modification. Thus NWPGCL will take some action to streamline the old system. It is advisable to make a soft landing on the treatment of staff rather than to implement a drastic change at the time of transfer, while ignoring temporary inconveniences.
The result of manpower simulation shows that in case the existing Khulna power station is not taken over by NWPGCL, simply observed, the number of personnel will be balanced out around 2017. Including this point and above-mentioned background, following recommendations are submitted:

(a) Establish transfer period

There is a high risk with selecting required personnel by a single interview at the time of transfer. It is advisable to set up a transfer period (of about three years), during which a generous number of staff should be secured for the same salary level as that of BPDB. It is recommended to reduce the number of personnel to the level of required staff, after the transfer period and in consideration of the performance of personnel during the transfer period. If the transferred employees are aware that their performance during the transfer period is one of the measures for a continuous employment after the transfer period, their work attitude may change during that period. In addition, they will gain motivation to improve business performance, which is expected to become crucial to improve the ability of all the existing staff.

(b) Ensure freedom of choice

At the time of transfer, all personnel should be given an option whether they will be transferred to NWPGCL or remain as BPDB staff. In this selection, to promote proper selection and avoid the future troubles, all conditions for transferring to NWPGCL (labor conditions, contract years, wage levels, welfare program and so forth) shall be presented. To enable this, compensation package, employment conditions, service rules and so forth need to be prepared before facility transfer.

If it is decided that the personnel are transferred back to BPDB as a BPDB employee, since their former work place is already incorporated into NWPGCL, they cannot be assigned to their former station and are obliged to change their position of duty. However, The power stations are scattered in location, and it may require moving of residence instead of simple work transfer. Considering such situations, it is necessary to discuss the employee working conditions with BPDB in advance so those who choose to stay as BPDB employees can be presented with the selections regarding transfer destinations and so forth.

(4) Proposal of personnel transfer process

Based on the conditions stated above, following personnel transfer process is proposed in relation to the treatment of staff working at the existing power stations:

Table II-4-30 Proposed personnel transfer process at existing power stations

(A)	The BPDB staff working at the existing power stations can apply for a job opening at the new power station (s) recruited by NWPGCL.
(B)	If the applicant passes the recruitment exam, NWPGCL will hire him/her as a permanent employee with a higher salary. Their new position will be at the new power station, for which the recruitment was made.
(C)	If the applicant failed the recruitment exam, he/she remains working at the existing power station as before as BPDB personnel.
(D)	Confirm the intentions of all the personnel working at the existing power stations just before the transfer.
(E)	Those who wish to remain to be a BPDB staff can do so, except that they need To transfer to other power stations under the control of BPDB, as the existing power station will be transferred to NWPGCL.
(F)	All those who wish to transfer to NWPGCL become NWPGCL's temporary employees with a time limit of three years. In this case, the salary level is the same as before. Their position will also remain the same in principle. NWPGCL will enter a three-year transitional employment agreement with all the temporary employees, which stipulates clearly that continuation of employment may be determined at an interview after a period of three years.
(G)	If NWPGCL recruits personnel for new power stations during the transitional period, one can apply for the job opening. If the applicants pass the recruitment exam, they will become NWPGCL's permanent employee with a higher salary. Their position will be at the new power station, for which the recruitment was made. If the applicant failed the recruitment exam, his/her status as a transitional employee of NWPGCL does not change.
(H)	At the expiration of a transitional period of three years, NWPGCL will offer a permanent employee recruitment interview. A single interview does not decide their employment. In consideration of their performance during the transitional period, the subject employee will be evaluated. Since a sharp reduction in manpower is not required, a reformation of awareness is implemented for targeting all personell adoption. If the reformation is successfully implemented, and staff work ethic is sufficiently reformed during the transitional period of three years, pass rate is expected to exceed 90%.
(I)	In the event the transitional employee fails a final interview, he/she must leave the company. (There is no option for them to return to BPDB). In order for them to pass the exam, transitional employees are encouraged to change their work ethic.
(J)	Upon passing the final interview, transitional employees become a permanent employee of NWPGCL under the same compensation package with other employees. The double standard for the compensation system will be eliminated.

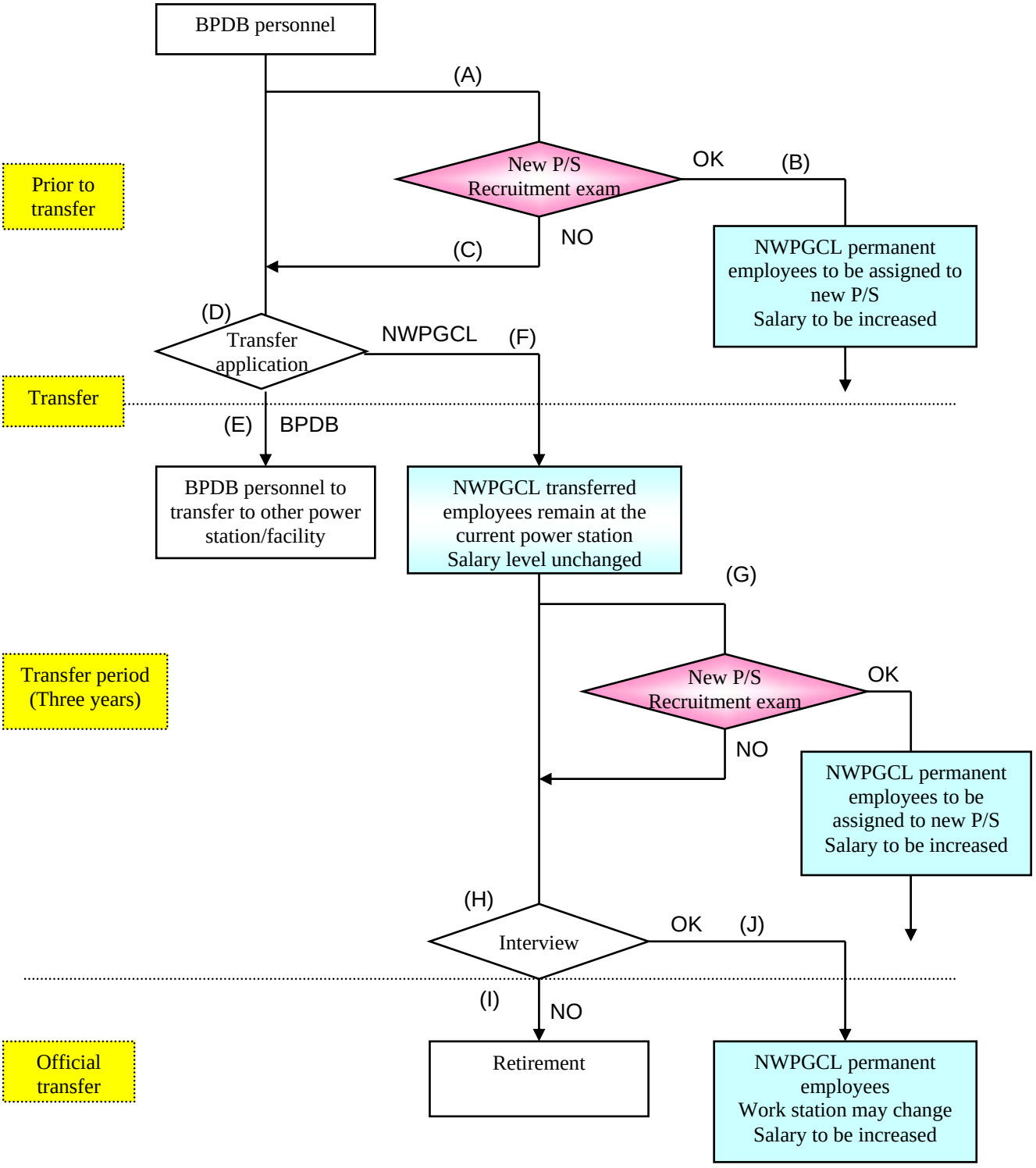


Figure II-4-16 Proposed personnel transfer process at existing power stations

(5) Issues related to proposed transfer process

(a) During the transitional period, there will be double standards for the compensation package

During the transitional period, there will be the gap in the salary between the permanent employees who passed a regular recruitment exam and transitional employees. However, the transitional employees are always given an opportunity to take an exam to be conducted by NWPGCL for the recruitment at the new power stations. Thus in mid-course of transitional period, there is still a change for them to become a permanent employee if they make efforts.

The double standard for the compensation system will be eliminated after the transitional period of three years.

(b) Measures for increased salary at the time of official transfer

The salary level of the transitional employees, who passed recruitment interview at the termination of the transitional period, will increase as they become a permanent employee.

A reformation of awareness is implemented for targeting all personnel adoption, if the reformation is successfully implemented and staff work ethic is sufficiently reformed during the transitional period of three years. Since most of the transitional employees are expected to make efforts during the transitional period, the higher pass rate of recruitment interviews at the termination of transitional period is predicted at over 90%.

The total personnel expense will increase to a large extent, as the salary level rises sharply at this point in time. On the other hand, as the processing ability of employees improves during the transitional period, operational efficiency becomes higher than before the transition, so cost reduction can be expected. The reserves stored as a result of cost reduction will be put aside to respond to an extensive increase of total personnel expense to occur at the termination of transitional period.

(c) Treatment of those who are to leave the company at the time of official transfer

The employees who failed the recruitment exam and were not hired at the time of official transfer must leave the company eventually. The employees who did not demonstrate any potential to improve during the transitional period will not be recruited since the company offers much opportunity to promote awareness reformation for them during transition period. The proportion of such employees is projected at less than 10% of all applicants. Rejection of hiring such employees would not cause a serious problem as the transitional employment agreement stipulates this point clearly when it was concluded between the company and the transitional employees.

Chapter 5. Accounting and Financial Management

5.1 Approach for Achieving the Corporate Vision

In order to successfully materialize the corporate vision of attaining the Independence of Management, this chapter deals with the implementation of "Making Accurate Management Judgment", "Making Prompt Decision", and "Promoting Management Efficiency" in the field of the "Accounting and Financial Management";

Corporate Vision : Independence of Management
- Making Accurate Management Judgment,
- Making Prompt Decision, and
- Promoting Management Efficiency

5.2 Accounting and Accounting Policies

5.2.1 Accounting System at BPDB

BPDB has been established in 1972 in separating from Bangladesh Water and Power Development Authority by virtue of the Presidential Order No. 59. Its juridical status is classified to be one of the government agencies and therefore is exempt from adopting Bangladesh Accounting Standard. The current financial accounting system was introduced at BPDB in the early 1970's. At that time the consultants, SGV & Co prepared a comprehensive accounting manual. The SGV manual, and its updates, remains the authority for accounting followed in BPDB. The chart of accounts was designed by SGV and it remains in use with sporadic modifications. BPDB has been slow in automating its financial and accounting management and remains to be belated in catching up with the development of current style of business practices while resorting to the manual operation for its financial and accounts processing.

At BPDB, the accounting operation takes place at three levels:

a) Billing Units: Records like debtor ledger, bill register, receipt cash books and petty cash books are maintained.
b) RAO: This is where most of the accounting effort is concentrated. Control ledgers are maintained for each unit as appropriate.
c) Head Office Accounts: The consolidated trial balance submitted by each RAO from control ledger is further consolidated for entry into GL for the whole of BPDB.

At present the accounting transactions are manually processed at Regional Accounting Offices (RAO). RAOs have the responsibility of disbursement function and for accounting of all transaction related to the offices under the jurisdiction of each RAO. RAOs maintain basic books of accounts and prepare monthly and yearly accounts in form of trial balance for each of the units' office under its jurisdiction and a consolidated trial balance. The trial balance is then sent to the Head Office (HO) in Dhaka for compilation, consolidation and preparation of financial statements in the form of balance sheet, income statement and cash flow statements.

The general ledger is maintained manually and consists of the revenue, expenses and asset categories consolidated from the RAO trial balances added to the HO trial balance. It gives a break down by chart of accounts, codes of consolidated revenue, expenses, asset and liability balances. Its usefulness is in providing information for annual accounts and is limited for MIS purpose.

The accounting modules specific for BPDB can be segregated as:

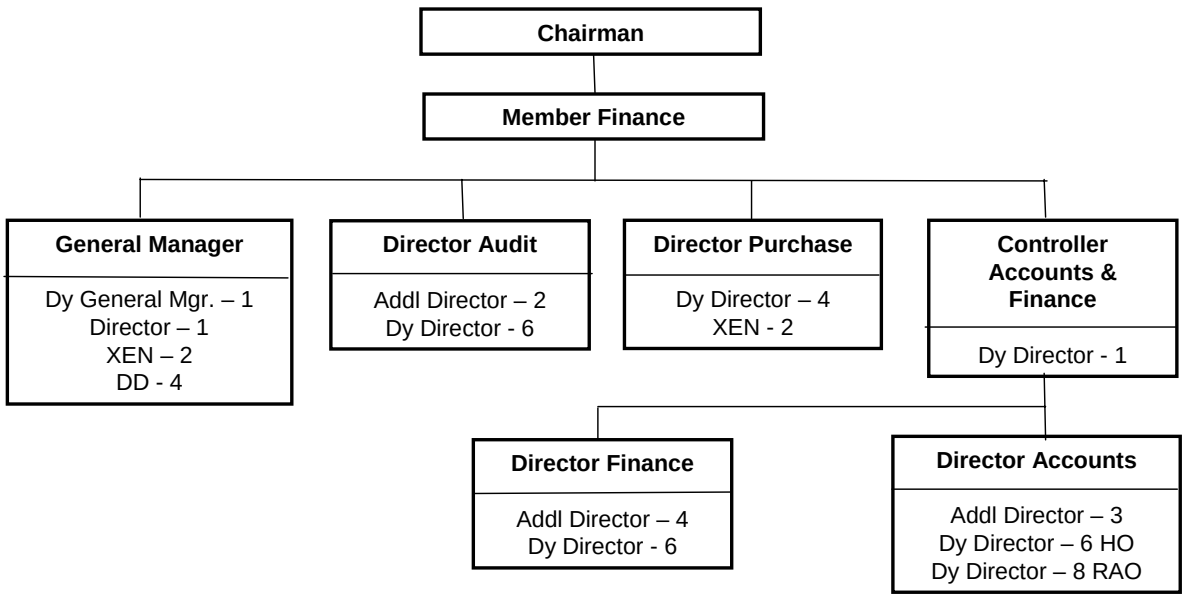
a) Financial accounting including general ledger and subordinate ledger,

b) Purchasing and accounts payable (sundry creditors),
c) Stores accounting,
d) Project accounting,
e) Fixed asset accounting,
f) Payroll accounting,
g) Cash and bank account tracking, control and reconciliation, and
h) Loan capital accounting.

Apart from the above, BPDB has billing and customer accounting for its distribution business. Because of inflexibility and laboriousness of the present system there is little scope for useful cost and management accounting. The only management information that is in actual use is the statistics of commercial operation and the summary of major outstanding debtors produced by General Manager, Commercial Operation.

5.2.2 Organizational Structure of Finance and Accounts Department

The organizational chart of the Finance and Accounts Department of BPDB is as in the following figure;



(source) BPDB, "Annual Report FY 2005-2006"

Figure II-5-1 Organizational Structure of Finance and Accounts at BPDB

The Finance and Accounts Department is composed, underneath the Member Finance, of four sections of commercial, audit, procurement and finance and accounts. The Finance and Accounts Section is further divided into two groups of finance and accounts. It is seen that the Commercial & Finance Section and the Procurement & Finance Section are placed under separate Directors which one can observe that the structure is based on the mutual check and balance. The fact that the audit function is placed underneath the Member Finance is in need of comment. In order for the auditor to play the important role, the location it now is placed needs reconsideration. The audit function should be placed out of the reporting line but should be placed at the position directly reporting to the board of directors so that the auditor does the oversight and monitoring of the entire activities of the institution and reports directly to the board of directors. We are of the opinion the auditors should be moved out of the present reporting line and should be placed at the advisory position that is reporting to the board of directors.

5.2.3 Chart of Accounts

BPDB has realigned the chart of accounts in June 1994. The chart is composed of two hierarchy layers. The hierarchy structure is not well balanced as the system that is seen at EGCB. The code number system is adopted but the system may not be fit for computerized operation and data processing. Main heads are coded by three digit numerals and three more digits are added to express the sub-main heads.

Table II-5-1 Chart of Accounts of BPDB

Asset			Capital and Liabilities		
Main Head	Code	Sub-main Head (nos. of heads	Main Head	Code	Sub-main Head (nos. of heads
Utility Plant	101—109	11	Equity	201—206	6
Accumulated Depreciation	111—116	6	Grant	251—252	2
Non-Utility Property	121—122	2	Long-term Liabilities	301—309	4
Investment	129	1	Current and Accrued Liabilities	310—359	29
Current & Accrued Assets	130—150	24	Deferred Credits	391	1
Materials & Supplies Inventory	151—159	5	Clearing Accounts	901—922	22
Prepaid Expense	161—169	3			
Other Assets	181—186	6			
Deferred Debits	191—199	7			

Profit and Loss			Profit and Loss (Sub-code)		
Main Head	Code	Sub-main Head (nos. of heads)	Sub-main heads	Code	Detail Heads (nos. of heads)
Revenues	501—511	4	Energy Sales	501.01-501.10	12
Generation Expenses	611—612	2	Other Operating Income	511.11-511.19	17
Transmission Expenses	621—622	2			
Distribution Expenses	631—632	2	Cost and Expenses Account (Code: 611-612, 621-622, 631-632, 641-642, 651-652, & 702)	.20—.96	109
Customers Accounts Expenses	641—642	2			
General & Administrative Expenses	651—652	2			
Financing & Other Charges	671—677	7			
Amortizations	681—682	2			
Development Overhead	701	1			

(source) BPDB

5.2.4 Accounts Processing

The accounting process of BPDB is pointed out as failing to meet what is required for accounting. The points noted are such as; the presentation of accounts, accounting policies, notes to accounts, statement of changes of equity, etc[3]. BPDB used to have established manuals for accounting system in 1970s based on which it has been reportedly processing on the basis of accrual accounting. In despite, BPDB is found to be following the cash basis accounting for some of its items. Such practices are reportedly

[3] JBIC, "Technical Assistance for Central Zone Power Distribution Company Corporatization Support", March 2008

seen in the areas such as; providing for unbilled revenue at the year end; recognizing the liability for unavailed portion of the leave encashment by the employees; income from reconnection; miscellaneous receipts from sale of scrap; demand of permanently disconnected consumers; leave travel concession; education expenses reimbursed and medical reimbursement to employees, interest earned on short term deposits; interest recovered from employees on housing loans; etc[4]. There must be some reasons for BPDB not treating them on the accrual basis. While it is not allowed to use different accounting principles for a single account, some of the accounts may be found difficult to be processed based on the accrual basis. BPDB may be able to cope with such situation by clearly incorporating in its accounting policies that a certain kind of transactions shall be processed based on the cash basis accounting and in the financial statements appropriate footnotes shall be added to indicate the irregular handling.

There exist no files of policy documents which makes it difficult for field staff to rely on and handle the workload in discharging their responsibilities[5]. Given the environment as such, one specific issue of grave consequence is acknowledged in the fact that the institution fails to maintain the fixed asset register. At BPDB, the business is conducted without having the basic fundamental register which controls the book value and accumulated depreciation for each of the fixed assets owned. The immediate attention and rectification of the situation is urged. It is of our general understanding that the serious problems are stemming from the insufficiency of establishing and compiling the manuals of policy and rules and lack of dissemination of the policy and rules among the parties concerned within the institution.

In addition, the practice involving the clearance account in the balance sheet is debatable. The account has been used for booking the fund transfer between the head-quarter and branch office or between the company and its brother/sister company. The remittances used to take plural number of days to be completed that necessitated some intermediary accounts to book the transaction which is under implementation. Though may it be allowed to have a balance on the monthly trial balance, the fiscal year end closing should wipe out any balance left in the clearing account through reconciliation process as the first step to be taken in the closing efforts. It is evident that this fundamental principle of the accounting practice is not instituted and followed.

Another matter of importance is pointed out in the appearance of previous year adjustment in the income statement. BPDB's financial statements have no appropriate remarks or explanation on the contents of the adjustment and are simply carrying the account head and amount of adjustment. The financial statement goes on without explaining the outcome of the adjustment for the previous year's account.

For NWPGCL, it is imperative to learn from the experiences of BPDB as has been above mentioned and to establish; the fundamental financial and accounting policies; the rules and manuals of operation and to enforce its employees to abide by the policies and rules in conducting daily operations.

5.2.5 Accounting System and Practice at Preceding Corporatized Power Entities

(1) Accounts Processing at Electricity Generation Company of Bangladesh

Electricity Generation Company of Bangladesh Ltd. (EGCB) has been established in 1998 and changed its name to the present one in 2004.

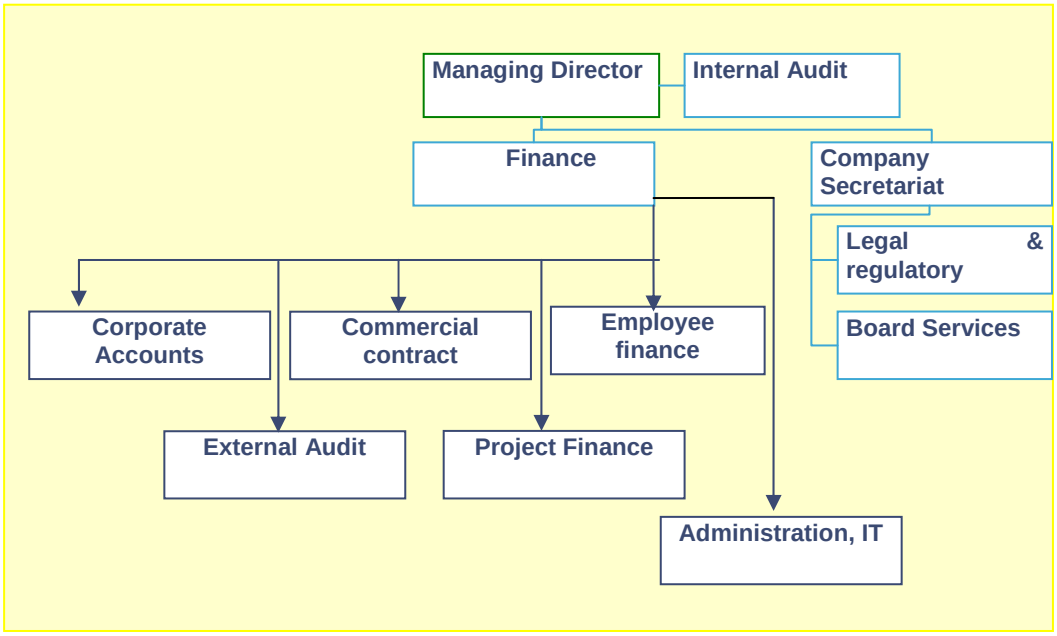
In addition to the construction of three new generation plants, EGCB has acquired from BPDB the existing power plant of Siddhirganj (210MW ST) and is planning to take over Haripur SBU (100MW ST). It will ultimately own and operates five of the following generation plants;

- Siddhirganj Generation Plant (under construction): 2 x 120 MW Gas Turbine for peak hour operation funded by ADB,
- Siddhirganj Generation Plant (under construction): 2 X 150MW Gas Turbine for peak hour operation funded by World Bank and to be completed by December 2010,

[4] ditto
[5]

- Siddhirganj Generation Plant (existing) : 210MW Gas Fired Steam Turbine transferred from BPDB in January 2008,
- Haripur Generation Plant (under construction) : 240MW Gas Turbine + 120MW Steam Turbine funded by JICA (used to be JBIC up till September 2008) and to be completed by December 2011, and
- Haripur Generation Plant (existing) : 100MW Gas Turbine to be transferred from BPDB in near future.

The current corporate management of EGCB has been formed with Managing Director, Director Finance and Director Technical. The figure below depicts the organizational structure of Finance and Accounting Division at EGCB taken out from its overall organizational chart:



(source) Draft EGCB Business Plan

Figure II-5-2 Organizational Structure of Finance and Accounting Division of EGCB

In January, 2008, Siddhirganj 210 MW TPP has been transferred to EGCB for which Power Purchase Agreement (PPA) would have been signed between EGCB and BPDB as a single buyer. After signing PPA, EGCB would have submitted invoice from 1st January 2008 as per Net Electricity Output (NEO). From the revenue earned, EGCB would have been paying for operation & maintenance expenses, debt servicing and development costs. Prior to signing of PPA, EGCB used to be meeting all those expenditure through getting loan from BPDB.
For each of the power plants there will be individual payment sections which will remain responsible to make all sorts of payments after having budget and fund availability. Each chief of individual payment section of the plants reports to Director/DGM Finance regarding all kinds of accounts and financial matter. Locally each finance chief of the plant reports to the plant manager (PM) for his routine works.

EGCB has its own financial rules, delegation of power that the company follows strictly. For financial and accounting system, EGPC has installed a software package at its head office and is planning to have an integrated system with its plant accounts. The chart of accounts is also developed through this package.

EGCB does not have any financial policy as such. However, in its Business Plan, some principles for financial and accounting policies are mentioned as follows;

- To follow the company's financial rules and delegations of power,
- To ensure that the lenders providing short and long term loan facilities at a low, soft or competitive interest rate which will be able to boost up the company's bright future,
- To ensure that the optimal capital structure in terms of the debt equity ratio maintained properly,
- To ensure that the investment decision to be taken right way and timely for utilization of fund,
- To ensure that the cost analysis and cost control measures are taken at plant and at the corporate level to maximize company's profit,
- To ensure that the company follows the International Accounting Standard (IAS) and also Bangladesh Accounting Standard (BAS),
- To ensure that the compliance with the auditing requirements under the Company Act 1994 and the cost audit requirements, and
- To develop the computerized accounting system through modern accounting software to record the financial transactions of the company.

EGCB currently is operating its establishment (employee and administrative expenses) funded by the budgetary allocations from BPDB's revenue funds. An annual budget is prepared for approval by the EGCB Board. Based on the approved budget, an annual fund requisition note is submitted to Member (Finance) of BPDB. Funds are drawn out either annually or in several installments from BPDB based on its cash position. These loans will be converted into equity eventually and will form a part of the total equity requirement of EGCB.

(2) Accounting System and Processing at Ashuganj Power Station Company Limited

Ashuganj Power Station Company Limited (APSCL) is a part of the overall business processes of BPDB. BPDB is the holding company of PSCL and the single buyer from APSCL. APSCL has been established as a private limited company in 2000. The company has converted its legal status to public limited company in 2003. The company has signed the Provisional Vendor's Agreement with BPDB in 2003 by virtue of which the company has received the transfer of Ashuganj Power Station from BPDB. The company has entered into the Provisional Power Purchase Agreement with BPDB in 2003 under which the company has contracted to sell the power generated to BPDB. At the time of the asset transfer of the power station, BPDB had no accurate value assessed of the plant and therefore it had been agreed between the parties concerned that the transfer of asset was implemented under a provisional agreement pending the conclusive assessment of the plant under the Identification, Verification, Valuation and Recording (IVVR) Program[6].

BPDB being a parent company of APSCL, a similar finance and accounting process is being followed by APSCL. The chart of accounts followed by APSCL is similar to that of BPDB. As such there is no documented financial policy for BPDB or APSCL. The accounting policies are in line with the BAS. Similar policies need to be developed for NWPGCL. A financial policy document can be developed for NWPGCL which will help in transparent dealings and all transaction affecting the company as a whole.

A mechanized system is running through the company for financial and accounting processes. In despite, APSCL does not have a structured integrated MIS running through the company. An MIS system shall help in quick and efficient decision making by the top management. There is a need for implementation of integrated IT system. This is more required for having an effective control over inventory, stores and procurement section. Same has to be developed for NWPGCL.

For preparation of budget, there exists the guideline for budget preparation. The chart of accounts is imported from BPDB and is utilized with some adjustments added. The inventory management is done by manual operation. The company is working for the development of the inventory management system which is linked to the accounting process. NWPGCL would find it to be vital to have the inventory control system which is linked with not only the financial and accounting system but also with the procurement control system.

[6] The Program has been implemented by BPDB through its budget since 1993. The Program has moved to the second pahse under the assistance extended by ADB. In the second phase, the Program had planned to computerize the financial and accounting operation by introducing an integrated software but has been kept pending due to the scarcity of funds for implementation. MOPEMR

(3) Accounting System of Pendekar Energy Company (IPP) at its Haripur Power Station

The Haripur Power Station was developed by AES Corporation at its outset. The power plant had the financial closing in 1998 and commenced its operation in 2001. Almost simultaneously, AES Corporation developed the Meghnaghat Power Station which also was financially closed in 1998 and commenced its operation in 2002. Both plants were sold to an investor of Bermuda based CDC Globeleg Group in 2 years of operation and were sold once again in 2007 to Pendekar Energy Company, a consortium of Malaysia based Tanjong Group and Saudi Arabia based Aljomaih Automotive Company. Pendekar has its headquarter in Malaysia whose Corporate Department controls the operation in Bangladesh through the Bangladesh Operation Manager stationed in Dhaka. The reporting line functions through the simple three layers of; Corporate Department at the headquarter on top; Bangladesh Operation Manager comes on the second layer; and the Plant Managers at Haripur and Meghnaghat at the third layer. A network has been established connecting Malaysia, Dhaka, Haripur using the public communication system. The network supports the facilities for distant meeting through TV system. The accounting operation is centralized in Dhaka while no bookkeeping is being done at Haripur. For the inventory control, the company has acquired and installed a software package which controls the inflow, outflow and balance through the application of the bar code system and is linked with the accounting and the budget control system.

(4) Lessons learnt from the preceding corporatization

Viewing the experiences and present state of operating conditions of the three companies plus BPDB whom we will review later, the followings are considered to be the generalized summary of operations. At the government owned power entities, a typical example of the decades-old business practices are being followed blindfoldly without having clearly established and documented rules and regulations in the environment of least developed computer systems. The phenomena are frequently found peculiar to the government sector including the power sector. A certain improvement has been acknowledged at the APSCL which has been the spin-out entity of BPDB, though the company, too, is observed of tracking the traditional practices of BPDB. The Haripur Power Station that has been the pioneer of IPPs in the country, established by U.S.A based AES Corporation and sold twice to the eventual buyer of Pendekar Energy, the management is efficiently conducted in a lean organization and in a smart utilization of communication network. There exist many points for NWPGCL to learn in pursuit of the efficient management.

5.2.6 Recommendation for Accounting System and Processing at NWPGCL

(1) Bangladesh Accounting Standard and International Accounting Standard.

In the world of business accounting, there exist two international standards that establish the dominant positions, i.e. the International Accounting Standards (IAS) and International Financial Reporting Standards (IFRS) both issued by International Accounting Standards Committee (IASB). In Bangladesh, Institute of Chartered Accountants of Bangladesh (ICAB) reviews and discusses IAS and IFRS to assess whether the articles of international standards should be adopted for Bangladesh and issues the adopted ones as the Bangladesh Accounting Standards (BAS). At present, IAS is composed of 30 articles, out of which ICAB has adopted and is practicing 24 articles. For three of the remaining articles which have been once adopted by ICAB but have later been revised by IASB, there has been no follow-up action taken to revise the BAS by ICAB. There still remain three more articles that have not been touched by ICAB. Similarly, out of the total articles of IFRS, 4 are adopted by ICAB but other 4 remains untouched. On top of it, there are some articles that have been adopted into BAS but the original articles were amended at IASB but not by Bangladesh. In addition, it is often pointed out that there exists no material ready for reference such as guidebook or guideline and that such state of conditions tends to cause the lack of uniform interpretation of the articles entailing confusions or differences of interpretation among the companies[7].

[7] JBIC, “Draft Final Report: Technical Assistance for Central Zone Power Distribution Company Corporatization Support”, March 2008

(2) Company Act 1994

NWPGCL is the company established based on the Company Act 1994 (Law No. 28 of 1994) and its accounting system has to be established so that it meets the requirement of the Company Act. The articles of the Company Act describing the accounting standard are often abstract and are difficult to follow in the business practices[8]. It is learnt that many of the power sector companies are adopting the Bangladesh Accounting Standard (BAS) to follow.

The Company Act prescribes that the balance sheet of a company shall be in the forms set out in the attached schedule of the Act or in such other form as may be approved by the government either generally or in any particular case. The Act requires the company to obtain approval of financial statements at its general shareholders meeting. The financial statements are stipulated to be composed of balance sheet, profit and loss statement, board of directors' report, and audit statement. The financial statements defined by BAS are the five documents being exactly same with what is defined by the Securities Exchange Regulation. However, there exists a difference in defining the financial statements between the Company Act and BAS. The Securities Exchange Regulation promulgated in 1987 is mandating the listed companies to file its annual report with the Securities Exchange Commission which contains the balance sheet, income statement, cash flow statement, footnotes for the items appearing in the financial statements and audit report. The listed companies are also required to comply with the IAS/IFRS which ICAB officially adopted, that is nothing but the BAS. The financial statements have to be finished within 120 days of the final date of the reported fiscal year and be filed with the Commission within 14 days of finishing the report. As stated earlier, BPDB is immune to the Company Act 1994 or Securities Exchange Regulation as its status being a part of the government. NWPGCL, while a judicial person founded on the base of Company Act needs to comply with the Act. The form and contents of the financial statements required by the Company Act 1994 are different from the ones required by the Securities Exchange Regulation. The company needs to have a clear understanding of the issue and make its own decision which standards to comply and abide by.

(3) Internal Control

As part of its duty, the management needs to play an active oversight role in the area of internal control by ensuring that the company has an effective internal control framework in place, including the assessment and management of key financial and non-financial risks and effective monitoring and oversight process, supported by the timely and accurate information and communication channels. The management should clearly define its role, the audit committee, internal and external auditors, and other parties involved. The internal control is a process designed to provide reasonable assurance that the company is achieving its objectives by helping to[9];

- Protect its assets and shareholders' investments,
- Ensure it is not overly exposed to risks,
- Improve the reliability of internal and external reporting,
- Promote compliance with applicable laws and regulations, and
- Improve the effectiveness and efficiency of operation.

[8] World Bank, "Report on the Observance of Standards and Codes (ROSC) Bangladesh Accounting and Auditing", May 2003
[9] The Conference Board Inc., U.S.A., "Corporate Governance Best Practices: A Blueprint for the Post-Enron Era", 2003

Figure II-5-3 Framework of Internal Control System

In order for a company to cover with an effective network of the internal control, it has to extend the network of control to every corner of the organization and in every respect of its operation for which the company needs to establish the rules and regulations, network for communication, mechanism for monitoring and oversight, function of the assessment of the risks and decision making of the company to take or to avert the risks. Among those extensive lists of items requiring the managerial efforts, the following are the most fundamental ones to be first installed in the company;

a. Controls on financial reporting cover the preparation of reliable financial statements and other financial information.
b. Operational controls address a company's basic business objectives, including adherence to performance standards and the safeguarding of resources.
c. Compliance controls cover laws and regulations to which a company is obliged to so as to avoid damages to the company's reputation or other negative consequences.

NWPGCL management should consider the following basic control procedures as a part of the internal control processes in their departments:

- Authorization of transactions,
- Segregation of duties,
- Adequate documentation and recording of transactions and events,
- Safeguards over access to, and use of, assets and records, and
- Independent checks on performance and proper valuation of recorded amounts.

(4) Project Accounting

During the initial years of establishment, it is imperative for NWPGCL to focus closely on (till COD of the plant) the financial and accounting framework and project accounting and control, as the company is to undertake construction of three new plants at its beginning years of operation. The project accounting system will provide the management with timely information regarding cost and schedule of the on-going project.

The project accounting system must:

- record the cost,
- provide an analysis of resources used on the project compared to the estimates for different categories. i.e. money, time, material, overheads etc.,
- maintain the records for duration of the project, and
- provide the management with various reports.

The project accounting should be linked to stores control, payroll, purchasing system etc and pass the information to the general ledger. Regarding stores control in the initial phase of project construction, there will be no requirement for stores as it will be the responsibility of the EPC contractor. However in the later phase of the construction, there might be a store control requirement for spares part and other items. The cost will enter the project accounting system either directly for original source document or by capturing for other modules like payroll or stores etc. Till the COD of the project, the work must be reflected in the Capital Work in Progress register after which it will be transferred to the Fixed Asset register through capitalization.

If some of the existing plants or assets are transferred from BPDB to NWPGCL, then the existing man power requirement will be required to be studied. There might be a requirement for manpower transfer/recruitment for the new company to man its Finance and Accounting Division and others. More professionals need to be recruited for the new company with competitive remuneration.

For the requirement of accounting locations, each of the individual plants may be made an accounting unit. The Head Office at Dhaka may be added as the other accounting function which will consolidate all the information. A detailed responsibility allocation for the accounting codes and transaction has to be done for HO and plant units. For example, the depreciation accounting can be done at Head Office and the loan accounting can be done at plant units.

In the project construction phase, a tight control on the payment mechanism has to be looked into. Usually the donor agency pays directly to the contactor. However the bills and work progress have to be checked and approved by the Executing Agencies before it is sent to the donor agencies. In the following table, a model payment mechanism is illustrated which can be used during the construction phase by NWPGCL;

Table II-5-2 Project Payment Mechanism (a sample case from India)

Project Vendor Payment Mechanism

Project Payment Mechanism

- Contractor will submit the bill to the Officer in Charge of Contractor Management on ***Day 0***.
- The Officer in Charge of Contractor Management after checking the legal aspects of the bill raised and its general agreement with the terms and stipulations of the contract will forward it to the Site Manager in charge on ***Day 1***.
- The Site Manager in charge will send the Bill to the Site Engineer on the same day i.e. ***Day 1*** after entering in a register to keep track of the Bills rendered by the Contractor till date. The Bill will be sent to the Site Engineer for checking and verification of both qualitative and quantitative aspects of the vendor's executed work against which the bill has been raised.
- The Site Engineer will verify the following:
  - Volume of Work (For Civil Contracts)
  - Labour Cost Charged (For manpower deployed and rates charged based on skill classification and applicable standard labour rates)
  - Tonnage of Steel Works (For Erection Work)
  - Milestone Achievement (For Electro Mechanical Package work)
- The exact type of checking will depend on the type of contract and its payment provision e.g. Rate contract, lumP/Sum contract, volume based contract etc.
- The Site Engineer during verifying the bill will have to procure an "OK"/ "Not OK" certification from the following
  - Site Quality Assurance (Site QA) for specifically works involving QA Audits e.g. welding, finishing works in buildings, erection work etc.
  - Site Stores in case material of vendor was kept under Site Stores and utilized in phases in the construction work. The Site Stores In charge will need to verify the material movement details for cross checking with the value stated in the Bill.
- The Site Engineer will forward the Bill for the certification to the above personnel on ***Day 1***.
- Both the certifications have to be provided to the Site Engineer by ***Day 3***.
- After obtaining the certification from Site Quality Assurance and Site Stores, the Site Engineer will forward the checked Bill with his comments and observations to the KLHEP Project Manager directly on ***Day 4***.
- The KLHEP Project Manger after obtaining the certification from the Site Engineer will check the following:
  - Vendor's Work Scheduled for the Duration in the Work Plan
  - Actual Physical Progress Achieved against Scheduled
  - Reasons behind Variance if any (The check will be done whether the variance was on account of the vendor's failure or owing to situations beyond his control)
  - Previous Outstanding Dues to the Vendor if any.
- Based on the above the Project Manager will release an ***Express*** Payment of **X** % of the Bill amount raised on ***Day 7***.
- The X % may vary based on the following factors:
  - Contractor's Performance at Site
  - Criticality of Payment in expediting downstream work
  - Discounts provided by the Contractor for express payment.
- After releasing the X%, the Project Manager's Office will dispatch the Bill to the Head Quarter. It is assumed that the Bills will be received by the Head Quarters within 3 days i.e. on Day 10.
- The Bills will be dispatched directly to the Finance Division with all the verification certificates. An advance copy informing the Chief Engineer Hydro will be sent along with. The Finance Department will complete verification and payment of the remaining i.e. 100 – X % of the Bill amount within 30 days of receipt of the Bill i.e. by ***Day 40***.

Liquid Cash Provision for Site

- The Project Manager by the 15th of each month will send the revised work-plan schedule for the ensuing month. The work plan schedule will indicate the following:
  - Work schedule for Next Month
  - Detailed activity List
  - Expected Cash Outflow Pattern
  - Buffer Cash Requirement (if any)
- Based on the projection of the Project Manager the Finance wing will advise the budget section to make adequate provision for the next month.
- To ensure prudent fund management the Project work plan Schedule will be updated every 15 days based on latest site information and field requirements.

Monthly Auditing

- All the payments occurring under the fast track mechanism for the KLHEP will be subject to a monthly auditing and review.
- Besides monthly auditing, it is advisable to conduct spot unannounced audits before releasing large payments to the tune of X lakhs and above to ensure that physical progress at site is in consonance with the stated value in Bill.

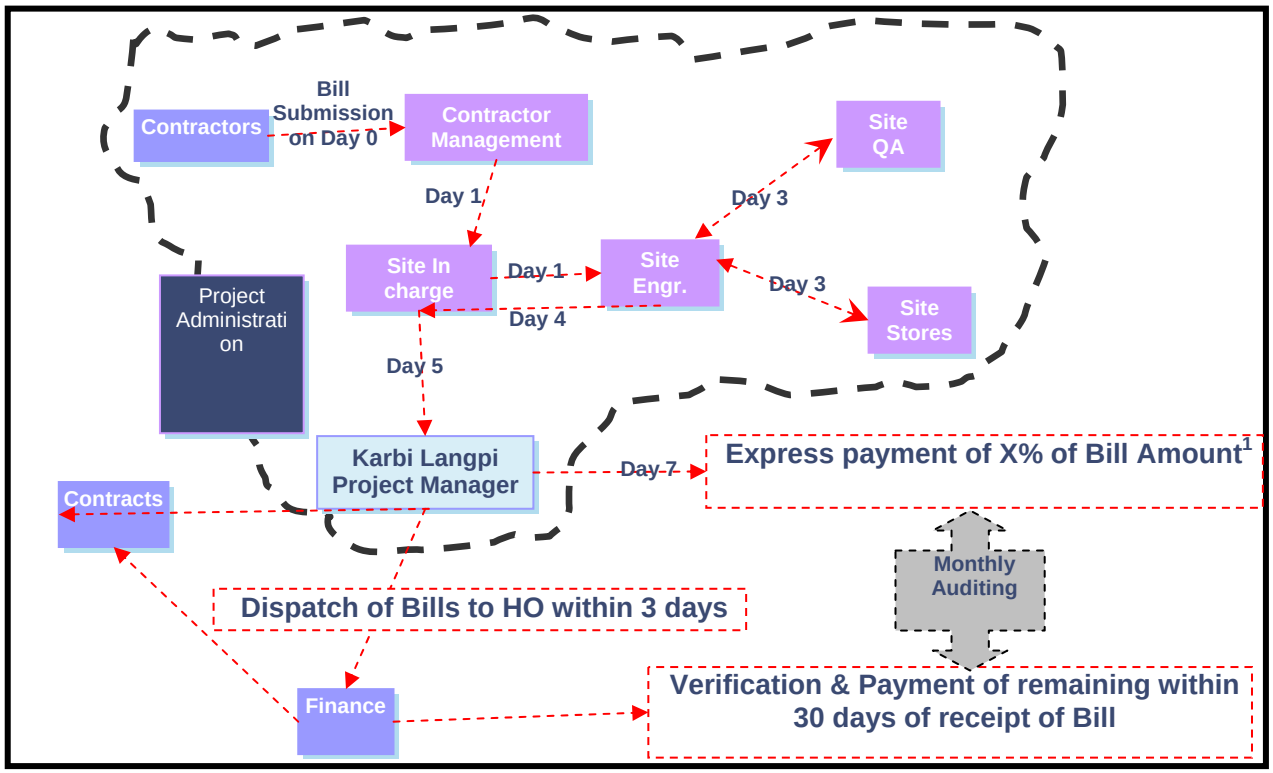


Figure II-5-4 Project Payment Mechanism

5.2.7 Recommendation for Establishing the Integrated Accounting Package

NWPGCL should construct an integrated Financial & Accounting System which will:

- provide integrated IT systems that will address the basic accounting and record keeping requirements;
- have correct recording and classification of financial transactions,
- have proper accountability of assets and liabilities,
- have reporting of the overall financial condition and operating results of the company,
- provide timely, accurate and up-to-date information to support the following functions;
  - budget preparation, monitoring and control,
  - cost planning, accounting and control, and
  - operational management of cash, accounts payable, accounts receivable, loans (domestic & foreign) and fixed assets,
- have general accounting functionality, and
- facilitate audit of financial transactions.

The system will have capability to generate various MIS reports aiding managerial decision making as well as operational management. It will comply with various statutory and regulatory requirements such as Company Act compliance requirements and BERC etc. The system can cater to various processes related to creditors accounting, customer accounting, materials accounting, employee accounting and accounting for projects and fixed assets. It will also have capability to cater to funds/treasury management as well as budget monitoring and control. The modular break-up of financial accounting can be as follows;

- General Ledger,
- Accounts Payable,
- Accounts Receivable,
- Project and CWIP Accounting,
- Fixed Asset,
- Treasury and Cash,
- Consolidation/Finalization, and
- Budgeting/Costing.

The integrated solution package should not only meet the existing functionality requirements but also take care of future requirements and upcoming demands/trends and should be scalable.

The diagram below shows an implementation approach for NWPGCL to proceed for integrated accounting and IT system:

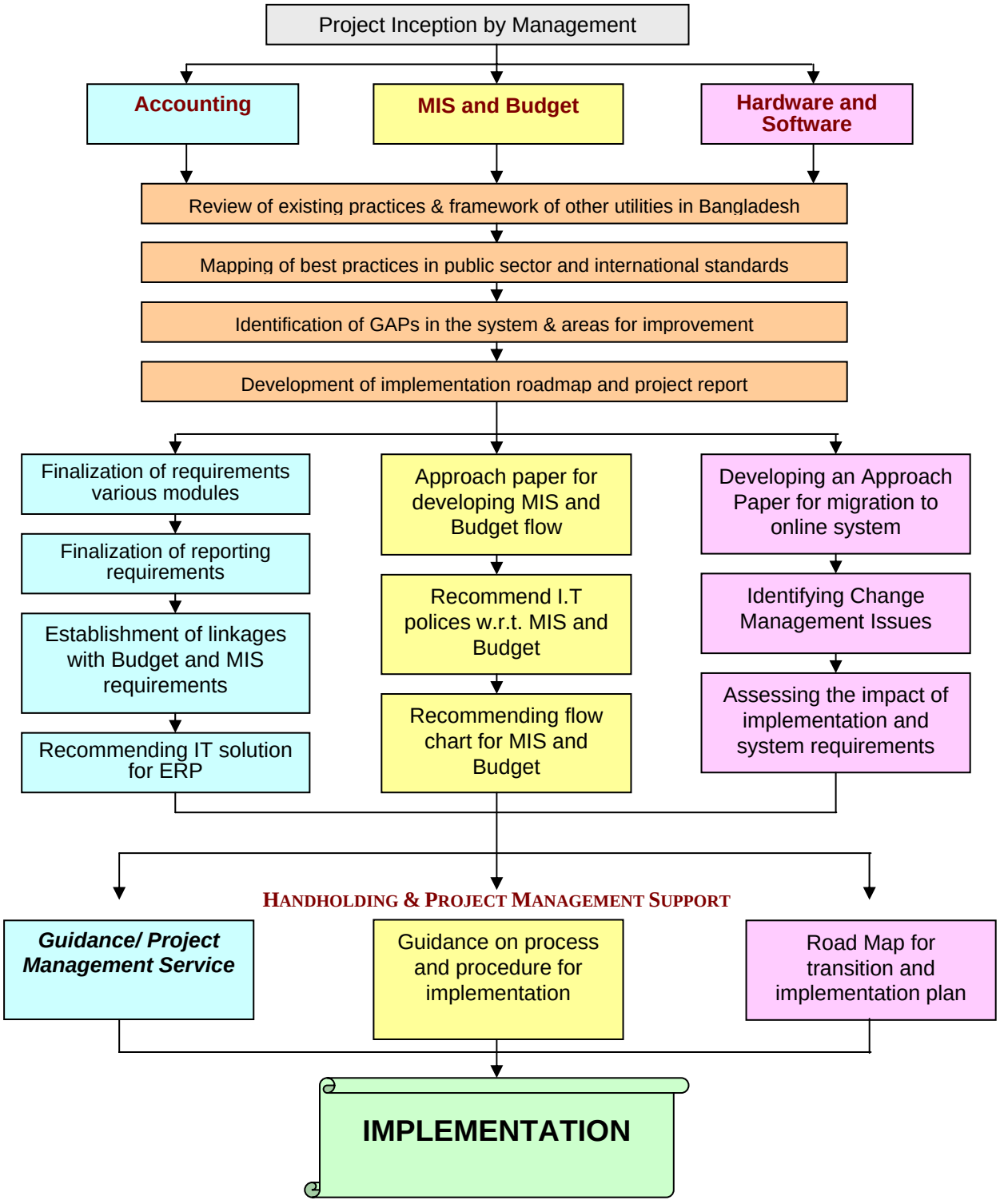


Figure II-5-5 Approach for IT implementation

(1) Integrated Accounting Package

The basic modules required for a financial and accounting system will include Cash and Bank, Purchase, Payable, Stores, Assets, Revenue, Receivables, Loan, MIS, Budget etc.

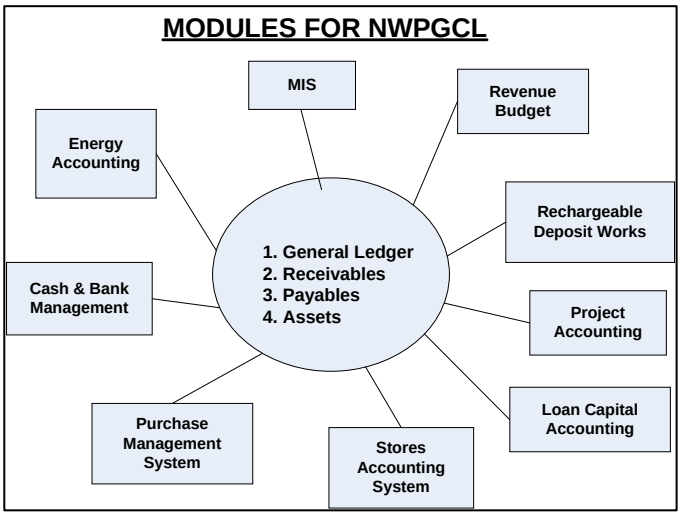


Figure II-5-6 Integrated Accounting Package

All these modules will have interfaces among themselves through subsidiary and general ledgers. These are common for all manual or computerized system. However it is always better to go for an integrated computerized system as it provides readily available information. This helps in improving the management decision making process.

(2) Cash and Bank Account Control Module

The Cash and Bank management is most critical for any utility. The following diagram depicts the process flow for the funds in a company right from the budget to its accounting in general ledger.

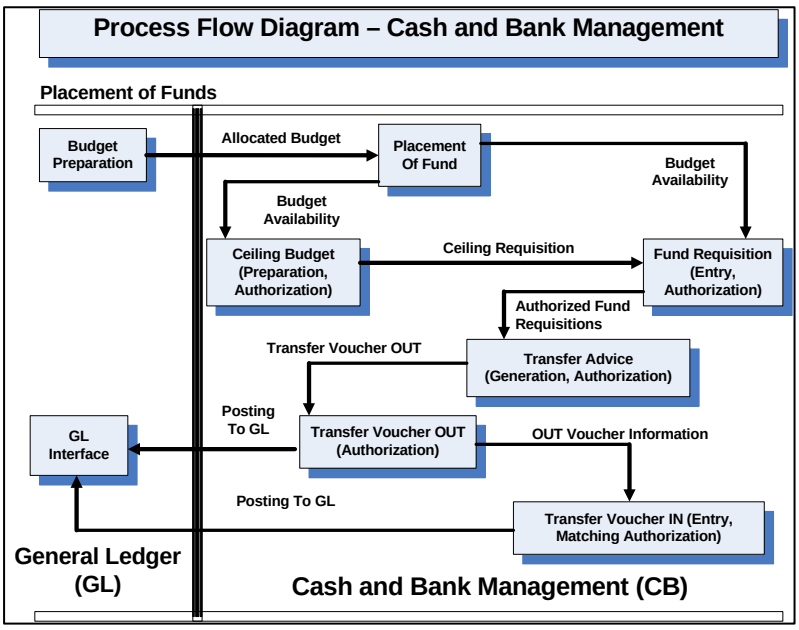


Figure II-5-7 Cash & Bank Account Control Module

The funds incurring expenditure is always linked to a budgeted figure. Requisition is accepted only if it is within budget. This helps as a control mechanism. The expenses incurred should have

documentary evidence in form of vouchers. This helps for tracking and for audit trail. The vouchers also help posting in the bank book and correspondingly in the general ledger.

(3) Bank Account Reconciliation Module

The cash and bank account is involved in almost all transactions and, therefore, entails a large number of transactions and entries. The cash and bank account should be regularly reconciled, preferably on a monthly basis. A monthly Bank Reconciliation Statement (BRS) should be drawn to ascertain the reason of difference between the bank balances as per cash book and bank balances per bank book. If required, a rectifying entry should be passed accordingly.

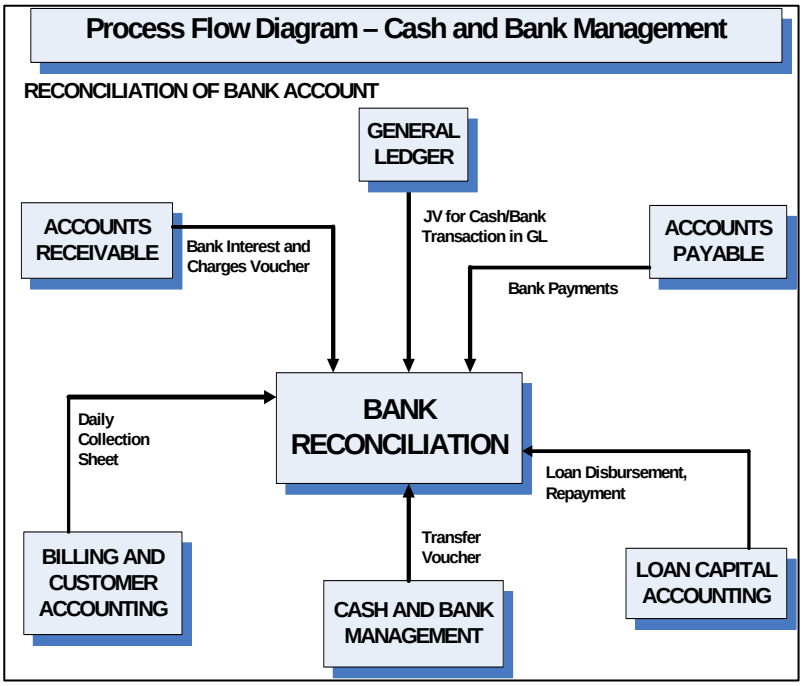


Figure II-5-8 Bank Account Reconciliation Module

(4) Stores Accounting Module

For any power utilities a proper control over its stores is very important. A well defined process for stores should be established at NWPGCL. The diagram in the below shows the process for stores from its purchases to the issues and its entries in the books of accounts.

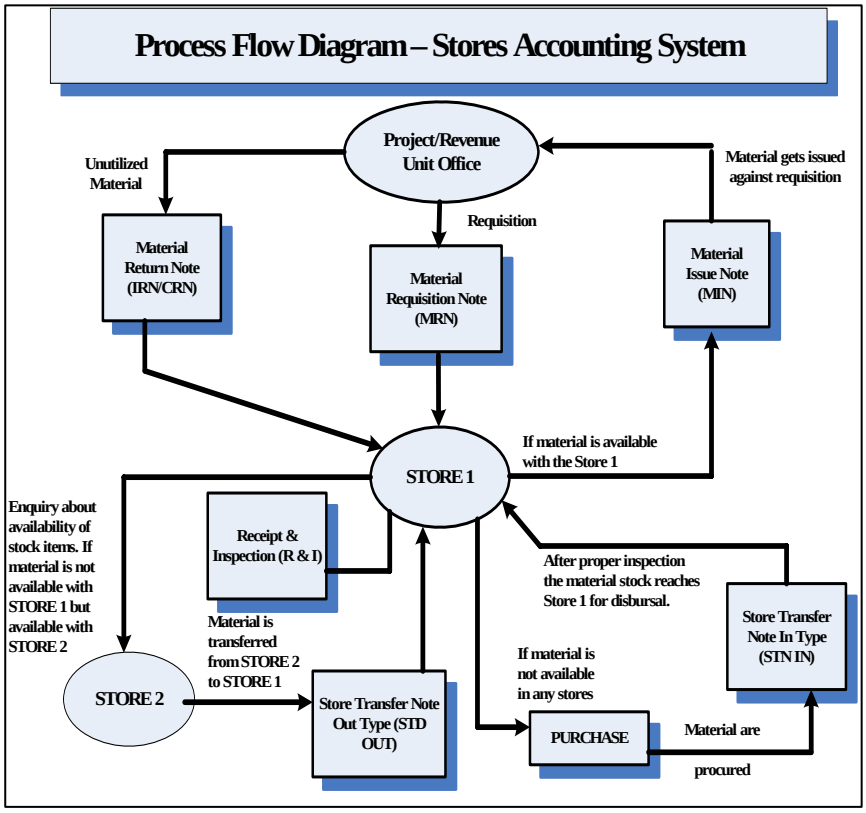


Figure II-5-9 Stores Accounting Module

In the store process the internal forms/documents has to include; material requisition note; return note; issue note; transfer note; inspection note; etc. All these forms help in audit trail and control. However in a manual system reconciliation among these store records becomes cumbersome and ultimately results in huge store suspense account at year end. An ideal store should have an online integrated store management system preferably linked with the financial and accounting system of the company.

(5) Fixed Asset Control Module

Recording and proper accounting of the fixed asset is critically important as the fixed asset utilizes most of the funds of a utility business. An asset can be internally created or may be purchased externally. Each of the cases when the asset is added or transferred from CWIP to Fixed Asset bears an importance as it has implication of depreciation. Apart from these transfer, retirement, revaluation and adjustment of asset has to be properly recorded in the general ledgers and Fixed Asset Register.

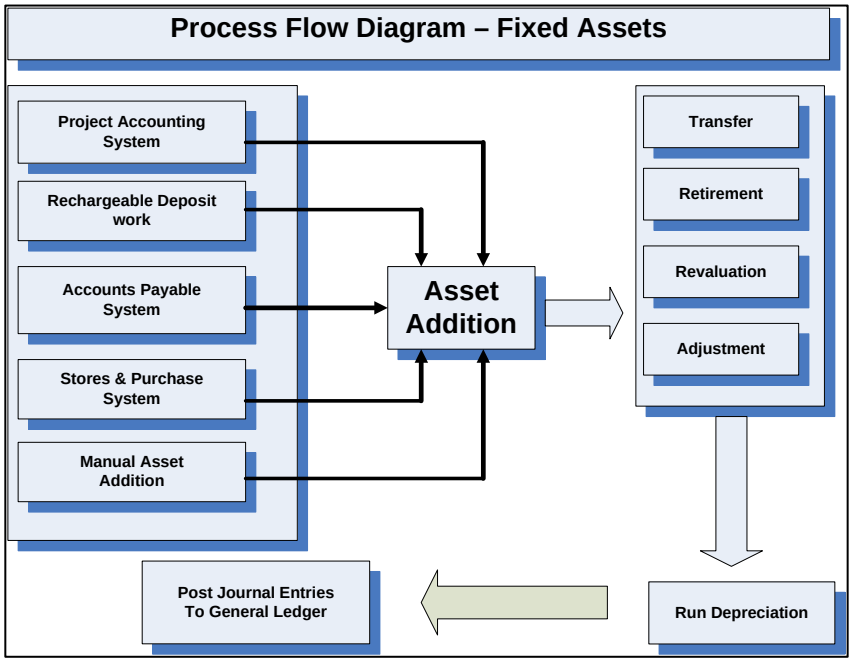


Figure II-5-10 Fixed Assets Control Module

(6) Account Payable Control Module

The stores and purchase is also linked with account payable system of a company. A proper creditor and debtor management is required for the company to have a healthy current ratio position. The following diagram describes the accounts payable process for NWPGCL right from Tender flotation to its accounting;

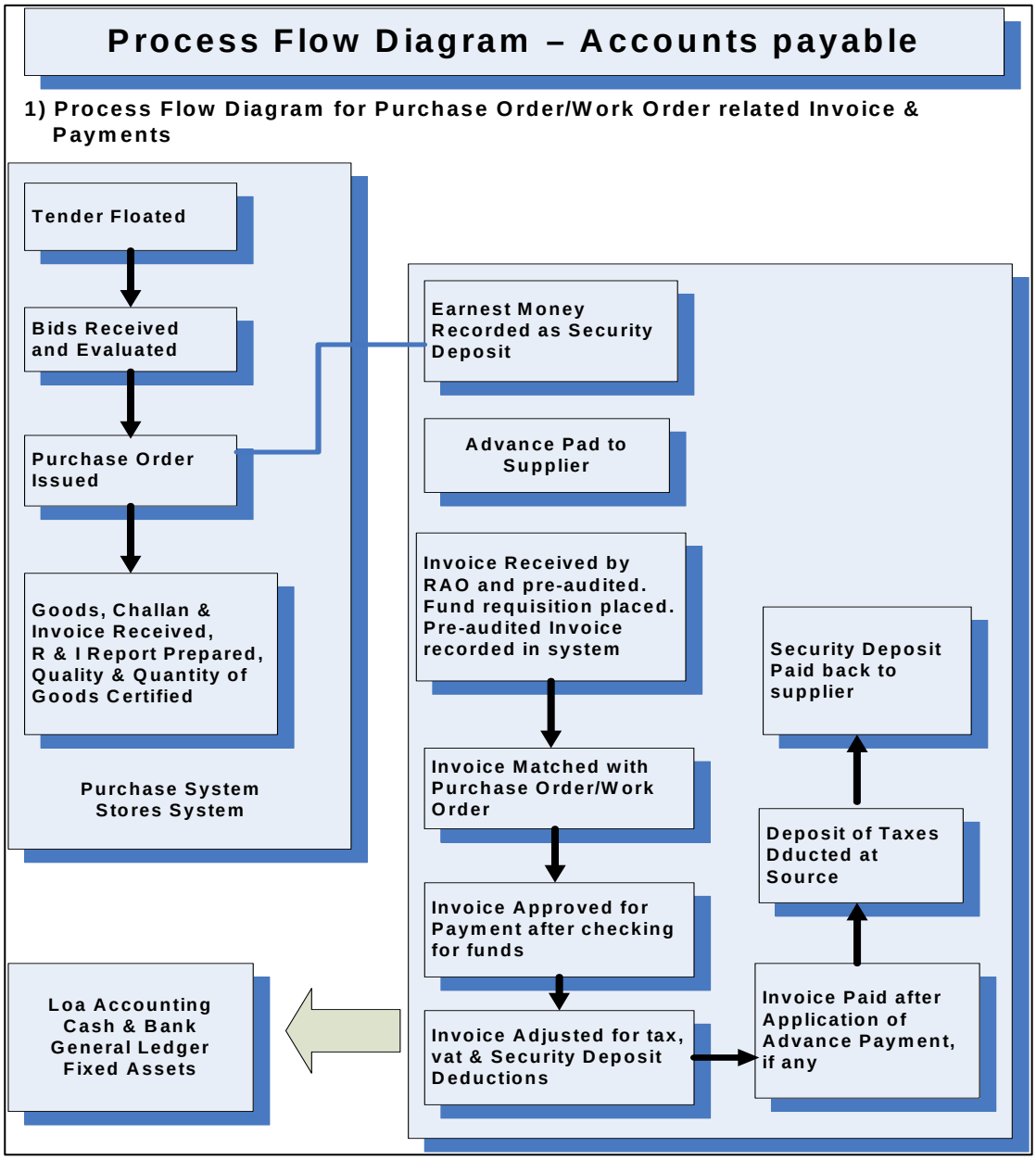


Figure II-5-11 Account Payable Control Module

(7) Computerized and Integrated Financial & Accounting System

NWPGCL should establish an integrated Financial & Accounting System which will:

- provide integrated IT system that will address the basic accounting and record keeping requirements;
- have correct recording and classification of financial transactions,
- have proper accountability of assets and liabilities,
- have reporting of the overall financial condition and operating results of the company,

- provide timely, accurate and up-to-date information to support the following functions;
  - Budget Preparation, Monitoring and Control,
  - Cost Planning, Accounting and Control, and
  - Operational Management of Cash, Accounts Payable, Accounts Receivable, Loans (Domestic & Foreign) and Fixed Assets,
- have general accounting functionality, and
- facilitate audit of financial transactions.

The system will have capability to generate various MIS reports aiding managerial decision making as well as operational management. It will comply with various statutory and regulatory requirements such as Company Act compliance requirements and BERC etc.

The integrated solution package should not only meet the existing functionality requirements but also take care of future requirements and upcoming demands/trends and should be scalable.

(8) Development of Chart of Accounts

The chart of accounts should enable NWPGCL to analyze, classify, and summarize the data in a way that is appropriate to meet managerial, financial and statistical requirements, besides ensuring the better compliance with the statutory requirements. The registers and forms have to be designed on the premise that they will be processed by the computer system and therefore need to be developed in close coordination with the development of the integrated financial and accounting system. We recommend that NWPGCL management also may consider in its starting phase to adopt Chart of Accounts of BPDB or can alternatively make arrangements to develop their own chart of accounts to reflect the accounting, statutory and managerial requirements.

(9) Financial System Development

A financial system should not be considered in isolation, it is a part of the total management information system of the organization. The main features of a financial management system should include;

- top level summary of operations showing production, sales, profit, cash flow achievement and significant performance indicators,
- regular reporting of profit and cost centre performance showing comparison with budget,
- regular cash flow reporting,
- regular rolling cash forecast for 12 months ahead, and
- regular projections of debt servicing and capital expenditure commitments.

The principal requirement for the financial management system is the computerized and integrated accounts and MIS modules. This will enable online and real time availability of information to the top-level management. This area of work would involve ensuring compliance with various statutory requirements, adequacy review of creation of clean financial statements, development of significant accounting policies, development of improved financial management and control systems, design of budgeting system, feasibility assessments of IT enablement of accounting system, preparation of fixed assets registers, voltage-wise asset classification etc. The system development for NWPGCL will require the following steps;

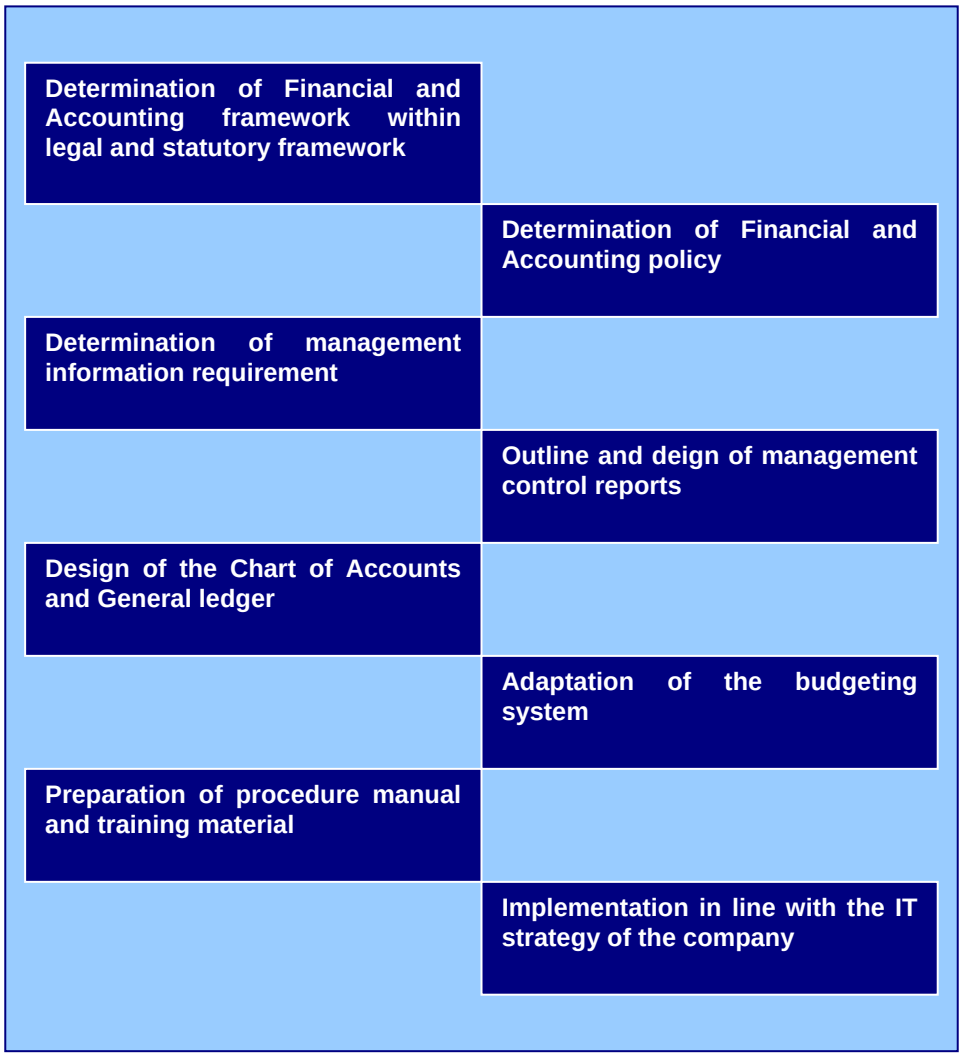


Figure II-5-12 Steps for Developing the Integrated Accounting Package

(10) Independent Finance and Accounting Function

An independent finance and accounting is to be established at NWPGCL. For this purpose it will be necessary to;

- identify the roles and responsibility, develop an organization structure and identify staffing and training requirements,
- establish the fundamental financial and accounting policies, develop the manuals, promote the awareness of the policies and rules among the employees and roll out operation in full compliance with the rules and regulations prescribed in the manuals, and
- identify the software and hardware requirements for an appropriate management information system for the finance and accounting function.

In the initial stage of formation of NWPGCL, some external agencies/advisors may be required for smooth running of the company.

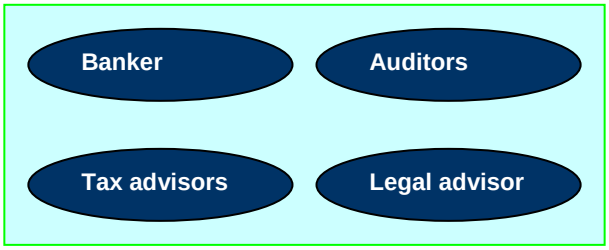


Figure II-5-13 External Advisory Institutions

The external agencies/advisors will be basically sought from among the bankers, auditors, tax advisors and legal advisors. To tackle the related issues expert service from these areas may be required as NWPGCL may not have the capacity developed in these issues. Some of the agencies like bankers and auditors have to be statutorily appointed.

5.3 Accounting Policies

5.3.1 Accounting Policies

Accounting policies refer to the manner in which financial transactions are recorded in the books of account. Financial policy, on the other hand, is the one that regulates the receipt, disbursal and utilization of funds. One of the most important requisites to NWPGCL is to have clear and consistent accounting and financial policies in line with the accounting standards and reporting formats as prescribed under Bangladesh Accounting Standards and the Companies Act 1994. A complete set of financial statements is comprised of;

- a balance sheet;
- an income statement;
- a statement of changes in equity;
- a cash flow statement; and
- Notes, comprising a summary of significant accounting policies and explanatory notes.

The fundamental policies have to be made official by the approval at the board of directors meeting. The employees' awareness on the policies must be promoted by all means. The plans, directives as well as the handling of its business activities have to be in line with the basic policies. The company, at the same time, should be flexible to modify the policies, once the laws and regulations concerned are revised by any means.

5.3.2 Recommendation for Establishing the Accounting Policies

(1) Guiding Principles of Financial Statements

Guiding principles for preparation of financial statements

- **Going Concern basis** – accounts are to be prepared as though the company will continue for a long period (unless the company is poised for bankruptcy or there is no alternative except to revoke license or trading at insolvency).
- Statements are to be prepared on 'accrual' basis rather than 'cash' basis.
  - **Accrual basis** – right to earn or liability to pay (income and expenses reflect the correct affairs of the company)
  - **Cash basis** – only when cash is exchanged and hence may not represent the occurrence of the financial affairs
- **Matching principle** – function matching and period matching – expenses are recognized on

the basis of costs incurred and income earned within a same time period. E.g.: unbilled sale of electricity and unpaid costs.

- **Consistency** – unless significant changes occur (which anyway should be separately disclosed), form of presentation and classification of expense should be consistent from year to year.
- Form of **Balance Sheet** – as given in the Companies Act 1994. .
- **Materiality and Aggregation** – material items should be disclosed separately (materiality is defined as a piece of information which can influence user's decision).
- **Offsetting** – assets and liabilities should be shown separately without offsetting one against other. E.g. Receivables from sale of power should not be set off against the security deposit received from consumers (unless the consumer has permanently ceased to be a consumer of the company).
- **Comparative information** – as per the requirements of Companies Act, previous year's figures are required to be provided and if necessary to be re-arranged for understanding the trend.
- **Accounting measurements** - this refers to the way the accounting transactions are to be measured and reported in financial statements. These may be based on historical cost or inflation accounting or replacement basis etc. Accounting measurements are defined under various accounting standards for various situations.

The selection of an accounting policy depends on the following criteria;

- Compliance with accounting standards
- Reliability and relevance
- Faithful presentation and completeness
- Neutrality
- Substance over form
- Prudence
- Materiality

Each entity should consider the nature of its operations and the policies that the users of its financial statements would expect to be disclosed for that type of entity. Notes to accounts: Notes to accounts are the explanation by the management about the items in the financial statements. The management gives more explanation and information about the items of profit and loss account, balance sheet items and any other items by way of notes to accounts. Notes to accounts are integral part of financial statements.

(2) Presentation of Financial Information and the Basis of Accounting

The Article 1s of both IAS and BAS provide some guiding principles on fair presentation of financial statements viz.:

- Fair presentation,
- Wrong cannot be right by disclosure,
- In the international accounting standards, an enterprise should comply with all the requirements of the currently operative standards along with interpretations,
- In case the deviation from accounting standards becomes necessary to avoid a misleading presentation of financial statements, the financial impact of the deviation on the enterprise should be disclosed,
- A complete set of financial statements comprises of: 5 documents. (See Section 5.3.1)

5.3.3 Framework of Significant Accounting Policies

What follows is the framework describing the horizon of the accounting policies to be established in the environment of power sector in Bangladesh;

(1) Basis of Accounting

The accounts are prepared on historical cost concept based on accrual method of accounting as the going concern and consistent with generally accepted accounting principles in accordance with the mandatory accounting standard and disclosure requirements as per the provisions of the Companies Act 1994, Securities and Exchange Rules 1987, except for the following items which are accounted on cash basis considering the principle of prudence ----------(mention the areas where cash basis accounting is followed) Examples: (a) other income arising from connection/disconnection, sale of meters etc. are recognized on cash basis (b) Interest on short term deposits with banks is taken as income as and when credited by banks

(2) Inventory Accounting

- The standard is relevant to the extent of power purchase, stores, spares, loose tools etc.
- Inventories of stores, spares and loose tools are valued at lower of the cost/net realizable value after making due allowance for any obsolete or slow moving items.
- Measurement of Costs:
  - Costs allowed for inventory include cost of purchase, cost of conversion and other costs in bringing them to their present position and location. All direct and variable costs (including foreign exchange fluctuations, if attributable) are to be included, but no interest or borrowing costs should be included
  - Costs that are direct or allocation of overheads should follow clear cost accounting rules and reasonableness.
  - Some of the ways, in which inventory costs are calculated include:
    i. FIFO – first in first out. Costs for the first items into the stock are tracked and when these are issued, they are assigned the same values. This method is useful in high inflation systems where the costs vary much with the time.
    ii. Weighted average cost – where the costs vary with the batch quantities and when mixed batches are issued, weighted average cost (weights of batches procured) is useful.
  - The above determines the cost of closing stock. As per the standard, this cost is to be compared to the Net Realizable Value (“NRV”). This is the estimated cost of sales of the stock item less cost of such sale.
  - Difference between NRV and historical cost in the books is to be written-off in the Profit & Loss account, if it is a loss. If there is a gain, then it is ignored, till such gain has been actually realized.
- Disclosure requirement: As per the disclosure requirement, companies should declare the accounting policies adopted for valuation of inventories. For balance sheet, companies are required to carry out physical verification of book figures, materials held at project site, NRV with reference to market prices and identification of slow moving or non-moving items (especially whether such items need to be written-off).

(3) Depreciation

- Depreciation is the allocation of original cost of tangible fixed asset over its useful life. This is nothing but measurement of loss in value of fixed assets during the accounting period. (Here the policy could be “Depreciation on fixed asset is provided on gross value on straight line method basis by depreciating ------% of the cost over useful life of the assets. Rates of depreciation being adopted by the Company vary from --- % to -- % depending on category and economic life of the assets” (mention the categories, rates of depreciation and the statute under which there rates are prescribed).
  - The depreciable amount (cost less prior depreciation, impairment, and residual value) should be allocated on a systematic basis over the asset’s useful life.
  - The residual value and the useful life of an asset should be reviewed at least at each financial year-end and, if expectations differ from previous estimates, any change should be accounted for prospectively as a change in estimate.
  - The depreciation method used should reflect the pattern in which the asset's economic

benefits are consumed by the enterprise
- The depreciation method should be reviewed at least annually and, if the pattern of consumption of benefits has changed, the depreciation method should be changed prospectively as a change in estimate.
- Depreciation should be charged to the income statement, unless it is included in the carrying amount of another asset
- Depreciation begins when the asset is available for use and continues until the asset is derecognized, even if it is idle
- An asset should be removed from the balance sheet on disposal or when it is withdrawn from use and no future economic benefits are expected from its disposal.
- The gain or loss on disposal is the difference between the proceeds and the carrying amount and should be recognized in the income statement.

- Assets procured during the year costing Tk. -----/- or less are fully written off during the year. This policy has been adopted generally across all categories of assets.
- On scrapping/obsolescence of an asset, the cost of asset and accumulated depreciation on it is withdrawn and transferred to a separate account.

(4) Cash Flow Statement

Cash flow statement has to be prepared as per BAS 7. The cash flow statement analyzes changes in cash and cash equivalents during a period classified by operating, investing and financing activities. For arriving at the cash flow from operating activities, the direct method of presentation is encouraged, but the indirect method is acceptable. Some important points to be followed while preparing the cash flow statement as per accounting standard requirement are stated below.

- Cash flows relating to extraordinary items should be classified as operating, investing or financing as appropriate and should be separately disclosed
- The exchange rate used for translation of transactions denominated in a foreign currency and the cash flows of a foreign subsidiary should be the rate in effect at the date of the cash flows
- Cash flows from investing and financing activities should be reported gross by major class of cash receipts and major class of cash payments except for the following cases, which may be reported on a net basis:
  - cash receipts and payments on behalf of customers (for example, receipt and repayment of demand deposits by banks, and receipts collected on behalf of and paid over to the owner of a property)
  - cash receipts and payments for items in which the turnover is quick, the amounts are large, and the maturities are short, generally less than three months (for example, charges and collections from credit card customers, and purchase and sale of investments)
  - cash receipts and payments relating to fixed maturity deposits
  - cash advances and loans made to customers and repayments thereof
- Investing and financing transactions which do not require the use of cash should be excluded from the cash flow statement, but they should be separately disclosed elsewhere in the financial statements
- The components of cash and cash equivalents should be disclosed, and a reconciliation presented to amounts reported in the balance sheet

(5) Fixed Assets (Property, Plant and Equipment)

- All fixed assets are initially recorded at cost. Historical cost comprises the purchase price and any other applicable costs attributable in bringing the assets to their working condition for their intended use, including inward freight, duties and non-refundable taxes till commencement of commercial operations attributable to the fixed assets.
- Gains/losses on sale of fixed assets are credited to/charged to Profit and Loss account.
- Capital spares are treated as capital assets. Capital spares purchased prior to commissioning of assets are capitalized along with the principal asset. Capital spares purchased subsequent to commissioning are capitalized on purchase and depreciated on the balance useful life of the principal asset to which it belongs.

- In case of commissioned asset where final settlement of bills with contractors is yet to be effected, capitalization is made on provisional basis subject to necessary adjustment in the year of the final settlement.
- An asset should be removed from the balance sheet on disposal or when it is withdrawn from use and no future economic benefits are expected from its disposal
- If payment for an item of property, plant, and equipment is deferred, interest at market rate must be recognized or imputed
- Some important disclosures to be considered while preparing the Annual Accounts are stated here below:

1) For each class of property, plants, and equipment, disclose;
   - basis for measuring of the carrying amount;
   - depreciation method(s) used;
   - useful lives or depreciation rates;
   - gross carrying amount and accumulated depreciation and impairment losses;
   - reconciliation of the carrying amount at the beginning and the end of the period, showing: additions, disposals, revaluation increases, impairment losses, reversals of impairment losses, depreciation, net foreign exchange, differences on translation, other movements.

2) Also disclose:
   - restrictions on title
   - expenditures to construct property, plant, and equipment during the period
   - commitments to acquire property, plant, and equipment
   - compensation included in the income statement received from the third parties for items of property, plant, and equipment that were impaired, lost or given up.

3) If property, plant, and equipment are stated at revalued amounts, certain additional disclosures are required as under:
   - the effective date of the revaluation.
   - whether an independent evaluator was involved.
   - the methods and significant assumptions used in estimating fair values.
   - the extent to which fair values were determined directly by reference to observable prices in an active market or recent market transactions on arm's length terms or were estimated using other valuation techniques.
   - the carrying amount that would have been recognized had the assets been carried under the cost model.
   - the revaluation surplus, including changes during the period and generation restrictions.

(6) Revenue Recognition

Revenue is the gross inflow of economic benefits arising in the course of ordinary activities, resulting in increase in equity. It should be measured at fair value of the consideration received or receivable. Electricity generation companies are recognizing revenue on bills issued to consumers for the consumption of energy. (Mention specifically whether provision for unbilled revenue has been made at the end of the year. If not, this aspect has to be disclosed properly)

(7) Borrowing Costs

On 29 March 2007, the IASB issued a revised IAS 23 for Borrowing Costs. The main change from the previous version is the removal of the option of immediately recognizing as an expense borrowing costs that relate to assets that take a substantial period of time to get ready for use or sale. An entity is, therefore, required to capitalize borrowing costs as part of the cost of such assets. The revised Standard applies to borrowing costs relating to qualifying assets for which the commencement date for capitalization is on or after 1 January 2009. The company’s policy on the cost of borrowing may have to reflect the following position.

To the extent that funds are borrowed specifically for the purpose of obtaining a qualifying asset (a qualifying asset is an asset that necessarily takes a substantial period of time to get ready for its intended use or sale), the amount of borrowing costs eligible for capitalization on that asset shall be

determined as the actual borrowing costs incurred on that borrowing during the period less any investment income on the temporary investment of those borrowings.

To the extent that funds are borrowed generally and used for the purpose of obtaining a qualifying asset, the amount of borrowing costs eligible for capitalization shall be determined by applying a capitalization rate to the expenditures on that asset. The capitalization rate shall be the weighted average of the borrowing costs applicable to the borrowings of the entity that are outstanding during the period, other than borrowings made specifically for the purpose of obtaining a qualifying asset. The amount of borrowing costs capitalized during a period shall not exceed the amount of borrowing costs incurred during that period.

The capitalization of borrowing costs as part of the cost of a qualifying asset shall commence when:
(a) expenditure for the asset is being incurred;
(b) borrowing costs are being incurred; and
(c) activities that are necessary to prepare the asset for its intended use or sale are in progress.

- Interest on Borrowings
  - Provision is made for the interest accrued on all borrowings including Government loans whether such interest is due or not and whether it is actually paid or not.
  - Total interest cost for the year including interest on Government loans shall be, subject to capitalization of a portion of interest, charged to Revenue Account for the year.
  - A portion of the interest on borrowings which relates to financing of capital work-in-progress up to the stage of commissioning shall be capitalized in accordance with the details mentioned above.

- Cost relating to Borrowings
  - Guarantee charges, commitment charges and legal charges/stamp duty for loan agreements, debenture trust deeds, bonds or debentures relating to borrowing costs not capitalized and are charged to Profit & Loss Account in the year in which the costs are incurred. Provision has been made for the above costs for the year, which have accrued but are not paid.

(8) Contribution and Grants

Accounting policy needs to be framed keeping in view the following key points;

- Grants/consumer contributions relating to assets may be presented in one of two ways: (a) as deferred income, or (b) by deducting the grant from the asset's carrying amount;
- The grant is recognized as the income over the period necessary to match them with the related costs, for which they are intended to compensate, on a systematic basis, and should not to be credited directly to equity;
- Non-monetary grants, such as land or other resources, are usually accounted for at fair value, although recording both the asset and the grant at a nominal amount is also permitted;
- Grant receivable as compensation for costs already incurred or for immediate financial support, with no future related costs, should be recognized as the income in the period in which it is receivable; and
- A grant relating to the income may be reported separately as 'other income' or deducted from the related expense.

(9) Foreign Currency Transactions

Foreign currency transactions are translated into Taka at the exchange rates prevailing on the respective dates of transaction. At each subsequent balance sheet dates:

- Foreign Currency monetary amounts should be reported using the closing rate;
- Non-monetary items carried at historical cost are reported using the exchange rate at the date of the transaction;
- Non-monetary items carried at fair value are reported at the rate that existed when the fair values were determined.

Exchange differences arising when monetary items are settled or when monetary items are translated at rates different from those at which they were translated when initially recognized or in previous financial statements are reported in profit or loss in the period.

(10) Retirement Benefit Plans

Accounting policy and disclosure to be drafted keeping in view the following principles;
Retirement benefit plans may be a defined benefit plan or a defined contribution plan. The financial statements of a defined contribution plan contain a statement of net assets available for benefits and a description of the funding policy.

The report of a defined benefit plan should contain either;

- a statement that shows the net assets available for benefits, the actuarial present value of promised retirement benefits and the resulting excess or deficiency; or
- a statement of net assets available for benefits, including either a note disclosing the actuarial present value of promised retirement benefits or a reference to this information in an accompanying actuarial report.

The actuarial present value of promised retirement benefits is based on the benefits promised under the terms of the plan on service rendered to date using either current salary levels or projected salary levels. Retirement benefit plan investments are carried at fair value. If the liability shown in the Balance Sheet does not reflect the present value of the expected payments by the company's retirement plan to existing and past employees attributable to the service already rendered, the company should disclose the non-compliance. Therefore initiating the actuarial valuation of retirement benefits is further necessitated.

(11) Changes in Accounting Estimates and Errors

Keeping in view the following points, the policy on changes in accounting estimates and errors required to be drafted suitably and disclosed;

- Whether the company is recognizing the effect of a change in an accounting estimate prospectively by including it in the profit or loss in the period of the change, if the change affects that period only; or the period of the change and future periods, if the change affects both. However, to the extent that a change in an accounting estimate gives rise to changes in assets and liabilities, or relates to an item of equity, it has recognized the same by adjusting the carrying amount of the related asset, liability, or equity item in the period of the change.
- Whenever any errors are noticed whether the company is correcting all prior period errors retrospectively in the first set of financial statements authorized for issue after their discovery by restating the comparative amounts for the prior period(s) presented in which the error occurred; or if the error occurred before the earliest prior period presented, restating the opening balances of assets, liabilities and equity for the earliest prior period presented. However, if it is impracticable to determine the period-specific effects of an error on comparative information for one or more prior periods presented, the entity must restate the opening balances of assets, liabilities, and equity for the earliest period for which retrospective restatement is practicable. Further, if it is impracticable to determine the cumulative effect, at the beginning of the current period, of an error on all prior periods, the entity must restate the comparative information to correct the error prospectively from the earliest date practicable.
- Disclosures Relating to Prior Period Errors viz., the nature of the prior period error, for each prior period presented, to the extent practicable, the amount of the correction, for each financial statement line item affected.

(12) Segment Reporting

A reportable segment may be defined as a business segment or geographic segment, based on the dominant source and nature of organization's risks and return. In case the segment reporting is applicable to the company segment, accounting policies must be the same as those used in the

consolidated financial statements. However, the company has to comply with various disclosure requirements.

Some disclosure requirements are sales revenue (distinguishing between external and intersegment), result, assets, the basis of intersegment pricing, liabilities, capital additions, depreciation, non-cash expenses other than depreciation and equity method income i.e. an enterprise must present a reconciliation between information reported for segments and consolidated information.

In case the segment reporting is not applicable to the company, the disclosure could be: The Company is involved only in one activity namely 'Generation of Electricity'. Hence Segment Reporting is not considered to be applicable to the company

5.4 Financial Policy and Management

5.4.1 Financial Restructuring of Power Sector Entities

(1) Financial Reform of the Power Sector

There exists no long term financial plan at BPDB who construes the annual budget as the sole financial plan to rein the corporate entity as the guide post. Of late, BPDB together with MoPEMR has participated in the major restructuring projects with the assistance of donors in such as; Power Sector Master Plan Update[10]; Power Sector Financial Restructuring and Recovery Plan[11]; Three Year Roadmap for Power Sector Reform[12]. Those projects have laid down the medium term targets for restructuring and the milestones that need to be achieved by the sector. Those three projects do not contradict among themselves but are in complementary nature. Each of the projects is recommending BPDB with the targets for financial management as follows;

(a) The Power Sector Master Plan Update in 2006

Power Cell of MoPEMR is executing the project under the assistance of ADB. The project makes the estimate of long term demand for electricity and prepares the long term least cost development plan of power through the analysis resorting to the WASP model. The project goes into the analysis of long term supply potentiality of different energy resources and develops a plural number of scenarios constituted of different utilization ratios of natural gas and the coal energy.

(b) The Power Sector Financial Restructuring and Recovery Plan in 2006

Power Cell of MoPEMR is executing the project under the assistance of World Bank (IDA). The project analyzes financial performances of all the public and semi-public entities in the power sector making estimates of their future performance, makes recommendations for restructuring and financial reconstruction, and develops an integrated system for monitoring the financial performance of the power sector as a whole and the individual entities. Financial models have been constructed for all of the power sector entities for the purpose of analyzing the impact to be created by the fluctuation of parameters upon the financial performances of those entities. The project makes detailed and item by item recommendations for the allocation of assets and liabilities which are to be made at the time of corporatization and separation of organization.

(c) Three Year Roadmap for Power Sector Reform in 2006

Power Cell of MoPEMR is executing the project. The project aims at preparing the three year roadmap which will be the basis for concretizing the sector reform and facilitating its execution. The roadmap specifies the individual steps to be taken by different entities of the sector between 2007 through 2009 in the fields of generation, transmission, distribution, renewable energy and regulatory function of the sector.

[10] Power Cell, MOPEMR, "Power System Master Plan Update", June 2006
[11] Power Cell, MOPEMR, "Power Sector Financial Restructuring and Recovery Plan", August 2006
[12] Power Division, MOPEMR, "3-Year Roadmap for Power Sector Reform", September 2006

BPDB is placed in the center of those reforming projects and plays the pivotal role for implementing the reforming steps. Obviously BPDB is the one to be drastically impacted by the reforming activities. BPDB is placing the utmost importance in taking the proactive participation and implementation of the projects.

(2) The Power Sector Financial Restructuring and Recovery Plan of MOPEMR

Among the reforming projects, the Power Sector Financial Restructuring and Recovery Plan analyzes the financial performances of all the public and semi-public power entities and recommends the solution of financial problems through the restructuring and implementation of the measures to recover their financial strength and capabilities. The project enumerates the following issues BPDB and subsidiary power entities are confronted and solicits the concretized measures to be taken to cope with the issues and problems[13];

(a) Accounts Receivable from End Consumers

The power entities should reconcile the outstanding accounts receivable and write off the amount irrecoverable. The entities should contain the balance of accounts receivable within 60 days of electricity sales. The project recommends to trim the accounts receivable that exceeds the three months of sales and to write off the portion exceeding the maximum limit.

(b) Reconciliation of the Accounts Receivable between the Sector Companies

The power entities should reconcile the accounts receivable outstanding between the companies within the sector at both ends of the transactions and reach the accurate balances. The balance that cannot be reconciled should be written off. The entities should establish a rule that the accounts receivable shall be contained within three months of sale while writing off the amount that exceeds such limit.

(c) Overestimated and Underestimated Value of Fixed Assets

The asset transfers that have taken place so far are found to be either over or under estimated and settled at the provisional prices. There exist other cases of the transfers executed without an official vendor's agreement and loan re-lending agreements. The over or under estimated values of the assets transferred should be rectified. For those projects that are missing the official agreement, official steps have to be taken to sign the official contract or signing an on-lending agreement for those cases.

(d) Recognition of the Pension Liabilities

BPDB maintains the defined benefit pension plan but its balance sheet has no disclosure of pension liabilities. The correct actuarial valuation should be made and amount BPDB owes as the unfunded liability should be recognized in the balance sheet.

(e) Foreign Currency Denominated Loan

For the corporatizing company, BPDB transfers the fixed assets and the balance of debts denominated in domestic or foreign currencies created in conjunction with the fixed plants. At the corporatized entities it so happens that the booking made by those companies for the foreign exchange gains/losses and/or the balance of loan transferred does not match with each other. The situation needs attention and appropriate actions for rectification should be taken.

(f) Equity Ratio of the Corporatized Companies

The project has reached a conclusion that the corporatized companies should maintain the equity ratio of minimum 40% in order for them to become and remain self sustainable. The project recommends BPDB to convert a part of its lending balance to those companies into equity to the extent that the equity ratios of those companies reach 40%.

Having been recommended by the project, MoPEMR has engaged a consultant to proceed with the valuation of the fixed assets of which the result should be obtained toward the end of 2008. The

[13] Power Cell, MOPEMR, "Power Sector Restructuring and Recovery Plan", August 2006

balance sheet of BPDB and its subsidiary entities should be re-adjusted based on the result of such survey.

(3) Potential impacts of the power sector restructuring plans upon NWPGCL

The Power Sector Financial Restructuring and Recovery Plan indicates the direction for the power sector to pursue. The Project Report reveals that the considerations have been made on the following measures among other things;

- reducing the inter-company debt;
- clearing the accounts receivable from end-user customers;
- making provisions for the unfunded and unrecorded pension and gratuity obligations;
- finalizing the unresolved issues of ongoing transfer of assets;
- clearing other inter-company accounts; and
- resolving "clearing accounts". .

The issues raised above are some of the typical issues that the power sector has been chronically entangled. In addition to what has been addressed in the preceding paragraph, in the subsequent section 5.4.5 (2) "Risks and Preventive Measures", we will delve into some of the issues that are deeply embedded in the present power sector but should be straightened out for the healthy start-up and operation of NWPGCL. In order to cope with those issues, the management of the power sector entity is required to exercise the prudent judgment for which the well established financial policy and financial management shall be of significant means to rely on.

5.4.2 Financial Management

(1) Financial Policy and Financial Plan

Financial Policy is basically a high level overall plan with general goals, definitive course of action chosen from among alternatives in light of given conditions that determine the present and future decisions. Financial planning or policy involves analyzing the financial flows of the company, forecasting the consequences of various investments and financing decisions and weighing the effects of various alternatives. Since investment and financing act together, they cannot be made independently.

Planning horizon can be anywhere between 1 year to 5 years. The 1 year plan will be more detailed, whereas the 3 to 5 year will be based on more general trends. For projects having long lead time (e.g. of transmission projects or generation projects), the planning horizon needs to be longer of say 10 years.

Financial planning is a process of:

- analyzing the financing and investment choices open to the firm;
- projecting the future consequence of the present decisions – to avoid surprises and also to understand the link between present and future decisions;
- deciding on the alternatives to undertake;
- preparation of financial plan; and
- measuring subsequent performance against the goals set.

The important financial tools used are detailed cash flow statements and forecasting models. Sophisticated computer models ensure that the interactions between key parameters are captured correctly. For example, good understanding of consumption patterns amongst different categories of consumers will lead to a better load forecast than say, mere averaging. The financial models will be further discussed in the later section of 5.7.

(2) Use of Cash Flow Statement

While entities (including BPDB) prepare periodic cash flow statements, the power utilities continue to be cash starved and as such, fire fight for cash management on a day to day basis. Accordingly, in

addition to a cash flow statement, it may be useful if NWPGCL prepares a 'Cash Flow Statement' at regular intervals which can actually help it forecast its cash position in advance. In such a statement, the short term realizability of the assets would play a critical role.
Flow of funds in a company is a continuous process. Thus, policy impacting one activity will have certain impact on the cash position of the company. For example, the number of days of sales that is sold on credit will increase the receivables, and can affect the cash available for investment in long term projects.
Similarly, the investment plan also has an impact on the short term cash generation and deployment and can cause illiquidity in short term. Method of funding the investment would also impact the profitability as well as repayment levels.
Companies should also develop contingency plans to handle the problem of unforeseen events. Hence apart from the regular funds/cash flow analysis, companies should also draw up their liquidity funds flow statement, wherein the short term realizability of the assets would play a critical role.

Financial policy needs to be evaluated against the actual behavior and corrections to be set. By close monitoring of the following financial indicators, the management should be able to correctly evaluate the relevancy of the financial policy and the corporate goals;
(a) Short term for Phase 0 and Phase 1
1) Power purchase payable
2) Sales to cash cycle – number of days of credit for sale of power (i.e. meter reading and raising of bills cycle), days of receivable and bad debts
3) Inventory cycle – number of days of inventory holding, order quantity, order period
4) Suppliers to be paid – purchase to payment cycle
(b) Long term for Phase 2 and Phase 3
1) Investment –identification, selection criteria, prioritization, cost benefit analysis and approval for implementation
2) Funding mix of debt, internal resource and fresh equity, cost of funds, recovery probability

As stated earlier, policy has to be developed using forecasting models with alternate scenarios for evaluating the contingencies or 'worse than now' or 'business as usual' scenarios.
The modern management concept refers to the ability of an organization to have sound management and financial controls and practices, to focus on accountability and learning through organization-wide thinking, and to establish good performance measurement processes to report on planned results. This involves creating a vision, establishing goals to set a direction for the organization, planning the objectives, priorities, and tasks for work, setting up an effective structure & resource allocation, and reviewing work outcomes against established goals and priorities.

(3) Creating Accountability
Accountability means the ownership of conferred responsibilities combined with an obligation to report to a higher authority on the discharge of these responsibilities and on the results obtained. Accountability includes:

- answering to the consumers/public;
- quality decision making;
- strong internal controls;
- knowledge of policies and procedures, with effective communication;
- knowledge throughout the organization; and
- development and implementation of risk management practices.

5.4.3 Delegation of Power and Internal Control

(1) Defining Roles of Departments Concerned
Departments play a critical role in carrying out day to day management of the business in the organization. There must be a clear delegation of authority to ensure that public money is controlled. Delegation of authority provides specific responsibilities and powers to the department exercising it. When delegating financial authority, restrictions must exist in order to maintain sufficient control and

reduce risk proportionate with responsibility and level of knowledge. Delegation should be made to appropriate officials where responsibility can be most effectively exercised and where accountability for results can be readily established. Functions that are delegated to departmental staff must be clearly communicated to those staff members. Departments must establish policies and procedures to ensure an adequate level of control over delegated authorities.

Key financial management functions are performed at the departmental level. Reference to departments refers to that portion of the department's organizational structure that has financial management responsibilities. Included in these functions are:

- Uniform Classification of Accounts Preparation,
- Budgetary Control,
- Accounting and Control of Expenditures,
- Accounting and Control of Revenue,
- Financial Reporting,
- Financial Audit,
- Inventory Control,
- Fixed Asset Control, and
- Approval Control.

(2) Financial Delegation of Power

As NWPGCL is the entity having its solid independence, it should establish its own system of financial delegation of power. With a different organizational structure and philosophy, the financial empowerment of each department as well as each rank in the organizational hierarchy will have to be re-examined and redefined in order to maximize transparency, accountability and ease of operations. The financial delegation of power can relate to three basic areas. Spending authority is the empowered authority to facilitate the incurrence of a liability. Purchasing authority is the empowered authority to procure a good or service (after ensuring that the spending authority has provided for it) and payment authority is the empowered authority to pay the liability for the acquired good or services.

An explicit document exists in respect of the delegation of power at BPDB. NWPGCL is taking a quick action to start preparing its own rules and regulations concerning the delegation of power by learning lessons from the ones established at BPDB and EGCB, etc. The delegation of power must be established in close coordination with the development of an effective internal control and reporting system

(3) Internal Control

Internal control is comprised of the control environment, accounting systems and financial control policies and procedures established and maintained by the management to assist in achieving the orderly and efficient conduct of affairs of the organization. The management should ensure they meet at least four main objectives when designing and implementing effective internal controls:

- Maintaining Reliable Control Systems: The management must have reliable control systems to have accurate information for carrying out operations and producing reliable, timely financial information.
- Safeguarding Assets: The management must provide for the security of physical and non-physical assets by controlling access and by comparison of assets with records of those assets.
- Optimizing the Use of Resources: The management must ensure there is no unnecessary duplication of effort or waste, and discourage inefficient use of resources.
- Preventing and Detecting Error and Fraud: The management must ensure procedures are in place to reduce errors and prevent misappropriation of organization's assets or other fraudulent activity.

The management should consider the following basic control procedures as a part of the internal control processes in their departments:

- authorization of transactions,
- segregation of duties,

- adequate documentation and recording of transactions and events,
- safeguards over access to, and use of, assets and records, and
- independent checks on performance and proper valuation of recorded amounts.

Besides, as per the generally accepted accounting practice, the Directors of the company are required to provide a "Directors' Responsibility Statement" covering among other aspects that proper and sufficient care has been taken for safeguarding the assets of the company and for preventing and detecting fraud and other irregularities.

5.4.4 Establishment of Financial Policy

With respect to the financial management policy, the delegation of power is documented and its copies are delivered to those concerned at BPDB. Other items are said to be announced through the circulars and recognized as the basic policy of the institution. The existence of policy rules are confirmed to exist for control of the remittances of the amount collected from the bill, the remittances of general funds, and the procedures for procurement and payments. On the other hand, in despite of importance of the process, circulars have not been issued and financial policy has not been evidently established in such areas as; asset creation (capitalization, planning for investments, disposal, write-off, release and replacement, transfer of the assets, etc.); funding (long term and short term); O&M cost management; revenue management; provision for writing-off bad debts, etc.

The organization should clearly define the financial policies in the form of "Financial Policy Manual" in respect of the following areas of operation clearly mentioning the department responsible, procedure to be followed, approving authority etc.

- Revenue management – receipt and remittance,
- Cash control and physical security of cash,
- Banking arrangements,
- Transfer of funds from HO,
- Remittance of collection from field units,
- Petty cash/interest management,
- Accounts receivables,
- Bad and doubtful debts,
- Inventory management,
- Investment management,
- Advances to employees, contractors, suppliers etc.,
- Accounts payable,
- Debt management,
- Leased assets and liability management,
- Payroll processing,
- Unfunded pension liability management, and
- Loans to employees.

On the Finance & Accounts side, development of significant accounting policies/manual is mandatory, and entails moderate efforts but could have high impact.

5.4.5 Risks and Preventive Measures

The risks and preventive measures which are outlined below will ensure NWPGCL to avail free cash flow. Free cash is always required for a company to ensure its operational obligation and liability along with the debt service requirements. Following are the significant risks that are conceived for NWPGCL to encounter whose outlines and measures to cope with are discussed in a compact manner. The readers may refer to section 4.8 with regard to the risks potentially inherent in the transfer of the existing power plants to NWPGCL;

(1) Inauguration with Clean Balance Sheet

NWPGCL is a company newly incorporated and registered in August 2007. NWPGCL is resolved to own and operate the Bheramara 360MW CCGT to be newly constructed and two more new plants of Simple Cycle Gas Turbines for 150MW each to be constructed at Khulna and Sirajganj for the peak hour generation. These projects mentioned are newly constructed ones in addition of which, NWPGCL recently releases its 5 year roadmap of the company in which it specifies its policy to take over the existing generation plants owned and operated by BPDB in the western part of the country, i.e. the Barapukuria Coal Thermal Plant for 2x125 MW commissioned in November 2006 and Baghabari Gas Turbine Plant for 71MW commissioned in June 1991 plus 100MW commissioned in November 2001[14]. For the transfers of those existing plants, NWPGCL will enter into the Vendor's Agreement and take over the fixed assets together with the remaining balance of the debts that have financed those fixed assets. The fixed assets to be transferred are to be evaluated under the Identification, Verification, Valuation and Recording Program, being implemented by BPDB since 1993 It is presumed that the fixed assets are entailing a mess of unsettled assets and liabilities which NWPGCL should not be forced to accept but should be separated and disposed by BPDB so as to enable NWPGCL to inaugurate with the clean balance sheet of zero balance with the exception of the balance of loan whose maturities are yet to come at the outset of its operation of the acquired plants. The pursuit of the clean balance sheet and the avoidance of the negative legacy on the part of NWPGCL will create the situation in which BPDB will be left with a considerable amount of upaid liabilities and the accumulated deficits. The Power Sector Financial Restructuring and Recovery Plan is recommending the ultimate writing-off of the bad debts and accumulated deficits through the means of; reduction of account receivable by writing-off and/or provisioning; converting the loan to capital; off-setting of accumulated deficits with the capital, etc.

(2) Avoidance of the Negative Legacy

Taking the examples of preceding corporatized cases from BPDB, the Vendor's Agreement is seen to have been signed on the provisional basis. This is due to the fact that the value of the assets transferred is not updated and properly evaluated. What have been transferred in the preceding cases are the fixed assets and the unpaid balance of the associated loans taken for the construction of the plants. The difference between the value of fixed assets and the transferred balance of loan is defined as the value to be paid by the receiver company to BPDB. The payment is not made in cash but the value is treated as the equity investment by BPDB to the receiver company. A problem is identified in relation to the transfer of the debt which includes the overdue arrear of principal and interest that BPDB failed to pay on due dates. BPDB classifies such portion of loans as Debt Service Liabilities. The fixed assets have taken the depreciation during the period of BPDB's ownership and the funds generated from the depreciation should have been appropriated for the repayment of principal and interest of loans on their due dates. Apparently, the funds generated in such manner have been used for the purposes other than the debt servicing. A gap has been created between the depreciation and debt servicing. What is probably to happen at the new company taking over such assets is that the new company will continue charging depreciation but the actual amounts to be generated through the depreciation shall not be sufficient enough to fully repay the loan transferred. Theoretically, the new company may not be able to repay the loans with insufficient amount of funds. It is construed that the transferring the Debt Service Liability to the newly created subsidiary company is nothing but the transfer of the negative legacy which should not be enforced.

(3) Management of Other Risks

Other significant risks NWPGCL will be exposed in the course of building up of the assets are summarized to be such as; the cost recovery in the power purchase agreement to be concluded with BPDB; the assurance for the supply of fuel gas for the entire term of plant life and the price of fuel gas; the exchange rate fluctuation in case of taking loans in foreign currencies; the unfunded liabilities that will come arise if it maintains the defined benefit pension plan similar to BPDB; etc. The contents

[14] NWPGCL, "5-Year Road Map/Business Plan", June 2008

of the risks are as explained below and the measures to cope with such risks are also mentioned hereunder.

(a) Vendor's Agreement for Transfer of Fixed Assets

At APSCL we have encountered with a typical example of asset transfer accompanying some problems worth to be reviewed and to learn lessons there from. APSCL has entered into the Vendor's Agreement for the transfer and took over the fixed assets. The contract provisionally agreed to pay for the fixed assets which is fixed at the net book value after depreciation and less the amount of the debt transferred which includes the Debt Service Liabilities. The contract stipulates that after the transfer of the fixed assets and prior to the commencement of the commercial operation, a Dependable Capacity Test is agreed to be conducted. Based on the clause stipulated BPDB did test the plant for its capacity which has failed to reach the rated capacity contracted. And due to the failure in reaching the rated capacity, the amount of the capacity payment has been unilaterally reduced by the purchaser of the power, BPDB. In normal business practices for the sale of plant and equipment, the seller provides the buyer a certain level of performance warranty, based on which, should the event be taking place of the plant failing to meet the rated capacity, the seller concedes for fixing the plant and/or pays compensation. This is to give a caution to NWPGCL to make sure that the acquisition of plant asset from BPDB shall not involve similar problems as APSCL has experienced and to cause measures to appropriately cope with the similar event of the case.

(b) Cost Recovery in the Power Purchase Agreement

NWPGCL is selling all the electricity generated to the single buyer, BPDB under a Power Purchase Agreement (PPA) to be entered between NWPGCL and BPDB. The selling price is composed of two parts; the capacity payment and the energy payment. The capacity payment is to recover the fixed cost invested and spent for the construction, maintenance and operation whereas the energy payment is to recover the variable expenses the company spent for the operation and maintenance of the generation plant. The selling price is to be agreed between the seller and the buyer, included into the application for generation licemse and submitted to BERC for licensing approval. NWPGCL will not be required to separately apply BERC for the selling price. The selling price agreed should be sufficient to recover the investment and the operational expenses including the funds for maintenance and repairs. The power tariff which BPDB applies and has it approved by BERC is subject to the ceiling limit above which the cost shall be declined in the structuring of the tariff. The price of electricity BPDB purchases from any of the generation companies including NWPGCL will be determined in taking such ceiling limit into consideration. If the company operated with inefficiency, the part of the expense exceeding the ceiling limit might not be approved by the buyer. The selling price is supposed to be structured of the components which typically includes the items such as; the return on capital (limit is the risk free rate of capital + risk premium x β co-efficient of the applicant company as compared with the listed company at the stock exchange); working capital (limit: 2 months of sales revenue); inventory and advance payment of expense (limit: one month of consumption); etc. The fuel price is allowed to be passed through onto the selling price. The shut down period for regular maintenances and accidents are allowed to the generating company up to the certain number of days without affecting the capacity payment. At APSCL, the term covered by PPA was found to be three years after the effective date, unless extended or earlier terminated, and under the contract the plant shutdown is allowed at normal years for 876 hours (equivalent of 36.5 days) whereas at every three years, longer period is allowed for 1,440 hours (equivalent to 60 days) for conducting an extensive overhaul maintenance[15]. In order for the NWPGCL to operate its plants to be profitable and self sustainable, it has to improve the efficiency of operation so that the operation and maintenance cost shall be contained within what is prescribed in the PPA. The PPA of APSCL is found to be for a period of three years, though the contract is understood to be implying the extension of its term beyond the originally signed three years, which is much shorter than the contracts signed by IPPs which have the contract periods between 15 - 22 years. There are no measures incorporated against the risk of such PPA being literally terminated at the end of the third year of the contract. The

[15] The expression adopted here suggests as if the contract will be extended before it will mature at the fulfillment of 3 years and the contract term would be longer in its substance.

new plant of Bheramara of NWPGCL is designed to have the useful life of 30 years and has a legitimate reason demanding the contract to cover the entire life of the plant.

(c) Accounts Receivable

NWPGCL will sell all the power generated to the single buyer, BPDB. As there will be no other sales of the power, the accounts receivable stemming from the sales of power shall be limited to those against BPDB. In accordance with the precedent case of Power Purchase Agreement which APSCL entered with BPDB, the seller of the power shall prepare and send a monthly invoice to the buyer within 7 days of the final date of the covered month and the buyer shall pay the invoice within 45 days of the date of invoice. The account receivable shall not exceed two months. Collection of bills shall not be difficult unless BPDB delays its payment. On the other hand at BPDB, it is selling the electricity to the distribution companies as well as to the consumers directly. BPDB is faced with the delays in payment of the bills by the end consumers or by the distribution company. If the delays accumulate, the arrears will pile up gradually starting at the distribution companies to BPDB and going upstream to the generating companies. NWPGCL should not forget about the control of the accounts receivable. Several methods have been taken to cope with the mounting arrears of account receivables. One of such means is found in stipulating in the PPA for the deposit of a certain amount of cash by the buyer to the seller that can be forfeited upon the buyer's delay in payment beyond a prescribed number of days or provision of letters of credit or revolving letters of credit issued by commercial banks for the buyer that could be drawn by the seller against the buyer's delay in payment. Another preventive measure can be found in establishing escrow accounts system under which a generation company, a distribution company and a commercial bank sign an escrow agreement and nominates the escrow agent to keep the funds collected from the consumers deposited into the escrow account and payments thereof would be made by the escrow agent in accordance with the predetermined priority order of various invoices. Pakistan has lately adopted this mechanism of the escrow account to secure the priority payments to the generation companies, servicing of debts, and taxes, etc.

(d) Assurance for Fuel Supply and its Price

NWPGCL will be supplied its fuel gas by Petrobangla through its subsidiary (Sundarbans Gas Transport & Supply Company: to be established soon). Take the precedent experience at APSCL who signed the Gas Supply Agreement with Petrobangla and let us learn the lessons from its terms and conditions. The term of contract signed by APSCL is for 10 years with the automatic renewal clause for another 5 years. Unless terminated upon the due dates thus established, the contract will be extended for 5 more years repeatedly. Though it virtually gives assurance of supply for long years, it still is short of irrevocable commitment covering the useful life of the plant. Another precedent example at Pendekar Energy Company (IPP) shows that it has obtained the contract covering for 22 years in addition to which the generation company has obtained commitment from Petrobangla for priority supply of gas to the two generation plants it owns. IPPs other than AES (Pendekar) are normally awarded the supply contract for 15 years. AES (Pendekar) is understood to have been given a preferential treatment for its pioneering status among IPPs and to demonstrate government intention to promote IPP investment[16]. The future course of development for NWPGCL is envisaging the self sustaining path after leaving the umbrella and protection by BPDB gradually. Being amidst in such environment, NWPGCL will no longer be enduring the contractual conditions that are inferior to the same of IPPs as its brother/sister company had to accept. It is the time for not only NWPGCL

[16] Following preferential treatments of IPPs are recognized to be in effect in addition to the preferential terms and conditions of PPA and fuel supply agreement;

- Exemption from corporate income tax of 15 years,
- Exemption from custom duties , VAT and any other surcharges in importing plants and equipment,
- Repatriation of equity along with dividends allowed freely,
- Exemption of income tax for foreign lenders to such companies,
- Avoidance of double taxation case of foreign investors on the basis of bilateral agreements,
- Remittances of up to 50% of salary of the foreigners employed in Bangladesh, and
- Companies are eligible for all concessions which are available to industrial projects.

but also the government to consider developing the level playing field for all the players in the power sector.

With respect to the price of gas, it is learnt that the different prices are quoted for different users. The price of gas supplied to BPDB is quoted now at Taka 73.91/MSCF, Pendekar Energy Company is paying US$ 2.40/GJ（equivalent to Taka 156/MSCF）for two of its generation plants while other IPPs are paying US$ 1.117/MSCF. The selling price of electricity applied to the IPPs other than AES (Pendekar) is virtually at the same level with the average tariff of BPDB allowing no margin in its import and export of the power.

(e) Foreign Exchange Risk associated with the Foreign Currency Denominated Loan

NWPGCL will be seeing itself of resorting to the loans extended from the foreign donors from whom the government of Bangladesh borrows the funds and on-lends the funds to the executing agency. The generation company has no means to earn the foreign currency denominated revenue and will be exposed to the risk of fluctuating foreign exchange rate. The loans to finance the power projects normally run for the long period of 20-40 years which will make it virtually impossible to hedge the risk in the foreign exchange market, to say nothing of the enormous cost for hedging. The generating company is allowed to pass through the exchange fluctuation onto the selling price of power. The process of passing through will take time before it will be agreed by the counter party and the company has no means to recover the loss incurred before the enforcement of revised selling price. On the part of the generating company, there is no reason that the company wants to take the risk and is natural that it averts such risk. The government is adding a considerable margin in on-lending the funds to the executing agency and such margin could be used for a part of the absorbing cushion for the government to take the risk and the on-lending shall be allowed in the risk free domestic currency.

(f) Pension Liability

BPDB runs three kinds of retirement benefits for the employees, i.e. the Defined Benefit Pension Plan, the Gratuity Fund and the Contributory Provident Fund. The Defined Benefit Pension Plan is funded by the employer and employee and employees whose services exceed a certain number of years are vested and paid after retirement for their lives for a fixed amount of periodical payment to be determined by the salary level during the service period. The Gratuity Fund pays the retiree having service record of a certain minimum years or longer a lump sum which is calculated based on the retiree’s salary and is paid at the time of retirement. The Contributory Provident Fund, on the other hand, is the fund established and managed by the trustee. The fund is contributed by the employees for a fixed percentage of the monthly salary and the employer contributes the same amount of matching funds. The funds contributed and accumulated are paid to the retirees. The gratuity fund and the contributory provident fund are of less risk to the company while the defined benefit plan is. For the maintenance of the defined benefit pension plan, BPDB has to conduct an actuarial valuation which will estimate the future payment obligation of BPDB converted into the present value. The employer has to make the contribution up to the total amount of present value of such actuarial valuation. There is no record of the actuarial valuation conducted at BPDB and there exists no estimate of future payment obligation. As the average life expectancy tends to extend, the pension liabilities could happen to inflate unexpectedly. The management should have a good insight of the future potential liability and takes appropriate precautionary steps. At the precedent case of APSCL, the company runs the Gratuity Fund and the Employee Contributory Provident Fund but does not run the defined benefit pension plan. Same story is heard at Pendekar Energy Company who has not introduced the defined benefit pension plan. Taking a look at the examples in the developed countries, the mega trend of the retirement benefit system is while the companies maintain the pension systems to help the retirees to support their retirement lives but are shifting its systems from the defined benefit plans that commit the amount of benefit payment to the defined contribution plans that commit the amounts of employee contribution and the companies’ matching contribution and the retirement benefit shall be paid to the retirees within the amount accumulated and the return on investment accrued. The management needs to be prudent in making the best efforts to avert the risks which is not controllable or is beyond the limit of calculated risk.

In case an existing plant of BPDB is transferred to NWPGCL together with the staff for operation of such plant, the staffs that move with the plant are to retire BPDB before joining NWPGCL. BPDB is obliged to settle the retirement benefit of those employees while it maintains a limited amount of funds that are insufficient to honor the large amount of the one time payment upon their termination. NWPGCL may need to approach and negotiate with BPDB for the timely settlement of the retirement benefit or cause to arrange remedial measures instead. NWPGCL is well aware of the issue and expresses its readiness to proactively address the issue for smoothier settlement and transition of the plant transfer.

5.5 Budget

Budget essentially lays down the physical and financial operating plan/targets for the budget period and lays down the standards/yardsticks for inputs and the outputs associated with the various activities. It is an important tool for managerial appraisal and control. It also provides an estimate of internal generation of funds from operations, which would be available for financing the capital expenditure, meeting the loan repayment obligations, etc.

The main objectives of the budgeting system are to ensure that:

- Specific budgets in physical and financial terms are laid down for all activities and the respective budget/responsibility/cost centres are held accountable for them,
- Co-ordination in planning so that all the inputs necessary to achieve the physical targets are available in time,
- A basis of control over operational expenses and working capital and to inculcate greater cost consciousness in the organization,
- A basis for forecasting profitability and planning for cash/funds is provided, and
- Standards and yard sticks are laid down for measuring performance in physical and financial terms, ascertain variances, identify responsibilities for under-performance, to analyze contributory reasons thereof and determining corrective actions

With respect to its coverage, the operations budget is prepared by all the stations that are in the operation phase. The budget is also prepared by the projects for the year in which they plan to commercialize the first generating unit. However, the anticipated revenue and expenditure during the trial run (i.e. from the date of synchronization to the date of commercial generation) is treated as a part of pre-commissioning expenses (net) and forms a part of the capital budget.

The expenses in respect of developmental expenditure for improvements, additions, replacements, renewals, balancing facilities which are capital in nature are budgeted for in the capital budget.

5.5.1 Budget System at BPDB

While BPDB maintains no long or medium term of business plan or management target, NWPGCL should establish the corporate vision and mission statement under which the long or medium term business plan should be established and in which the company clearly identifies the numeral target. The targets set in the long or medium term business plan should be reviewed at the time of annual compilation of budget and the target should be renewed or revised to best suit for the long term management goal. The indication of such long term goal and the targets planned within the budget shall identify the exact feature of the annual budget. It is imperative to concretize the immediate target to be achieved under the annual budget and to provide a supportive endorsement with the sufficient budget allocation. The procedure for its preparation and execution is as follows;

(1) Capital Budget

The capital budget is prepared and executed in obtaining funds from the domestic source (government) and/or the foreign source (donors). At BPDB, the budget is compiled by the Director Project who acts as the nodal person but its fund raising is handled by Director Finance. The procedure for the capital budget commences in December every year when Director Project compiles the Project Plan comprised of the project proposals collected from the departments concerned; development, planning, and system departments. The Project Plan compiled is discussed at the board of directors meeting of BPDB. The Project Plan approved by the board of directors of BPDB goes to MOPEMR and then to Planning Commission after being approved at MOPEMR. The Planning Commission scrutinizes the Project Plan and initiates discussions with other relevant ministries and agencies of the government. The Project Plan is discussed and approved at Executive Committee of National Economic Council (ECNEC) before the end of June each year. The development budget approved is called “Annual Development Programme” which is executed by the applicant agency.

The selection process of the individual projects for incorporation into the Project Plan is going through the strict screening process. For the large project like the one under our study, the executing agency is required to prepare the Detailed Project Proforma which is the basic document to be scrutinized by the government and approved by ECNEC. DPP prepared by the executing agency will be submitted to MOPEMR first for approval. After the approval is given by MOPEMR, the document is submitted to Planning Commission for its own scrutiny and thence to ECNEC for the government final approval of the project.

ECNEC is convened normally twice a month and is ready to appraise the document at any time of the year. The DPP approved by ECNEC is to be automatically incorporated into the Annual Development Programme.

Programme. Should it happen that the funds available is limited to cover all the projects presented, the priority of implementation is discussed and given for inclusion to the Annual Development Programme. The projects going through of the above mentioned procedure is ready for being allocated with the funds for development under the Annual Development Programme.

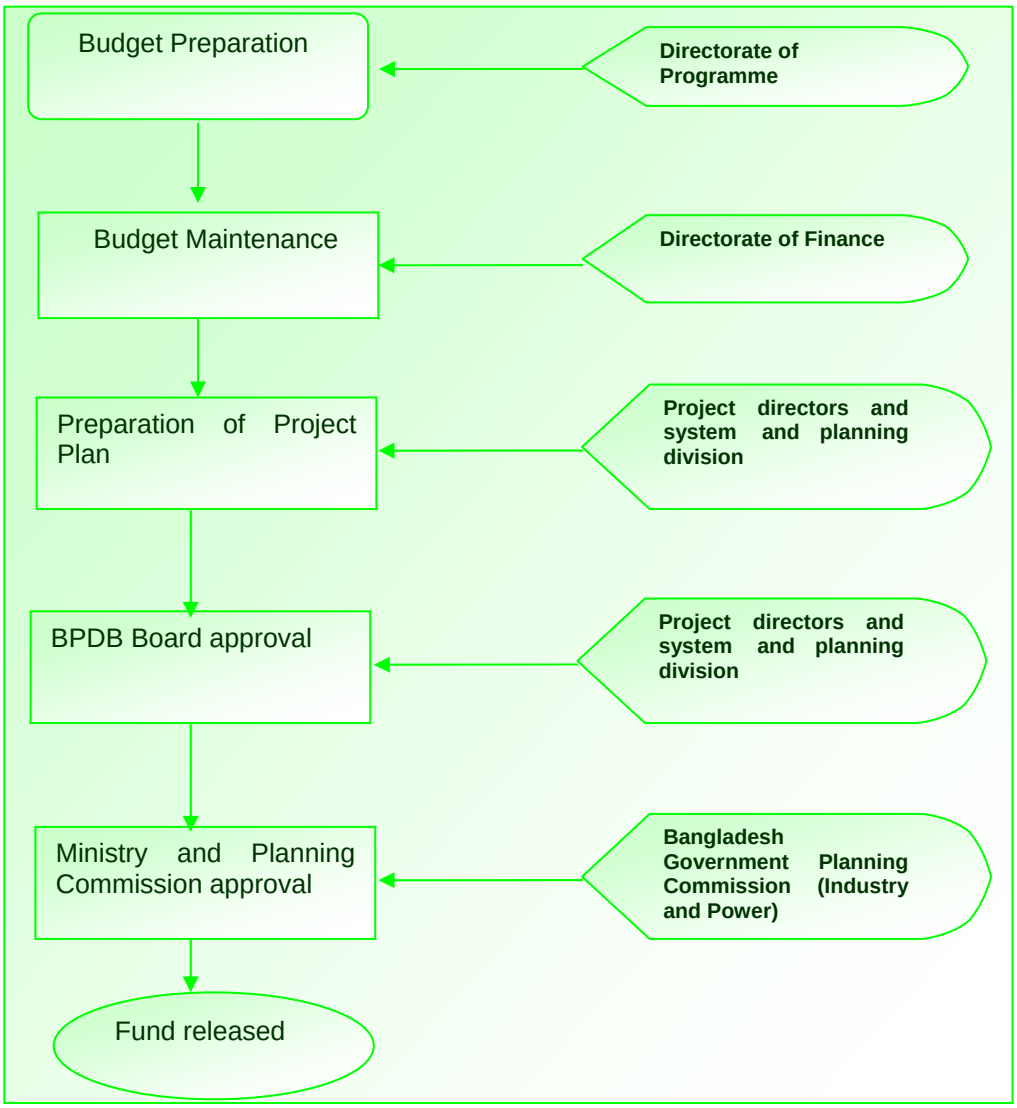


Figure II-5-14 Steps for Preparation of Capital Budget

(2) Recurrent Budget

On the contrary to the capital budget, the recurrent budget is to provide the funds for the operation and maintenance of projects and its funding source is limited to the domestic source. The responsibility of

budget preparation is resting upon the Director Finance. The major targets of budget compilation are those of the revenue accounts such as; revenue from electricity sale; other income; government subsidy and/or grant, and those of the expenditure side of accounts such as; fuel cost; electricity purchase; maintenance and repair; personnel expense: general administrative expense; depreciation; interests on loans; etc. The budgeting process starts in November or December in each year. Director Finance instructs the organizational units concerned to produce the items requiring budget and the amount necessary to be budgeted. The information required to be submitted include the revised budget for the current fiscal year and the budget for the next fiscal year. Each budget unit is obliged to submit the actual expenses incurred during the first 6 months of the year together with the estimate for the remaining six months. Should the estimate for the latter half of the fiscal year and the actual expense incurred for the first 6 months of the year deviate from the budget originally established, the budget unit is required to explain the reason causing the deviation. Upon the submission of budget data from all of the budget units, Director Finance convenes a meeting at which participants discuss the initial draft of budget and proceed with the coordination. Once the coordination is finished, the draft budget goes up to the board meeting for perusal and decision. The approved draft budget is sent to MOPEMR for approval and submission to the government. The draft budget is then submitted to Ministry of Finance and is to be approved by the Minister of Finance. The budget approved by the Minister becomes the official budget which is noticed to each of the budget units. The budget is required to be strictly complied in its execution. When there happens to be a necessity to go beyond what has been approved in the budget, the budget unit in charge has to obtain the approval of Director of Finance even the amount exceeded is small.

(3) Deviation between the Budget and Actual

BPDB is controlling the strict observance of the budget. The information concerning the budget and the actual is released in its annual report every year. What follows are the records taken from BPDB's annual reports for the budget and actual expenditure for 2005/06 and 2006/07 of which the following are the noteworthy points. For 2005/06, the revenue achieved was 94.4% of the budget set target which was off by 5.6%. For 2006/07, too, the revenue undermined the budget by 4.0%. This caused the subsequent failure of the ratios that were calculated on the basis of the revenue. On the expense side, almost all of the items were under control within the budget with exception of the foreign exchange loss and a minor excess in the administration expense. The foreign exchange loss was found to be large in excess of the budget as it is in no way controllable by BPDB and no one is to be claimed of responsibility.

Table II-5-3 Comparison of Budget and Actual

	FY 2005/06				FY 2006/07			
	Budget (Tk million)	Increase from prev. year actual	Actual (Tk million)	Deviation (%)	Budget (Tk million)	Increase from prev. year actual	Actual (Tk million)	Deviation (%)
Revenue								
Electricity sold	48,566	11.4%	45,859	94.4	49,969	9.0%	47,986	96.0
Other revenue	850	- 24.3%	710	84.5	824	16.1%	1,598	193.9
Revenue Total	49,416		46.568	94.2	50,793	9.1%	49,583	97.6
Operating expense								
Fuel cost	16,160	23.8%	15,607	94.0	17,050	9.2%	16,760	98.3
Depreciation	5,152 *1	5.1%	5,156	100.1	5,473 *3	6.1%	6,677	122.0
Maintenance expense	2,793 *2	4.5%	2,595	92.9	4,073 *4	57.0%	2,453	60.2
Power purchase from IPPs	25,708	14.3%	25,382	98.7	23,902	-5.8%	25,166	105.3

	FY 2005/06				FY 2006/07			
	Budget (Tk million)	Increase from prev. year actual	Actual (Tk million)	Deviation (%)	Budget (Tk million)	Increase from prev. year actual	Actual (Tk million)	Deviation (%)
Transmission expense	1,400	2.3%	1,162	83.0	1,223	5.2%	1,216	99.4
Other operating Expense	2,924		2,205	75.4	3,526	59.9%	2,616	74.2
Distribution expense	625		594	95.0	543	-8.6%	516	95.0
Administration	789	- 9.8%	817	103.7	950	16.3%	964	101.5
Operating expense Total	56,000	17.3%	53,517	95.6	56,739	6.0%	56,366	99.3
Operating income／Loss	-6,585		-6,948	105.5	-5,946	9.7%	-6,783	114.1
Non-operating Income								
Asset insurance Fund	15	0.0%	15	100.0	15	0.0%	15	100.0
Interest on loan	1,582	- 8.4%	1,355	85.7	2,217	63.6%	2,150	97.0
Foreign exchange gain/loss	-814	23.4%	-1,062	130.5	-113	89.4%	-93	81.9
Non-operating expense Total	2,411		2,432	100.9	2,345	-3.6%	2,258	96.3
Net Profit／Loss	-8,996	-47.8%	-9,381	104.3	-8,292	11.6%	-9,041	109.0

(note) *1: 3.0% of gross fixed assets of pervious year end *3: 2.7% of gross fixed assets of pervious year end
*2: 1.6% of gross fixed assets of previous year end *4: 2.0% of gross fixed assets of pervious year end
(source) BPDB, "Annual Reports FY 2005-2006 and FY 2006-2007"

With respect to the depreciation, the table shows the budgets were set at 3.0% in 2005/06 and 2.7% in 2006/07 of the gross value of the fixed assets at the ends of preceding years. In 2006/07, the fixed assets have been revalued and their value increased by 47%. The actual amount spent for depreciation in 2006/07 exceeded the budget amount by 22%. It is evident that the increase is due to the increased value of the fixed assets by the revaluation process.

For the maintenance and repair, we have checked the budget records tracking as far back to 2001/02 and found that, on an average, the maintenance and repair expenses had been budgeted almost at the constant level of 1.5% of the gross book value at the end of the preceding fiscal year (but had been 1.6% for 2005/06). The Power Sector Master Plan Update Project executed in 2006 is calculating the total cost for capital investment as well as the operation and maintenance expense for the long term by using the WASP model. The study reveals that the maintenance and repair costs for typical types of generation plants are assessed in the percentages of the capital cost such as; 2.34% (fixed cost of 0.77% and variable cost of 1.57%) for 450MW gas combined cycle; 2.53% (fixed: 1.44% and variable: 2.09%) for steam SCGT; 1.43% (fixed:0.71% and variable: 2.09%) for natural gas steam[17]. The level of 1.5% which BPDB is budgeting now is understood to be too little and implies the insufficiency of funds to attain what is considered necessary. In addition to the fact that the budget is set too little, the actual execution of the budget stayed at 93% of the amount budgeted in 2005/06 and at 60%, an astonishingly low level of execution in 2006/07. The level of the actual expenditure for the item was at 1.5% of the gross book value of the fixed assets for 2005/06 and mere 0.8% for 2006/07 at the ends of the preceding fiscal years, which is nothing but an expression of the state of insufficient maintenance.

[17] Power Cell, MOPEMR, "Power System Master Plan Update", June 2006

To be also noteworthy is the purchasing of power from IPPs. In 2006/07, the budget anticipated to purchase the power from IPPs for less amount than the preceding year by 5.8% whereas the total revenue from electricity sale was budgeted with 9.0% increase. What happened in actuality was that the amount of purchase from IPPs could not be reduced despite the fact that the total sale of electricity increased only by 4.6%, about one half of the budgeted increase.

One more point to be noted is the interest expense which ended at much less than the amount budgeted. BPDB carries over the arrears of past due principal and interest of loan. The fact that the interest expense undermined the amount budgeted might be the results of the cases; 1) some of the interest falling due and thus budgeted were not paid and transferred to the Debt Service Liability Account; 2) the amount budgeted might have anticipated the payment of the past arrears of interest but could not be executed due to the insufficiency of funds; 3) the liability of interest payment was transferred to other subsidiary company together with the transfer of the fixed assets. There is no explicit explanation made on the points.

5.5.2 Recommendation for Establishing Budget System

(1) Budget Time Table

A tightly structured budget procedure along with the accompanying time table that specifies when all activities will occur, who will complete them, and when a deliverable is back at the budget section of the corporate office has to be developed for NWPGCL. By laying out the process in this manner, and following up closely on all due dates, it is possible to issue complete budget on time. A good budget document should include Capital Budget, Revenue Budget, Stores Budget, Establishment Budget etc. Budget procedure and time table must be built around budget flow, in sequential manner. It is recommended to have budget time table with milestones so as to enable the companies to have better discipline in budget preparation and adherence.

Table II-5-4 Budget Time Table

Activity	Time Frame	
	Power Station	H.O
Issue of Budget Circular		1st week of January
Commencement of the budget exercise	1st week of January	
Formulation of initial budget proposal	By 1st week of February	
Review of initial budget proposal by the Station Budget Committee and submission to Budget committee	By 10th of February	
Compilation of Station Budget		By 15th of February
Compilation of budgeted Balance sheet, Profit and Loss Account and Cash Flow Statement		By 25th of February
Circulation of initial budget proposal and budgeted Balance sheet, Profit and Loss Account and Cash Flow Statement to the various departments		By last day of February
Consolidation of comments of various departments		By 1st week of March
Review of the initial budget proposal and discussions with the stations		By 3rd week of March
Presentation of budget to Corporate Budget Committee and approval thereon		By the 25th of March

Activity	Time Frame	
	Power Station	H.O
Intimation of approved budget to Power Station		By 31st March
Preparation of Final Budget and forwarding to MOPEMR	By 30th April	

(2) Preparation of Capital Budget

Currently the budget for the entire BPDB is approved by the Government year by year. A comprehensive budget process that can be adopted by NWPGCL in a market environment is furnished below:

Step 1: Issue of guidelines for initiation of budget process
Step 2: Project assessment
Step 3: Project identification phase
Step 4: Assessment of feasibility
Step 5: Choosing the project
Step 6: Identifying sources of funding
Step 7: Inclusion of projects in budget document
Step 8: Communicating approval for budget document
Step 9: Monitoring of projects
Step 10: Post completion audit

(3) Involvement of the senior management

Decisions once taken to invest money in capital projects are irreversible. Any wrong investment decision will have a far reaching impact on the performance of a company. Hence for any budget system to be effective, active participation of the senior management in motivating budgeting units is very necessary. The management must participate in the preparation, approval, execution monitoring and review of the budgetary performance. Prescribing monthly progress report formats (physical and financial), periodical review meetings, monitoring the progress by physical inspections to the work spot etc. will help the management to closely follow up the progress and avoid time and cost overruns.

(4) Preparing a Budgeting Policy Manual

Since budgeting exercise involves a lot of procedures, processes and assumptions to be followed, it is prudent to have a formal Budgeting Policy Manual, in which formal procedures and rules are established to assure that all proposals are reviewed fairly and consistently. The manual helps to ensure that managers and supervisors who make proposals know what the organization expects the proposals to contain, and on what basis their proposed projects will be judged. In an outline, the policy manual should include specifications for:

- an annually updated forecast of capital/revenue expenditures,
- the appropriation steps,
- the appraisal method(s) to be used to evaluate proposals,
- the minimum acceptable rate(s) of return on projects of various risk,
- the limits of authority,
- the control of capital/revenue expenditures, and
- the procedure to be followed when accepted projects are subject to an actual performance review after implementation.

(5) IT Solutions

There are IT software modules which can help deal with budget preparation/revision as well as budget monitoring and control. These modules can also deal with process for generating the cost sheet at various levels. The module can cover the following sub-processes:

- Budget preparation
- Budget consolidation and revision
- Budget monitoring and control
- Creation of Cost Centre

- Generation of Costing Reports

(6) Revenue and Expense Budget

The revenue budget needs to concentrate in the estimate of revenue from electricity sale. The volume of sale, first, needs to be estimated accurately and planned for the budget. Then comes the billing price of power which in combination with the volume estimated for sale, can produce the estimate of total revenue. Once the volume of generation is estimated, the expenses that will be needed for generation are to be calculated whose result will be incorporated into the expense budget. The expense budget will include the items such as; personnel expense; maintenance & repair; depreciation; interest on loans; general administration; etc. The evaluation of performance on budget management should not only be done at the level of power station but also at the smaller units whom the responsibility budget will be allocated as much as the practicality allows.

It is imperative and extremely important to secure the sufficient budget for the operation and maintenance in order for the company to maintain the effective and efficient operation of the generation plants and to proceed with the prudent execution of the maintenance activities. For the efficient operation of the generation plants, the company undertakes to execute the scheduled maintenance and implements the repair works found to be indispensable as the result of the scheduled periodical checking of the plants. On the other hand, NWPGCL, as a company, has to take into consideration of its estimated revenue and other expenses in establishing of the annual recurrent budget. The budget of the company will be decided within the restriction of the total revenue and expense framework within which the company allocates the budget for each individual expense category, i.e. total budget for O&M expense of the whole company. Then, the budget determined for each category will be allocated to each generation plant in accordance with the quantified yard stick. The following figure depicts the flow of the budget preparation which envisages the revenue and expenditures with particular emphasis on the maintenance and repair, etc.

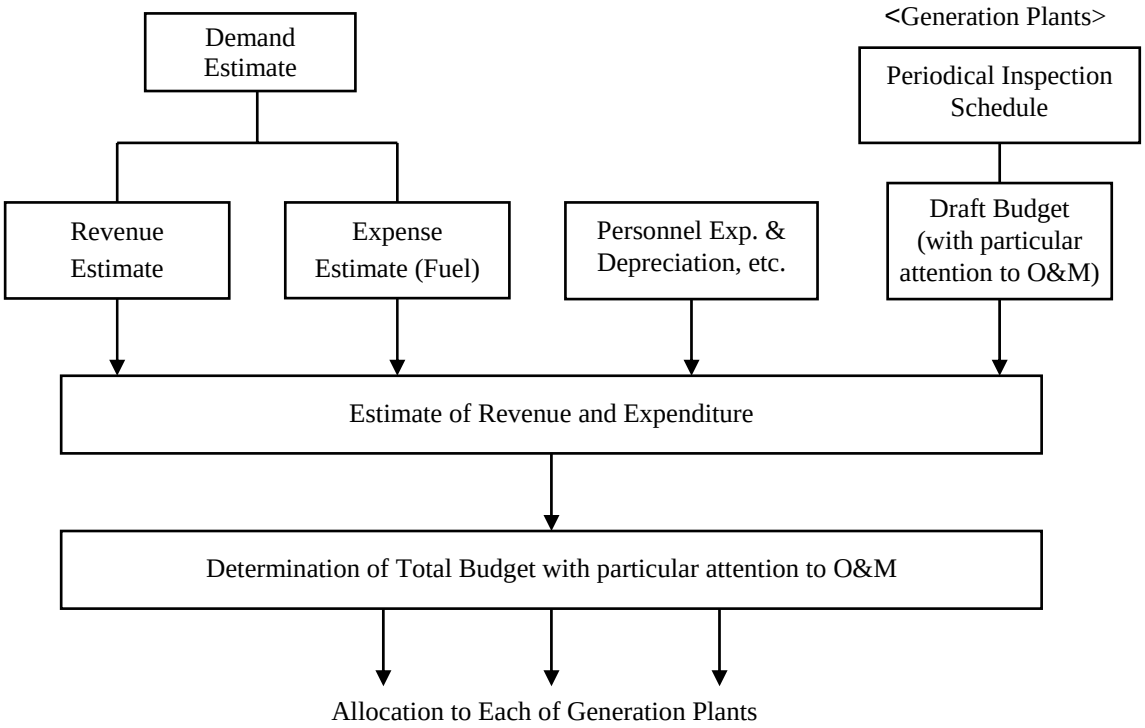


Figure II-5-15 Flow of Preparation of Recurrent Budget

In order to address the issue of the trade-off relationship that exists in between the improvement of the profitability and periodical execution of appropriate maintenance and repair, we hereby recommend the company to introduce and utilize the yard stick system. Under the yard stick system, the conditional status of plants and equipment at the generation plants are checked and quantified

numerically, based on which the budget will be allocated to such category of the generation plants out of the total pre-determined allocation for the category. The quantifying indicators are to be consisted of the following ones;

- Dependable capacity,
- Number of starts and stops (annual and cumulative),
- Equivalent operation hours (annual and cumulative),
- Number of forced outages, and
- Others, e.g. the extent of the seriousness of the mechanical trouble which is difficult to be quantified.

The total budget allocated to each generation plants should be entrusted to the plant manager who would be the incumbent top of SBU for a certain extent of flexibility as to its usage.

5.6 Management Accounting

5.6.1 Roles and Functions of Management Accounting

Management accounting is the presentation of accounting information in such a way as to assist the management in the creation of policy and in the day-to-day operation of an undertaking. Objective of the management accounting is not only to keep records and prepare final accounts but also to help the management in its basic functions of planning, organizing, directing, controlling and co-ordinating, which are more complex and complicated. Though financial accounting is store of information, it is historical in nature and conveys useful information to the outsiders such as owners, creditors, government, etc. but fails to communicate valuable and varied information to the management. The business environment is fast changing and the informational needs of the management have increased many a fold in volume and variety due to technological advancements, keen competition, changed economic or social values and fast changes in government thinking. Hence, the need is felt for a system of accounting that would collect, arrange and present the discharging its major functions such as planning organizing, directing, motivating, controlling, etc.

Management accounting is the study of managerial aspects of accounting. It is the process of identifying, measuring, accumulating, analyzing, preparing, interpreting and communicating information that helps managers fulfill organizational objectives, and assist the management in carrying out its functions more efficiently. Management accounting is always concerned with collection, analysis to the management. The following are the important characteristics of management accounting;

- **Forecasting**
  Management accounting lays more emphasis on future, although it is concerned with collection of historical data. It uses the data for making protections for various situations which may occur in future. It helps the management in planning and forecasting.
- **Providing accounting information**
  Management accounting is based on information collected by accounting department. The information so collected is presented in a form as to serve managerial needs and for receiving various policy decisions.
- **Cause and effect analysis**
  Management accounting studies the cause and effect relationship. In case of loss the reasons for loss are probed. In case of profit factors directly influencing the profitability are studied.
- **Use of special techniques and concepts**
  It uses certain techniques such as financial planning and analysis, standard costing, budgetary control, marginal costing, etc.
- **Supplies information but not decision**
  Management accounting supplies information and the decisions are taken by the management, based on such information provided.

- **No fixed norms are followed**
  Accounting information is used in achieving organizational objectives. Historical data is used for formulating plans and objectives. Actual data is compared with targeted figures, deviations if any, actions are taken to correct the negative deviations.

Management accounting practice extends to the following three areas:

- **Strategic Management**
  Advancing the role of the management accountant as a strategic partner in the organization.
- **Performance Management**
  Developing the practice of business decision-making and managing the performance of the organization.
- **Risk Management**
  Contributing to frameworks and practices for identifying, measuring, managing and reporting risks to the achievement of the objectives of the organization.

To be more specific, the management is found making corporate decisions in a variety of its business activities. For the decision making process by the management, the management accounting should be the tool which the management can resort to in making an appropriate data-based decisions. The following are the business events that require managerial decision making;

(1) Strategic planning
- Long term business plan,
- Medium term business plan,
- Long/medium term investment plan,
- Preparation of an investment project,
- Enrollment planning,
- Payroll planning,
- Negotiation for salary increase,
- Fuel procurement planning,
- Electricity purchase planning,
- Spare parts procurement planning, and
- Maintenance and overhaul planning.

(2) Preparation of budget and execution
- Preparation of medium/annual budget,
- Monitoring of budget for monthly, quarterly, semi-annual or annual progress, and
- Preparation of estimated cash flow for monthly, quarterly or annual plan.

(3) Reporting and disclosure
- Preparation of the annual report,
- Filing of financial records required by Company Act 1994,
- Tax return,
- Reporting of performance to MoPEMR,
- Reporting to BERC,
- Reporting to the shareholders, and
- Reporting to the financial institutions.

(4) Business performance, assets, liabilities, profit and loss
- Monitoring and judgment on business performance,
- Performance evaluation of plants and employees,
- Acquisition and disposal of assets, and
- Negotiation with financial institutions for fund raising.

(5) Applications to government offices concerned
- Application for license and permission,
- Application for tariff revision,
- Preparation of data for holding the public hearing,
- Preparation of opinion on the increase of fuel price, and
- Judgment on the impact of external environment such as inflation.

(6) Measures to cope with hindrances and accidents

- Measures to cope with the operational hindrances and/or accident, and
- Measures to cope with court cases.

What are listed above are typical cases the management requires accurate data to rely on. The power entities in Bangladesh are causing measures to collect the data by means other than management accounting system. The management may be issuing an ad hoc instruction to the departments concerned for submission of the data required or may be going through different channels. The management accounting is the method to systemize the feeding and submission of those data so as to make them readily available.

Management accounting knowledge and experience can therefore be obtained from varied fields and functions within NWPGCL, such as information management, treasury, efficiency auditing, valuation, pricing, tariff, logistics, etc. Its aim in NWPGCL will be:

- Formulating strategies,
- Planning and constructing business activities,
- Helps in making decision,
- Optimal use of resources,
- Supporting financial reports preparation, and
- Safeguarding asset.

The activities management accountants provide inclusive of forecasting and planning, performing variance analysis, reviewing and monitoring costs inherent in the business are the ones that have dual accountability to both finance and the business team. Examples of tasks where accountability may be more meaningful to the business management team vs. the corporate finance department are the development of new product costing, operations research, business driver metrics, sales management score carding, and client profitability analysis. Conversely, the preparation of certain financial reports, reconciliations of the financial data to source systems, risk and regulatory reporting will be more useful to the corporate finance team as they are charged with aggregating certain financial information from all segments of the corporation.

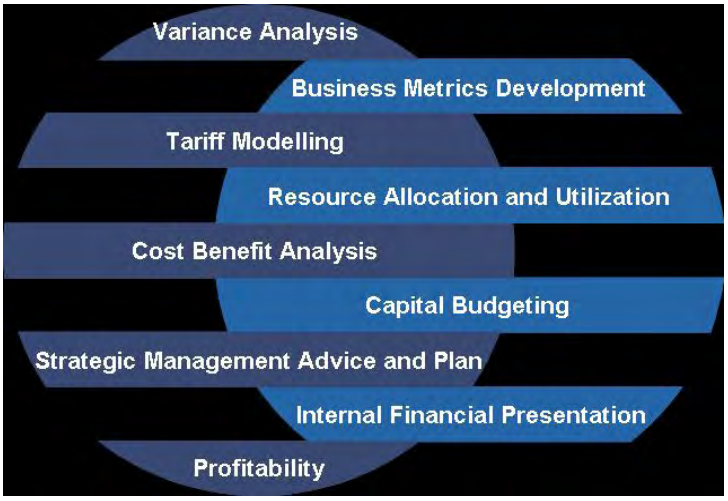


Figure II-5-16 Role of Management Accounting

5.6.2 Recommendation for Establishing the Management Accounting System

The top management of NWPGCL can use the management accounting tool and function to make plans, execute, evaluate and control the whole or a part of the corporate entity and enable to make the most effective use of managerial resources of funds, materials and human resources through the delivery of accounting information from its initial recognition, measurement, aggregation, analysis, interpretation and conveyance. These will help NWPGCL management to prepare the financial reporting to the parties outside of the company which include shareholders, creditors, regulatory authority, tax agency,

etc. The management accounting has several unique characteristics as below mentioned that differentiate itself from the financial accounting;

a. Management accounting collects data not necessarily for the whole company but for the segments or product specific data.
b. Management accounting measures its objects not only by the monetary value but by other means of measurement.
c. Management accounting captures financial data not only for the whole company but for the segments and product wise amount of sales, expenses incurred and profits earned.
d. Management accounting does not stick to the accrual basis accounting but may employ different basis for recognition.

The flow of information in NWPGCL will be typically from a few to several power stations to Head Office and vice-versa. The information may be there in patches. All these have to be integrated and aligned to the usefulness of the NWPGCL management.

In order to establish the management accounting system, the company has to establish its policy on the following points and develop the organization for implementing and maintaining the system as planned and on-going.

a. Media for reporting
   The reporting can be made through such means of; written paper; oral; regular meeting; uploading to computer network system; distribution of printed material, etc. and the media to be used should be put into a company rule.
b. Timeliness of reporting
   The frequency of reporting and the time limit of the reporting should be made and put into a company rule.
c. Format of reporting
   The format to be used for the reporting including its style such as; document, table, combination of both, etc. should be determined and put into a company rule.
d. Contents of reporting
   The reporting should be classified based on the reporting frequency into the daily, weekly, monthly, quarterly, semi-annually, annually and ad hoc reports. For each of the reports, the content should be determined and put into a company rule.
e. Distribution of reports
   The reports determined for routine exercise, the list of parties receiving the reports should be made clear and put into a company rule.

5.7 Financial Simulation

5.7.1 Financial Model

The purpose of constructing the financial model is to delve into the varying situations in implementing the business plan to ascertain various factors such as; what would be the outcomes that will emerge in the financial front; whether the business plan would be viable in terms of financing and/or business promotion; what would be the tariff level that would assure the overall feasibility of the business plan, etc. In order to establish the solid financial strength, a clear financial plan needs to be established. Through the process of preparing the financial plan, the management may be able to validate the commissioning date of the project, identify and become aware of the impacts of the financial cost to be felt on the capital investment and the company's competitiveness. The financial model will help the management to establish the plan for obtaining and mobilizing the working capial during the operational period of the plant.

Inputs to the financial model are comprised of the parameters including;

- capital structure,
- capital cost,
- revenue plan, and
- expansion plan.

Outputs of the financial model include;

- profit and loss statement,
- cash flow statement,
- balance sheet,
- sensitivity tests, and
- significant financial ratios.

The parameters and inputs to be made into the financial model need to be updated in accordance with the progress of the project. For instance, the fund raising plan is to be drawn from DPP/RDPP at the intial stage of the project but will be replaced by the plan under EPC contract as the project will progress and reach to that stage. The financial model will also be synchronized with the program of donors who will be sponsoring the project and with the Power Sector Master Plan of MoPEMR.

The user of the financial model is reminded of the fact that the outputs of the model are based on a certain assumptions and business targets to be achieved. The financial model can cope with any addition of projects as the business might expand and with the case that will involve any additional investment due to the change of the environment and/or scenario. The model can also reflect the varying conditions of contracts such as PPA or FSA the company will sign with the outside parties. Based on such, the company will take advantage of the financial model in forcasting the financial impacts of those purchasing and/or selling terms and conditions and utilize its outputs effectively at the table of contract negotiation.

5.7.2 Assumptions

The financial model adopts a large number of assumptions whose details are forthcoming in Table 5.6, albeit, out of which the important ones are as shown in the following table;

Table II-5-5 Assumptions for Financial Simulation

	Bheramara	Khulna	Sirajganj
Completion of Plant	October 2014	April 2011	April 2011
Rated Capacity	360MW	150MW	150MW
Type of Operation	Base Load	Peak Hours	Peak Hours
Capital Cost (Tk million)	59,356	7.416	6.856
O&M Expense	2.5% of the Gross Fixed Assets （inflation at 7% p.a.）		

	Bheramara	Khulna	Sirajganj
Fuel Price	Tk 73.91/1,000cft （inflation at 4.50% p.a.）		
Working Capital	Account Receivable: 2 m/s of sales, Fuel and Inventory: 1m/s of sales, and Rate of Interest on Short term BNorrowing: 13% p.a.		
Return of Equity	14% p.a.		
Price of Power based on the Cost	Taka 3.68 in 2012; 3.70 in 2013; 3.71 in 2014		

5.7.3 Simulation

In utilization of the financial model constructed, we are to make a trial run for producing the financial statement covering up to the fiscal year of 2026. The profit and loss statement and the balance sheet are as seen in the forthcoming Tables 5.8, 5.9, and 5.10. The financial model indicates the financial features of NWPGCL expressed in the key ratios as follows;

Table II-5-6 Ratio Analysis

Financial Ratio	Average for NWPGCL (2011-2020)	Average of Power Companies in Japan（FY2006）	Assessment of NWPGCL Ratio	Particulars
Return on Assets	1.9%	1.7%	Fair	The ratio keeps fluctuating within the low level of range between 0.7-2.6% during FY2011-2020
Return on Equity	13.2%	7.1%	Excellent	The model is constructed on the assumption of ROE: 14.0%.
Net Profit/Total Revenue	9.2%	4.4%	Excellent	Increase of fuel cost and O&M are passed through to the electricity selling price.
Debt/Equity Ratio	3.0 times	3.15 times	Fair	The ratio stays above 3.0 times up till 2017 due to the fact that initial fund raising of the projects are heavily relying upon borrowings from donors and GOB.
Current Ratio	9.5 times	33.7%	Excellent	Comfortable coverage
Quick Ratio	2.5 times	21.6%	Excellent	Comfortable coverage
Debt Service Coverage Ratio	1.86 times	n.a.	Excellent	Sufficient cash flow is generated through the operating activities and the cash generated clears the generally conceived safety level of 1.3 times with comfortable margin.
Sale of Electricity per Employee（MW）	52.6MW	n.a.		
Sale of Electricity per Employee（Tk Million）	Tk 86.1 million	n.a.		

(source) Averages for Japanese Power Companies are taken from the website of Federation of Electric Companies, Japan.

The ratios are generally found satisfactory with exception of a few cases. The fact is partly due from the fact that the assumption adopted at the beginning considers the ROA being at the high level, the fuel costs and O&M expense to be reflected to the selling price of electricity as the pass-through items.
Conversely, the management has to secure those assumptions realized in order for the above stated results to materialize. The key of such points are; 1) to contain the account receivable within 2 months of electricity sales; 2) to contain O&M expense within 2.5% of the gross fixed assets; 3) to secure the return on equity at 14% in negotiating PPA.

To be noted at the same time are the facts that; 1) the ROA stays at a low level throughout the project life; and 2) Debt/Equity Ratio stays at rather high level in comparison with the excellent ratios found for the other items. The stagnant level of ROA and D/E Ratio are stemming from the fact that the projects of the company raise the funds heavily through borrowings from the donor and the government of Bangladesh. The funds to be provided by the donors are subject to certain limitations and the funding gap between the project cost and the funds covered by the donors is financed by GOB with the combination of equity for 60% and loan for 40%. The loan portion of GOB funding pushes up the overall borrowing position of the projects. Nevertheless, the ultimate level of those ratios during the period up till 2026 shows no tendency of aggravation but are in the upward trend. We, therefore, conclude that there is no serious problem in respect of the above selected ratios.

5.7.4 Sensitivity Test

The financial model has been used to test the viability of NWPGCL by making various changes in the project assumption/parameters. The summary of the sensitivity analysis is provided hereunder:

Table II-5-7 Sensitivity Tests (Average during 2011-26)

		ROA(%)	ROE(%)	DSCR(times)	D/E Ratio (times)	Current Ratio(times)
Standard			8.0%(=Opportunity Cost of Capital)	1.3 times (=Internationally accepted norm)	1.5 times (D:E =:60:40)	1.5 times (= Internationally accepted norm)
Base Case		1.95	13.47	1.85	2.78	8.92
Capital Cost	+10%	1.36	9.55	1.72	3.05	6.96
	+20%	0.47	4.63	1.60	3.42	4.73
Fuel Price	+10%	1.77	12.23	1.81	2.83	8.06
	+20%	1.59	10.99	1.76	2.89	7.25
PLF	-10%(63%)	1.36	9.43	1.72	2.99	6.85
	-20%(56%)	0.58	5.07	1.62	3.23	5.10
Account Receivable	6 m/s of sales	1.60	11.07	1.63	2.87	7.58
	12 m/s of sales	0.63	5.55	1.39	3.11	5.31

(note) Shaded boxes are the ones undermining the standard criteria.

The result of the sensitivity tests elucidates the facts that ;1) the debt:equity ratio stays at a high level of 2.7-3.4 for all of the cases including the base case exceeding the standard norm of 1.5 times (D/E=60:40) adopted by the Power Sector Financial Restructuring and Recovery Plan implemented by Power Cell; 2) ROE decreases to the level of 4-5% undermining the opportunity cost of capital in cases where the capital cost which is 8.0% and PLF aggravates by 20% and where the account receivable accumulates exceeding 12 months of electricity sales; 3) the return on assets decreases to the level of 0.4-0.6% in those three cases mentioned. While DSCR and current ratio undergo some changes but remain healthy in clearing the thresholds of the normative criteria.

The following fugure illustrates the typical example of the account receivable increase like what has been witnessed in reality at BPDB and ASPCL.

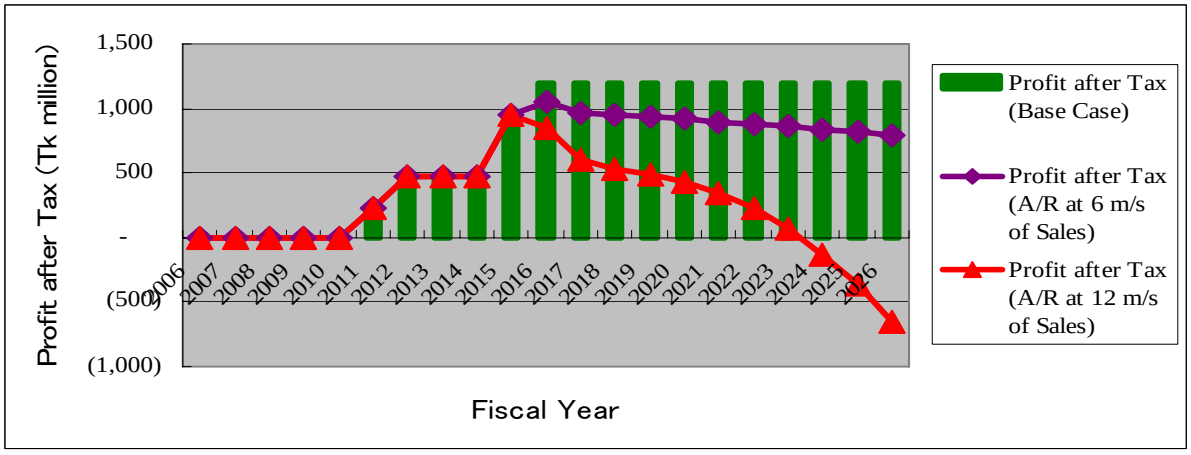


Figure II-5-17 Impact of the Accumulation of Account Receivable

The base case assumes the account receivable to be collected within 2 months of their issue dates, the delay of which causes the company's cash to deplete weakening the company of the capability to purchase the fuel, bear expenditures and servie the debt. For the short term borrowing to complement the insufficiency of cash, the rate of interest is assumed to be 13% as such is the rate prevailing among the commercial banks for short term lending. The shortage of cash drives the increase of the short term borrowing, from which the interest cost swells as the time goes on. The company will see its profit and loss statement to be in deficit in the fiscal year of 2024 despite the fact that the electricity price is set to incorporate the return on equity at 14%. This indicates the importance of the punctual collection of the outstanding account receivable.

5.7.5 Input and Output of the Model

The inputs and the outputs of the model are displayed in the following pages for references. It includes the assumption sheet, capital cost structures, profit and loss for Bheramara and NWPGCL and balance sheet projection of NWPGCL till FY 2026;

Table II-5-8 Assumptions

Project Capital Cost Outlay

	Unit 1	Unit 2	Unit 3	Unit 4
Equipment Cost	5,301	5,989	41,733	
Land Cost	2	-	-	
Installation Cost	931	831	-	
Works Power Cost	769	2	-	
Initial Spares Cost	-	-	-	
Commissioning Cost	66	34	1,414	
Physical Contingency	243	-	1,595	
Price Contingency	104	-	6,919	

Project Start up / Mobilisation Costs

	Unit 1	Unit 2	Unit 3	Unit 4
Mobilization Fees	-	-	-	
Manpower Costs	30	23	-	
Startup Costs etc	271	-	-	

Financing Structure of Sidhirganj Project

	Unit 1	Unit 2	Unit 3	Unit 4
Debt (% Basis)	77%	78%	88%	

Project Financing Details

	Unit 1	Unit 2	Unit 3	Unit 4
Debt 1	80%	81%	91%	
Debt 2	20%	19%	9%	
Debt 3	0%	0%	0%	0%

Terms & Conditions of Lending

Khulna Unit	Debt 1	Debt 2	Debt 3
Moratorium (Years)	5	5	0
Repayment in Year	20	20	0
Interest Rate	4%	5%	0%
Drawdown			
Year 1	10%	10%	0%
Year 2	44%	44%	0%
Year 3	46%	46%	0%

Terms & Conditions of Lending

Sirajganj Unit	Debt 1	Debt 2	Debt 3
Moratorium (Years)	5	5	0
Repayment in Year	20	20	0
Interest Rate	4%	5%	0%
Drawdown			
Year 1	8%	8%	0%
Year 2	61%	61%	0%
Year 3	31%	31%	0%

Terms & Conditions of Lending

Bheramara Unit	Debt 1	Debt 2	Debt 3
Moratorium (Years)	5	5	0
Repayment in Year	20	20	0
Interest Rate	4%	3%	0%
Drawdown			
Year 1	1%	1%	0%
Year 2	29%	29%	0%
Year 3	20%	20%	0%
Year 4	20%	20%	0%
Year 5	30%	30%	0%

Project Cost Structure Assumptions

	Unit 1	Unit 2	Unit 3	Unit 4
Depreciation Rate	4.5%	4.5%	3.0%	
Terminal Value	10%	10%	10%	
A&G Expenses (% of GFA)	0.38%	0.38%	0.38%	
R&M Expenses (% of GFA)	1.35%	1.35%	1.35%	
Emp Expenses (% of GFA)	0.53%	0.53%	0.53%	
O&M Vendor Fees (% of GFA)	0.25%	0.25%	0.25%	
Proportion of Fixed Fees	50%	50%	50%	
Inflation Index	7%	7%	7%	

Dividend Payout Estimation

Dividend as % of PAT	0%
Dividend Tax Rate	0%

Regulatory Norms for Tariff Elements

Return on Equity	14%

Working Capital on Annual Basis

Fuel Cost in Months	1	12	12
O&M Expenses in Months	1	12	12
SoP Receiveables in Months	2	12	6
Rate of Interest on WC	13%		

O&M Expenses Beginning Year Basis

As % of GFA	2.50%
Inflation Index	7%

Variable Cost Normative Parameters

Gas CV	1000
Unit Heat Rate (150 MW)	9905
Unit Heat Rate (150 MW)	9905
Unit Heat Rate (360 MW)	7500

Project Start & Commissioning Details

	Unit 1	Unit 2	Unit 3	Unit 4
Start Date	4-Mar-09	4-Mar-09	4-Apr-11	
Completion Time (Months)	21	21	42	
Stabilization Period (Months)	3	3	3	
Life of Asset (Years)	20	20	20	

Project Operational Performance Details

	Unit 1	Unit 2	Unit 3	Unit 4
Capacity in MW	150	150	360	
APC%	4%	4%	4%	
Ramp up Rate	15	15	25	
Ramp Down Rate	20	20	40	
Annual Deterioration Factor	0.10%	0.10%	0.10%	
Start ups (Daily OCGT, Annual CCGT)	1	1	30	
Operation Hours	8	8	24	
Load Factor in Operation hours	85%	85%	70%	
Off-Peak Period hours	**16**	**16**	**0**	
Start ups / day in Off-Peak	1	1	1	
Load Factor in Off -Peak hours	20%	20%	0%	

Plant Heat Rate Parameters

	Unit 1	Unit 2	Unit 3	Unit 4
Annual Deterioration Factor	0.00%	0.00%	0.00%	
Running	9905	9905	7500	
Ramp Up	9905	9905	7500	
Ramp down	9905	9905	7500	

Plant Maintenance Paramters

	Unit 1	Unit 2	Unit 3	Unit 4
Shut down days	15	15	20	
Forced Outage Ratio	4%	4%	4%	

Gas Cost Data

Gas CV	950	Btu /cft
Base Price	73.91	/1000 cft
Inflation Index	4.50%	

Lub Oil Consumption	0.55	gms/Kwh
Lub Oil Price	135	Taka / litre
Specific Gravity	0.9	

Working Capital Basis

Fuel Cost in Months	1
O&M Expenses in Months	1
SoP Receiveables in Months	2
Maintenance Spares	1%
Rate of Interest	13%

Misc Items

Weightage for Peak Hours Generation	**1**	
Other Income as % of Total Revenue	2%	
Rebate to BPDB	0.00%	(Seller's Credit to Offtaker BPDB)
Rebate from PetroBangla	0.00%	(Buyer's Credit from Fuel Supplier)

Power Purchase for Non-running Hours

	Unit 1	Unit 2	Unit 3	Unit 4
Works Power (Standby Mode)	1%	1%	1%	1%
Colony /Misc.Power	2%	2%	2%	2%

Rate of Power (HT)	2.5	Taka / Kwh	
Inflation Rate for HT Power	2%		

Corporate Tax Rate

Tax Rate non-publicly traded entity	40%

Incentive Mechanism

	OCGT	CCGT
Benchmark PLF for Incentive Level	35%	85%
Incentive Rate at Taka / Kwh	0.10	0.1

Investment Income

Current Account Level	25%
Maturity of Short term Instruments	3.00
Interest Rate of Instruments	9.64%

Start Up Payments

No. of Free Starts per Year	335
Start up Charges per Start (Base Year)	0.045

Table II-5-9 Capital Cost

Capital Cost Structure				
(Inclusive of Taxes , Import Duty Waivers)				
Unit	**1**	**2**	**3**	**4**
Basic Equipment Cost	5,301	5,989	41,733	-
Land Cost	2	-	-	-
Installation Cost	931	831	-	-
Works Power Cost	769	2	-	-
Initial Spares Cost	-	-	-	-
Commissioning Cost	66	34	1,414	-
Total Capital Cost	**7,070**	**6,856**	**43,147**	**-**
Contingencies	346	-		-
Mobilization Fees	-	-	-	-
Manpower Costs	30	23	-	-
Startup Costs etc	271	-	-	-
Total Mobilization Costs	**301**	**23**	**-**	**-**
Project Costs (Unit Wise Basis)	**7,717**	**6,879**	**43,147**	**-**
Add IDC	**195**	**175**	**2,219**	
Final Project Capitalized Costs	**7,912**	**7,055**	**45,366**	**-**
Funding Plan of Project				
Unit	1	2	3	4
Debt (% Basis)	77%	78%	88%	0%
Equity (% Basis)	23%	22%	12%	100%
Debt Amount	**5,933**	**5,351**	**37,969**	**-**
Debt 1	4,743	4,331	34,518	-
Debt 2	1,190	1,019	3,452	-
Debt 3	-	-	-	-
Equity Amount	**1,784**	**1,529**	**5,178**	**-**

Table II-5-10 Profit & Loss Statement of Bheramara Power Station (360MW)

Profit & Loss Statement for NWPGCL Bheramara 360 MW	FY 06	FY 07 1	FY08 2	FY09 3	FY10 4	FY11 5	FY12 6	FY13 7	FY14 8	Projections FY15 9	FY16 10	FY17 11	FY18 12	FY19 13	FY20 14	FY21 15	FY22 16	FY23 17	FY24 18	FY25 19	FY26 20
Installed Capacity	360	360	360	360	360	360	360	360	360	360	360	359	359	359	358	358	357	357	357	356	356
Plant Load Factor	0%	0%	0%	0%	0%	0%	0%	0%	0%	42%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%
Gross Generation	-	-	-	-	-	-	-	-	-	1,333	1,972	1,972	1,972	1,972	1,972	1,972	1,972	1,972	1,972	1,972	1,972
Less APC in Mus	-	-	-	-	-	-	-	-	-	53	79	79	79	79	79	79	79	79	79	79	79
Net Sent Out Units	-	-	-	-	-	-	-	-	-	1,279	1,894	1,894	1,894	1,894	1,894	1,894	1,894	1,894	1,894	1,894	1,894
Tariff Levels Based on																					
Annual Generation	-	-	-	-	-	-	-	-	-	3.92	4.13	4.20	4.27	4.35	4.43	4.52	4.63	4.74	4.88	5.02	5.18
Total Revenue	-	-	-	-	-	-	-	-	-	5,013	7,817	7,966	8,093	8,236	8,388	8,571	8,766	8,989	9,240	9,502	9,817
Less Discount to BPDB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Income	-	-	-	-	-	-	-	-	-	224	443	519	574	627	690	740	798	848	894	952	984
Total Income	-	-	-	-	-	-	-	-	-	5,237	8,261	8,485	8,666	8,863	9,078	9,311	9,564	9,838	10,134	10,454	10,801
Less																					
Operating Expenses	-	-	-	-	-	-	-	-	-	2,599	4,003	4,241	4,493	4,762	5,047	5,351	5,674	6,017	6,382	6,770	7,183
Fuel Cost Incurred	-	-	-	-	-	-	-	-	-	1,173	1,814	1,896	1,981	2,070	2,163	2,260	2,362	2,468	2,580	2,696	2,817
Fixed Cost Incurred	-	-	-	-	-	-	-	-	-	1,426	2,189	2,345	2,512	2,692	2,884	3,090	3,311	3,548	3,802	4,074	4,366
Repair & Maintenance	-	-	-	-	-	-	-	-	-	726	1,167	1,251	1,342	1,438	1,542	1,653	1,772	1,899	2,036	2,183	2,340
Employee Expenses	-	-	-	-	-	-	-	-	-	204	329	352	378	405	434	465	499	535	573	614	659
A & G Expenses	-	-	-	-	-	-	-	-	-	282	454	487	522	559	600	643	689	739	792	849	910
O&M Contractor Fees	-	-	-	-	-	-	-	-	-	198	212	227	243	261	280	300	322	345	370	396	425
Power Purchase Expenses	-	-	-	-	-	-	-	-	-	15	27	27	28	29	29	30	30	31	32	32	33
PBID	-	-	-	-	-	-	-	-	-	2,639	4,258	4,244	4,173	4,101	4,030	3,960	3,890	3,821	3,752	3,685	3,618
Depreciation	-	-	-	-	-	-	-	-	-	907	1,361	1,361	1,361	1,361	1,361	1,361	1,361	1,361	1,361	1,361	1,361
Profit before Interest	-	-	-	-	-	-	-	-	-	1,731	2,897	2,883	2,812	2,740	2,669	2,599	2,529	2,460	2,391	2,324	2,257
Interest & Finance Charges	-	-	-	-	-	-	-	-	-	919	1,682	1,668	1,597	1,525	1,454	1,383	1,313	1,244	1,175	1,107	1,040
Existing Loans	-	-	-	-	-	-	-	-	-	891	1,532	1,454	1,375	1,296	1,218	1,139	1,061	982	904	825	746
Working Capital	-	-	-	-	-	-	-	-	-	28	150	214	222	229	236	244	252	262	272	282	294
Loans for Project Expansion																					
Market Borrowings																					
Profit Before Tax	-	-	-	-	-	-	-	-	-	812	1,215	1,215	1,215	1,215	1,215	1,216	1,216	1,216	1,216	1,216	1,217
Provision for Taxation	-	-	-	-	-	-	-	-	-	325	486	486	486	486	486	486	486	486	486	487	487
Profit after Tax	-	-	-	-	-	-	-	-	-	487	729	729	729	729	729	729	729	730	730	730	730

Table II-5-11 Profit & Loss Statement of NWPGCL (660MW)

Profit & Loss Statement for NWPGCL	FY 06	FY 07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
											Projections										
Installed Capacity	660	660	660	660	660	660	660	659	659	659	658	657	657	656	656	655	654	654	653	652	652
Plant Load Factor	0%	0%	0%	0%	0%	9%	17%	17%	17%	40%	51%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%
Gross Generation	-	-	-	-	-	504	995	995	995	2,328	2,967	2,967	2,967	2,967	2,967	2,967	2,967	2,967	2,967	2,967	2,967
Less APC in Mus	-	-	-	-	-	20	40	40	40	93	119	119	119	119	119	119	119	119	119	119	119
Net Sent Out Units	-	-	-	-	-	484	955	955	955	2,234	2,849	2,849	2,849	2,849	2,849	2,849	2,849	2,849	2,849	2,849	2,849
Total Revenue	-	-	-	-	-	1,706	3,520	3,538	3,550	8,695	11,652	11,864	12,067	12,294	12,534	12,816	13,117	13,456	13,834	14,230	14,696
Less Discount to BPDB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Income	-	-	-	-	-	34	100	171	240	423	581	680	752	822	904	970	1,046	1,113	1,173	1,248	1,290
Total Income	-	-	-	-	-	1,741	3,620	3,709	3,791	9,118	12,233	12,544	12,819	13,116	13,438	13,786	14,163	14,569	15,007	15,479	15,987
Less																					
Operating Expenses	-	-	-	-	-	784	1,586	1,672	1,763	4,473	5,991	6,337	6,704	7,094	7,507	7,947	8,413	8,908	9,434	9,993	10,587
Fuel Cost Incurred	-	-	-	-	-	495	1,021	1,067	1,115	2,338	3,032	3,168	3,310	3,459	3,615	3,778	3,948	4,125	4,311	4,505	4,708
Fixed Cost Incurred	-	-	-	-	-	289	565	605	648	2,135	2,959	3,169	3,393	3,634	3,892	4,169	4,465	4,783	5,123	5,488	5,879
Repair & Maintenance	-	-	-	-	-	139	299	321	344	1,094	1,562	1,675	1,795	1,925	2,063	2,212	2,371	2,542	2,725	2,921	3,131
Employee Expenses	-	-	-	-	-	39	84	90	97	308	440	471	505	542	581	623	667	715	767	822	881
A & G Expenses	-	-	-	-	-	54	116	125	134	426	608	651	698	749	802	860	922	988	1,060	1,136	1,218
O&M Contractor Fees	-	-	-	-	-	51	54	58	62	264	284	304	326	349	374	401	430	461	495	530	568
Power Purchase Expenses	-	-	-	-	-	5	11	11	12	43	66	67	69	70	71	73	74	76	77	79	80
PBID	-	-	-	-	-	957	2,034	2,037	2,028	4,645	6,243	6,207	6,115	6,023	5,931	5,840	5,750	5,661	5,573	5,485	5,400
Depreciation	-	-	-	-	-	337	673	673	673	1,581	2,034	2,034	2,034	2,034	2,034	2,034	2,034	2,034	2,034	2,034	2,034
Profit before Interest	-	-	-	-	-	620	1,361	1,364	1,354	3,064	4,208	4,173	4,081	3,988	3,896	3,805	3,715	3,626	3,538	3,451	3,365
Interest & Finance Charges	-	-	-	-	-	233	582	585	575	1,473	2,214	2,179	2,087	1,994	1,902	1,811	1,721	1,631	1,543	1,456	1,369
Existing Loans	-	-	-	-	-	189	489	489	477	1,344	1,960	1,857	1,754	1,651	1,548	1,445	1,342	1,239	1,136	1,033	930
Working Capital	-	-	-	-	-	45	92	95	98	129	254	321	332	343	354	365	378	392	407	422	439
Loans for Project Expansion																					
Market Borrowings																					
Profit Before Tax	-	-	-	-	-	387	779	779	779	1,591	1,994	1,994	1,994	1,994	1,994	1,995	1,995	1,995	1,995	1,995	1,996
Provision for Taxation	-	-	-	-	-	155	312	312	312	636	798	798	798	798	798	798	798	798	798	798	798
Profit after Tax	-	-	-	-	-	232	467	467	467	955	1,196	1,196	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197	1,197

Table II-5-12 Balance Sheet of NWPGCL (3 Plants: 660MW)

Balanc Sheet Projections for NWPGCL	FY 06	FY 07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
										Projections											
Assets																					
Gross Fixed Assets	-	-	-	-	-	14,966	14,966	14,966	14,966	60,332	60,332	60,332	60,332	60,332	60,332	60,332	60,332	60,332	60,332	60,332	60,332
Less Depreciation	-	-	-	-	-	337	673	673	673	1,581	2,034	2,034	2,034	2,034	2,034	2,034	2,034	2,034	2,034	2,034	2,034
Net Fixed Assets	-	-	-	-	-	14,629	13,956	13,283	12,609	56,394	54,360	52,325	50,291	48,257	46,222	44,188	42,153	40,119	38,084	36,050	34,015
CWIP	-	-	-	1,485	8,110	278	12,922	22,113	31,824	7	7	7	7	7	7	7	7	7	7	7	7
Current Assets																					
Inventories	-	-	-	-	-	65	131	138	146	155	163	172	182	192	202	214	226	238	252	266	281
Debtors	-	-	-	-	-	284	586	589	591	613	638	649	662	676	690	707	725	744	765	787	813
Cash & Bank Balance	-	-	-	-	-	325	838	1,131	1,104	1,967	1,614	1,276	1,464	1,190	1,120	1,211	929	1,236	1,099	1,086	1,683
Investments	-	-	-	-	-	244	872	1,720	2,304	3,395	4,386	5,363	5,814	6,727	7,436	7,984	8,905	9,238	10,014	10,666	10,710
Total current Assets	-	-	-	-	-	918	2,427	3,578	4,146	6,129	6,802	7,460	8,121	8,784	9,449	10,116	10,784	11,456	12,130	12,806	13,486
Total Assets	**-**	**-**	**-**	**1,485**	**8,110**	**15,826**	**29,305**	**38,973**	**48,579**	**62,530**	**61,169**	**59,792**	**58,419**	**57,048**	**55,677**	**54,310**	**52,944**	**51,581**	**50,221**	**48,862**	**47,508**
Liabilities																					
Long Term Debt	-	-	-	1,156	6,315	11,900	23,101	31,243	39,263	50,683	48,091	45,499	42,907	40,315	37,723	35,130	32,538	29,946	27,354	24,762	22,170
Debt 1	-	-	-	928	5,069	9,579	19,766	27,181	34,555	45,008	42,711	40,414	38,117	35,820	33,523	31,225	28,928	26,631	24,334	22,037	19,740
Debt 2	-	-	-	229	1,246	2,322	3,335	4,062	4,709	5,675	5,380	5,085	4,790	4,495	4,200	3,905	3,610	3,315	3,020	2,725	2,430
Debt 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Working Capital Loans	-	-	-	-	-	349	717	727	737	768	802	821	844	868	893	921	950	982	1,017	1,053	1,093
Shareholder's Funds	-	-	-	329	1,795	3,576	5,487	7,003	8,579	11,079	12,276	13,472	14,669	15,865	17,062	18,259	19,456	20,653	21,850	23,047	24,244
Equity Capital	-	-	-	329	1,795	3,344	4,787	5,836	6,945	8,491	8,491	8,491	8,491	8,491	8,491	8,491	8,491	8,491	8,491	8,491	8,491
Reserves & Surplus	-	-	-	-	-	232	699	1,167	1,634	2,589	3,785	4,981	6,178	7,375	8,571	9,768	10,965	12,162	13,359	14,556	15,754
Total Liabilities	**-**	**-**	**-**	**1,485**	**8,110**	**15,826**	**29,305**	**38,973**	**48,579**	**62,530**	**61,169**	**59,792**	**58,419**	**57,048**	**55,677**	**54,310**	**52,944**	**51,581**	**50,221**	**48,862**	**47,508**

Chapter 6. Operation and Maintenance Management

6.1 Approach for Achieving the Corporate Vision

In order to successfully materialize the corporate vision of attaining the High-reliability power supply, and Sustainable development, this chapter deals with the implementation of "Total Quality Management in O&M Activities", and "Long-term human capital development", in the field of the "Operation and Maintenance Management".

Corporate Visions: Highly reliable power supply
- Total Quality Management in O&M Activities

Corporate Vision: Sustainable development
- Long-term human capital development

6.2 Strengthening of Organization Management (Construction of O&M Management System based on PDCA)

6.2.1 Segregation of Duties between Head Office and P/S

The segregation of duties between head office and P/S is as follows. The function of head office is divided into general business management function, sectoral business management function and general staff function. That of P/S is divided into general staff function and operation team whose members perform real operation. General, long-term and systematic planning is developed at headquarter level, while basic policy and plan of the department are developed by the management department of P/S. The data at P/S unit / on site level is collected, monitored at power station level, and it is fed back to the business management function at the headquarter level.

Table II-6-1 Functions between HQ and P/S

Organization level	Category	Works
HQ level	Top management	Management for the corporation (1) Setting management target, (2) Long term planning (3) Coordination and controls (4) analyzing operating conditions
	Each department	(1) Operating mismanagement function -Section-wise policy, planning, target, and monitoring -General staffing: P/S administrative works
P/S level	General admin and technical	General staffing: P/S administrative works, data collecting, analysis
	Unit and on site	Actual working on site

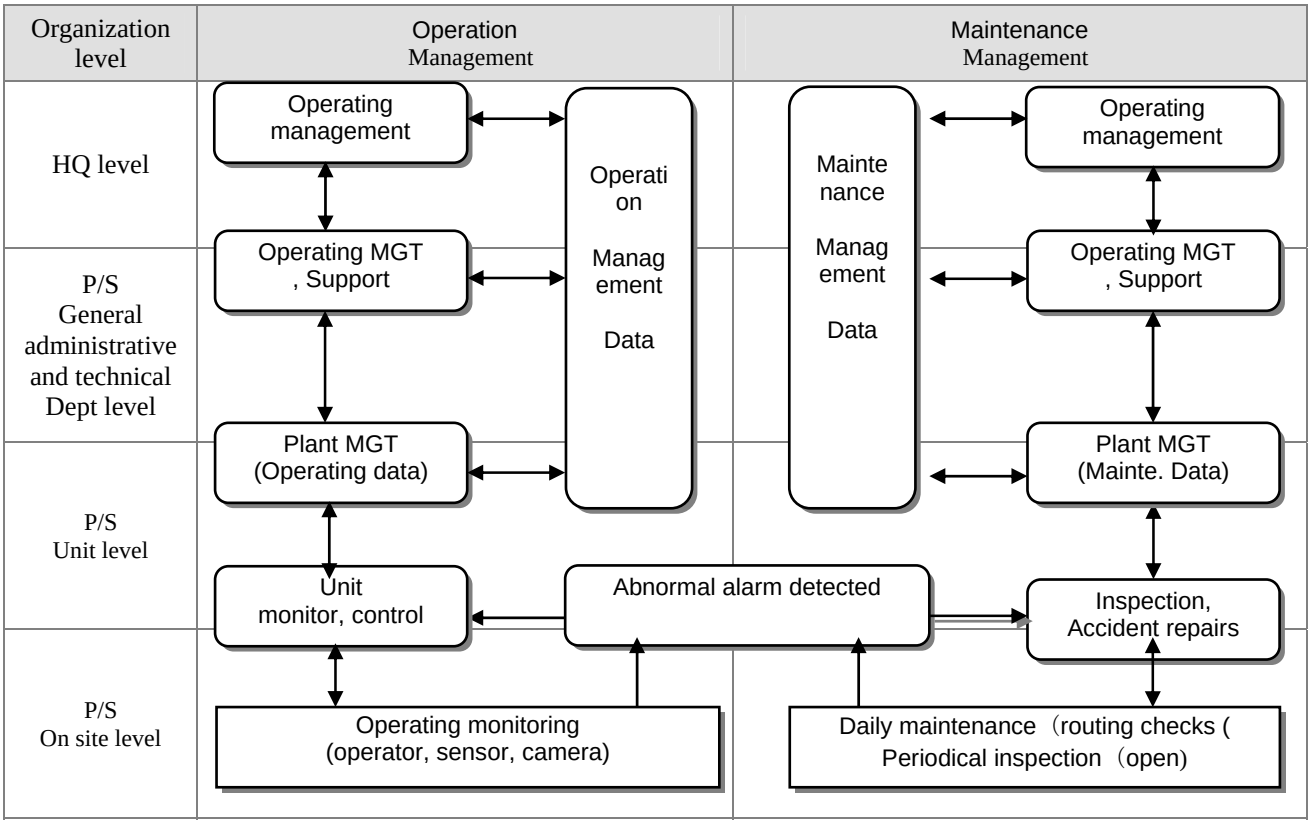


Figure II-6-1 Organizational-wise O&M management flow

6.3 Reinforcement of Cause Analysis Capability

6.3.1 Selection of Maintenance Management Method

(1) Improvement of maintenance management level (Necessity of shift from Level 1 to Level 3)

The maintenance management is sorted into three types as shown below. Each characteristic is shown below.

In many P/Ss, the condition of “Level 1” in which the equipment is operated until it breaks is kept. In case of Japan, as the periodic legal inspection was established by the regulatory authority, time-based maintenance (TBM) which is “Level 2” was mainly used.. However, electric power supplier has conducted maintenance activities and the inspection style by regulatory authority has been studied energetically, and in the result, the condition is shifting to the maintenance method of “Level 3” in which CBM is used with TBM (the interval of periodic inspection is extended while keeping the current safety). Therefore, it is desired that, in Bangladesh, organizational power and technical capabilities are to be strengthened so that the flexible maintenance management in which TBM and CBM are used together like in Japan.

In the case of the shift of the maintenance management method from Level 1 to Level 3, it is necessary to acquire the ability to judge the situation accurately and to ensure the reliability and safety of our facility. Defiantly, the followings are required.

- Comparison between operating state value and reference value (temperature, pressure, current, vibration)
- Periodic diagnoses of leaks, abnormal sound, corrosion, deformation, discoloration, expansion and others problems by your five senses on patrol (sight, smell, hearing, touch etc.)
- Quantitative diagnostic technology in overhaul during periodic checks and maintenance

One of quantitative diagnostic technologies to judge the situation accurately is a nondestructive test. The followings are included in nondestructive tests.

- Liquid penetrante test (Detection limit – Surface flaw of approximately 20 μ)
- Magnetic Particle test (Detection limit – Depth of approximately 0.5mm)
- Ultrasonic test (Detection of inside flaw in thick member – 0.2mm – 0.3mm)

Among them, only the Liquid penetrante test is often used in Bangladesh. In Japan, as for engineers of nondestructive tests, the national examination system is implemented in each inspection method and only qualified persons are engaged in the inspection.

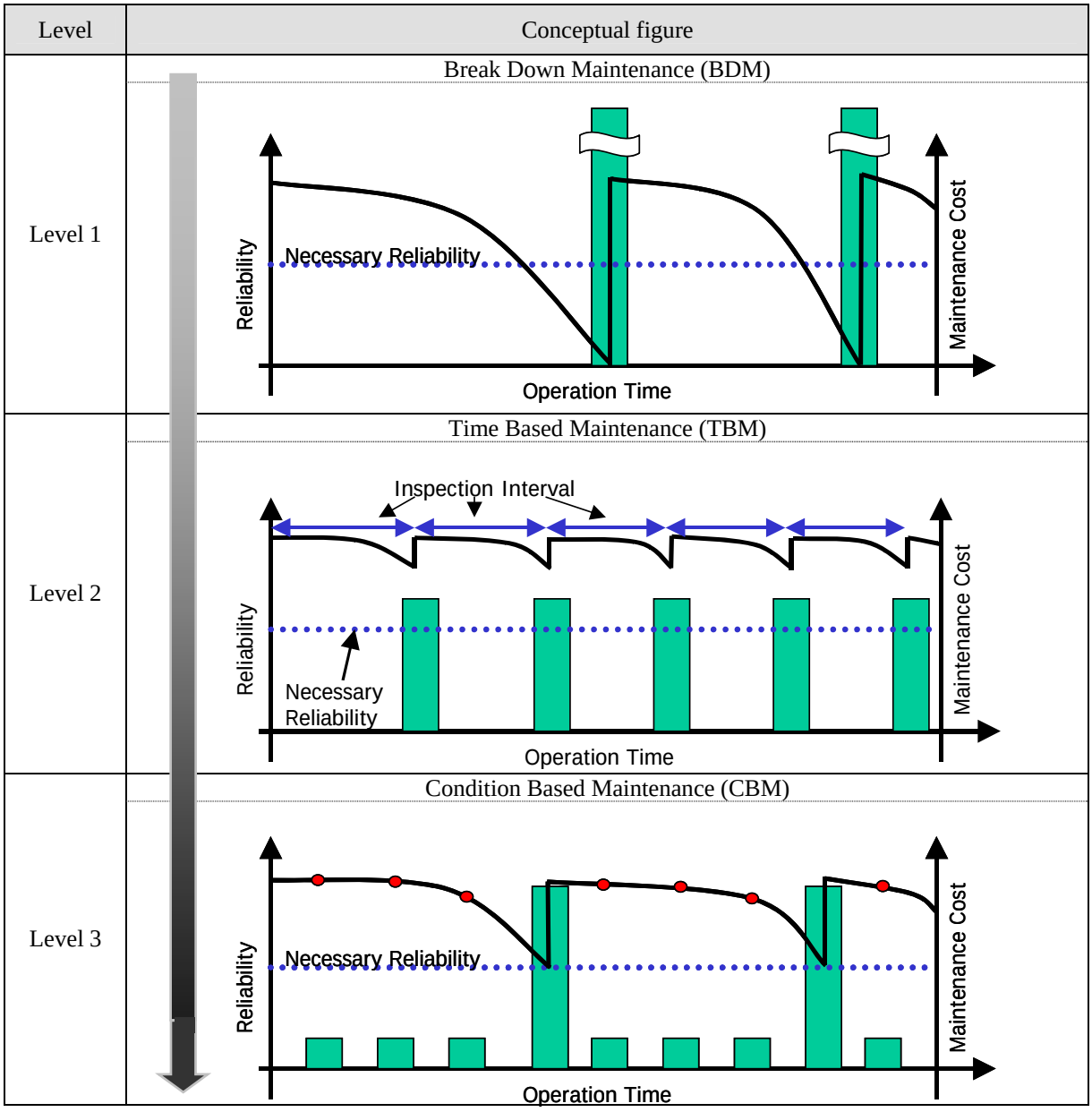


Figure II-6-2 Conceptual figure of maintenance management (level-wise)

(2) Obstruction for shifting

(a) Internal cause

The operator of P/S enters the operation record in the log sheet according to O&M manual. However, the log sheet in which data has been recorded is not converted into electronic data, is not utilized again and is preserved in a warehouse.

The aim of recording in the log sheet is to conduct trend analysis using the recorded data to find the bud of accident. But in many cases, it is not conducted. As a result, the condition of equipment is not understood, it is impossible to understand the symptom of accident previously and the situation may lead to serious accident. (Preventive maintenance is impossible = only ex-post maintenance)

Therefore, the following countermeasures are proposed to improve the level of maintenance management method.

- Strengthening of organization: To strengthen the organizational function to conduct information analysis (trend analysis)
- Strengthening of infrastructure for management information system (MIS): To introduce MIS, convert paper data into electronic data and establish the infrastructure for information management system where the trend management can be conducted. (Refer to Chapter 8)
- Strengthening of technical capabilities: To establish the system in which the flexible maintenance management according to deterioration condition of equipment is conducted by strengthening the inspection ability of nondestructive test and others and understanding the equipment condition based on the trend management. (Shift to the flexible maintenance system by using TBM with CBM)

Write down data on log sheet hourly in line with O&M Manual

After recording data, no data is utilized

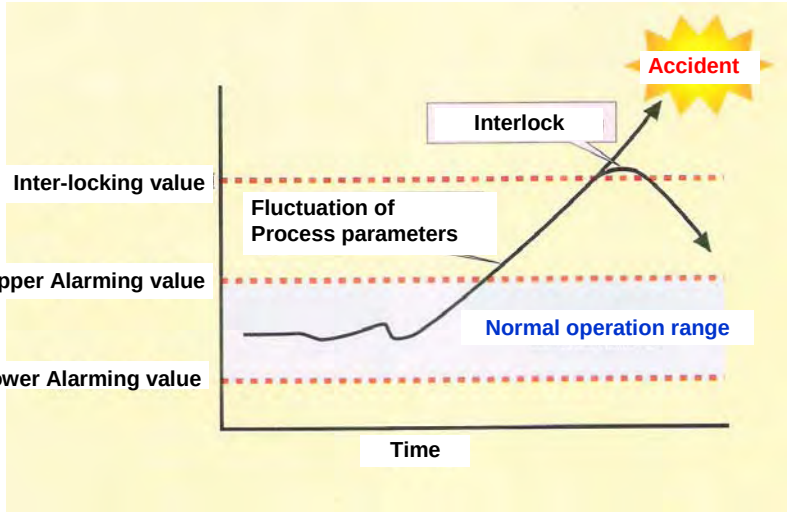


Figure II-6-3 Necessity of Trend analysis

(b) External cause

In case of Japan, in Article 55 of Electricity Enterprises Law, it is stipulated that, as legal inspection, the periodical voluntary inspection should be conducted within 2 years since previous periodical voluntary inspection as for boilers and gas turbines, and within 4 years as for steam turbines, and all electric power suppliers are required to check them periodically regardless of the condition of equipment.

In Bangladesh, the law to stipulate such legal inspection does not exist, and it is said that periodic inspection is left to the voluntary of electric power suppliers. However, in fact, because of urgency of demand and supply, if the equipment is in "the condition where operation is possible", the government does not permit them to suspend the operation in many cases. So to speak, the condition of "Level 1" in which the equipment is operated until it breaks is kept forcibly. If, under the circumstances, the limit level is exceeded, the equipment stops suddenly, and the facility does not function as a supplier, the responsibility is not clarified.

In Bangladesh, IPP accounts for more than 25% of the installed capacity of the whole country and the percentage is high. The following case example is also confirmed. According to the results of field investigation in Haripur IPP by JICA management team, it was found that IPP kept strong posture to conduct voluntary inspection in order to hold its own valuable operating assets, and after the patient negotiation, the stop permission was given finally.

Therefore, the following countermeasures are proposed to improve the level of maintenance management method.

- To develop legal environment under the government initiative so that the legal inspection can be conducted in order to improve the existing supply capability.
- To identify the responsibility of the government and electric power suppliers.

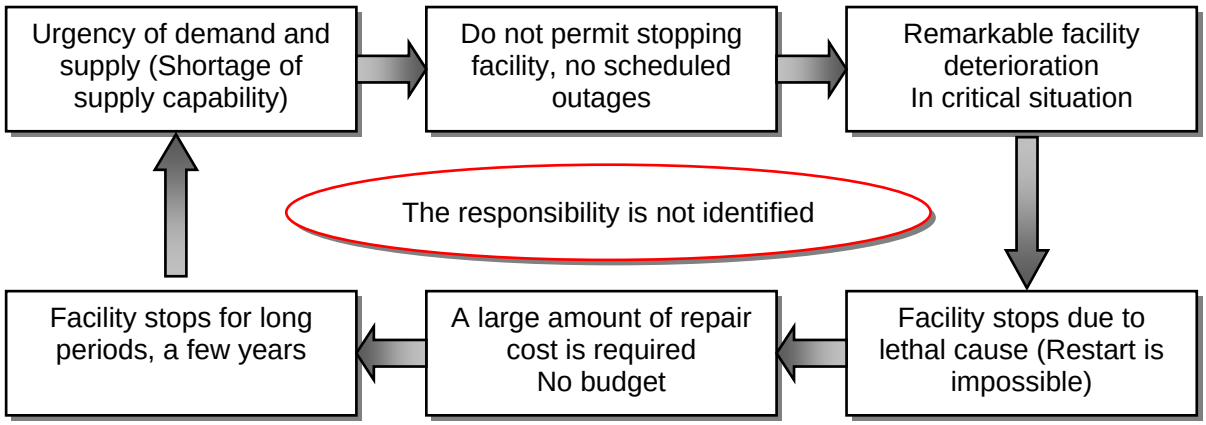


Figure II-6-4 Negative spiral of shortage of supply capability

6.3.2 Proposal of Concrete Management Method

(1) Standard management flow based on PDCA

The management flows of operation and maintenance based on PDCA is shown below.

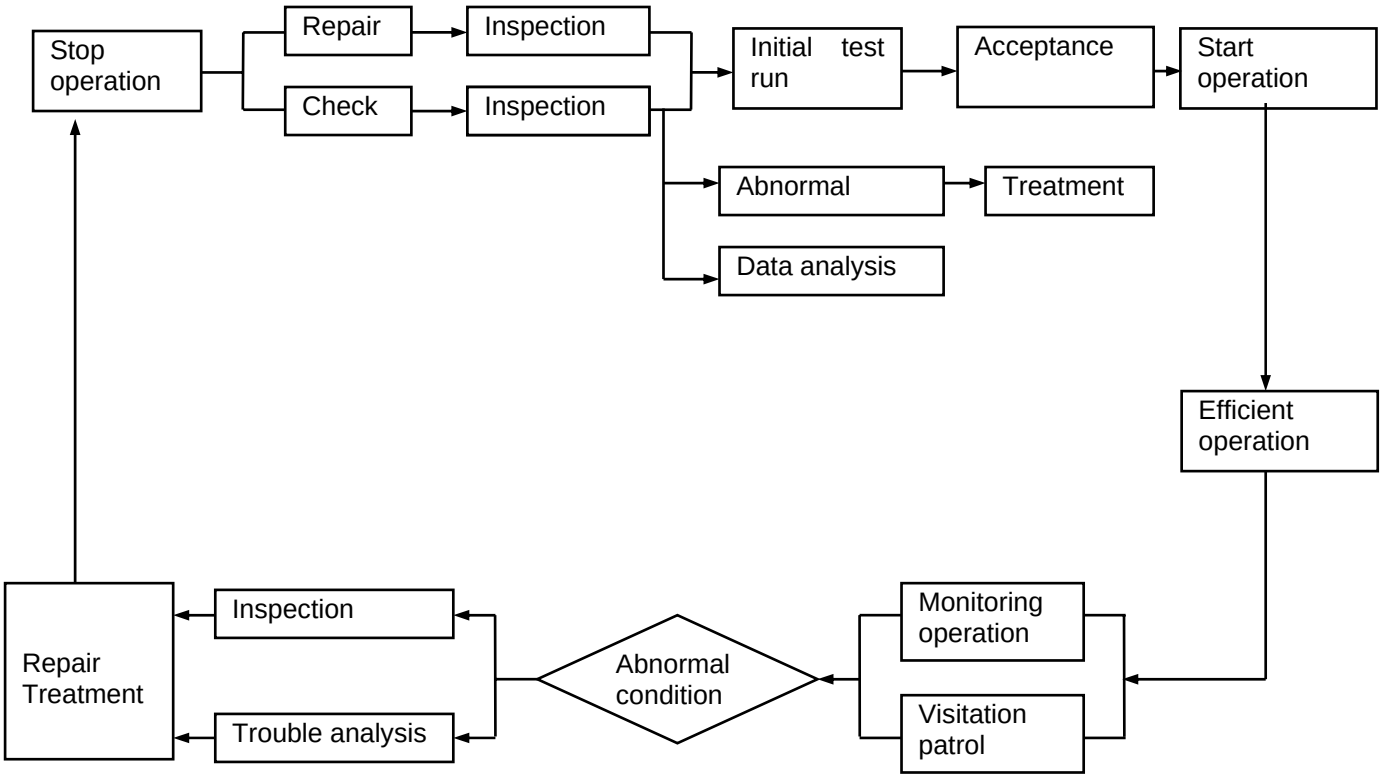


Figure II-6-5 Standard management flow based on PDCA

(a) Monitoring and checking during the operation

It is important to always monitor temperature, pressure, flow rate, water level and the level of oil and others of various parts and check that they are within the predetermined reference value in the operation of P/S. Also, to conduct “realization of equipment function”, “holding of heat efficiency”, “reduction of equipment wear” and “reduction of creep and fatigue degradation in high temperature member”, the operation within the predetermined reference value (steam condition, burn condition and others) is always carried out strictly.

In the process computer, transfer the data relating to the actual performance of electricity generation and heat efficiency to the computer for the management of operation, create the data of actual performance of electricity generation and that of heat efficiency for management, conduct the trend management in the situation of various parts and find the symptom of abnormality in the early stages. At the same time, conduct the daily inspection tour and find the symptom of abnormality, such as slight difference of vibration, noise, odor and color which are difficult to be measured and a tiny quality of oil leak and water leak (exudation), in the early stages

(b) Prevention of trouble

If the symptom of abnormality is found, analyze the data to specify the cause. If the need arises, stop the operation urgently and temporarily, and conduct the necessary inspection and diagnosis. Based on the results, estimate the current difficulties and decide the policy of countermeasures.

(c) Repair, inspection and maintenance

Before conducting the periodic inspection, in addition to the contents of the periodic work, clarify all work which should be conducted at the time of shutdown, including the repair of abnormal parts which have been found during the operation, create the detailed work plan, and get necessary parts in advance, if any if the parts are required.

As for the abnormality, which is found in the inspection, basically it is repaired during the periodic inspection. Estimate the difficulties of abnormality and the lead time in preparing the parts and decide the policy of countermeasures (emergency measure, permanent measure). As for small-scale abnormality which is carried over to the periodic inspection after the next and the abnormality which was repaired temporarily, the countermeasures such as setting of special measuring equipment are taken to understand the status of the progress of the abnormality as the concern management.

The contents of inspection, measurement results and others are recorded in the predetermined format, the trend management is conducted in each inspection and they are used in the remaining life assessment

(2) Maintenance management

(a) Daily maintenance

It is the most important in the maintenance management of equipment of P/S to perform the daily maintenance carefully. In the "Heinrich's Principle" shown below, it is said that 29 disasters with light injury occur and there are 300 events where sudden fear is felt (bud of disaster cause) behind an occurrence of serious injury. This is an experimental rule in the work accident, but it can also apply to the daily maintenance.

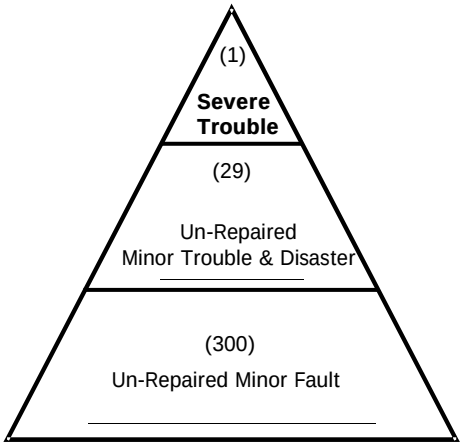


Figure II-6-6 Hein Richs Principle Disaster Occurrence Pyramid

The base of daily maintenance is to pick many buds of trouble in the early stages and take measures. The buds of trouble hide in various places and cover a widespread area. Detection of abnormality (vibration, noise, bad smell, oil leak and others), change of operation state value, and frequent alarm generation in the daily inspection tour. And the daily visual check is main. It is the technique based on guess, knack and long experience, and it is the technique, which is developed in the site OJT by building up the cooperation of experienced persons and young people.

And also, in the daily maintenance, it is important to check monitoring instruments, and there is no point in conducting the daily maintenance if the monitoring instrument does not function normally. Therefore, it is necessary to calibrate the monitoring instruments correctly in the early stages.

(b) Periodical inspection

The periodic inspection is mainly divided into simple inspection and full-scale inspection. The both should be conducted in the best time in view of time (total operation time*number of start) and the condition of plant.

As for the parts whose materials deteriorate due to creep*thermal fatigue damage, crack and fissure, such as hot parts of gas turbines, inlets of main steam / reheated steam of steam turbines and others, the inspection of each part is required. As for other parts, the targets spread widely and are large in number; so selected parts are inspected due to the problem of cost and time. The priority order and development chart of the inspection of selected parts are created based on the operation status value, heat efficiency and the first inspection data. It is important not to leave undisputed parts.

Especially, as for the setting of schedule of periodic inspection and maintenance, in consideration of the actual performance of precedent IPP plant, ensuring of safety on site (avoidance of vertical work,

open inspection and maintenance place and work environment), operation rate of overhead crane and others, the streaming of work and shortening of process in the object which parallel decomposition can be conducted are promoted. And also, it is important to boost the morale of workers and make them compete against each other in the improvement of the improvement of quality control by adopting the bonus and financial incentives system if the construction period can be shortened.
And also, at the time of planned stop, it is important to conduct the visual inspection during the time of to P/S such as check of the remaining work of daily repair which is planned to conduct during the stop of unit, the condition of the parts which were repaired temporarily in the previous periodic inspection and maintenance work, and the parts which are left unprepared and whose change is observed, and reflect the repair time to the next stoppage plan and that after the next.

(c) Maintenance of Accident

In case of occurrence of urgent accident (during the operation and the inspection), the site investigation is conducted and the situation is understood. In addition to them, based on the database such as the past operation record and the record in the previous periodic inspection, the true cause is understood. As for the trouble parts, which are found during the periodic inspection, if the materials cannot be prepared, emergency measure is taken. As for this emergency measure, if the reliability till the next periodic inspection and maintenance is not secured, the permanent measure is taken in the use of the next planned stop work. On the other hand, if the part where the emergency measure is taken is operated till the next periodic inspection and maintenance work, the relevant part is checked at the planned stop time, and the investigation is continued to check how the trend of data of each investigation changes.

(d) Maintenance plan

In consideration of the time of exchange of consumable parts, exchange of deteriorated parts, and exchange of hot parts of gas turbines where EOH (Equivalent operation hour) recommended by manufacturers is used as a guide, NWPGCL establishes the medium- and long-term repair plan. In that, the type of maintenance, the stop time and the number of days when it stops should be included. The real time and number of days when it stops are decided in coordination with the central power feeding center in consideration of the situation of demand and supply, but basically it is important to hold the schedule which is predetermined in the medium- and long-term repair plan from viewpoints of keeping of reliability of equipment and efficient maintenance management. If the repair which is predetermined in the medium- and long-term repair plan is postponed, due to the growth of deterioration, expansion of inspection range, expansion of repair range and parts where unexpected damage are found, additional order of spare and urgent exchange are required, which may lead to lengthening of construction period and expense of huge additional cost.

(e) Budgeting of maintenance

At the creation time of medium- and long-term repair plan, approximate construction cost is calculated based on the exchange parts in each unit, parts which are GT hot parts and are reused in the repair after removing, the cost of construction which is planned in the periodic inspection such as replacement of equipment (purchase cost of equipment + transportation cost + installation cost) and others.

However, there is always a risk that securing of workers becomes impossible due to price change and prolongation of construction period, so it is necessary to discuss among the persons involved (staff on duty of P/S, repair department, budget department, construction company) one year before the planned periodic inspection of the relevant unit and establish the detailed implementation plan. The meeting of the last double check is held three months before the inspection. Then, the inspection and investigation of the part where trouble occurred after the creation of plan are added.

(In Haripur IPP, they conclude contracts of TLSA and LTPM with equipment manufacturers. This is a contract that equipment manufacturers provide spares and consumable parts over a long period of time as for GT hot parts, and large contract deposit is paid for long-term collateral. In this contract condition, gas turbine engineers and repair technicians are difficult to be cultivated).

(3) Operation management

It is the base of operation management to strictly keep the reference value operation. If the operation statue value deviates from the reference value, the engineers of electricity generation group and repair staff pursue the cause and take reform measures.

(a) Standard process

The base is the reference value automatic operation by process computer. During the automatic operation, keep security devices and protection circuits normal. The unit trip is the last measure to protect the equipment and do not remove the trip circuit.

If you have to inspect the circuit when the unit output is constant, decide the inspection range, who conducts the inspection and who conducts manual trip. If the output should change and big change may affect other equipment, create the operating procedure, decide division of roles and deployment of staff and then launch it.

(b) Management of security devices and protection circuits

In security devices and protection circuits, the sequence at the completion of test operation is the base. (What P/S approves in the application for approval, which a manufacturer submits) As for the part where the alarm device operates frequently, check it immediately, pursue the cause of abnormality and take reform measures. However, if the sequence is changed or the set value of each alarm is changed, top-level technical staff of P/S discusses and the range, which is approved by them, is changed. In this case, it is important to immediately change the original drawing of sequence and the list of set values and inform operation staffs on duty and staff in charge of repair.

(c) Fuel management

It is important that executive of P/S attends the orifice test at the setting of gas receiving flow meter (The gas supplier side sets) and examine the data. And also, the both beforehand decide the interval of checking of the change with time and the test method.

And the gas composition is the main element, which affects the heat efficiency. To check the change of gas composition due to the change of gas supplier (mined well) and others, set Gas chromatography at the outlet side of flow meter and check the gas composition always.

(d) Efficiency management

Send the data required for the heat efficiency management from the process computer to the computer for operation history management, and establish necessary LAN so that it can be controlled in the heat efficiency management workstation.

In the heat efficiency management workstation, the documentation function such as daily report, monthly report, quarterly report and yearly report is also added with the function required for the heat efficiency management such as individual operation of gas turbine, combined cycle operation and heat balance check.

(e) Management of water and lubricating oil which are used in P/S

To operate P/S stably, lots of water, lubricating oil, hydrogen gas and nitrogen gas are used daily. Based on annual consumption of pure water, rate of HRSG makeup water, name and amount of injected agent in HRSG feed water, exchange of resin in the manufacturing equipment of pure water, name and amount of injected agent in HRSG boiler water, amount of cooling water of accessories, GT/ST lubricating oil, other lubricating oil for accessories, exchange of agent of the fire extinguisher, amount of hydrogen gas for cooling the electric generator/nitrogen gas for substitution, consumption during the normal operation, and exchange amount in periodic inspection and maintenance, establish the medium- and long-term consumption plan.

(f) Coordination with PGCB

Power station operation shall basically follow the instructions of PGCB (central load dispatching center). However, urgent decisions to conduct operation or not in case of troubles and so forth shall be made by the power station. There are also substation facilities within the power station premises to

transmit the generated power. Considering these points, the following points need to be discussed with PGCB to reach agreement in advance;

- Power output instruction procedures
- Types of information to be reported
- Power measurement methods
- Responsibility demarcation points for power station facilities
- Modes of discussion on regular inspection timing

(4) Cause analysis in unscheduled outage trouble

Unplanned stop trouble occurs due to some sort of cause. It is important to certainly conduct the cause analysis and take measures to remove the true cause in order to avoid the occurrence of similar one since the occurrence of trouble. So, in the occurrence of unplanned stop trouble, if it is small-scale trouble, it is important to certainly create the sheet and accumulate the trouble information as database.

(a) Reference datasheet

The following table shows the datasheet for analyzing unscheduled outages as a reference

Table II-6-2 Datasheet for analyzing unscheduled outages

Item	Reference data
1. Trip	At start, At stop, During operation (Within 3 months after OH, Three months passed)
2. Alarm which is generated	Trip alarm, Serious trouble
3. Phenomenon	Leak, Break, Breakage, Damage, Smoking, Vibration, Operation trouble, Actuation trouble, Malfunction, False feeling, Removal of parts, Ignition, Deterioration
4. Direct cause	Improper design, improper quality control, Improper skill, Improper operation, Inspection interval, Lack of critical feeling
5. Indirect cause	Improper operating instruction, Insufficient manual, Insufficient check sheet, Inexperienced event
6. Reason of impossible response	Out of Patrol range, Out of range of inspection and maintenance, Impossible detection due to the structural problem, Impossible detection with five senses, Actuation trouble of security device, Delay of emergency stop operation
7. Preventive measure of reoccurrence	Emergency measure, Permanent Measure, (Repair of equipment, Reexamination of structure, Reexamination of manual)

*If several items are applicable, list all of them.

Table II-6-3 Analysis sheet of unplanned stop trouble: Preventive measure of reoccurrence

No.	Date	Time	Unit No	Operation load MW	(1) Trips	(2) Alarm which is generated	(3) Phenomenon	(4) Direct cause	(5) Indirect cause	(6) Reason of impossible response	(7) Preventive measure of reoccurrence	Time of recovery work

6.4 O&M Implementation System

As NWPGCL, in the future implementation of O&M of P/S, we propose the form of relation with manufacturers, which have detailed know-how of technology and the desirable implementation system inside NWPGCL.

(1) Evaluation of preceding example case

(a) Haripur IPP

In case of MOH, at the periodic inspection and maintenance of GT, ST, GEN and HRSG equipment, they request the original manufacturer to dispatch instructors and examiners.

(b) APSCL

In Ashuganj, they also request the original manufacturer to dispatch instructors and examiners. For example, though about 20 years passed since the operation start of 3-5unit of this P/S, it requests the original manufacturer to do them. In this point, they do not tackle employee training and training system of P/S sufficiently.

(2) Maintenance of combined cycle

The combined cycle consists of a gas turbine which is operated with high-temperature combustion gas, HRSG, steam turbine and a generator. Seen from the viewpoint of the interval of periodic test, the main is the gas turbine, so it is practical to conduct the periodic tests of the steam turbine, the generator and HRSG when the gas turbine is inspected.

And also, in the gas turbine, severe cracks, corrosion, oxidation, deformation and detachment of coating occur in the hot parts such as combustor, stationary blade, moving blade, impeller blade (shroud segment) and others. So, the aging deterioration level is not estimated based on the total operation hours and the total number of start/stop which are adopted in the steam turbine, but the time of periodic test is estimated based on EOH (Equivalent operation hour). Based on EOH, the deformation and the high-temperature creep fatigue life in the time of start/stop, the number of load rejection, the number of trip and others are estimated and the safety is confirmed. Each GT manufacturer adopts this method.

Generally, LTSA (Long Term Service Agreement) is concluded between suppliers to plants and users. The following schedule pattern is developed: Minor inspection is repeated after every 8,000 hours of operation (EOH) after the commission date, the Major inspection is conducted after 25,000 hours of operation from the commission date, Minor inspection is repeated after every 8,000 hour after and Overhaul of the Hot gas component is conducted after 50,000 hours of operation from the commission date.

The contract period of LTSA is 6 years (approximately 50,000 hours of operation) because the cycle in which the parts that are removed and repaired in each Minor inspection and the high-temperature parts that are replaced in Major inspection (after 25,000 hours operation) are replaced and reused in the overhaul of Hot gas component (after 50,000 hours operation) is considered.

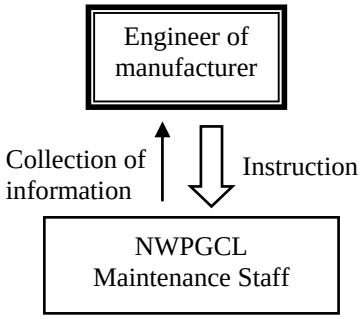
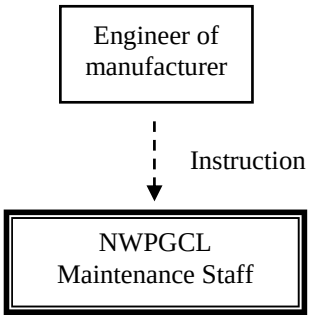
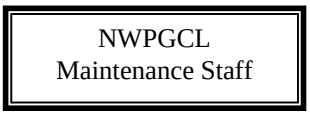
During the contract period of LTSA, the manufacturer supplies GT high-temperature parts and dispatches instructors for disassembly, assembly and test operation to the site. In this case, the workers of power plant conduct the operation under the supervision of the instructors from the manufacturer onsite.

After the LTSA expires, generally, under an LTPM (Long Term Parts Management) agreement, the unit-price contract of high-temperature parts is concluded. As for the repairs of GT after the 7th year from commissioning, if the workers of the power plant are experienced in the disassembly, the assembly and test operation for 50,000 hours from the commission date and GT maintenance skills are settled in NWPGCL, GT maintenance and quality are ensured by purchasing and stocking spare parts under LTPM after that. If the request for dispatch of an instructor from manufacturer is required after that, the way where the number of dispatched instructors during the contract period of LTSA is reviewed and the instructors of necessary jobs in necessary process are dispatched can be selected.

(3) Direction of maintenance implementation system in NWPGCL

NWPGCL has the management vision "Continuous Development", and tries to develop human resources based on a long-term perspective.

The direction of maintenance implementation system in NWPGCL is shown below.

Early period (for 6 years after commissioning)	Middle period (7^{th} ~ 12^{th} year)	Long period (after 13^{th} year)
		
LTSA contract (6 years) is concluded and the periodic checks during this period are mainly conducted by the engineers from the manufacturer. Then, the maintenance staff of NWPGCL tries to improve their technical capabilities by collecting information.	The periodic checks are conducted mainly by the maintenance staff of NWPGCL. When necessary, the dispatch of engineers from the manufacturer can be required for guidance.	The maintenance staff of NWPGCL conducts the periodic checks solely by himself. The department of maintenance in NWPGCL is developed to SBU and the periodic checks of other companies are accepted and conducted, when possible, by using the technical ability which they have acquired.

Although it is inevitable that the instructors and inspectors from the manufacturer are asked to conduct periodic checks in the early period (first and 2nd check), then, the maintenance staff should take part in the checks and others and should try to acquire the technology. And they should aim to establish a system in which the periodic checks can be implemented by only the staff of NWPGCL at the earliest possible stage. We propose the direction in which the technical capability is improved into the level where the periodic checks of other power plants can be undertaken by accumulating the implementation experience of periodic checks and they aim to accept orders from other power plants in Bangladesh. One of measures is to develop the department of maintenance in NWPGCL to SUB and implement the construction management of maintenance by a group of professional engineers and technicians, and from this protocol it is expected to maintain and improve equipment quality, eliminate injury or accidents and ensure personal safety.

(4) The technological level which will be required in the maintenance department in the future and how to acquire the technology

To implement the periodic checks by only company staff, it is necessary to cultivate the technicians who have the same level of technical knowledge as technical instructors, special inspectors (nondestructive test, remaining life assessment and others) and specialist labor (special processing and welding, low-alloy steel – SUS dissimilar metal joint welding, welding of large diameter pipe, annealing operation of welding area and others) in NWPGCL.

The methods to acquire these technologies are as follows.

(a) General information

The basic technical capability should be settled mainly by the staff of maintenance department who trained in the assembly and test operation during the construction works and accompanied the instructors from the manufacturer during the period of LTSA learning the skills of disassembly, assembly and adjustment.

The set protocols are as follows: Write the source of acquired technology in the manufacturer instruction book and add photographs if needed to clarify operational methods. At the same time, write a memo about the technical information which is acquired in the field onsite, and add it to the manual as needed to complement the manual. At the completion of the periodic checks and maintenance, checked equipments, contents of checks, used equipment, check result data, judgment (good or bad) based on the data, difference between planned man-hours and real man-hours and others factors should be written in the construction report without any omissions. And also create the report in which the issues (number of days of operation, used equipment, used measuring instruments and results of the introduced nondestructive test) that should be reflected in the next periodic check, including maintenance and the parts that should be rechecked as soon as possible in the area which was inspected in this periodic check are included. Construct a system in which the persons who need the information can search anytime by digitizing the report.

(b) Disassembly and assembly of GT and ST

During the periodic check which is conducted in the early period by the engineers from manufacturer, take video pictures and photographs of the operation of disassembly and assembly, collect necessary information of the engineers from manufacturer and create a manual for disassembly and assembly procedures. Also note one methods of receiving training of disassembly and assembly of GT and ST is at the training center of manufacturer.

(c) Nondestructive test

As for the nondestructive test, it is possible to cultivate the engineer's knowledge for a short period by purchasing the inspection equipment and receiving the training by foreign experts who are invited to Bangladesh for a short period. During the construction work, they never fail to conduct the check with the inspection equipment at the welding site, so there are many chances to acquire their knowledge and expertise. We can say that it is also an effective method to promote the cultivation of their knowledge by appointing staff who will be in charge of the inspection department in the future, and sending him or her to the site of the nondestructive test.

As for UT inspection, besides a simple measuring instrument in which the measured results are displayed digitally such as an instrument for measuring the wall thickness of a boiler tube, TFD method (angle beam technique, use of plural sensing terminals) in which the inside flaw of a material is judged, the radiograph examination and others are adopted. Now, no one in Bangladesh can use these technologies, and they completely depend on overseas experts in relation to this technology. As one of the methods used to judge the life of equipment, the photomicrography of metal structure is also a necessary technology to harness. The long- term vision about how much the diagnosis technology used in electric power facilities in Bangladesh will be developed in the future is required.

(d) Specialist labor

It is not easy to cultivate specialist labor such as a special in-house welder. Temporarily, the system in which staff who possess the qualifications and skills of specialist labor (special processing and welding, low-alloy steel – SUS dissimilar metal joint welding, welding of large diameter pipe, annealing operation of welding area and others) is ensured contractually is adopted. If it is planned that the maintenance department will be developed to SBU and the periodic checks of other companies will be undertaken, it is necessary to cultivate the engineers in NWPGCL.

(5) Maintenance method in and the middle period

To aim at effective maintenance management, in daily maintenance (small-scale maintenance which can be conducted during the operation, for example, tightening of leak of valve gland, tightening of flange leak, refill of a lubricant, calibration of instruments, replacement of automatic control card and others), urgent response is required to ensure the reliability of electric power facilities, so the department of daily maintenance of the power station which can adapt quickly is in charge of it.

Three months prior to the periodic check, the maintenance department holds a joint conference with the operation department and the daily maintenance department. The maintenance department explains the contents of the next periodic check and maintenance construction, obtaining agreement from the operation department and the daily maintenance department. Total agreement should be reflected in

the program for the next periodic check and maintenance construction. Then, to avoid any oversights in the contents of construction, about areas whose value of operating state deviates from the planned values, frequent alarms and others, the staff in charge of each field reports their current situation. Especially, about untreated lapses among the daily maintenance lapses, which are issued by the operation department of power station, the value which is close to the limit value judging from the operating state value, for example, the vibration value of rotating equipment, the point where the metal temperature of hot area is close to the warning value, the system in which the differential pressure between the front pressure gauge and the rear one is large and others, the current situation is checked by all three departments.
One month prior to the periodic check, the three departments hold the conference again to conduct final confirmation on whether there are any additional checks and maintenance required. The maintenance department rechecks ordered spare articles, parts which should be ordered newly, consumable supplies (general- purpose articles such as gasket packing, sheet packing, each valve gland packing, packing of pump shaft seal part and others, special components) and confirms that there are no omissions.
Furthermore, the situation of creation and procedure of the construction schedule, schedule of worker deployment, number of outsourced workers in each job, equipment for construction, nondestructive test, equipment for special welding and others in each part, GT, ST, HRSG, generator and I&C are confirmed.

6.5 Long-term Human Capital Development

6.5.1 Development of Staffs during the Construction Period

Before launching the construction work, select the leaders of O&M and cultivate them on the side in the construction. In the construction work, the structure of the equipment in P/S which can not be checked during the operation can learn in detail. And, moreover, the knack in installing of equipment can be checked. The leaders collect the data in each point, such as assembly of equipment, opening measuring method in assembling and acceptable value, the sequence check before the single test after assembly, general security test, load test and others, and take photographs with digital camera about the range of which they are in charge. Attach them to the instruction book which is provided by the manufacturer to visualize them. They are used for the education of O&M staff in the P/S and OJT materials of young staff. The documentation and data, which are accepted during the period of the construction work, should be stored on OA server. (The data and document are also accepted in the form of electronic file.)
The contract system with manufacturer is not decided yet. Even if full-turnkey system is adopted, the P/S composes the electric generation preparation group, is subject to manufacturer start-up, and receives OJT of practical operation. Especially, the sequence test provides the chance to check the circuit and function, and not only the members of the electric generation preparation group but also those of the electricity group and I&C group in the repair department attend it.

In the unit testing of accessories, after conducting the inching test in the condition where coupling is separated, the unit testing after direct coupling is conducted. The record is stored on OA server because the centering record in coupling becomes the pace of subsequent maintenance.
To promote the automation, in many systems, motor valves are used, and the records of setting positions of torque switch and limit switch is stored. It is necessary to accurately take over the know-how of manufacturer because the full closed position in cold is different from that in warm.
And as for “burning adjustment”, “start stop test”, “runback test”, “load control test”, “load rejection test”, general test of system”, “AC,DC power-off test” and others which are conducted in the stage of HRSG water pressure test and load test after unit testing of accessories, the staffs of P/S attend all of them. All data, drawings and others relating to test plan, preparation measures for test, command structure of test, responsible persons in decision of stop of test and operation of fuel shutoff valve switch are stored and used as reference in the security test after subsequent MOH.

6.5.2 Training System

The contents of training are different according to the academic background and experience in entering the company. As NWPGCL, the following training items are required.

(1) Items for all new employees, mid-career workers and experienced persons

- Positioning and responsibility as power company
- Operation principle of power company
- System and basic knowledge of equipment of P/S (As all specifications of the plant are different, experienced persons should attend the class.)
- Safety precaution in P/S

(2) Concrete training for new employees and mid-career workers

- Training of operation duty (College graduate:1-3 weeks, Others:3-5 weeks, Clerical staff:1 week)
- Operation duty and business transfer in shift work, Implementation of patrol (the staff in charge of training-chief class of operation duty who is not included in the operation duty shift the staff in charge of actual operation-OJT of staff on duty)
- Training of maintenance (College graduate: 1-3 weeks, Others:3-5 weeks)
- General maintenance (1 week)
- Training in each specialized field (3 weeks: new employees, Mid-career workers are divided according to the department from which they graduated such as machine, electricity, instrumentation and others. In this training, OJT in the group is conducted, and the drawings of manufacturers, instruction manuals and relevant manuals are used as a text)
- During the training, OJT of equipment check patrol, repair technology and skills in the field of repair construction, handling of measuring instruments, which are used, management of data and others is conducted.

(3) Cultivation of O&M staffs in the period of construction work

As described in the preceding section, cultivation of O&M staff in the period of construction work can be established by deploying the candidates of leaders who will become the key men of operation department and maintenance department of P/S after starting of the operation of P/S to learn required special technology.

After launching of the operation, these staff will become the key men instructors of operation department and maintenance department of P/S, and teach subordinates in OJT. Moreover, to improve the level of the staff that plays a central role, plan the internship in the relevant facilities inside and outside the company carefully.

(4) Adoption of recognition system

The measure in which a certain level is set according to the level of acquiring technology and the level of acquiring technology is linked to the wage standard is desirable. It is also required to take measures to avoid the loss of the staff who has acquired the required skills to IPP, whose wage standard is higher by establishing the system in which the staff who acquired the same level of skill as the technical instructor from manufacturer are given a title like Meister in Germany and an appropriate wage.

6.6 Support for the Implementation of Environment Management Planning and Monitoring

6.6.1 Corporate Level

(1) Organizational framework

As described in Chapter 3 on corporate governance, the JICA management team proposes to establish the internal functions to supervise implementation by management of duties, including the auditing committee, governance/environment committee, and election/benefit committee. Setting up the governance/environment committee composed of external members of experts and intellectuals

enables NWPGL to obtain advice and directions for environmental measures from these experts and reinforce its environment control initiatives.

(2) Management structure

The Corporate Governance Code 2004, the corporate governance law in Bangladesh stipulates that one third of potential committee members should be elected outside the Company. NWPCGL is strongly recommended to comply with this code and apply directions and advice from external experts and intellectuals in its environmental management.

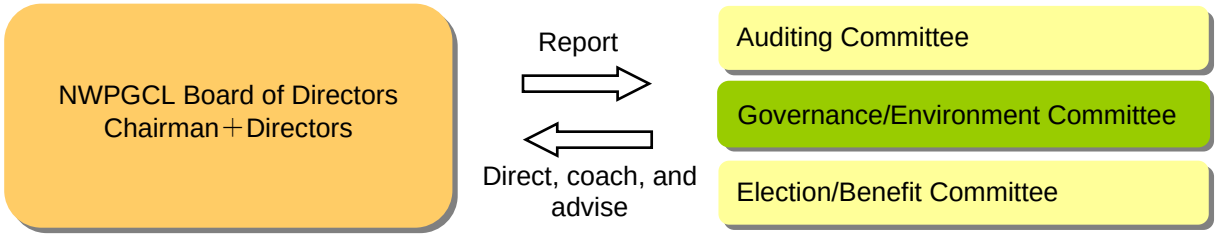


Figure II-6-7 Environmental Management System (Corporate Level)

Environmental preservation measures include specifically the air quality conservation measures, prevention of nitrogen oxide, water quality conservation measures, water discharge, prevention of oil leakage, prevention of noise and vibration, proper assignment of machinery and equipment, measures to harmonize the facilities with surrounding environment in terms of scenic balance and greening. The management should actively seek advice and technical guidance from external experts and intellectuals to build and manage facilities complying with all the requirements stipulated in the related Bangladesh laws and regulations.

With respect to the existing agreement with the community on the acquisition of land, the management may need to respond to adverse claims, which might arise upon the operational start of power station. In such a case, solving disputes through dialogues with local residents is essential.

6.6.2 Management Level

(1) Organizational framework

As described in Chapter 4, the organizational framework at management level should consist of vertical organization including finance, operation and maintenance, planning and development, and human resources on one hand, and the lateral organization on the other, which coordinates the information provided by these groups laterally. As a line post to support the CEO, it is proposed to assign a chief officer in charge of corporate strategy and information management, and a chief office in charge of environment, safety, and quality control.

(2) Management structure

The chief officer in charge bears total responsibility for environmental management. It is an extremely important post that should hold all the great responsibilities in promoting environmental measures at each power station, setting environmental goals, assessing and reviewing performance, obtaining and analyzing environmental data, and disseminating and reporting the information to the members of Board of Directors (including external experts and intellectuals) and the management team.

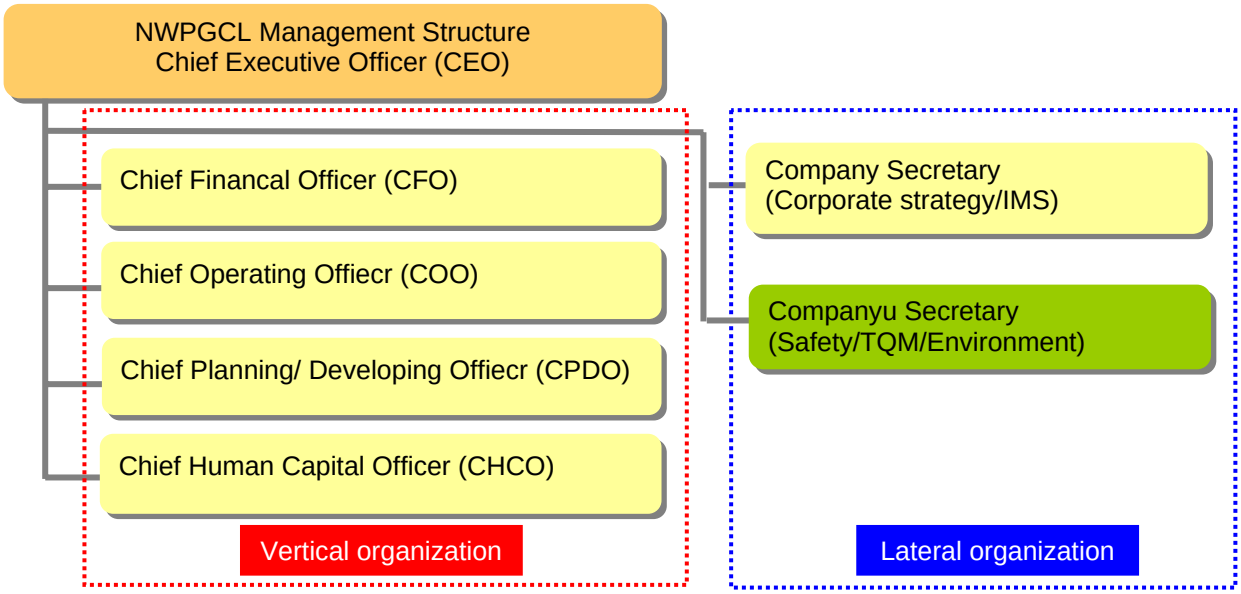


Figure II-6-8 Environmental Management System (Management Level)

(3) Support measures

In order for environmental management to be implemented on a regular basis, it is also essential to apply environmental indicators for management goals so that satisfactory environmental controls would lead to the achievement of management goals.

6.6.3 Plant Level

(1) Organizational framework

In the same manner as management level, it is proposed to introduce a position of deputy director in charge of environment, safety, and quality control, within the organizational framework on a plant level, who laterally collects and coordinates information that exist in the organization.

(2) Management structure

The aforementioned position is critical in that it plays an important role in gathering and analyzing environmental data through day-to-day operations such as setting the goals of power station and assessing and reviewing performance, and because it has complete responsibility in the immediate provision of information to the director and executive officers of the power station as well as to the Chief Officer in Charge of Environment at the headquarters.

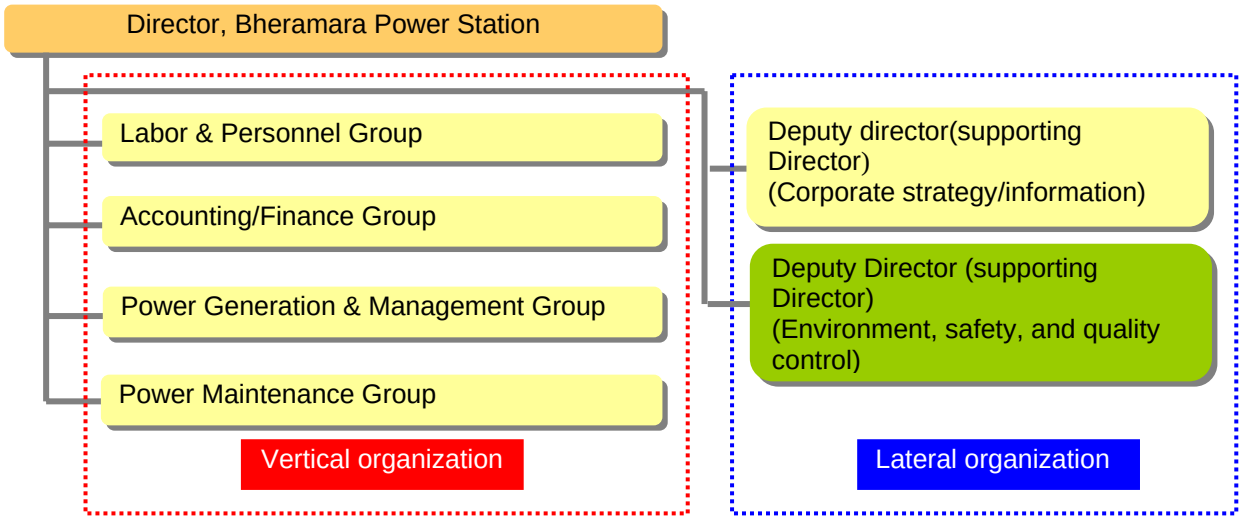


Figure II-6-9 Environmental Management Systems (Plant Level)

(3) Support measures

(a) Corporate ethics

This position also has an acute responsibility in instilling corporate ethics among all the employees through training on the proper treatment and submission of all information in the correct manner including environmental data, so that falsification of data does not occur within the power station's operations.

(b) Management of environmental monitoring

The important points in controlling the information are summarized below:

- Operational administrative data on environmental preservation should be saved in the database so that data can always be submitted too outsides organizations immediately upon request.
- In addition, measuring equipment for air quality conservation and water quality conservation facilities should be placed under strict control so that it operates properly offering management value without fail.
- Related measuring equipment must be assessed every month at regular intervals and be ensured of accurate performance.
- With respect to the noise level on the perimeter of power stations, the stationary measurement points before operational start should be decided and the noise level during trial runs must be measured at all points.
- Stationary measurement must be carried out after the full-scale periodic inspection of power plant.
- Daily discharged water needs sample analysis per drain outlet once a month to ensure the management value is maintained.
- In regards to emergency drainage, acceptable discharge value must be inspected at the exit of drainage tanks before water discharge is commenced.
- The operational, measurement, and maintenance data of environmental facilities, as well as repair data for related measuring equipment should be stored in the operational data processing computer system to record the maintenance history.

(c) Preservation measures

The specific environmental preservation measures at the plant level are described below.

Table II-6-4 Specific Environmental Preservation Measures

Issue	Measure
Air quality conservation	Low NOx burning appliances are used to prevent nitrogen oxide (denitration equipment will not be installed).
Water quality conservation	Environmental changes at points of water intake and discharge (basically, power facilities will be designed so that environmental changes in the rivers at discharge points would not take place nor do they happen regardless of rainy and dry seasons) Compliance with water quality laws and regulations with respect to regular and emergency water discharge when power stations are in operation (periodic water quality inspection will be implemented). Prevention of leakage of lubricant and fuel oil from the premises (installation of a shutoff valve at the very end of drainage path)
Prevention of noise and vibration	Avoid installation of machines and equipment which might be a main source of noise and vibration at the perimeter of power stations (stationary noise measurement to be implemented continuously). HRSG drum safety valves will be equipped with silencer(s).
Harmonious coexistence with local community	Scenic balance and greening (based on the local opinions), Regional scale activities by volunteer fire fighters

6.6.4 Public Level

(1) Implementation of active information disclosure

Because of the business characteristics of constructing power facilities in the region(s) and supplying power to local residents, it is extremely important for the power business to build a relationship of mutual trust with the stakeholders (including shareholders, business partners, and local community, etc.). In addition to implementing an appropriate and responsible reporting to regulatory agencies, it is essential to build a relationship of mutual trust with local communities through active information disclosure of daily operations, environmental data, and immediate countermeasures against accidents to stakeholders including general public, in the annual report or via website.

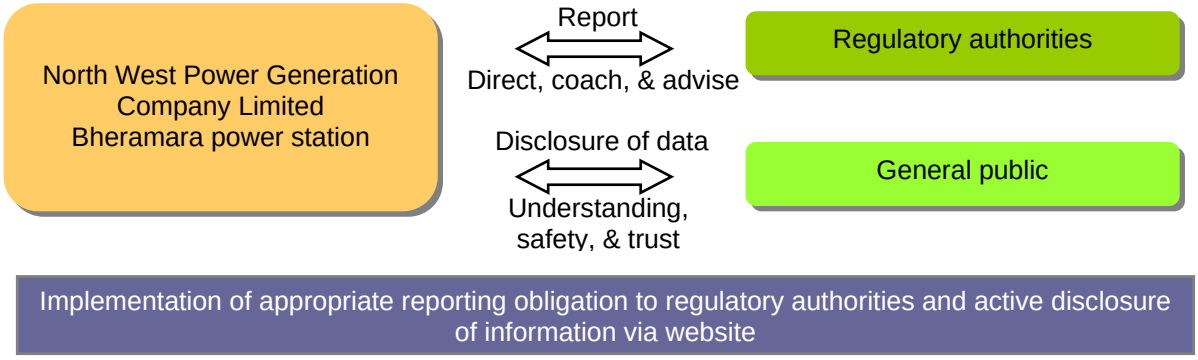


Figure II-6-10 Environmental Management System (Public Level)

(2) Harmonious coexistence with the local community

As regards too the site location for Bheramara power station, it is recommended to adopt the basic policies for environmental preservation by participating in community minded building “by constructing a popular power station”, making the power station open to public, i.e., “construction of a usable power station”, and harmonizing with local community “with an expansive power station”, and implement these policies in all construction and operation.

In the construction of power stations, it is essential to preserve and create the natural environment by conserving the existing green spaces as much as possible and planting trees onsite to coexist with the local community. The specific measures to achieve these goals are:

- Build a popular power station: by planting many trees onsite and aiming at developing a power station with lots of greenery contribute to the expansion of building a healthy and productive environment for the community as a whole, in cooperation with local residents.
- Build a usable power station: by creating green spaces, water features and opening a part of the premises as a community park, aimed at developing the power station to be used by local community.
- Build a power station with open atmosphere: by making the inside of power station open to general public on a regular basis, therefore constructing a power station with open atmosphere.
- In terms of coexistence with the local community, a positive employment promotion from the local community for the logistic works position such as drivers, cleaning, and cooking is highly recommended.

Chapter 7. Safety Management

7.1 Approach for Achieving the Corporate Vision

In order to successfully materialize the corporate vision of attaining the High-reliability power supply, this chapter deals with the implementation of ”Ensuring safety “, and “Total Quality Management in O&M Activities (safety)” in the field of the “Safety management”.

Corporate Vision: Highly reliability power supply
- Ensuring safety
- Total Quality Management in O&M Activities (safety)

7.2 Clarification of Definition

The word of safety in International Organization for Standardization (ISO) defined as the situation where there are no risks, which cannot be acceptable. In this chapter, safety management defines as to implement preventive activities for the facilities, equipment, and human life to remove or mitigate the existing risks to the level, which can be acceptable, or controllable, and to prevent accident before something happens. In addition, to identify accident causes by root-cause analysis, and to do appropriate ex-pots activates to prevent same errors, and accident again.

7.3 Current Analysis

7.3.1 Understanding of Current Situation

For example, safety awareness among people at BPDB P/Sis extremely low and there is no mechanism for ensuring PDCA (plan-do-check-act) cycle based safety and health management. However, safety awareness among people at IPP P/S, which is financed by private capital, is high and the PDCA management system is well established.

BPDB P/Ss

safety equipment: nil
safety measure: nil
safety awareness: very low

IPP/S

safety equipment: all wear
safety measure: implementation strictly
safety awareness: very high

7.3.2 Gap Analysis

(1) Comparing A Gap between Two Power Stations

An interview survey was conducted to middle and top management at the two P/Ss to perform gap analysis in safety management between them. The table below shows the results of the interview survey. The two P/Ss have safety manual and safety equipment. However, there is a huge gap between the two in the way they utilize the safety manuals and safety equipment. It is assumed that such gap arise due to a difference in the awareness of safety management among management of P/S.

Table II-7-1 Gap Analysis

Category	Viewpoint	Example at BPDB P/S	Example at IPP P/S
Organizational structure	Clear responsibility for safety management	Nil	Setting up of a safety committee and a safety manager. Identification of clear responsibility regarding safety management.
	Reward and penalty system	Nil	Four warnings will result in dismissal.
	Safety training	Nil	Periodically implemented
	Safety manual	Present	Present
Management methodology	Management flow based on PDCA cycle	Nil	PDCA-based safety management is implemented
Ex-ante activity Preventive activities	Risk prediction activity Risk assessment	Nil	Being implemented
	Tool inspection before operation	Nil	Being implemented
Ex-post activity	Accident reporting system Pursuit of cause analysis Horizontal development	There is an accident reporting system, but it does not really perform any functions. Only a serious disaster is reported (once in a few years). Even the possibility of implementing cause analysis and formulation of preventative measures of reoccurrence has not been examined.	Employees are obliged to report even minor accidents. The accident reporting system is really performing its functions. A meeting to pursue the cause of accident and examine preventative measures of reoccurrence is held and the results are reported to the head office.
Safety equipment	Provision of safety equipment	Individual employees are not provided with safety equipment. They are stored in a warehouse. Periodical inspection or upgrading is not implemented.	Individual employees are provided with safety equipment. They are inspected and replaced periodically.
Safety budget	Creating a safety budget	Nil	A necessary budget is calculated and created every year.
Safety awareness	Safety awareness (top management and management)	Extremely low	Extremely high
	Safety awareness (general staff)	Extremely low	Extremely high

(2) Cause Analysis

As Figure 7.1 shows, the manufacturing cost will generally increase if we strive to increase safety and reduce risk. This is because an increase in the cost of safety management will be reflected in the manufacturing cost. In this case, however, the cost of loss will decrease because sufficient measures are taken to ensure safety. On the contrary, the manufacturing cost will drop significantly if we sacrifice safety and allow for a great risk. This is because there is no longer a need to secure the cost of safety management and quality control. In this case, however, the cost of loss will dramatically increase due to factors such as the occurrence of serious disaster involving the loss of life, and a significant increase in the percentage of defective goods. Management, therefore, pursue an optimized solution to achieve a balance between safety and manufacturing cost in the manufacturing process. Products of ordinary companies are evaluated based on their market value. This means that the optimized solution will be determined by the market, which carefully examines a balance between price and quality from the perspective of customers.

Quality of electricity remains the same and changes in safety and risk do not result in rise and fall of manufacturing cost. In addition, the government guarantees the price of electricity because the electricity market is monopolized. As for the BPDB P/S in Bangladesh, even if a serious disaster occurs, there will be no awareness of costs such as a significant reduction in the income associated with the shutdown of P/S because of its position as a government agency. Furthermore, clear responsibilities for safety management have not been identified. Therefore, penalty (e.g. loss of employment due to dismissal, a substantial decrease in income due to demotion, criminal penalty) will not be imposed on management, thus the market mechanism does not function in this context.

In the case of IPP, however, it is recognized that it will face a huge cost of loss if a serious disaster which is fatal to humans occur, because of a substantial decline in income incurred by a reduction in electric power supply, pursuit of responsibilities of the safety manager, and the loss of its confidence in society because of the serious disaster. In other words, a difference in the awareness of the responsibility for safety and the cost of loss creates a gap between the two.

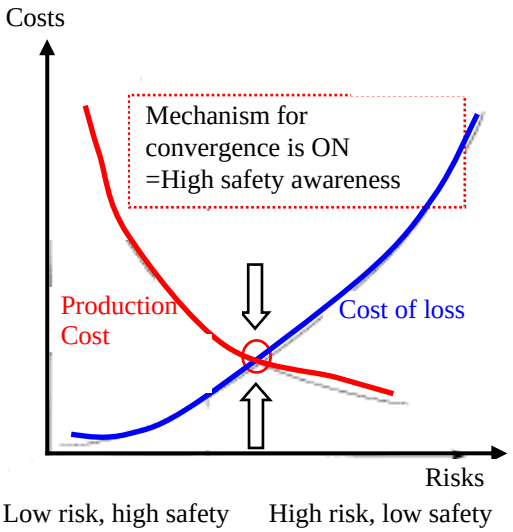


Figure II-7-1 General industrial case (or IPP)

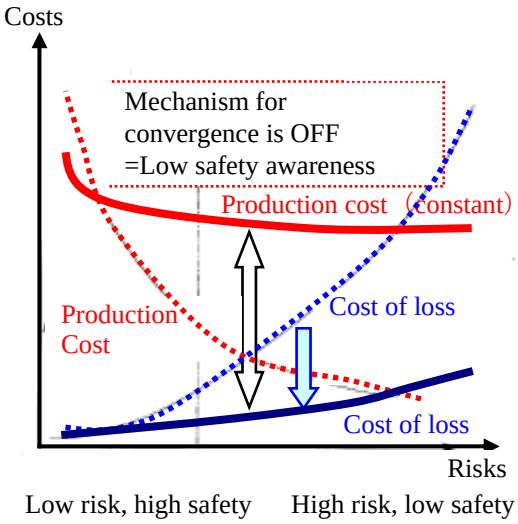


Figure II-7-2 Power sector case (BPDB)

7.4 Recommendation

7.4.1 Approach for Achieving Reduction of Risk

(1) Disaster Occurring Mechanism

A disaster is caused by unstable conditions and unsafe behavior. P/S does not consist of machine alone. It always consists of humans and machine. And other elements stand between humans and machine, including media and manual such as work method and environment, and management such as management structure. If we perceive these basic elements as Human Machine System (HMS) of P/S, we need to approach disaster occurring mechanism from the 4M aspect, namely, Man, Machine, Media and Management.

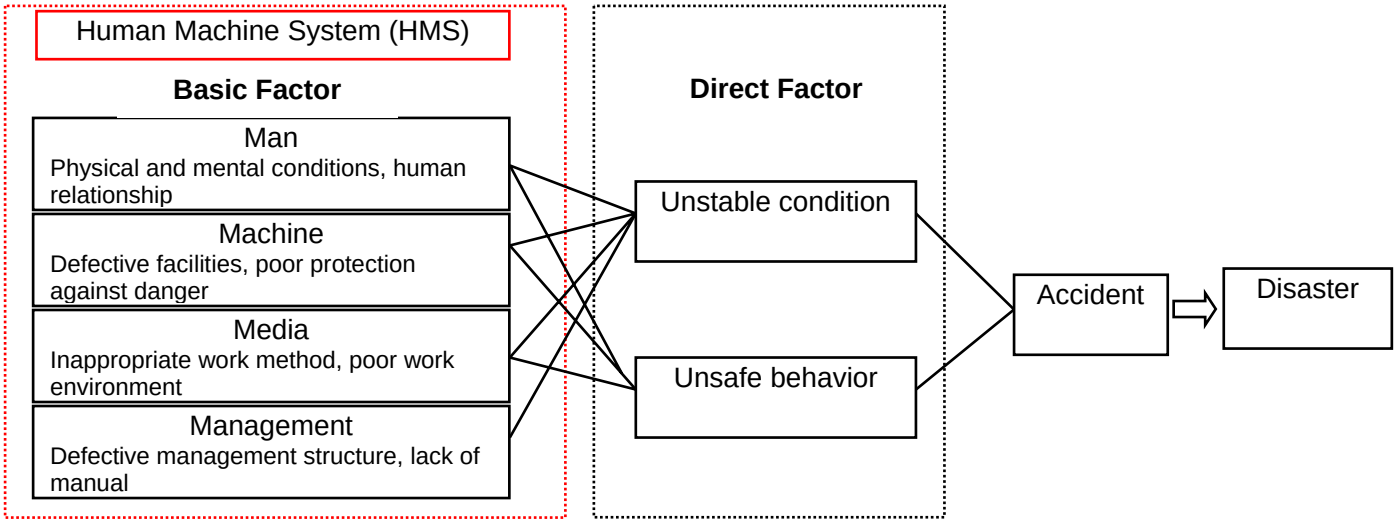


Figure II-7-3 Human Machine System (HMS) and Disaster Occurring Mechanism

(2) Concept of Disaster Risk Reduction

The concept for reducing the number of disasters shall be based on a very simple formula as follows.

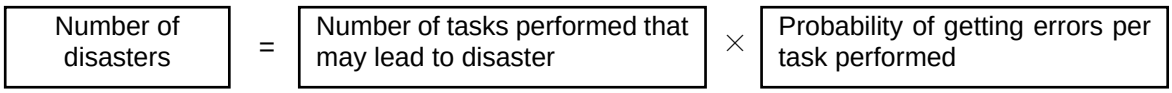


Figure II-7-4 Concept of Reducing the Number of Disasters

This means that it will be necessary to reduce either the number of tasks performed or the probability of getting errors per task performed. However, it is difficult to reduce the probability to zero. Therefore, it is also important to think that errors could occur at any time and to be prepared to prevent them from developing into an accident or disaster. Concrete measures that shall be taken are as follows.

- To reduce the number of disasters,
  - Stop performing a task: Stop performing a task that may lead to a disaster
- To reduce the probability,
  - Prevent people from performing a task: For example, install a lock
  - Make it easy for people to understand: Put up operating procedures in a prominent place
  - Make it easy for people to perform a task: Improve operating procedures
  - Make people perceive: Put up a sign board to alert people
  - Make people recognize and forecast: Providing risk prediction training (KYT) to develop sensitivity to risk, and organizing TBM to make people point out potential risk of performing a task are effective.

- Prioritize safety: Clarify procedures to respond to a disaster in case where people can appropriately predict risk or disaster. It is necessary to have the sense of value that prioritizes safety and the criteria for prioritizing safety.
- Make people develop the ability: Offer educational programs to help people acquire and maintain knowledge and skills. People must be taught not only "know how" that help them decide what to do, but also "know why knowledge" which help them understand the reason behind the incident so that they can respond to an unexpected incident in an appropriate manner.
- Make people recognize risk on their own: Check with safety mirror and finger pointing with calling
- Make people detect: Mechanism for sounding an alarm when people do not follow correct procedures in performing a task.

◆ To prepare for risk

- Prepare for risk: Make preparations to minimize damage. Put up a protection barrier and use nondurable sheets to provide cover and to prevent physical damage from burning and breakage. Prepare safety equipment such as safety net and life rope.

7.4.2 Organizational and Institutional Aspects

(1) Establishment of Organizational Structure for Safety Management and Identification of Safety Responsibility

A safety committee shall be established within Bheramara P/S by appointing its head as the chairperson to strengthen safety management and identify the organizational responsibility structure for safety management. The committee shall consist of union representative and management level employees. To improve safety measures within P/S, the committee shall continue to implement its annual activity plan, including safety meeting plan, solicitation of report on Hiyari Hatto (near accident) incidents, solicitation of posters to improve safety activity (a medal of honor shall be awarded to excellent work), periodical patrol, and 5S awareness campaign.

In addition, the "prior safety evaluation committee" shall be held to evaluate safety of tasks prior to the adoption of a new work or construction method, commencement of a work with explosion or fire hazard, lifting and moving of large equipment with large-size heavy machinery, and shutdown of protection circuit to conduct circuit inspection or replace relay during operation within P/S.
Chairman of the safety committee shall select members of all committees each time. Those who used to work for a construction company and external knowledgeable persons may be asked to participate in a committee as necessary. At the safety committee, the person who is in charge of safety and who is Deputy Director of P/S supervises all committees and events to be held within P/S.

The Secretariat is headed by deputy chief of the personnel division and its members are managers of each division. In case a large number of workers visit P/S because of regular inspection or other reasons, a safety conference shall be organized for all workers including those from construction companies and manufacturers. During regular inspections, a construction site patrol shall be conducted once a week and instructions shall be given to improve an unsafe behavior and poor work environment. The first and second warnings on unsafe behavior are "caution". Without strict disciplinary rules that stipulate, for example, that the first and second warnings shall constitute a "caution" and the third warning shall result in dismissal, safety will never become established. It is important for Head of P/S and other executives to improve their attitude, as they are constantly compared with one another.

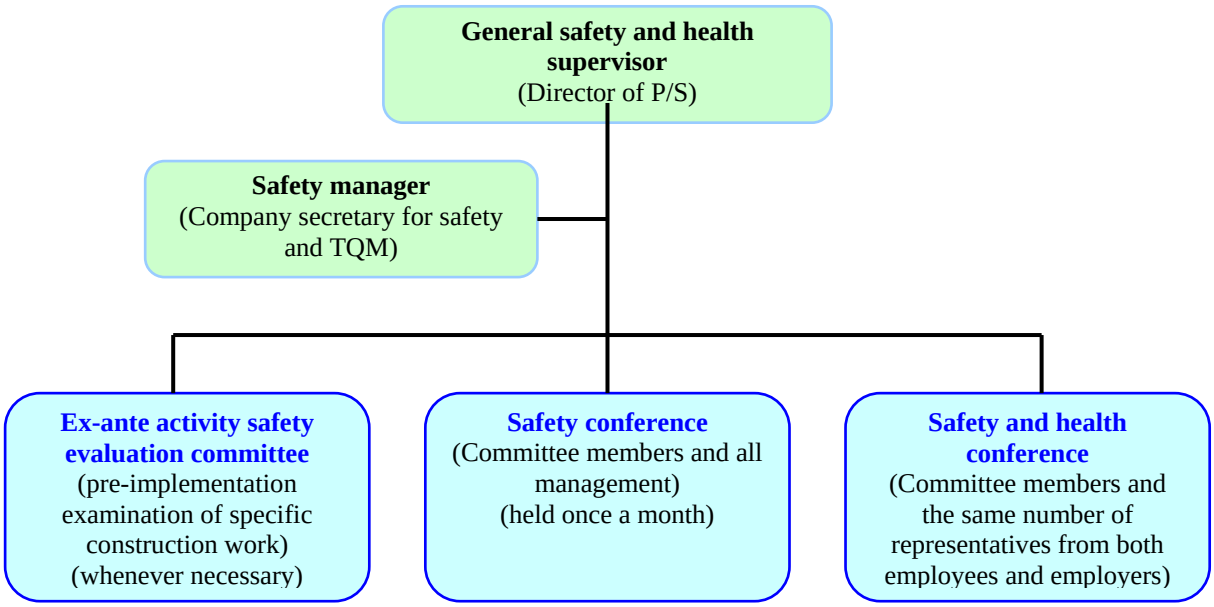


Figure II-7-5 Safety and Health Management Structure

(2) Introduction of Reward and Penalty System

Those who finished on-premise safety precaution training shall be given a sticker which is to be put on a helmet. (Those who conduct welding operation shall also be given safety training and those who finished safety training shall be given a sticker.) It is necessary to establish a structure to enable experts to educate workers so that they will be able to acquire skills required for jobs for which Labour Standard Bureaus of Japan grant a license to managers who finished training. These jobs include scaffolding work, crane operation with wire rope, gas welding, prevention of oxygen deficiency and handling of specified chemical substances. This is the work that the government must do. However, P/S needs to ensure safety on its own in the foreseeable future.

(a) Safety Award

Award to an improvement proposal that clearly ensures worker safety, including the one that aims to install a sign to prevent erroneous operation, install a tag plate on valve station valve, or improve a patrol route. (Create an atmosphere in which anyone can submit a proposal any time. Offer different cash rewards to different proposals that have been adopted depending on the content.)

(b) Penalty, Re-education and Recommendation on Resignation

If those who finished safety precaution training and who do not wear required protective equipment, ignore instructions for safe operations, continue to engage in unsafe behavior (was instructed to improve behavior by the safety committee patrol), or ignore on-premise safety precaution did engage in unsafe behavior, the worker concerned shall be suspended from work from the following day.

(3) Safety Training

Video pictures of actual operations shall be taken and used as teaching materials for workers at P/S for training. These operations include the correct procedures to put on fatigues, protective footwear and protective helmet during construction work, high-place work (fall prevention measures), work that requires the use of fire (fire, explosion, spark), heavy-duty lifting (fall of heavy goods, contact with goods during lifting operation), ventilation measures for closed work site (oxygen deficiency, hydrogen sulfide), electric shock prevention measures (use of protective equipment, voltage detection), and restricted areas within work area and display.

A fire company for self-defense shall be organized separately for work hours during daytime hours of work and for holidays and nighttime, with the latter consisting of duty persons. These fire companies shall repeatedly conduct drills, including water-discharge exercise, fire extinguishing training, and emergency call exercise on holiday and during nighttime.

As part of extinguishing and water-discharge exercises, fire companies shall use an electric pump and engine-driven pump alternately.

(4) Safety Manual

Every business establishment has a safety manual. However, BPDB P/S does not use it at all. It is therefore necessary to create and distribute a portable, easy-to-understand, pocketable manual in a local language to all staff. In addition, it is necessary to review the system of the existing manual as shown in the figure below, and to formulate concrete rules that are more appropriate for job site to carry out rules and measures for each division.

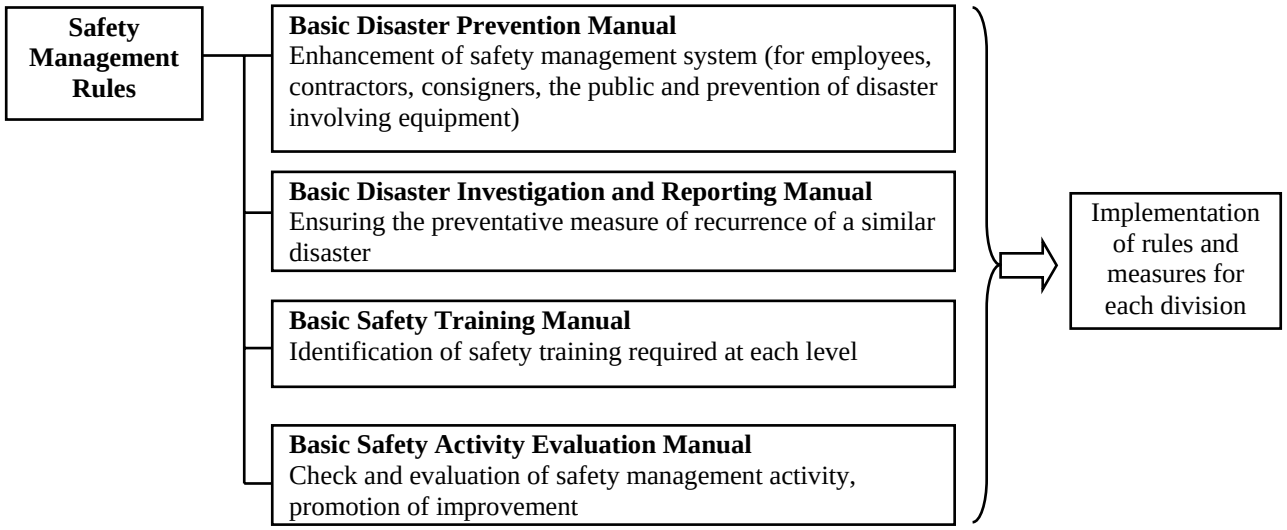


Figure II-7-6 Safety Management Manual System

7.4.3 Management Methodology

(1) Management Flow Based on PDCA Cycle

Introducing a mechanism for creating PDCA cycle, which utilizes the opinion of frontline workers and that of top management as two wheels of one cart, make it possible to construct a solid safe management system. The safety management manual in the previous section constitutes a key element of successful PDCA cycle.

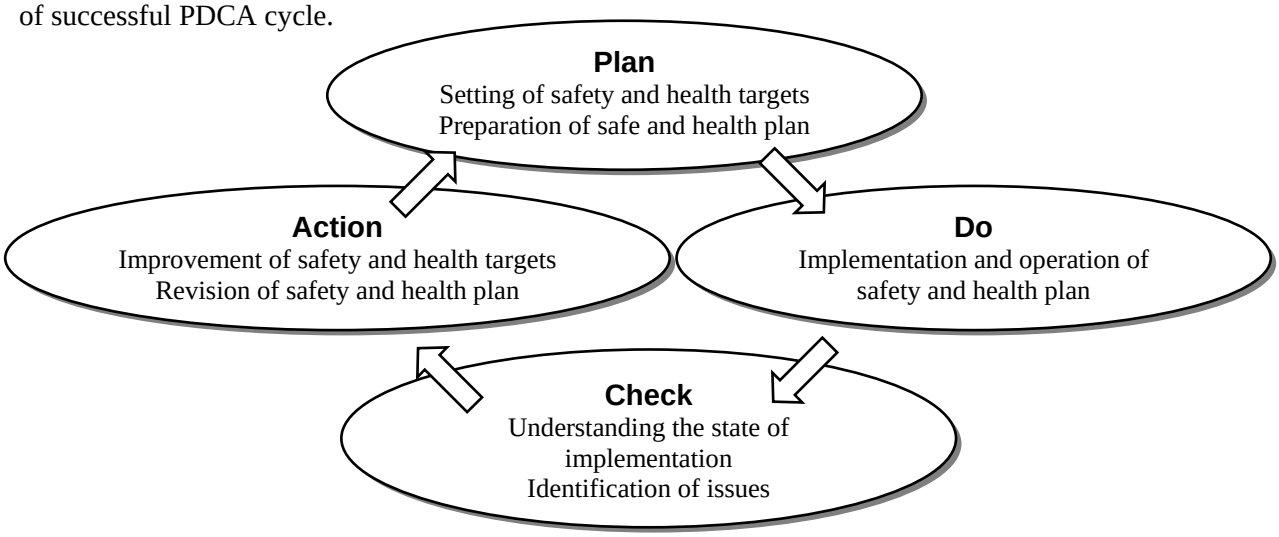


Figure II-7-7 Management Flow Based on PDCA Cycle

7.4.4 Ex-ante Activity (Preventive Activities)

(1) Clarification of dangerous areas

In the P/S, there are storage areas of dangerous goods that can induce fire and explosion. To enter this area or to do repair work at facilities in this area, an application for prior authorization shall be made,

by which the work under authorized condition is permitted. Especially, the patrolmen of gas receiving station shall carry a gas detector to check for gas leaks at flange joints, detector joints and valve glands. The P/S entrance gate shall be provided with an overall layout plan of the premises which shows the dangerous areas and the locations of fire hydrants / fire extinguishers with distinction of types (large or small type with tires or not and types of articles to be extinguished). Let workers who enter the area for the first time confirm the regulations restricting the entry and an emergency phone number (to the chief duty person in the central control room). A supervisory board capable of detecting activation of fire alarm, smoke detector and gas leak detector shall be provided in the security office and central control room. Smoking shall be prohibited in all areas in the P/S and the signs shall be posted in various places. The P/S employees shall leave cigarettes and lighters at their desk when they leave for the workplace. The same rule shall be applied to workers.

- Dangerous areas to keep out:
- Gas receiving/metering stations and piping
- Emergency diesel fuel tank and piping
- Station boiler fuel tank and piping

(2) Security and disaster prevention

- Provide a layout plan of the premises next to the guard station where check-in procedures are performed.
- Show dangerous areas, firefighting equipment, fire hydrants and emergency contact on the layout plan.
- Alert those who enter the premises by car or truck for the first time to keep out of and away from the dangerous areas.
- Hydrogen collecting equipment for cooling the power generator

(3) Fire protection/preventive equipment in P/S

- Lay a looped fire-fighting pipe all around the P/S. Install water-in taking hydrant boxes (with fire hose) at pivotal points.
  Install both electric-driven pump and engine-driven pump.
- Install powder fire extinguishers and foam fire extinguishers at pivotal points for initial firefighting of possible fuel gas/oil fires and electric facility fires. The typical fire extinguishers are shown below by function. Put serial numbers on fire extinguishers that are always equipped at the P/S to prevent them from being transferred or lost. Check twice a year if they are stored in place.
- Fire extinguisher types
  Oil: Gas fire, powder (ABC) fire extinguisher, 8L type, large types 100L/200L
  Normal fire: Foam fire extinguisher, 6L type, 20L type
  Electric fire: Carbon dioxide fire extinguisher, 6L type
- In Japan, the Fire Defense Law specifies which firefighting equipment to use; a fixed type or portable type, discharge time, amount of medical agent contained, etc. according to an object of facilities to extinguish a fire. (Administrative direction is provided.)
  Also, check the installation status, appearance and functional capability of the fire extinguishers at least once every 6 month to maintain the functions. The expected life is 8 years.

(4) Collecting near-miss cases and compiling them into brochure

Even if an incident was a “near-miss” case that did not end in disaster, there are many cases that even the slightest mistake leads to a serious disaster. Thus, it is necessary to clarify any danger in the workplace as a risk factor even if it is a minor disaster, assess it as a risk and develop it in the form of rule or measures that act as preventive measures of reoccurrence and outbreak of disasters.

(5) Clarification of TBM-KY activity and work instruction

Before the start of work, it is important that all workers jointly clarify risks associated with their work to be done on the day to prevent accidents, which is called the TBM-KY activity. Every work instruction needs to be given not verbally but in the form of paper to mutually confirm the steady communication among the workers.

Table II-7-2 TBM-KY Board

Date:		
Today's Work:		
Abnormal experience(s)		
Countermeasures Applied:		Performed by:
Team Safety Target		
Prohibited Unplanned Work		
Special instructions		Person In charge:

Table II-7-3 How to implement KY4 rand method

Introductions	Safety Leader's Speech	
1R	Potential risks	
2R	Focul point of risks	
3R	Risk Countermeasures	
4R	Application of Countermeasures	

Table II-7-4 Touch and Call

Leader	All members
Today's Slogan: (Ex. Zero Disasters!)	Yes, zero disasters!
*All the member forms a ring, holding hands or grasping shoulders. , and put one's hand on someone's hand together *or put one's hand on someone's shoulder.	

7.4.5 Ex-post Activity

(1) Ex-post reporting system

A person responsible for response to disasters shall be the safety personnel. The assistants shall be an assistant (staff) to the chief officer and a person in charge of labor management in the administrative department. (Responds to daily repair work and disasters for construction company workers.)

If an accident occurs, lifesaving is given the highest priority. In case of fatal disaster, the area shall be designated as a no-go zone to preserve the scene. In case of disasters resulting in minor or serious injury, victims shall be transported first and then the area shall be designated as a no-go zone to preserve the scene. Also, the accident shall be reported to the associated external organizations (police, the Labor Standards Inspection Office and hospitals) as well as the associated departments of electricity producers and BPDB.

The accidents shall be investigated by interviewing on the following matters and confirming the scene, and be compiled into reports from a multilateral perspective. The reports shall be made respectively for minor injury with no lost workdays, minor injury with hospitalization, serious injury with hospitalization and fatal disaster. The reports and photos shall be stored in a predetermined file in the OA server.

- Details of work that was instructed to the victims and the workplaces, both on the day of accident
- Whether the victims were wearing protective equipment or not

- Whether there were any co-worker or not (investigate the place and status of the co-worker(s) working at the time of the disaster)
- What were the direct causes of injuries arising from the disaster
- Whether the factors of the direct cause could have be prevented or not if appropriate work instructions, etc. had been given.
- Whether the distribution and the number of workers were adequate or not
- Whether the accident results from a worker's random thought or not, and whether the worker was wearing protective equipment or not
- Whether the temporary scaffolding for the work was adequate or not, etc.

(2) Emergency responses

In case of large-scale disasters such as the one producing plural victims and the one affected by explosion/fire during plant operation or scaffolding, the accident countermeasure headquarters shall be set up with the P/S chief officer as the chairman. The measures shall be taken mainly by the countermeasure task force consisting of the safety personnel, assistant to the chief officer, the associated people in the administrative department, power station department and repair department and a chief officer of the construction company.

If a disaster accident occurs during the power plant operation, designers of the manufacturer and external academic experts shall be invited to pursue the cause and develop preventive measures of reoccurrence.

When a disaster occurs, the first person to find it shall report it to the central control room first. Then, the central control room shall communicate it urgently based on a contact chart which shows who to contact at the time of disasters.

7.4.6 Safety Equipment

The safety equipment owned by the P/S shall be functionally checked regularly.
The safety equipment brought by a construction company to the P/S shall be checked with the presence of both parties to confirm if there is any risk of activation failure, damage or functional inhibition. The equipment permitted for use shall be attached with an emblem for identification.
(The refused equipment shall be taken out of the P/S immediately.)

Table II-7-5 Safety equipment

Personally served for rental	Work wear, work shoes, safety helmet
Owned by P/S	Safety band, gas detector, oxygen respirator, safety signs, safety slogans, partition net (for daily repair)
Prepared by construction company	Partition net, fall prevention net, ropes for safety band attachment (with attachment fittings), fire extinguishers for places where fire is used (check the use warranty period), water for firefighting (portable bucket), safety signs (Keep out, Pay attention to falling objects, etc.)
Reference	Articles that need to be checked to ensure safe work, though they are not equipment: Welding masks, welding rod holders, cables, wires (strand breakage, kink, no uniform wire size), electric wire reel

7.4.7 Strengthening Safety Management System during Construction Period

The daily repair department and the construction company shall make a work plan of the following day, discuss it with the equipment management section and the construction management department, through which all members can know the construction information.
On the day of work, the central control office and the repair department in charge of the work shall be informed of the start of the work before it is started.
The work instructions of the day shall be confirmed by all members of each work group in the field, followed by TBM-KY before the start of the work. Never conduct an unscheduled work or a work based on workers' random thought. At the end of work, all members shall make the workplace clean and tidy and inform the central control office and the repair department of the end of work. Particularly

when the work using fire is completed, the workplace shall be sprinkled with water to prevent fire caused by embers.

The workers who work in the P/S for the first time shall be given a beginner's training based on the P/S compliance manual. Also, it is necessary to create separate manuals such as "Work instruction manual for use of fire", "Work instruction manual for preventing oxygen deficiency in closed workplaces", "Work instruction manual for handling of specified chemicals" and "Safety manual for welding work" in sequence, which are routinely used at a thermal P/S.

Field survey results on safety management in Haripur IPP (Part 1)

Manages the visitors to the P/S using electronic ID cards

Manages the visitors to the P/S (with surveillance camera)

Gives safety training to visitors to the P/Ss (using computer)

All visitors sign the safety behavior testimony.

Publicizes management guidelines on safety, health and environment

Safety sign (Watch your head)

Field survey results on safety management (Part 2)

Thoroughly instructed to wear safety equipment (uniform, helmet, protective goggle and safety shoes)

Thoroughly instructed to wear safety equipment (uniform, helmet, protective goggle and safety shoes)

Measure to prevent entry to no-go zone

Thoroughly instructed to wear safety equipment (safety band for high-place work)

Equipped with firefighting equipment

Safety sign
(The use of compressed air to the body is strictly prohibited)

Field survey results on safety management (Part 3)

Safety signs
(Significantly dangerous spot: Keep away from high voltage)

Safety signs
(Wear earplugs, Pay attention not to get caught in machines)

Thoroughly instructed to wear safety equipment (always wear helmet, protective goggle and safety shoes)

Equipped with safety fences (for fall prevention)

Sign enlightening safety awareness at the P/S gate
(Safety first, Posting the running days of zero disaster)

Signboard for reporting accidents
(Reports and discloses injuries even if they are treated just with a first aid kit)

Chapter 8. Information Management

8.1 Approach for Achieving the Corporate Vision

In order to successfully materialize the corporate vision of attaining the Independence of Management and High-reliability power supply, this chapter deals with the implementation activities in the field of the Information management system.

Corporate Visions: Independence of Management
- Making accurate management judgment
- Making prompt decisions
- Promoting management efficiency

Corporate Vision: Highly reliability power supply
- Promoting management efficiency Ensuring safety
- Total Quality Management in O&M Activities (Information Management)

8.2 The Necessity of Establishing an Information Management Strategy

There is a variety of data (information) in power plant sites. This data (information) is very important for decision-making regarding operation and management and to grasp the situation of the site in real time.
As shown in Fig. 8.1, it is a basic part of the PDCA (Plan, Do, Check, Action) activity cycle that the information is distributed to all organizations in the plant, and the decision-making is based on this information. Also there is constant feedback. So, one of the important roles of the information management system is to provide real time information in the right time, to the right people.

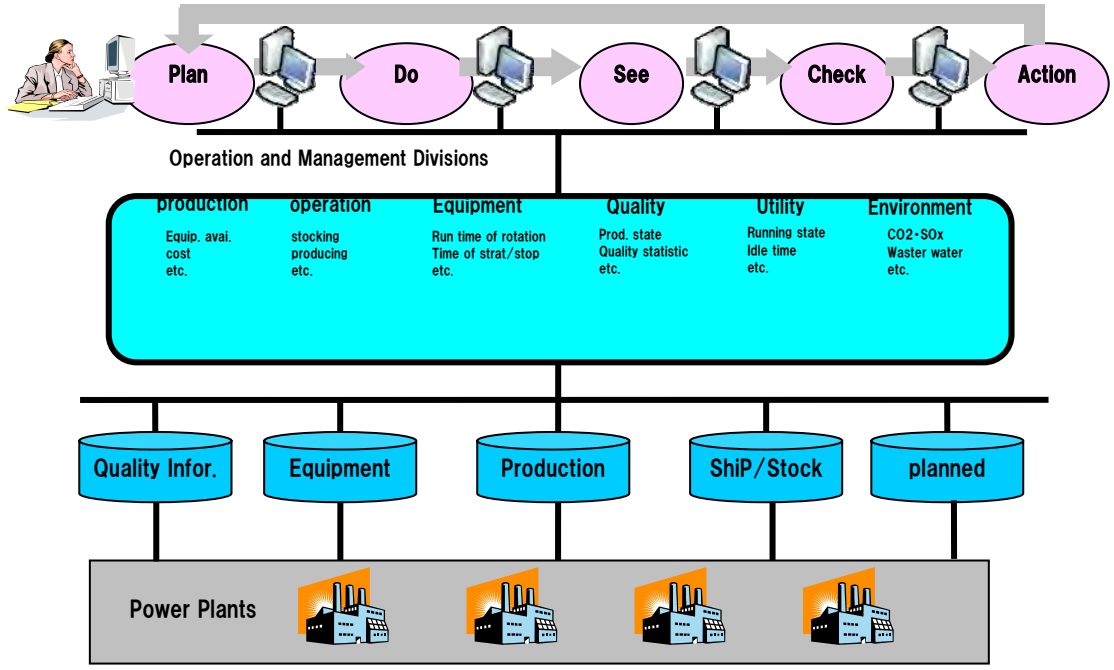


Figure II-8-1 Process data acquisition and distribution for the decision making

It also is necessary and indispensable for plant managers, engineers, and operators to know information about the past and the situation in which they occurred. The information management system has to record the "Now", then store the data (information) long term, and access the "Past" easily if necessary. This is the most basic part of the information management hierarchy, so it is called the foundation of information management strategy.

In fact, data is not always meaningful information. A large amount of data has to be analyzed and organized, then presented in a form for easy understanding. Thus the data becomes useful information.
Therefore, the analysis tool and the collaboration with other systems in the information management system is necessary.
With assistance of system integration and data analysis, it is possible to access the data (information) you want with one click, and achieve “Manufacturing Visibility“ in the plant.

What managers really want in the top hierarchy of information system is plant operation optimization. Based on the real time information system provided, the managers and engineers promptly and precisely make decisions from the viewpoint of the plant management and the operator, respectively. They aim for process innovation, lowering cost, quality improvement, and maximization of profit of the entire plant.

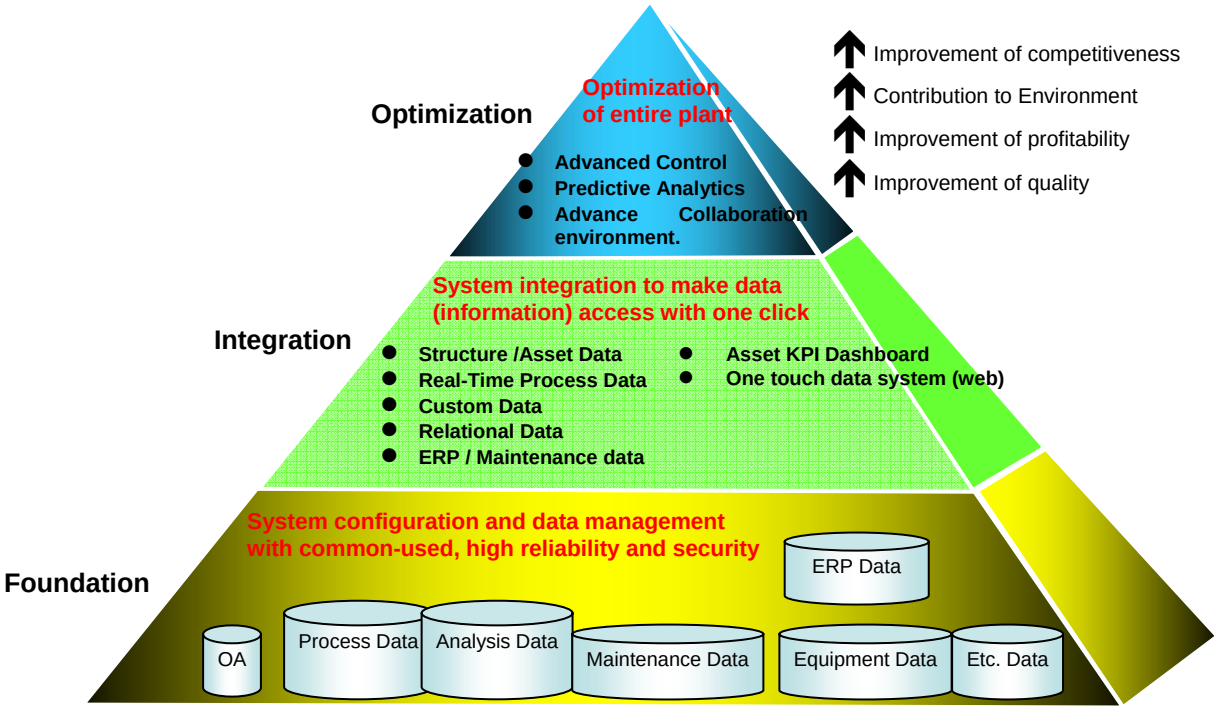


Figure II-8-2 The framework of plant information management strategy

8.3 Concrete Strategy

8.3.1 Total System

The whole plant information management system integrates all of the information scattered in the various control systems, which are located in the power plants. Then it constructs a database in which data can be easily retrieved and presented. With this information system, useful information is provided for making managerial decisions and the accomplishment of business goals. Also, to realize the visibility of operation of the entire plant, and to optimize business resources in the entire enterprise. On each of the sites, the systems provide information to keep power generation stable and efficient. With the network connection of power plants, headquarters gather information from all the plants and keep

business running in the right direction. The function of networking easily, gathering information easily, and making the application easy for various management activities are required for the information management system.

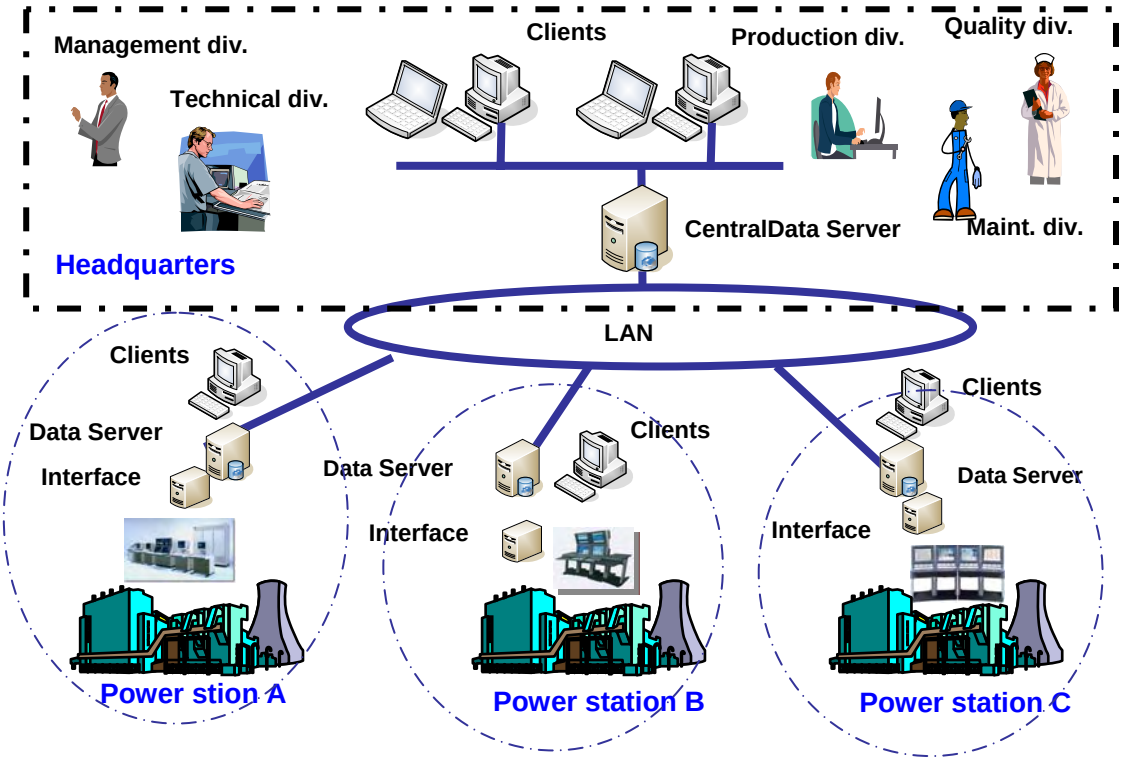


Figure II-8-3 Information integration in power plants

Utilizing an optical cable between the NWPGCL headquarters and the power stations as a corporate LAN system is the most realistic way in term of information management. However, installment of an optical cable for exclusive use takes plenty of costs, at least for the earlier stage, alternative method among the following potions is to be selected, taking consideration cost-effectiveness, and information security.

(1) To borrow an optical cable (2nd core cable) of optical ground wire (OPGW), owned by PGCB
PGCB will construct a 2nd core optical cable requires between the power station and the load dispatch center since the output data is required for load dispatching. The optical cable is OPGW, utilizing the overhead ground wire of the transmission line. The cable has some allowance core, so that it is possible to borrow the optical cable from PGCB for NWPGCL communication purpose.

(2) To use satellite connection
To place an antenna at both the power station and the NWPGCL headquarters is required for satellite communication. Satellite connation fee shall be paid. Since a time-lag of more than one second will occurs, it is difficult to use the satellite connection for emergency control.

(3) To use Internet connection
If an Internet connection is available nearby the power station, this potion is the most quick and easy method for data communications. Whereas this option is inexpensive, and possible to send voluminous of information, information security measures shall be carefully considered.

(4) To use mobile telephone connection

A mobile phone connection is utilizable easily throughout the Bangladesh. However, when voluminous of information is sent, it takes time and the telecommunication fee is likely to become high. In addition, information security measures shall be carefully considered.

8.3.2 External Information Transmission

(1) Establishment of Website

We propose that Website is established as soon as possible to ensure external communication, "clarify" the management and gain more awareness of exterior persons by positive information transmission.

The following items can be considered as crucial and set contents of Web site.

- Introduction of the management layer
- Management's vision
- Photographs of our power stations
- Progress report of construction work (Bheramara power station, Khulna power station, Sirajganj power station (under construction)
- Implementation of daily power generation, environment emissions (after commissioning of power station, which is under construction and after transfer of existing power station)
- Bidding information
- Recruitment information
- Annual report
- Feedback form

(2) Transmission of varied information

We seek to transmit information positively by using the media such as newspaper, TV and radio. Especially, it is important to disclose not only positive and correct information but also any negative information openly. It is necessary to accurately report environmental emissions and others to authorities concerned and local governments based on given standards.

The power station is basically a hateful facility for the residents living in the vicinity of it. In view of this point, it is necessary to open the power station to the public and establish the system in which the ordinary citizens can tour our facilities if they wish.

8.3.3 Internal information transmission

(1) Information needed in management accounting

We propose the improvement of "management accounting" as a part of the improvement of our financial accounting system. The management accounting is not the system in which the information data is one-sidedly given to the manager but the system in which the basic information for the preparation and decision of the policy which the manager conducts, or daily business judgments and decision-making is provided. (Refer to clause 5.6 for details)

(2) Information on daily operation conditions

The information on daily operation conditions is shown in the Section 6.3.2 in detail. The examples of items which are described in each report are shown below.

Table II-8-1 Sample of reporting items

Items	Unit		Daily	Weekly	Monthly	4 times a year	Twice a year	Yearly
(1) Electricity generation, L	kWh		○	○	○	○	○	○
(2) Internal consumption, I	kWh		○	○	○	○	○	○
(3) Electricity generation (transmission end)	kWh		○	○	○	○	○	○
(4) Fuel heat rate	Kcal/Nm3	latest analyzed data			○	○	○	○

Items	Unit		Daily	Weekly	Monthly	4 times a year	Twice a year	Yearly
(5) Fuel consumption	Nm3	latest analyzed data	○	○	○	○	○	○
(6) Fuel consumption rate	Nm3/kWh		○	○	○	○	○	○
(7) Efficiency (generation end)	%	η p=860×L/④×⑤×100			○	○	○	○
(8) Efficiency (transmission end)	%	η p′ =⑤×(1-I/100)			○	○	○	○
(9) Capacity factor (hours)		Electricity generation/oper.hour×rated capacity			○	○	○	○
(10) Capacity factor (day basis hours)		Electricity generation/day basis hours×rated capacity			○	○	○	○
(11) Air temperature	℃	Daily average(adjustment curve))	○	○	○	○	○	○
(12) Differentiate pressure	㎜ Aq	Maximum (adjustment)	○	○	○	○	○	○
(13) Equivalent operating hour	EOH	Equivalent Operation Hour			○	○	○	○
(14) Total operating hour	hr			○	○	○	○	○
(15) Total start and stop				○	○	○	○	○
(16) Scheduled outage		Outage hours/times			○	○	○	○
(17) Un-scheduled outage		Outage hours/times×total annual time			○	○	○	○

8.3.4 Application in O & M

(1) Trend management

The functional overview of the operation data processing computer (computer for management) among the operation information management is shown below. Based on this information, monitor the change of daily condition by the trend management and prevent the outages caused by accidents and others.

Table II-8-2 Function of operation data processing computer

Classification	Solution function
Basic function	Search function of operation history data (graph, table)
Operation record management	Display function of present location (trend graph, table)
	Management function of diary data
	Form creation function (season, monthly, quarterly, annual report)
	Warning message management (basic data of diagnosis of the area where it occurs frequently)
	Management of electric generation performance
	Display of electric generation overview (quick estimation of operation condition of the previous day)
Heat efficiency management	Management of performance test record
	Management of start/stop loss
Facility maintenance management	Process data check
	Secular change management (decision of outage time and operation continuation by conducting the trend management such as vibration of rotating equipment, temperature of bearing, metal temperature of hot area)

(2) Establishment of a check plan, Management system

By introducing the following Maintenance planning & Management system with use of the general-purpose software will improve functionalization, labor cost savings and reliability of the facility.

Table II-8-3 Maintenance planning & Management system

System name	Contents
Maintenance management system	System diagram, Equipment assembly drawing, Periodic check record, Trend of record, Management of remaining life, Maintenance management table
Facility history management system	Repair history, Unplanned stop operation history
Video, photograph management system	Processing photograph and moving image
Parts management system	Inventory management of spare parts, Consumable articles at the periodic check, Management of parts for replacement
Creation of construction plan, Editing system	Mid-to long term maintenance plan, Plan for the forthcoming year, Construction specifications
Management system of periodic check construction	Construction schedule, Manpower loading chart
Daily maintenance management system	Check of operation request / repair completion slip

8.4 PI System

One solution of the above information strategies is the PI system. The overview of this system is shown.

8.4.1 PI System in Information Management

Being faced with fierce global competition, many enterprises around the world have installed information management systems such as ERP (Enterprise Resource Planning) and MES (Manufacturing Execution System) to aim towards making quick management decisions. ANSI/ISA95 international standard defines the system hierarchy in manufacturing industries as shown in the figure below, and specify the seamless connection between each domain.
The entire enterprise information is unitarily managed with this system structure, and it supports quick decision making for operation and management. Real visibility in the production site, the management floor, and enterprise level can be achieved. It is also applied to the power plant information management system.

PIMS (Plant Information Management System) connects PCS (Process Control System) and MES, gathers real-time operation data from PCS, stores the data in the time series, and sends it to the MES or ERP depending on the requests.
PIMS plays an important role to unlock the real time operation data which are used to be limited to the operator room on the site. Real time information is now sent to the desk to P/S of all factories and headquarters so anybody can see the information they need at the time they want.
PI system, developed by OSI soft in the United States of America, is one of PIMS software package which is widely used in a variety of industries such as power, gas & oil, petrochemical, iron & steel, paper & pulp, food, pharmacy and water, etc. Around 14,000 systems are installed in more than 120 countries.

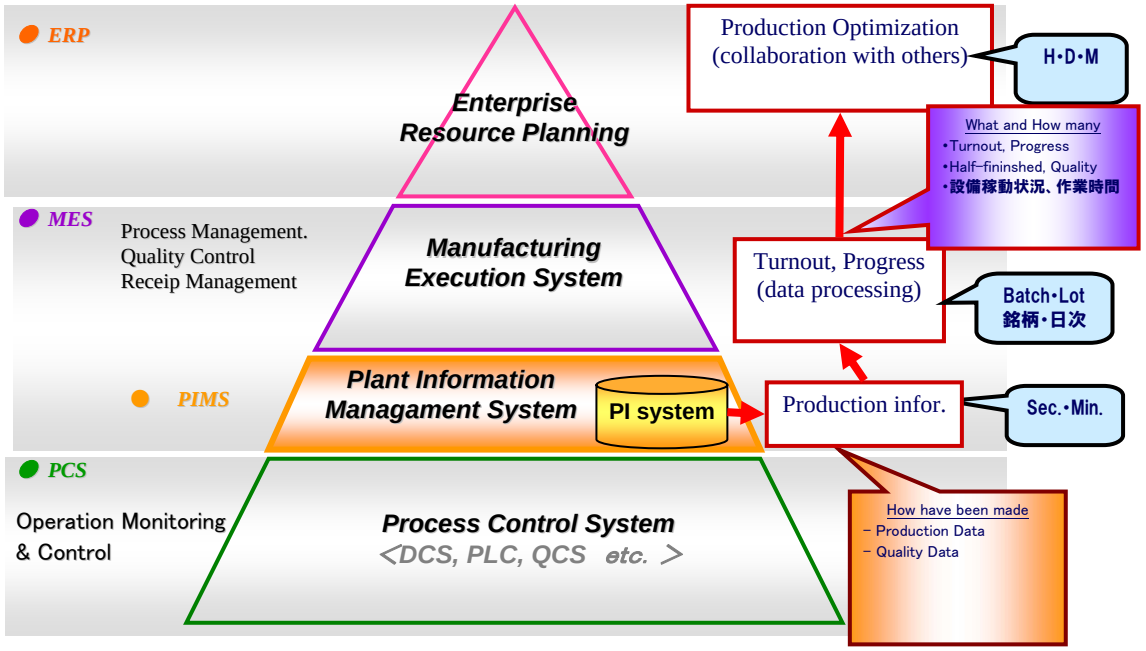


Figure II-8-4 System hierarchy for manufacturing industry

PI system is an important tool for plant operation and management, it gathers the operation data from control systems, and integrates information from other systems in the plants. The operation data of the plants (production units) is collected from instrumentation and the control system automatically through PI interface. It is then stored for a long term in the PI server as historical data that can be used to accurately replay the proceeding process. The PI client can retrieve this data easily and display it in the form of useful information. It saves engineers a lot of time which used to be spent to find, collect, organize data. Therefore, the engineers can concentrate on creative work.

With the network, the PI server can be connected and accessed from anywhere at any time. The plant operation and management can be fully supported with PI system, such as plant operation KPI (Key Performance Indicator) displayed in real time, production remote monitoring, quality control, report outputting and process analyzing, etc. PI system is composed of PI interface, PI server, and PI client as shown in the follwing Figure.

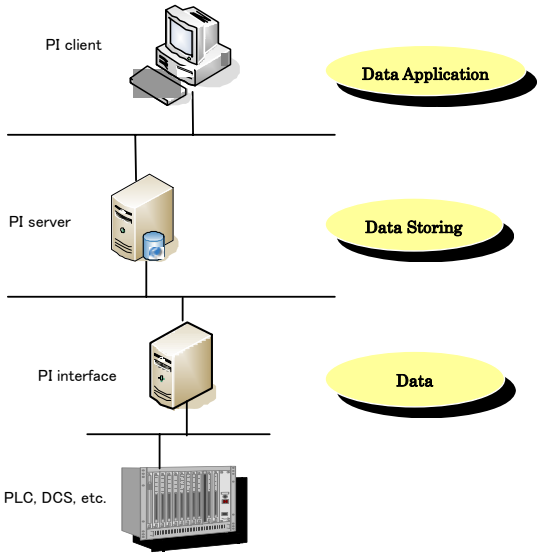


Figure II-8-5 PI system configurations

(1) PI interface

PI interface has the function of gathering the process data from DCS, PLC and SCADA, etc., and sends it to the PI server.

As one of the basic design concepts, the PI system is developed for plant information integration. It now can connect to most control systems with its own interface, no matter the control system model and platform. The PI system gathers real time process data from the multi-control systems in the plants and integrates the information for the operation and management of the whole plant.

The data inputted by hand and the electronic file transmissions from portable data terminals (PDA) are also available.

(2) PI server

The real time data gathered from DCS and PLC are stored in the archives on the PI server with the time stamp. The PI server database structure is developed by OSI soft in which the data is stored in the order of the time series.

The PI server has the flexibility to collect 1,000 through 1,500,000 data streams (tag) and can be used to configure the systems from small scale to large scale.

(3) PI client

PI system has many “visualize” tools to change the data stored in the PI server into useful information for users. The typical and most used tools, PI Process Book and PI Data Link, are introduced briefly as follows.

(a) PI Process Book functions and features

PI Process Book is used to monitor the process and analyze the operation data with the graphical user interface Users can draw and display a process flow diagram, process real time data value, and chart the trend graph etc. without programming. Not only can the current data be processed but past data can also be retrieved quickly and easily. Therefore, the operation situation from the past can be replayed which can be used to compare with the best practice, quality analysis and trouble shooting, etc..

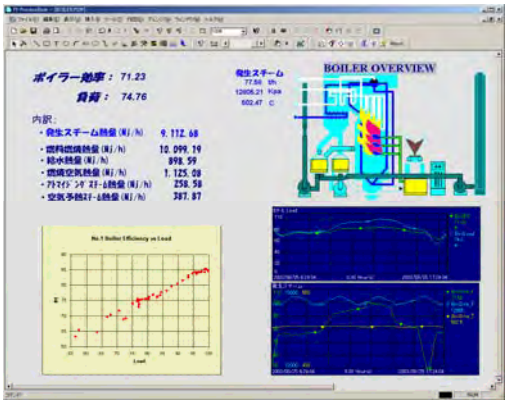


Figure II-8-6 PI Process Flow diagram in Process Book

(b) PI Data Link functions and features

PI Data Link is used to take the historical data stored in the PI server into Microsoft Excel format. Since it is one of the functions added into Excel, users familiar with Excel can easily use it to access data in the PI server without any special training.

The current value, historical value, average and sum value, and the standard deviation etc. can be retrieved and calculated easily and quickly.

In combination with the original functions in Excel, users can edit and output their own daily operation reports and the process analysis reports. Data Link strongly supports users to carry out routine and non-routine work efficiently.

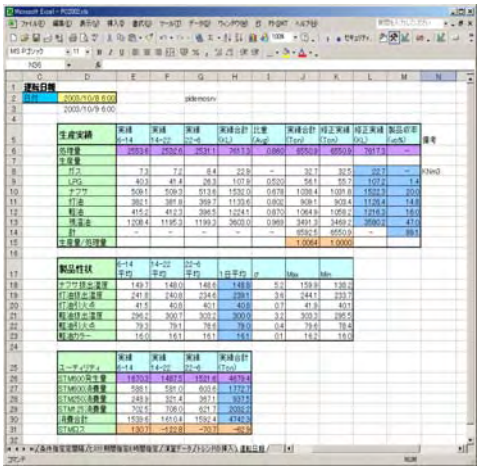


Figure II-8-7 Report with PI Data Link

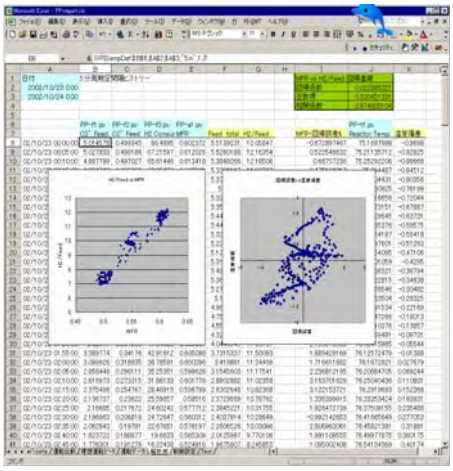


Figure II-8-8 Data analyzing with PI Data Link/Excel

(4) Other component: PI ACE (Advanced Computing Engine)

PI ACE's function is to execute complex repeated calculation and the automatic processing application. The calculation can be executed under the command from users or from conditions specified beforehand. The complex calculation includes equipment predict modeling, What-if analysis, start & stop time monitoring, mass balance, heat balance, performance index and KPI (Key Performance Indicator) of the entire enterprise.

In the power plant, it is used for the performance calculation of the boiler, turbine, and other equipment.

The final goal of an enterprise information system in manufacturing industries is to bring all operations data into a single system that can deliver data to users at all levels of the company, from the plant floor to the enterprise level.

The PI server gathers and stores relevant data from different sources and define frames of reference or context for proper presentation to individuals in the organization. It drives analyses applications and displays with PI visualizing tools so that users all work with the same up-to-date information.

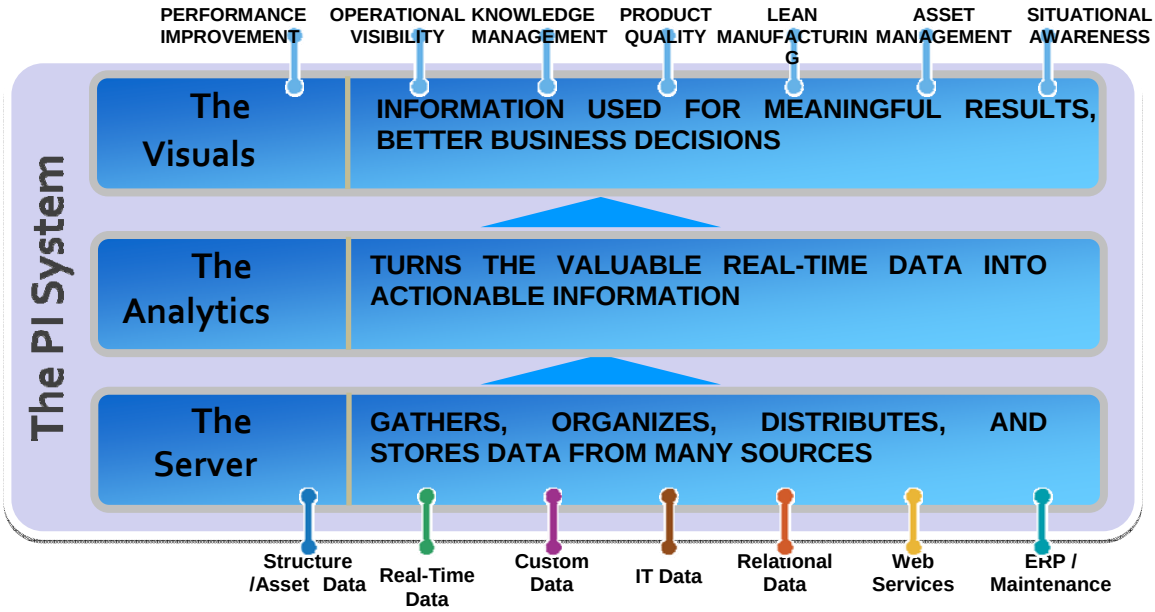


Figure II-8-9 Applications of PI system

8.4.2 Hardware, Software List and Budgetary Quotation

PI system proposed for Bheramara Power Plant contains the following hardware and software. The detailed information for the PI system can be found in the attachment, System Configuration Diagram.

(1) Hardware

The PI system consists of the following the hardware.

Table II-8-4 Hardware lists

Items	No.	Contents
PI sever PC	1 lot	Has 5,000 data stream capacity, is supposed to be capable of storing data for a maximum of 3 years.
PI ACE PC	1 lot	To be mainly used for the performance calculation of the equipment in the power plant.
PI interface PC	1 lot	To gather process data from DCS at 1 minute scan rate with OPC
PI client PC	7 lot	To make use of Process Book and Data Link to retrieve the data stored in PI server, draw and display the process flow diagram, trend and etc., edit and output the report with MS Excel.
Printer	1 lot	
Others	1 set	Network equipment like Ethernet, Hub, etc.
Approximate estimates	1 set	10,000 kJPY

(2) Software

The PI system consists of the following the software.

Table II-8-5 software list

Items	No.	Contents
PI Enterprise Server	1 lot	5,000 data streams
PI ACE	1 lot	5,000 data streams
PI OPC interface	1 lot	To collect process data every one minute from DCS by OPC interface.
PI Combo	7 lots	Process Book, Data Link
PI system application	1 lot	Process Book displays, Data link reports and the performance calculations for process monitoring.
Approximate estimates	1 set	55,000kJPY (including engineering fee)

Chapter 9. Risk Management

In this chapter risks, which NWPGCL will face, are clarified. With this in mind, the frequency rate and influence degree of these risks are estimated and risk mitigation measures are proposed.
Risks are classified by considering occurrence periods such as; Preparation/ during construction stage (Phase 1), Immediate operation stage (Phase 2: up to 3 years from commissioning), and Stable operation stage (Phase 3: 3-10 years form commissioning).

9.1 Relevant Contract

Risk level varies to a large extent by the text of related contracts. It is preferable for NWPGCL to conclude the contracts favorable for NWPGCL to reduce risks.

9.1.1 Subsidiary Loan Agreement

(1) Subsidiary Loan Agreement

With respect to loan agreement with international donors, the Government of Bangladesh becomes a counterpart of negotiation with the donors and determines the receiving conditions. The Loan Agreement to be concluded with the donor(s) specifies that the Government becomes the borrower and stipulates that the executing entity (NWPGCL) be an executing agency. Based on these, the Government concluding the loan agreement exchanges a contract on "on-lending" with an executing agency. The agreement on "on-lending" to be concluded between the Government and the executing agency is the Subsidiary Loan Agreement. The conditions of the "on-lending" contract are specified in the Implementation Program (I/P) of the project and are submitted to donors. The donors will review the appropriateness of the conditions of subsidiary loan at the time of project assessment, and may request for the revision of conditions, as appropriate. In Bangladesh, the conditions of subsidiary loans to be agreed between the Government and the executing agency are described in DPP and assessed by ECNEC, the project approval organization within the Government.

(2) Financing by the implementation agency

The loans from donors will be determined after reviewing the required project fund, excluding non-qualified portions (land, tax, interest and personnel cost). Since the operating capital cannot be included in the required project fund, the Subsidiary Loan Agreement cannot include operating capital in the purpose of loan. Therefore, the executing agency is required to find other source of financing for the non-qualified portions of loans and operating capital.
Typically, upon the establishment and operational start, as a financing source of project development, private companies get a loan from a bank in the form of project loans or syndicated loans, while general operational capital required for operational start and initial fund to cover negative figures to arise at the start of operation are estimated in advance in the phase when the scale of capital is determined and the required amount is contributed from the capital. In the event the business proceeds steadily as planned, the fund to cover negative figures is considered within the projection, for which the initial capital is utilized.

(3) Experience of preceding case of publitization

In the case of power industry in Bangladesh, the shortage of project fund which are not covered by donors is covered by government funding (60%) and loan(s) (40%). However, as the fund to cover negative figures at the time of company establishment is not assumed in the determination of initial capital in the cash planning, a financing problem arises. In other words, the total of capital from donors and government fund cover only project capital. As such, the personnel cost during the period of company establishment until the company becomes financially stable and other management costs have not been financed. In the publitization of BPDB, BPDB provides the new company with these required costs in the form of no-time limit loan (with or without interest) to respond to this issue.

The loan made by BPDB may be balanced out by the charge of power to be sold to BPDB in the future. Or the amount of loan will be switched as the capital which BPDB plans to invest in the new company. BPDB will maintain a strong position as a creditor of the new company both in terms of capital and loans.

(4) Considerations on Subsidiary Loan Agreement

In addition to the amount, interest rate, lending period, and grace period, the basic conditions of subsidiary loan agreement include the determination as to which currency to be based. The bearer of currency exposure differs depending on the use of home currency or foreign currency. Thus, critical information for risk judgment is required. In Bangladesh, the Subsidiary Loan Agreement has been so far based on the same foreign currency as that of original loan agreement, while the currency exposure is shifted to the executing agency.

When the Subsidiary Loan Agreement between the Government and the executing agency is based on the foreign currency, the Company will be exposed to exchange rate fluctuations as it does not have foreign exchange earnings. Since the loan to implement power project generally extends over a period of 20 to 40 years, and the Company is not able to establish a hedge in the foreign exchange market, it will be continuously kept in an unguarded condition.

Though the Company can request BERC to adjust the power selling prices to make up the incurred exchange loss, the loss during the period when it incurred and until BERC approves power rate change will not be covered. It is the order of nature for power companies not to have currency risk actively but to avoid it. As the Government added a certain interest rate margin on the loan in the subsidiary loan agreement when it subsidized the loan received from the aid organizations to the executing agency, it is legitimate to set up the on-lending conditions that the Government bears currency risk.

Apart from the currency issue, other on-lending conditions such as interest rate, lending period and grace period are stipulated in the guidelines issued by Ministry of Finance. The guidelines specify that the interest rate be 4.0% per year, lending period be 25 years, 5 years of which be a grace period, and repayment start after five years of project completion. According to the hearing with the officer of Ministry of Finance, these are the standard conditions and as appropriate, different conditions can be established in DPP. With the approval of such conditions by ECNEC, the conditions different from those specified in the guidelines can be established.

9.1.2 Employment Contract

(1) Condition and tenure of appointment

Most of the companies, such as APSCL, BPDB, EGCB, PGCB, and DESCO have probation of 1 year, and have a contract based appointment for a period of 3-5 years which is based on performance and is renewed only when the candidate has suitably performed.

(2) Relevant policy, laws, and regulation regarding personnel transfer

(a) Government's Policy Statement on Power Sector Reform

The Government's Policy Statement on Power Sector Reform regarding the impact of Corporatisation calls for 'separating out all existing power generation units through a corporatized national power generation entity…for restructuring power generation on commercial lines'. With respect to protecting the interest of the employees, the Policy Statement (point no 6), it states that 'GOB recognizes that for successful implementation of the reform and restructuring of the power sector, the concerns of the employees of the sector are required to be appropriately addressed.' It also states that the 'employees will be involved in constructive dialogue of the reform program and their views will be given due consideration during the restructuring process'. The Government shall also ensure that the interests of the employees are protected during reform process as follows:

- The terms and conditions of the service applicable to them after restructuring shall not be less favourable than or inferior in terms of remuneration and monetary benefits to those applicable to them immediately before the restructuring.

- The employees shall have continuity of service in all respects.
- All benefits of service accrued before restructuring shall be fully recognized and taken into account for all purposes including the payment of any and all terminal benefits.

(b) Bangladesh Water and Power Development Boards order 1972, Section 32

It should be noted that the automatic transfer of current and regular employees from BPDB was legally not feasible. Section 32 of the Bangladesh Water and Power Development Boards order 1972 ('order') does not make any express provisions for treating BPDB employees as Government Servants.

(c) Contract Act 1872, Section 10

Since officers and staff do not have the status of a Government Servant, the employees of BPDB are regulated by the Contractual laws. Under Section 10 of the Contract Act 1872, only agreements, which are entered into free consent, will be deemed to be agreements.

(d) BPDB Service Rule 1982, Rule 13

Transfer of employees on deputation ('lien') from BPDB to the new company cannot be forced upon the employees unless the terms of the existing contracts so provide. Under the Bangladesh Power Development Board (Employees) Service Rules, 1982, Rule 13 of the Services Rules state that an employee holding a regular post shall retain a lien on posts –

- while performing the duties of that post;
- while holding a temporary post or officiating in another post;
- during joining time on transfer to another post;
- while on leave;
- when temporarily deputed or transferred under any organization within or outside Bangladesh while the specific orders of the Government; and while under suspension;

The lien of an employee on a regular post shall be terminated

- On his appointment substantively to another regular post; and
- In the case of an employee deputed or transferred outside the Board, if he does not return to the service of the Board within a period of three years.

(e) BPDB Positions

BPDB has decided that the deputation/lien arrangement would no longer be resorted to and all employees who qualify the recruitment procedure of the new companies would be required to resign and join the new company.

(3) Employees Absorption Case

(a) PGCB

In PGCB, all the employees were transferred on deputation from BPDB to PGCB on an as-is where-is basis. In 1999, employees were allowed to retain lien with BPDB and had the right to go back to BPDB. Employees were given advance increments depending upon their service for BPDB on the BPDB based pay structure. In 2003, Employees were given an option for absorption after a notification was issued by the government amending the BPDB employee pension rules. Out of the 1522 personnel, who were placed on lien, 1289 employees opted for absorption on PGCB's terms and conditions; 198 employees have gone back to BPDB and 35 were still working on lien. While giving the option to the employees, PGCB did not initiate any process of screening the employees and whosoever opted for absorption were taken on PGCB terms & conditions.

(b) DESCO

During the formation of DESCO, no employee was taken from DESA to DESCO on creation of DESCO from DESA.

(c) WZPDC

About 2400 employees were placed on lien in 2004. The option for absorption has been given to employees in Jul-Aug 2007. It is probable that only 50% of the employees may opt for it. This is due to certain concerns indicated by the employees. The following are some of the concerns raised due to which some of the employees may not opt for absorption.

- BPDB provides greater job security as compared to the appointment on a tenure basis in WZPDC
- Employees expecting promotions in BPDB are not sure of the same in WZPDC since the promotion system in WZPDC has not been clearly defined
- The Pension Scheme provided in BPDB is preferred when compared to the CPF in WZPDC

(d) APSCL

The Ashuganj Power Station was the first Power Station to be corporatised under the Power Sector Reform of Bangladesh. It was registered under the Companies' Act 1994 in the year 2000, the actual commencement of business started from the year 2003. In 2003, around 800 employees working in the Ashuganj Power Station joined on 'lien' for a period of five years. They were bound by the Service Rules of APSCL. At present the employee strength stands at 550, out of which 430 employees were on lien from BPDB and 120 employees were newly recruited by APSCL.

APSCL formulated a new organisation structure and manpower plan to make the organisation more geared towards achieving its objective of being a commercially viable organisation. The manpower strength suggested was 650. On 15th January 2008, at the expiry of the lien period, the employees on lien were offered an appointment with APSCL to regularise their employment status. Their terminal benefits that accrued in the past years of service at BPDB were given to them as a lump sum amount at the time of joining APSCL. Following this, the years of service in APSCL would be counted from the date of joining service at APSCL. Almost 90% of the employees have consented, while 10% of the employees on 'Lien' have sought a stay order from the High Court, stating that it cannot be mandatory for them to join APSCL at the expiry of their lien period, unless they provide their free consent to the contractual agreement. The High Court of Bangladesh has provided judgment in favour of the employees. However, the High Court has confirmed that all employees on lien who have consented to join APSCL may continue to work as APSCL employees. This means that lien can be provided only in case of employees within the BPDB and the transfer from one post to other within BPDB. Such legal hassles would definitely create implementation issues. These learning from APSCL Corporatisation experience would have to be kept in mind while drafting the corporate plan for NWPGCL.

9.1.3 Power Purchase Agreement (PPA)

BPDB is to purchase all the generated electricity from NWPGCL. Power Purchase Agreement (PPA) is made between BPDB and NWPGCL to determine the purchase price. Payment for electricity is paid based on the PPA from BPDB to NWPGCL. Therefore, PPA is of considerable significance for the NWPGCL management system.

A key position of PPA between BPDB and Ashuganj Power Station Company Ltd. (APSCL) is shown below;

(1) Payment conditions

- Payment consists of two portions, Capacity payment and Energy payment
- APSCL sends the bill for the previous month to BPDB by the 7th of every month, and BPDB pays the charge within 45 days after receiving the bill.

(2) Capacity payment

- Capacity payment is determined by dependable capacity.
- Dependable capacity is determined based on the dependable capacity test, which is carried out within one month after an annual periodical maintenance. However, when the result of the dependable test is different from the actual value the company has the right to claim a re-test.
- Dependable Capacity Test measures 12 Net Energy Output continuously every 30 minutes in a power transmission end (delivery point). Dependable capacity is taken as the average value.
- Capacity payment consists of depreciation, cost of capital, return on equity, Operation & Maintenance, and administrative expenses. For O&M and Administrative expenses, the predetermined escalation rate (consumer price index) is to be taken account.

(3) Energy payment

- Energy payment is proportional to the generated electric energy (Net Energy Output).
- When the gas price fluctuates, the unit price of energy payment also changes according to the amount of such changes.
- Since the unit price of energy payment for every unit is determined taking into consideration the efficiency of each unit, the unit price at each unit differs. (The unit price of the inefficient unit is high.)

(4) The penalty for outage in operation

- As stopped operations, forced outages, maintenance outages, and scheduled outages are specified.
- In the sum total of the three outages specified above, an annual total of 876 hours (36.5 days) is allowed. In addition, every 3 years an annual total of 1440 hours (60 days) is permitted.
- When the outage hour exceeds the permitted period, APSCL needs to pay a penalty according to the number of hours which exceeded the allowable hours. The unit price of a penalty is the same as those of the capacity payment.

9.1.4 Gas Sales Agreement (GSA)

The fuel cost occupies the largest portion in expenditure of NWPGCL. NWPGCL pays the fuel cost of gas to Gas Transmission Company Limited (GTCL) based on Gas Sales Agreement (GSA) between NWPGCL and GTCL. Thus, establishment of GSA is an important factor for the management of NWPGCL, in terms of risks.

A key position of GSA between TGTDCL and APSCL is shown below;

(1) Gas rate

- Gas rate consists of two portions, a charge which is proportional to the amount of gas usage, and lease fee for a gas station (RMS: Regulating and Metering Station).
- The unit price of gas is based on those determined by the governmental institutions.
- The lease fee for RMS is a flat monthly rate (payoff period of 20 years is assumed)

(2) Amount of gas supply

- The gas supply amount, an upper limit of supply is determined by hourly, daily, and yearly amount.
- The annual amount of gas supply, the minimum amount of supply, which is equivalent to half of the annual upper limit, is determined.

(3) Payment of charges

- Even when the annual usage of gas is less than the minimum value, the gas rate equivalent to the minimum value needs to be paid. (Take or Pay provision)

- TGTDCL sends the monthly bill to APSCL by the 10th every month, and APSCL pays the charge within 27 days after receiving the bill. If APSCL does not pay the charge within 90 days after receiving the bill, TGTDCL is able to stop gas supply without any advance notice.

(4) Measurement of usage amount

- The amount of gas usage is measured by the TGTDCL meters.
- In proofreading of the meter, in an orifice type case, TGTDCL carries it out twice a year, and once a month in the case of other meter models as indicated in GSA.

(5) Quality of gas

- TGTDCL carries out the gas chemical test to measure gas composition, and calorific value twice a year.
- The allowable pressure level at the supply point is specified. (allowable margin of error is ±5%)
- When the actual gas quality does not satisfy the specified quality level, and gas supply is out of operation, TGTDCL shall inform APSCL promptly. (However, any clause regarding penalty is not specified on the agreement.)

9.1.5 Maintenance Management Contract

The Gas Turbine Long-term Service Agreement (LTSA) is described in detail in Volume 1. Therefore, a part of this agreement is introduced in this section.

The table below compares the cases between the maintenance with and without the conclusion of LTSA.

Table II-9-1 Characteristics of LTSA

	LTSA concluded	LTSA not concluded
Inspection, repair, replacement of hot parts	Managed collectively by supplier	Managed by user
Monitor operation of gas turbine	Supplier does remote monitoring, contributing to improved operating ratio	To be monitored by user only
Resident engineer	yes	no
Assurance of operating ratio	yes (optional)	no
Payment of inspection, repair and replacement costs of hot parts	Payment is made at a monthly fixed blanket price. Supplier covers unexpected cost on repair and replacement of parts (except for the cause ascribed to users).	Payment is made for each inspection in accordance with the volume of repair and replacement. User covers unexpected cost on repair and replacement of parts.

LTSA's largest characteristics are twofold as follows:

- Equalization of cost burden is obtained as the payment is made at a monthly fixed blanket price.
- The cost on unexpected repair and replacement is covered by supplier.

9.2 Preparation/ during construction stage (Phase 1)

9.2.1 Risks which the Construction is not as Planned

(1) Increase of construction cost

Currently, the global gas turbine market is a sellers' market, and the demand surpasses its production capability. Moreover, metal prices such as rare metals keep rising. Considering such circumstances, there might be the risk that due to hikes in construction costs, tender would be suspended after reaching a loan agreement (L/A). In order to mitigate such a risk, it is necessary to proceed with the tender process as soon as possible immediately after L/A. Therefore, NWPGCL has to start preparation of tender documentation before L/A, so that NWPGCL is able to promptly start tendering after conclusion of a loan agreement.

(2) Delays of construction period

There would be the possibility of delays of the construction period due to time-consuming tasks in tender and procurement processes. When a construction period becomes longer than planned, a no-operating revenue period continues and the construction costs increases. These business circumstances adversely affect revenue aspects in management. Cause of these risks is due to lack of coordination capability by the project management during constructions. For the mitigation of these risks, a well-experienced engineering company shall be hired in order to implement proper project management.

(3) Financial risks

During construction, the situation of no operating revenue continues. Only when existing power plants are taken over, the operating revenues would go into NWPGCL. During such a no-revenue period, all expenditures shall be paid by debt from BPDB. Approximately 80% of the total construction cost is applied by a yen loan between the government of Japan and Bangladesh, so that the financial risk regarding unprocurable financial resources is thought to be small.

(4) Risks regarding failure to meet the deadline for transmission construction

The length of a newly constructed transmission line is just 1km, and there seems to be no difficulty in acquiring land for a power line tower. Therefore, risks regarding failure to meet the deadline for transmission construction seems to be low. However, connecting a new line requires an operational outage of the existing transmission line, and there needs to be coordination of the outage period. Therefore, construction time allowance is required for outage coordination.

(5) Risk of gas not being delivered by P/S commissioning

Although Khulna Peaking plant is scheduled to start operation in 2011, construction of gas supply will not be complete. Therefore, the plant will use diesel oil as an alternative fuel option until gas is supplied. For the gas supply at Bheramara Power Station, the power station is located 100-km upstream of the Khulna power station and there seems to be a low risk of gas not being delivered by P/S commissioning if the gas supply project will be on schedule.

9.2.2 Risks which incur at the Time of Transfer of Existing Power Station(s)

The issues related to transfer of existing power stations are described in detail in Chapter 4.10. Management risk varies to a large extent by the method to be adopted for hiring and transferring the personnel at the time of transfer of existing facilities. In Chapter 4.10, it was recommended that the intention of personnel should be respected and a three-year transitional period be established to facilitate the soft-landing so that the personnel transfer takes place smoothly. If the compulsory measures such as drastic lay-off are selected without setting up a transitional period, following problems may break out.

(1) Activation of a Labor Union

Because Bheramara, Khulna Peaking, and Sirajganj Peaking plants will be newly developed, hiring employees will be done under the newly established employment policy and rule. On the other hand, for the case of existing power plants such as Barapukuria and Baghabari plants, present employees will be transferred to the new company of NWPGCL. Since those employees have been hired under the BPDB employment policy and rule, NWPGCL has to have a double standard in their employment policy.

The gap in the salary level between ex-BPDB and newly joined workers will be large. There will be the risk that ex-BPDB members might activate a labor union and it may be difficult to operate the power plant at normal conditions.

In order to avoid such risks, existing BPDB power stations shall be transformed to the Strategic Business Unit (SBU) and introduce a bonus and penalty system based on the performance evaluation system. Also for ex-BPDB workers, NWPGCL would make the employment agreement of only 3 to 5 years under BPDB employment policy and the same payment conditions when NWPCGL takes over personnel from BPDB. When the previous contract expires, all workers have to take an employment examination. Only qualified employees will be hired based on the examination. For newly hired workers, salary conditions will be improved.

(2) Submission of dispute

When APSCL was inaugurated, it was decided to send all the manpower who was then working at the Ashuganj power station on loan to APSCL from BPDB and when temporary transfer period was over, they were to transfer to APSCL. Those who objected to this measure raised a dispute claiming that mandatory transfer at the completion of temporary transfer period would be unjustifiable. As a result, the High Court gave a decision favorable to laborers.

If NWPGCL ignores the intention of the personnel currently working at the existing power stations and decides on the transfer, there is a possibility that the same type of dispute is raised.

To avoid this risk, it is important to disclose the information related to transfer conditions to all the personnel currently working at the power station at the time of facility transfer, confirm their intention, conclude an individual employment agreement with those who chose to transfer, and confirm the post-transfer employment framework in detail.

9.3 Immediate Operation Stage (Phase 2: Up to 3 Years from Commissioning)

9.3.1 Forced Outage/Accidents due to Initial Troubles

(1) Poor quality at construction

When the quality control at the time of construction has not been fully performed, there will be the possibility that troubles resulting from the defect of quality will occur frequently, and operating availability ratio stays at a low level.

In order to avoid these kind of risks, a well-experienced engineering company for quality control shall be hired in order to implement proper quality control during construction. At the same time, NWPGCL has to implement quality control by itself, not relying on the engineering company.

(2) Lack of spare parts

If spare parts are not properly prepared when an accident happens, the parts which caused the trouble must be re-ordered from the manufactures. For some parts, lead-time is required for procurement, and this results in prolonging the outage period. This causes aggravation of the company's income-and-expenditure situation. With this in mind, parts which might require time for procurement shall be stored as spare parts at an earlier stage of commencement of commercial operation.

In terms of gas turbine, a 6 year LTSA is scheduled to conclude. With the conclusion of this agreement, the cost on unexpected repair and replacement of spare parts is covered by supplier. Therefore, there is no risk of extended outage hours due to the shortage of spare parts.

(3) Unpredicted error

At the earlier stage of commencement, there is a high possibility that unpredictable troubles will occur. Since gas turbines have been widely introduced and operated in the world, possibilities that unpredictable troubles will occur seems to be low. However, since peripheral equipment, such as fuel and cooling-water are manufactured according to the actual condition of the site, it might be possible that unexpected troubles may occur. In order to mitigate such risks, sufficient examinations in the design stage is required, and a well-experienced engineering company for quality control shall be hired.

9.3.2 Gas Depletion

The possibility of gas production being terminated in Bangladesh is a critical issue for the NWPGCL management. In particular, the western region where the power stations under the NWPGCL are located, are the furthest regions form the gas filed. Therefore, the priority of supplying gas to NWPGCL power stations might be low compared to other power stations. As countermeasures, provisions such as dual-fired facility or the guarantee of assurance of gas supply shall be stipulated on GSA.

However, gas issues are not a simple matter which the NWPGCL can solely solve. It is a major matter and necessary for the whole nation of Bangladesh to handle.

If the dual-fired system is introduced at the new unit of the Bheramara power station, there is a large gap between gas and oil fuel prices. Generation costs would be extremely high if oil is used instead of gas. Hence, in order to minimize fuel cost risk the PPA between the NWPGCL and BPDB shall contain the provision that the unit price is determined based on the actual fuel cost. In this case, an increase of supply cost by a usage of high fuel price will increase the public's financial burden. Therefore, it is highly doubtful that the BERC will easily accept this PPA system.

As a reference, the result of economic evaluation of competitive edge of gas supply to Bheramara power station is described below.

The key messages obtained from this evaluation are summarized below:

(1) Key messages

- In accordance with the gas supply scenario provided by MoPEMR in September 2008, if the development level of 80% is maintained, the problem of gas shortage is expected to be resolved between 2014 and 2015 and the possibility of supplying gas to the power stations as planned is secured. Risk of gas shortage to be supplied to Bheramara power station scheduled to start operation in 2014 will be reduced.
- It is impossible to ensure supply capacity that will satisfy even the Low Demand in the ADB Electric Power Development Master Plan 2006 (hereafter referred to as ADB-MP2006) with only the gas thermal power that is currently planned. To satisfy the ADB-MP2006 Low Demand, further power generation facilities need to be developed. Gas supply capacity will be insufficient even at 80% development level if its development is to be provided only with gas thermal power.
- If gas development plan is not processed as planned in the scenario causing the gas supply shortage, prioritizing gas supply to highly efficient Bheramara power station will contribute to the reduction of supply cost by about 90 million USD annually throughout Bangladesh.
- From the viewpoint of the risk of delayed gas development and assurance of energy security, departure from dependence on gas is essential and securing a source of electric power by the use of domestic resources including coals from the long term perspective is necessary.

(2) Scenario of gas supply

(a) Total supply scenario targeted at all sectors

The gas supply scenario of the total supply for all the sectors presented by MoPEMR in September 2008 was prepared based on the following presumptions:

- The total supply for all the sectors is the sum of development of Petrobangla, IOC-1, IOC-2 and IOC-3.
- The supply of Petrobangla is based on the supply plan by government mining agencies such as BAPEX.
- IOC-1 indicates the supply plan by contracted private mining companies.
- IOC-2 indicates the supply plan at individual blocks. Though mining year and supply amount are presented but the reserves include unconfirmed amount.
- IOC-3 is based on the supply plan for the off-shore blocks tendered in May 2008.

Table II-9-2 Total Power Supply Scenario for All Sectors

FY		**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Petrobangla	mmscfd	1015	1119	1314	1486	1670	1757	1869	1925	2005
IOC-1	mmscfd	1025	905	855	825	815	785	730	700	650
IOC-2	mmscfd				200	350	400	400	400	400
IOC-3 (Off-shore)	mmscfd							300	300	500
Total (All sector)	mmscfd	**2,040**	**2,024**	**2,169**	**2,511**	**2,835**	**2,942**	**3,299**	**3,325**	**3,555**

[Source: Petrobangra@Sep 2008]

(b) Supply scenario for power sector

In accordance with the presumption stated below, the gas supply scenario for the power sector has been prepared for this deliberation.

- Based on the performance, the allocation ratio of gas supply to power sector against the total supply is 40%.
- If 80% of the MoPEMR supply scenario is materialized, the potential supply in terms of 2008 base figures would be 2040mmscfd(total supply for all the sectors) ×80%（rate of development）×40%(allocation rate of power sector) =653mmscfd, almost equivalent of topographic value of 660mmscfd for 2008 indicated in ADB supply scenario shown in Table 9.4. This figure is also close to 684mmscfd, the value that JICA team assumed as the demand for gas in 2006 as indicated in Table 9.6 Thus, a development rate of 80% is designated as the base scenario.

Table II-9-3 Supply Scenario for Power Sector

FY			2008	2009	2010	2011	2012	2013	2014	2015	2016
Gas Supply (100% Dev.)	100%	mmscfd	816	810	868	1,004	1,134	1,177	1,320	1,330	1,422
Gas Supply (80% Dev.)	80%	mmscfd	653	648	694	804	907	941	1,056	1,064	1,138
Gas Supply (60% Dev.)	60%	mmscfd	490	486	521	603	680	706	792	798	853

[Source: JICA Team]

Table II-9-4 Category wise Gas Demand and Supply Scenario (2008)

Category	Customer	Demand	Supply	Shortfall
Bulk	Power	800	660	140
	Fertilizer	289	235	54
	Power (SPP)	35	22	13
	Sub Total	1124	917	207
Non-Bulk	Captive	270	265	5
	CNG	75	75	0
	Industry	295	273	22
	Domestic	255	247	8
	Commercial or Others	27	23	4
	Sub Total	922	883	39
Total		2046	1800	246

[Source: MoPEMR@Sep2008]

Table II-9-5 Revised power development plan (October 2008)

Name	Type	Installed capacity (MW)	Commercial operation		Status	Fund
			Original	Amendment		
Shiddirganj	GT	240	12/2008	12/2008	Under construction	ADB
Sylhet	GCC	150	06/2010	06/2010	Under construction	GOB
Chandpur	GCC	150	01/2011	06/2012	Tender preparation	GOB
Bhola	GCC	150	08/2012	06/2012	Tender evaluation	IDB
Shikalbaha	GT	150	06/2009	06/2012	Under construction	GOB
Sirajganj	GT	150	12/2010	06/2013	Tender preparation	ADB
Khulna	GT	150	12/2010	06/2013	Tender preparation	ADB
Shiddirganj	GT	300	12/2010	06/2014	Tender preparation	WB
Haripur	GCC	360	10/2011	06/2014	Selection of Consultant	JBIC
Bheramara	GCC	360	12/2012	06/2016	Feasibility Study	JBIC
Sirajganj	GCC	450	12/2011	06/2013	Tender preparation	IPP
Bibyana	GCC	450	12/2011	12/2011	Tender evaluation	IPP
Total		3,060				

[Source: MoPEMR@Sep2008]

(3) Scenario for power development plan

The proposed revised power development plan presented by MoPEMR in September 2008 is shown in Table 9.5 below. Though according to the revised plan, Bheramara's completion is scheduled for June 2016, it is proposed to finish the construction of Bheramara power station in October 2014 in accordance with the schedule presented in this report.

Table II-9-6 Estimated gas consumption (FY2006-2007)

Power Plant	Fuel	Installed Capacity (MW)	Gross Generation (GWh)	Efficiency (%) (Net)	Fuel Consumed (mmscfd)
Rauzan ST (1st)	Gas	210	997.2	28.66	34
Rauzan ST (2nd)	Gas	210	1,026.3	31.30	32
Chittagong ST	Gas	60	122.7	24.42	5
Chittagong Barge Mtd GT	Gas	28	8.5	20.82	0
Ahuganj ST	Gas	128	899.3	30.27	29
Ashuganj ST	Gas	450	2,012.0	31.92	62
Ashuganj GT 1	Gas	56	238.0	19.00	12
Ashuganj CC	Gas	34	80.8	25.86	3
Ashuganj GT (CC with above)	Gas	56	207.4	19.01	11
Ghorasal ST	Gas	110	185.5	21.60	8
Ghorasal ST	Gas	420	1,894.6	31.11	60
Ghorasal ST	Gas	420	2,490.4	32.88	75
Siddirganj ST	Gas		169.5	26.61	6
Siddirganj ST	Gas	210	1,074.8	33.96	31
Haripur GT	Gas	99	29.2	23.35	1
Tongi GT	Gas	109	181.6	25.63	7
Shahjibazar GT	Gas	57	81.4	15.04	5
Shahjibazar GT	Gas	70	25.6	21.72	1
Sylhet GT	Gas	20	139.0	24.64	6
Fenchganj CC	Gas	90	529.1	35.73	15
Baghabari GT	Gas	71	0.0		25
Baghabari GT	Gas	100	738.9	29.30	25
WEST MONT (Baghabari)	Gas	90	491.9	32.00	15
NEPC (Haripur, BMPP)	Gas	110	655.6	32.00	20
RPC (Mymensingh)	Gas	210	930.9	32.00	29
AES, Haripur	Gas	360	2,536.5	32.00	78
AES, Meghnaghat	Gas	450	2,883.1	32.00	89
Total					684

[Source: BPDB Annual report/ JICA Team]

According to this development plan, the amount of facilities that can be developed by the end of Year 2014 is 3,060MW including Bheramara. Assuming that the output from the existing facilities will remain the same at 5,269MW (according to Power Cell website as of June 2007), the facility capacity at the end of 2014 will be 8,329MW. Meanwhile, the power demand in 2015 is to grow to 9,786MW in the Base Case and 8,501MW in the Low Demand case in ADB-MP2006. That is, the power demands cannot be satisfied even in the Low Demand case with the current development plan, and we will need to develop more facilities.

(4) Simulation of gas demand and supply balance by means of PDPAT

(a) Objective

The objective was to simulate the most economic power management pattern with the use of supply and demand management simulation tool (PDPAT) in line with the presented power development plan, compute the gas consumption cross-sectionally in each fiscal year, and estimate the balance of demand for and supply of gas until 2015.

(b) Input condition

The input conditions for the simulation are as follows:

- Demand for gas : based on the ADB Power Development Master Plan 2006(hereinafter referred to as ADB-MP2006)
- Supply: MoPEMR Revised Plan (October 2008, See Table 9.5)
- Source of data for each power station: ADB-MP2006, WASP-IV data
- Fuel price: Current price
- Gas supply: No supply limit

(c) Simulation result of gas shortage

- In case gas development rate of 80% is secured, supply capability would be assured as shown in the daily load curve at the time of maximum power generation for 2015 in Table 9.2.
- In case of gas supply base scenario (allocation rate for power sector, 40%, gas development level, 80%), the simulated gas consumption for 2008 is estimated for 743mmscfd against the

supply amount of 653mmscdf in 2008, causing the gas shortage of 91mmscfd (653 minus 743).

- In 2014 when Bheramara power station starts operation, the estimated gas consumption would be 1089mmscfd against the estimated supply of 1056mmscfd, reducing the shortfall of gas to 33mmscfd.
- In 2015, the simulation shows the demand and supply would almost correspond with each other, eliminating the gas shortage.

Table II-9-7 Simulation of gas shortage

		2008	2009	2010	2011	2012	2013	2014	2015
Gas Supply (80% Dev.)	mmscfd	653	648	694	804	907	941	1,056	1,064
Gas Demand (if no gas limitation)	mmscfd	743	803	847	882	952	1,021	1,089	1,072
Gas Shortage	mmscfd	▲ 91	▲ 156	▲ 153	▲ 79	▲ 44	▲ 79	▲ 33	▲ 8

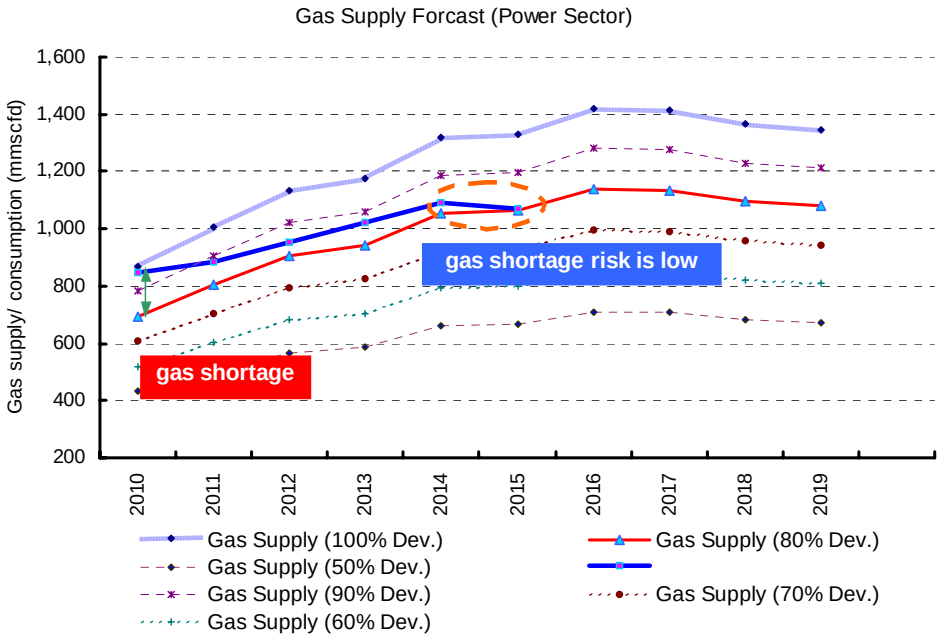


Figure II-9-1 Simulation of balance between demand for and supply of gas

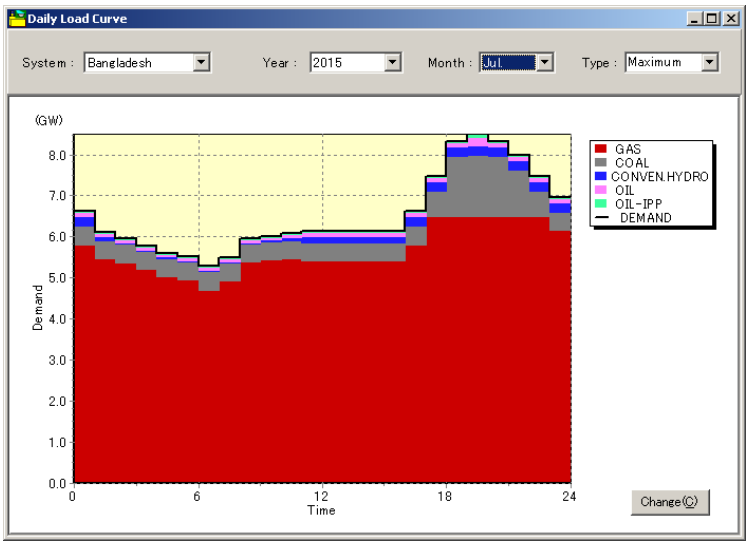


Figure II-9-2 Estimated daily load curve at maximum power generation (2015)
[Case 0 Rate of gas supply development 80%, Bheramara power station operated by gas]

(5) Economic evaluation of prioritized gas supply to Bheramara power station

(a) Objectives

Bangladesh faces a serious shortage of gas supply. Under this situation, it is extremely important to maximize the effective utilization of limited gas resources. In this section, the cases where the gas supply is limited are predicted, kWh balance, power generation efficiency, fuel consumption and supply cost per each year will be computed cross-sectionally by means of PDPAT, and economic value of prioritized gas supply to Bheramara power station is assessed.

(b) Study case

- Gas supply: in consideration of delay in gas development, and under the condition of development rate of 60% (798mmscfd in 2015), following two cases have been studied:
- Case 1: case of gas burning
  Gas is preferentially allocated to Bheramara power station.
- Case 2: case of light oil burning
  Gas supply to Bheramara power station is stopped and light oil will be used as an alternative resource.

(c) Result of simulation

- If gas development is delayed, in both cases of gas and light oil usage, there will be the shortage of supply capacity at the peak of power utilization. In case of gas burning, the supply shortage will be 2GW at maximum, while in the case of light oil burning; the shortage will be 1.6GW at maximum, slightly lowering the shortage of supply capability (See Figure 9. 3).
- In case gas supply is limited, 34,654GWh of power generation is possible if gas is burnt at the highly efficient Bheramara power station, while in case of light oil burning, 33,718GWh of power can be generated, which means that with the same gas consumption of 798mmscfd, more power by 936GWh can be generated.
- If light oil burning is selected for Bheramara power station, power will be generated with the fuel at a higher cost than gas. In terms of the simulation, additional 127 million USD will be required annually as a fuel cost. Of this 127 million USD, as the increased fuel expense to reduce the shortage of supply capability is estimated for 37 million USD, the fuel cost increases practically by 90 million USD (127 minus 37) per year. In other words, the benefit of gas burning is estimated as 90 million USD annually.

(6) Recommendation

The result of simulation indicates that preferential supply of gas to highly efficient Bheramara power station facilitates effective utilization of fuel on a country level and contributes to the reduction of supply cost at the end. Thus it is recommended to prioritize the supply of gas to Bheramara power station even in the environment where the gas supply is limited.

Table II-9-8 kWh Balance Comparison

Case	case-1	case-2	Difference
Gas Development Level	60%	60%	
Bheramara Fuel type	Gas	Oil	
Unit	GWh	GWh	GWh
Hydro	761	761	0
Coal	9,577	9,316	-261
Oil IPP	544	543	-1
Oil	1,247	1,210	-37
Oil NWPGCL	0	1,653	1,653
Gas	34,654	33,718	-936
(Gas NWPGCL)	*2,572*	*0*	*-2,572*
Total	46,783	47,201	418
Demand	48,907	48,907	0
Shortage	-2,123	-1,703	420

Table II-9-9 Comparison of fuel consumption/thermal efficiency

Case	case-1	case-2	Difference
Gas Development Level	60%	60%	
Bheramara Fuel type	Gas	Oil	
Oil consumption (mil kg)	576	841	265
Gas consumption (mmscfd)	798	798	0
Thermal efficiency [oil]	26.7%	34.8%	8.1%
Thermal efficiency [gas]	42.7%	41.6%	-1.2%

Table II-9-10 Comparison of economic efficiency

Case	case-1	case-2	Difference
Gas Development Level	60%	60%	
Bheramara Fuel type	Gas	Oil	
Unit	mil USD	mil USD	mil USD
Coal	368	357	-11
Oil IPP	33	33	-0
Oil	196	190	-6
Oil NWPGCL	0	144	144
Gas	286	286	0
Total [A]	884	1,010	127
Generation Cost (US cent/kWh)	4.00	4.26	0.26
Total generation (GWh) [B]	46,783	47,201	418
Generation cost of NWPGCL OIL (US cent/kWh) [C]			8.7
Loss by generation reduction [D=B*C]			37
Total Benefit [E=A-D}			90

Case 1 Bheramara power station run by gas

Case 2 Bheramara power station run by light oil

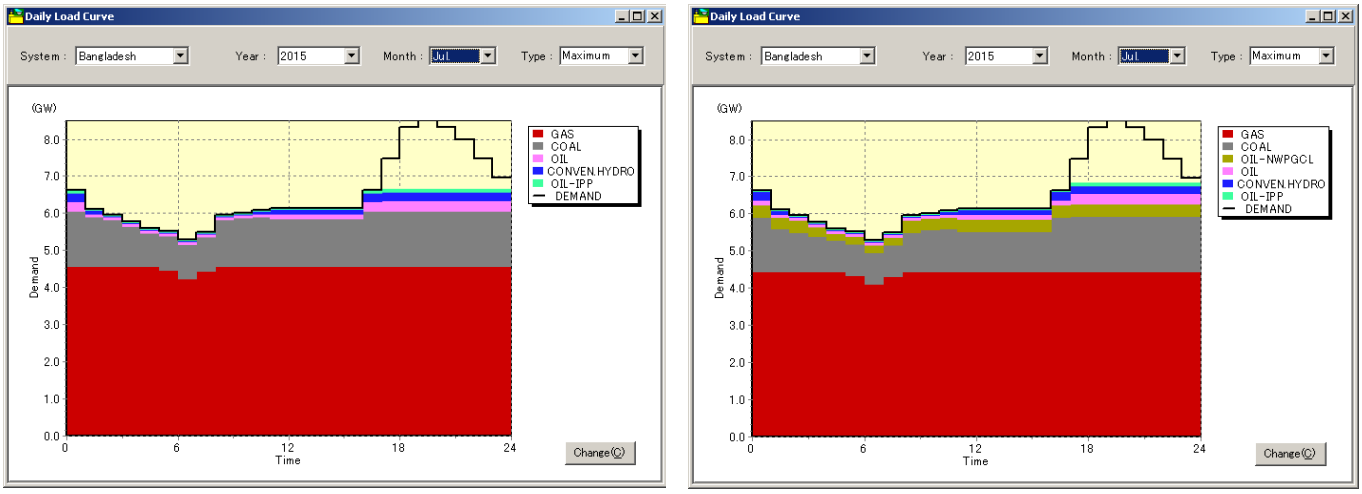


Figure II-9-3 Daily load curve at maximum power generation (2015)

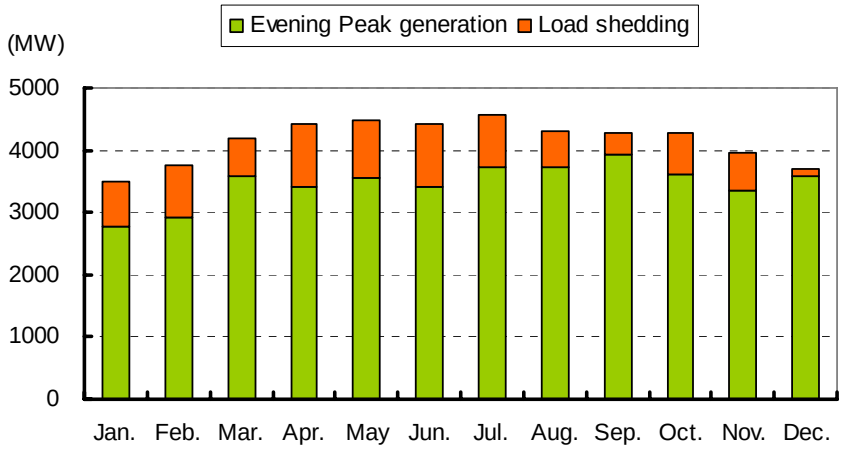
9.4 Stable Operation Stage(Phase 3：3-10 Years form Commissioning)

9.4.1 Risks of not being able to carry out Periodic Inspections on Schedule

In Bangladesh, the power supply has been in a constant serious insufficient condition. Under such circumstances, the power stations are not permitted to stop their operations in order to carry out periodic maintenance for preventive measures. Therefore, all power stations under the command of BPDB shall continuously operate even when periodical maintenance is required unless they face critical conditions. Even though the power station is unable to generate at the maximum capacity level, it would not be regarded as a serious condition and the power stations would be ordered to operate at a controllable capacity level. If the power station continuously operates under such conditions, it might face serious problems or accidents, resulting in loss of control. The power station finally carries out major maintenance work only after facing severe conditions, and operation will stop for a long term, and this results in a power crisis, not having enough power supply.

Although ASPCL is an independent power generation company, the generation units are forced to operate until it breaks down or face serious problems. The reality is, the company faces a shortage of cash due to a lot of account payable. Therefore, the company has to comply with BPDB's wishes. On the other hand, the Haripur IPP coordinated the maintenance period with BPDB for half a year and has successfully stopped operation to carry out periodic maintenance as planned.
Based on these observations, we strongly recommend that the NWPGCL shall establish a maintenance management system; planning periodic maintenance like IPPs, negotiating with BPDB to stop operation in line with the maintenance plan, and carry out such maintenance work at regular intervals. In order to carry out periodic maintenance as scheduled, the NWPGCL shall not only secure enough funding, but also select maintenance periods during the off-peak season when demand is rather small, and make unprecedented efforts to shorten the maintenance time.

The feasibility of implementing periodic testing is analyzed below. One of the factors causing a negative spiral of supply shortage is chronic electric shortfall. At present, as there is an extensive supply shortage, load-shedding is carried out almost every day in several locations in the country.
The amount of load-shedding is not necessarily the same every day, while no load-shedding is implemented on other days.
The actual maximum power demand for each month in 2007 including load shedding is estimated in the Figure below[18].



(Established by the JICA Team based on BPDB Web page)

Figure II-9-4 Estimated monthly maximum power demand in 2007

[18] Since an amount of load shedding has been recorded at the substation, actual maximum power demand is estimated by adding 1.1 times of recorded load shedding value in consideration of transmission losses.

Maximum power demand occurs in July, while the difference in the demand from March to October is not large. During the period between December and February, power demand is eased slightly, with the level of less than 80% of annual maximum power demand. As such, if the power station can generate power in a stable manner throughout the year, it will have a reserve supply capability for a period of December through February, meaning that about 20% of the facility can be stopped during this low demand period.
The Power System Master Plan(June 2006) envisages that the power demand in 2014 when Bheramara power station starts operation is 7970MW even in the low case. Based on this power demand, it is assumed possible to stop the power facility of about 1600MW scale for the period of three months from December to February on a country level in Bangladesh.

9.4.2 Risks regarding Deterioration of Management Environment

Risks regarding deterioration of management environment are regarded as both the decrease of revenue and increase of expenditure. A large portion of operating revenues consists of electricity sales and major expenditure is for fuel procurement, which accounts for 80% of total expenditure.

(1) Challenges regarding revenue

(a) Risks for revenue

In case the agreement is the same as that of PPA concluded between APSCL and BPDB (See Section 9.1.3), large scale risks regarding revenues will not occur. In order to avoid risks for revenues, the NWPGCN shall adhere fundamentally to the PPA conditions similar to those of APSCL.
Presuming that the contents of the PPA are those mentioned above, there is likely to be risks. However, those risks could be controlled if O&M works are strictly carried out.

1) Risks of capacity payment decreasing

Because of certain trouble, supply capacity and dependable capacity decrease, and as a result, the capacity payment decreases. In addition, a gas turbine has the characteristic that when inlet air temperature becomes high, the generation capacity decreases (or less output). Considering this characteristic, a dependable test is carried out at the time when outside temperature is high, and collective calculation shall be made.

2) Risks of having to pay the penalty at the time when operation is impossible

The NWPGCL shall pay the penalty fee for unscheduled outages such as serious problems, and prolonging periodic maintenance, which results in making operation impossible.
When the generation unit is stopped by the order of the load dispatch center, these outages might not be a target for penalization. In addition, PPA shall stipulate that the outages due to fuel supply and transmission troubles will not be penalized.

(b) Risks of electricity bill not being paid by BPDB

APSCL has Accounts Receivable (A/R) to BPDB, of which is equivalent to 1 year of sales amount. Even if a Profits and Losses statement (P/L) has remained in surplus, it might cause cash deficiency due to a large amount of A/R, so that the company might face difficulty for spare-parts procurements to manage the power station. On PPA, since the due date of payment (within 45 days) is clearly specified, the NWPGCL shall stress the importance of correcting A/R within the due date, and strive to correct A/R from BPDB in line with PPA conditions.

(2) Challenges for expenses

(a) Risks of expenditure

In case the agreement is the same as that of GSA concluded between APSCL and TGTDCL (See Section 9.1.4), the following risks are feared.

1) Risks for paying penalty in line with take-or pay provisions

When power generation units stop for a long period of time due to facility troubles and accidents, it becomes impossible to use even the minimum amount of gas, and the NWPCGL has to pay the penalty. As a countermeasure to the penalty payment, instead of making a separate GSA with each

power station, it is better to make one packaged contract of GSA with NWPGCL. This is to work as a buffer for NWPGCL company as a whole. However, Khulna and Sirajganj power plants are for peak hours, and the amount of gas usage and generation is expected to be small.
Therefore, it is necessary to take this point into consideration and to determine the minimum amount of gas usage on GSA.

2) Risks for gas supply being stopped and continuation of operation becoming impossible
When gas supply stops suddenly, naturally the units of the power station cannot operate and has to be stopped. In this case, the power station has no revenue resources at all since there is no penalty clause on GSA. When this situation of no gas supply continues, the NWPGCL will suffer severe financial difficulty. As a measure to cope with this issue, the New Bheramara power station is designed also to utilize oil-fired system, so the risk of operational shutdown is low.

(b) Risks of being forced to take existing small scale thermal power stations into NWPGCL
In Bangladesh, there are many small scale thermal power stations, using high unit price of fuels such as Diesel and Furnace oils since the gas pipeline is introduced only in limited regions. The following table shows the operation results (the 2006-2007 fiscal year) of the existing power stations located in the western region of the county, as well as a retirement plan based on the WASP simulation of the Master Plan (June 2006).

Table II-9-11 Operation results and Retirement plan of the existing power stations

P/S Name	Fuel	Output (MW)	Plant factor (%)	Generation cost (Tk/kWh)			Retirement
				Variable	Fixed	Total	
Baghabari	Gas	171	49.2%	1.28	0.62	1.90	2013, 2022
Barapukuria	Coal	250	41.1%	2.46	1.13	3.59	N/A
Khulna	Furnace oil	226	16.0%	9.09	2.28	11.37	2009, 2019,
Bheramara	Diesel	60	20.2%	15.03	2.16	17.19	2008
Barisal GT	Diesel	40	16.4%	18.14	2.98	21.13	2008, 2009
Sayedpur GT	Diesel	20	20.3%	15.00	2.28	17.29	N/A
Rangpur GT	Diesel	20	14.3%	15.00	2.64	17.65	N/A

The existing power stations located in the western region of the county use oil fuels (except Baghabari and Barapukuria power plants) and their generation costs are far more expensive than the sales price of electricity to BPDB. However, if PPA allows that required expense be covered, basically the problem of balance of payments will not occur, no matter if any power stations are transferred. On the other hand, existing power stations hold many personnel in proportion to the facility capability. It is essential to reduce the number of personnel if the level of manpower is adjusted to the standard level, when the power stations are taken over by NWPGCL. Upon the transfer of existing power stations, it is highly likely that human resource related problems break out if mandatory lay-off is implemented.
Those power stations (except Khulna power station) are old facilities and will be retired according to the Master Plan 2006. Thus, it is assumed that the NWPGCL would take over Baghabari, Barapukuria, and Khulna power stations. Among these power stations, the generation cost of Baghabari and Barapukuria is rather inexpensive, and taking over these power stations will not effect the NWPGCL management.
If the Khulna power station is to be handed over to NWPGCL, the generation cost, or fuel cost is presently expensive due to usage of Furnace oil so costs will rise. However, construction of the gas pipeline nearby the power station will be completed in the near future. Hence, the conversion of fuel system form oil to gas could be an option, taking into consideration the degree of aging, or soundness of the facility. However, it is noted that the depletion of the gas supply is feared in the near future so this must also be taken into consideration.

In connection with a new construction of the unit at the Bheramara power station, issues about how to deal with the existing power stations is a key subject. Existing power stations are supposed to be

retired because the facilities are old and the generation costs and fuel prices are high. However, Bangladesh has continuously suffered from a chronic electricity shortage, and even 60MW is regarded as a precious power supply. If the generation facility is able to run, those units are likely to be continuously operated. Under these circumstances, if the NWPGCL has to take over the existing Bheramara power station, it is important to establish an organizational system where the manpower for maintenance works on the existing units shall be minimized as much as possible, and most of the manpower should be used for the newly constructed unit. .

9.4.3 Risks of Decline in Capacity Factor

Due to the following conditions, a reduction of capacity factor at power stations results in a reduction of energy payment. Because the expenditure to fuel consumptions may also decrease, it is assumed that it will not affect the NWPGCL management. However, this is based on the premise that it is conditional that capacity payment income can definitely be secured. If this premise is not followed, it will pose a big problem for management of NWPGCL.

(1) Cooling water risk (insufficient water)

The Bheramara power station plans to utilize well water for cooling. Under the present circumstances, it is assumed that there is plenty of well water. The neighboring residents are also using well water. If there are some effects on the well water when the power station starts to use it, there is the possibility that the neighboring residences may not allow the station to use it anymore. In this case, in the least the steam turbine must be stopped and the capacity factor will decline.

(2) Long term stoppage accompanying an occurrence of a big accident

When a serious accident occurs a long time is required for repairs, and it is forced to stop for a long period of time. In this case, repair costs can be more than expected and be a major problem for management. Moreover, if it is expected that there will be a cut in supply power for a long period of time, there is a high possibility that BPDB will request reducing capacity payment. This results in a major problem for management of the generation company.

In addition, when the deficiency of large scale facilities arises (eg. GT), it is presumable that they cannot be repaired locally and has to be transported to the appropriate factory. And the means of transporting heavy load from Bheramara power station is basically by river.

As the water level of the rivers nearby Bheramara power station changes greatly in the rainy and dry seasons and the landing pier cannot be used at all during the dry season, the situation where heavy load cannot be transported continues for some time. If a deficiency occurs in the beginning of dry season (around October), transporting the load to the factory would have to wait until the beginning of rainy season (around June), enabling the shipment totally for 8 months and lowering the utilization rate to a large extent.

For this reason, it is important to carry out O&M activities on a routine basis, and to take preventive actions to avoid major accidents.

(3) Risk due to no operation order from LDC

Because the current situation of power shortage is thought to continue in Bangladesh for a long time, an order to stop the generation units from the Load Dispatch Center (LDC) is not likely. However, if generation units increase in the future LDC may order high fuel cost units to stop during off peak hours. This is in consideration of the overall supply and demand situation.

Chapter 10. Management Plan

10.1 Policy Management

10.1.1 Significance of Policy Management

The management visions of NWPGCL are 3 pillars of "independence of management", " High-reliability power supply", and " Sustainable development", as stated in the previous chapter. These visions are the direction which should be aimed at as a company. However, even when abstract words are lined up as a vision, each employee's own direction and level may be different.
For this reason, in order to effectively realize these visions the management of NWPGCL needs to extract the item which should be carried out clearly and specify the level of the direction which should be aimed at, expressed as a numerical target.

10.1.2 Flow of Policy Management Activity

The figure below explains the flow of policy management activity.

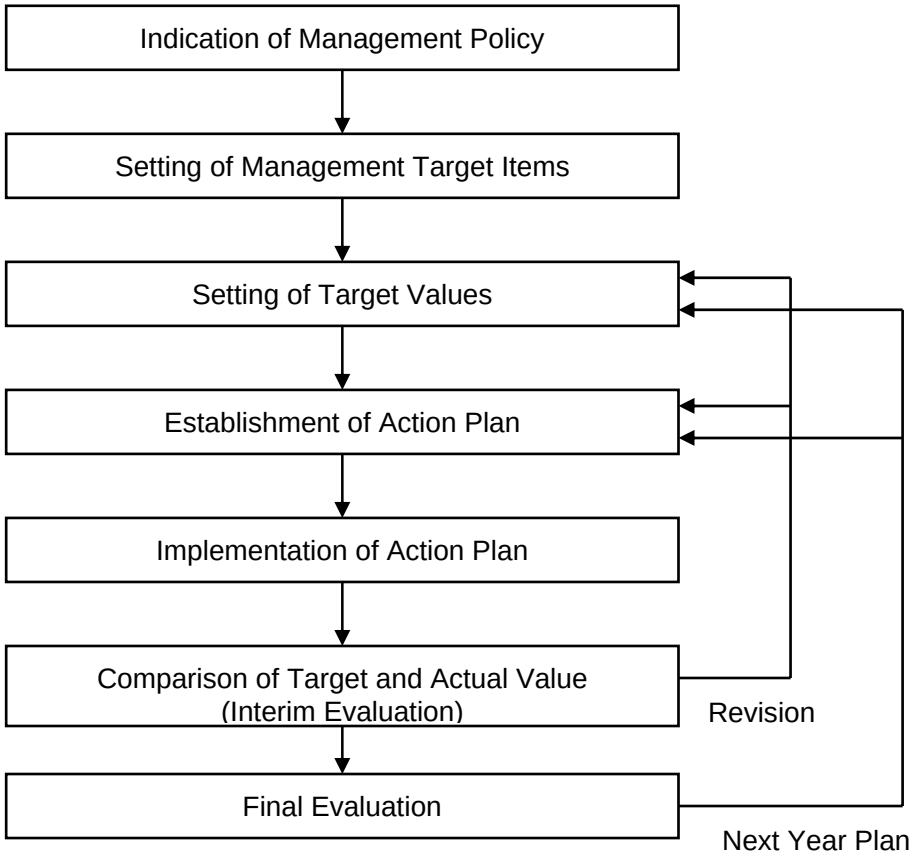


Figure II-10-1 Flow of Policy Management Activity

First of all, the Top management indicates the Management Policy of the company as a whole and sets the management target items in accordance with the policy.
Each management team sets the target value for each target item within their authority, and the action plan to achieve the target in the beginning of the fiscal year. Daily work will be done based on the action plan, and the target and actual value will be compared in the interim comparison half a year later. The target value and action plan will be revised if necessary based on the result of comparison. At the

end of the fiscal year, final evaluation will be carried out and the target and action plan of the next fiscal year will be established based on the evaluation result.

10.1.3 Activity Schedule of Target Management

The following Table shows a concrete image of the activity of one year.

Table II-10-1 Activity schedule of target management

	May	Jun.	Jul. – Dec.	Jan.	Feb. – Jun.	Jul.
Submission of Management policy						
Hearing for Next year plan	△				△	
Corporate Targets Setting Group Targets Setting		△			△	
Implementation			←	—	→	
Interim Check				△		
Final evaluation			△			△

(1) Submission of Management policy

Top management will submit the Management policy. It is not recommended to revise the Management policy very frequently, but considering the changes of time, it shall be revised once in about 3 years.

(2) Hearing for Next year's plan

Middle management explains and discusses the action plan of their group. In this hearing, Corporate Targets and Group Targets shall also be discussed.

(3) Corporate Target Setting, Group Target Setting

Based on the discussions in the hearing mentioned above, Corporate Office sets the items and the target value of the target year as a Corporate Target.

After acknowledgement of the Corporate Targets, Middle management will set their Group Target and revise their action plans.

(4) Implementation

Each group performs their work based on their action plans.

(5) Interim Check

After about 6 months, Corporate Office discusses with each group and checks the deviance of the plan and the actual results at the interim phase. If the deviance is large, Corporate Office will give suggestions on revision of plan or methodology. Top management shall also attend this meeting whenever convenient.

(6) Final evaluation

Based on the annual achievement of each group, Top management will conduct hearings regarding the level of achievement towards the target.

Corporate Office will attend this hearing as the secretariat of the target management activity and give rewards or penalties to each group according to their achievements.

10.1.4 Target Management Items

In order to raise the level of the whole organization, the items in the figure below shall be improved and well balanced.

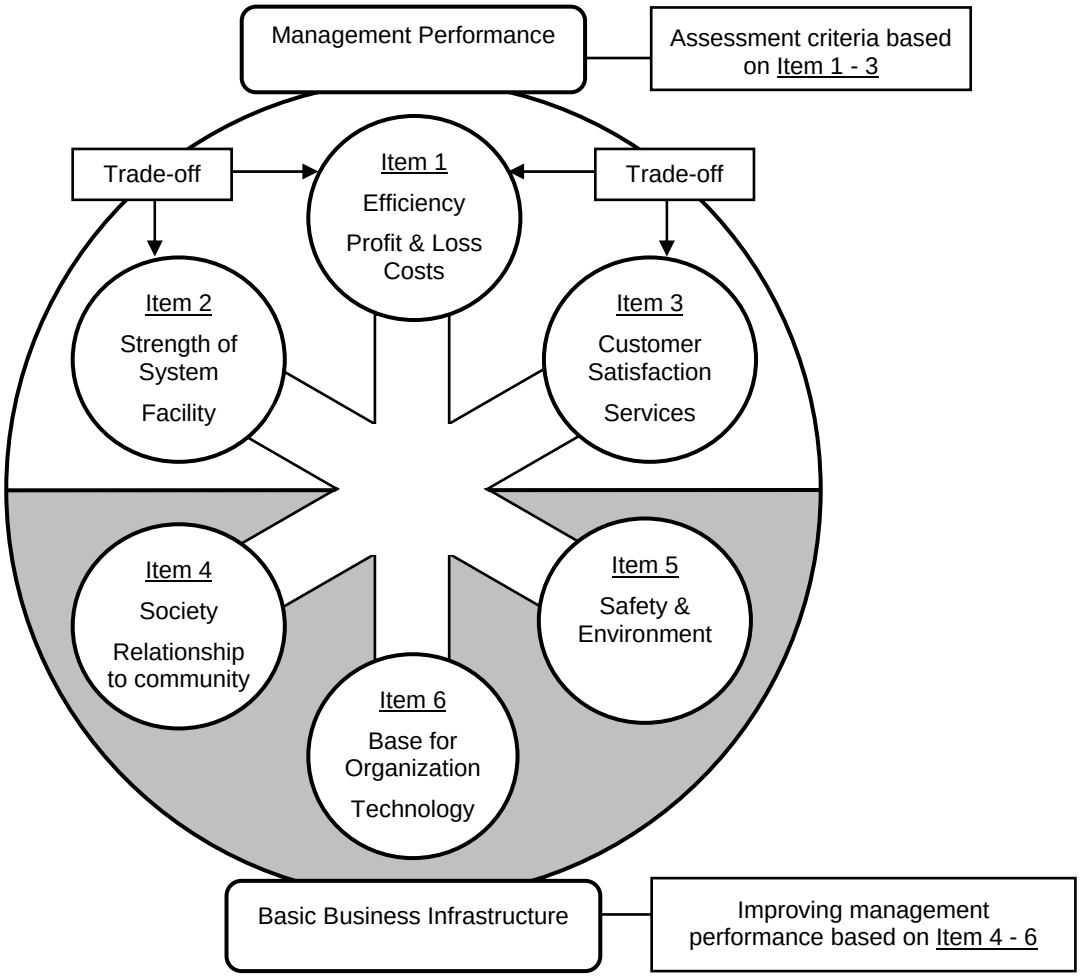


Figure II-10-2 Target Management Items

Overview of each item is explained below.

(1) Management Performance

These are items indicators which are used to evaluate the performance of efficiency improvement. Each item is in a trade-off relationship. Therefore, each item shall be improved and well balanced.

(a) Item 1: Efficiency

This is an indicator which evaluates the efficiency of the organization, which is mainly concerns costs such as revenue-expenditure condition and supply cost. Specific indicator includes revenue-expenditure condition, sales per employee, loss rate, and fuel consumption per kWh, etc.

(b) Item 2: Strength of system

This indicator evaluates the soundness and margin of the facilities, and concerns securing of stable power supply from a long-term aspect. Specific indicators include number of forced outages due to facility trouble, unit repair cost (per kW), and performance of periodic inspection, etc.

(c) Item 3: Customer satisfaction

This indicator evaluates the degree of satisfaction of the customer, and concerns the level of service. For power stations, direct customers will be transmission offices (or National Load Dispatch Center), where the product (power) will be directly sent.

Specific indicators include duration of forced outage, duration of availability, and utilization factor, etc.

(2) Basic Business Infrastructure

These items are indicators which concerns the basic infrastructure of the organization, and are essential to raise the performance of the organization. These items shall be improved gradually in a long-term point of view.

If the cash situation is tight, priority shall be given to the items in the Management Performance, such as efficiency and customer satisfaction. However, it is better to improve the safety, environment, and capability of employees as much as possible.

(a) Item 4: Society

This indicator concerns the degree of trust between the organization and the local community. In general, power facilities are not welcomed by neighboring residents. Therefore, in order to promote business smoothly in the Power Sector, the relationship between the organization, the neighboring residents, and municipality shall be kept in good condition. Establishing an environment where understanding points against business operation can easily be gained is important.

(b) Item 5: Safety and environment

This indicator concerns the consciousness about safety and environment. Regarding safety, not only employee safety but also the neighboring society is considered. Specific indicators include number of lost working days by a person due to injuries per 1000 employees (safety indicator), emission of air pollutants, contamination level of wastewater, noise level (environmental indictor), etc.

(c) Item 6: Base for organization

This indicator concerns the strength of the organization, such as capability and moral of employee, employee-employer relationship specific indicators include record of training, cost for employee education (per employee), etc.

10.1.5 Issues for Promoting Target Management Activity

(1) Making Definition of Indicators Concrete

If the target management is done when the definition or calculation method of indicators are unclear, there is a possibility that there will be a difference in the target level between the responsible person and the evaluator. This may cause the target management activity to be inaccurate. Also, the calculation will be done according to the judgment of each power station and comparison between stations will be difficult. Considering these points, the definition of indicators, the range of management, calculation method shall be clearly defined.

(2) Gathering of Reliable Data

The rule for collection and definition and target of indicators shall be established and distributed to all power stations from end to end in order to obtain reliable data.

(3) Establishment of Database

The accuracy of data analysis will be better if longer trend data or more station-wide data are used in target management, and the decision making based on the result will be easier. Therefore, it is important to establish a database to store the long-term data which is possible to access whenever required.

When considering establishment of a full-scale database, it is required to determine various factors such as the expected amount of information, method of input/output of data (including place), communication method, etc. Based on these factors, a large investment for installation of large size hard drives for data storage, purchase of software, and development of communication infrastructure may be required. Therefore, for the time being, it is recommended that the database shall be limited to one which can be managed by a dedicated PC installed in the planning division in headquarters.

10.1.6 Assigned Role in the Policy Management

(1) Relationship between Top management and General employee

The following figure shows the relationship between Top management and General employee.

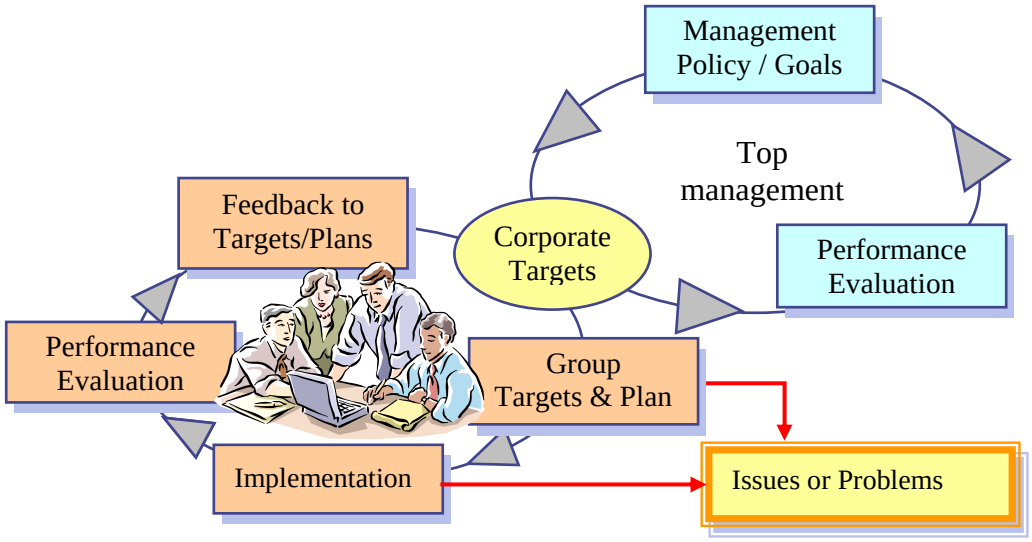


Figure II-10-3 Relation between Top management and General employee

Top management prepares the Management Policy / Goals and submits the Corporate Target to each division. After acknowledgement of the target, Group managers (Middle management) prepare their own Group targets and implement the plan with the Group members. Problem solving activities shall be conducted whenever it arises. After implementation, their performance shall be evaluated and the result shall be given feedback for the next Targets / Plans. This is how the Middle management rotates the PDCA cycle.

Top management rotates the PDCA cycle as well.

In such a relation between the top and middle managements, corporate targets based on Management Policy /Goals which Top management creates has played a very important role. That is, corporate targets play a role as mediation between top management and middle management.

(2) Organizational section in charge of policy management

As stated above, it is important in policy management that all the personnel share and carry out each role from the top to the bottom level.

In addition, the secretariat division for policy management will be established, and the company secretary will lead the office as a chief officer of the division. At the power station, the manager, or the principal head of the station, has to lead the policy management activity together with the secretary, or deputy manager.

10.1.7 Relation between Management Plan and other Plans

The figure below shows the relationship between the management plan and other plans.
Although a related section will draw up each plan, these plans have not been independent, respectively. These plans are mutually related with each other, and sufficient adjustment is required among each section.

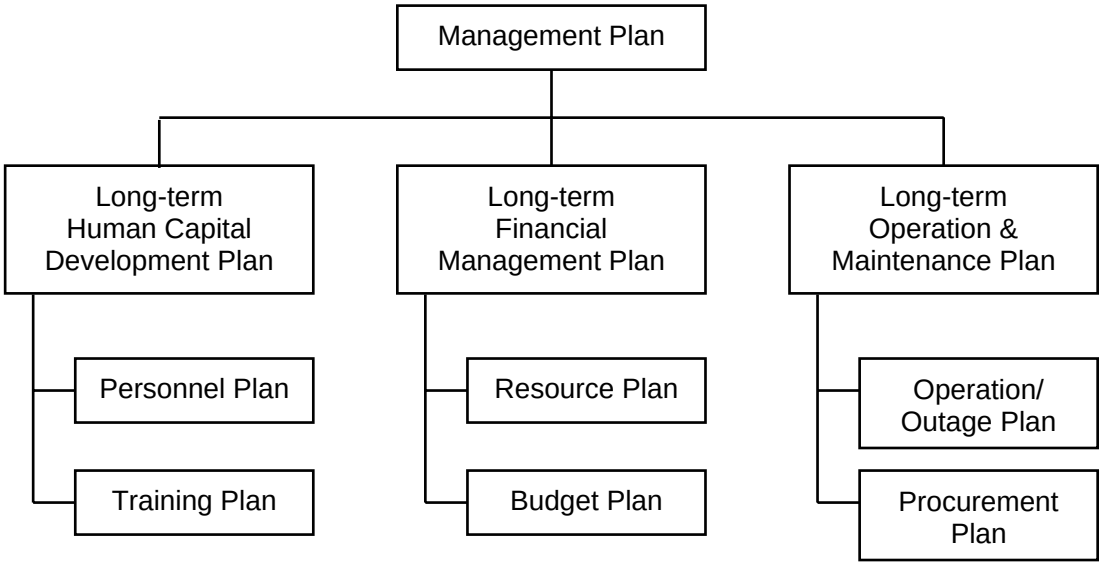


Figure II-10-4 Relation between management plan and other plans

10.2 Relation between NWPGCL and Each Power Station

In order to continually improve the performance of NWPGCL, it is important to establish the mechanism in which each power station shall carry out plant management independently with the management target value.
While performing a large portion of power delegation to each plant from headquarters, at the same time, it is also necessary to clarify responsibilities. Each power station is positioned as the SBU (Strategic Business Unit) and the achievements of each power station are evaluated every year. The mechanism of incentive scheme such as paying a bonus, according to its achievements (or imposing a penalty) shall be established.

10.2.1 Structure of Performance Evaluation

(1) The performance evaluation system at Baghabari power station

The performance evaluation system at the Baghabari power station, which has already been transformed into the SBU, is described as a reference

(a) Performance evaluation system

Although the Baghabari and Haripur power stations are owned by BPDB, they have been transformed into the SBU, and the amount of bonus is determined based on their performance. The evaluation method at the Baghabari power station is as follows.

Performance, as a whole power station, is evaluated based on the following criteria.

Table II-10-2 The performance evaluation system at the Baghabari power station

Parameters			Marks
(a) Availability of GT Unit		(A)	30
(b) Reliability of GT Unit		(R)	15
(c) Cost/kWh		(C)	30
(d) Return on Investment		(T)	10
(e) Administrative & General Performance	School Student scholarship	(S)	2
	Training	(TR)	3
	Decision's of Plant Management Board (PMB)		10
Total			100

In this case, a total comprehensive score is computed by multiplying the points of each index and the ratio of the target value to the actual value.
For this reason, if the actual value exceeds the target value, it is possible to obtain a total score that is more than indicated in the table.
A bonus is paid to the power station in accordance with a comprehensive score based on the following table.

Table II-10-3 The bonus rank by comprehensive score

Total Point	Rank
75 以下	1
75 – 80	2
70 – 85	3
85 – 90	4
90 – 95	5
95 – 100	6

(b) An example of score calculation

Performance at the Baghabari power station has been calculated based on the actual data in 2003-2004 as shown below.

Table II-10-4 Score calculation based on performance data 2003-2004 at the Baghabari P/S

		Target	Achievement	Marks	Points
(A)	(a) Availability Factor (%)	86.45	97.44	30	33.813
(R)	(b) Reliability Factor (%)	97.98	98.24	15	15.039
(C)	(c) Generating Cost (Taka/kWh)	1.21	1.15	30	31.565
(I)	(d) Return on Investment			10	
(S)	(e) Primary scholarship (Nos.)			2	
(TR)	(e) Training (Nos.)	139	133	3	2.870
	(e) Decision's (PMB)	65	63	10	9.692
	Total				92.979

As shown, the indexes of Return on Investment and Primary scholarship are not evaluated. For this reason, the total marks will be 88 points. Considering this point of view, total points will exceed 100 if the score is rectified. Thus, the Baghabari power station has obtained the highest rank of "6", which means they are being paid the highest bonus.

(c) Review of performance evaluation system for the BPDB-SBU power station (the Baghabari power station)

- Because evaluation is made based on the ratio of the target to the actual value, setting the target is very important.
- There is only an incentive mechanism (paying bonus) but no penalty system.
- From a long-term viewpoint, there are no evaluation criteria for maintenance management.
- A score may exceed the maximum marks.

(2) Proposal of a performance evaluation system for NWPGCL

The power station under the NWPGCL has to perform efficient management, and has the obligation to work for the public's benefit as well. For this reason, when the NWPGCL evaluates the performance of each power station, the stance of supplying inexpensive and stable electricity is important. That is, from this viewpoint, NWPGCL shall evaluate management and operation conditions properly, and provide appropriate instructions to each power station as required.

Based on the performance evaluation system at the Baghabari power station, the performance evaluation method for the SBU-power station under NWPGCL is proposed. As indicated in the table below, evaluation is made based on the 9 management targets, and total points become 100 points as the maximum.

Table II-10-5 The performance evaluation method of each plant in NWPGCL (proposal)

Category	Target	Definition	Points
Business Efficiency	(a) ROA: (Return on Assets)	Return/Assets (%)	25
	(b) Fuel consumption rate	Gas consumption/Sales electricity (m^3/kWh)	10
Soundness of Facilities	(c) Number of forced outage	Number of outages due to trouble in generation facilities	15
	(d) Contents of periodic inspections	Number of actual inspection items /Planned item number	10
Customer Satisfaction	(e) Duration of outage	Duration of outage (Forced + Planned)	15
	(f) Availability	Dependable capacity/Rated capacity (%)	10
Basic Business Infrastructure	(g) Number of injury accidents	All accidents which result lost work time or 3 or more days	5
	(h) Record of Training	Record of Training (Man-Days)	5
	(i) Environmental emissions	Emission and discharge level to air and water	5
Total			100

A target value is set up beforehand. When the actual value greatly exceeds the target value, full marks are obtained. When the actual and target values are the same, 80% to 90% is to be obtained on the proposed evaluation system. If the calculated points are more than 50%, a bonus will be paid according to the points. However, if it is less than 50%, a penalty is to be given by measures such as a salary cut.

The aim of each evaluation criteria is explained below.

(a) Revenue-expenditure situation (ROA: Return on Assets)

Financial statements shall be prepared every year to make all the management and employees aware of profitability per power station. ROA is adopted as an index from the viewpoint of profitability.

(b) Fuel consumption rate

It is an index regarding the generation efficiency at the generation end, and to see if the plant is operated in an efficient manner. The internal usage of electricity at the power station affects the index.

(c) Number of forced outage

It is an index which measures the soundness of the present conditions of all the equipment at the plant. It is the number of outages which were caused by facility troubles. For this reason, this forced outage does not include outages which were caused by troubles in transmission or in the gas supply system. In addition, it does not include outages caused by natural disasters like typhoons.

(d) Contents of the periodic inspections

It is an index which measures the long-term soundness of power generation facilities, and to see if the required inspections have been carried out at the appropriate time as scheduled.

(e) Duration of outage (forced & planned)

It is an index which measures whether the power stations are able to generate stable electricity for the customers. It is the duration during which the generation unit stops and is not able to supply electricity to the grid. Outages due to order from the load dispatch center are not included.

(f) Availability

Same as with the index of duration of outage (forced & planned), it is an index which measures the ability of power stations to generate electricity in a stable manner to the customers. If the generation capability of the unit is decreased, even if it has not stopped generating, it is regarded as not supplying stable electricity to the customers.

(g) Number of injury accidents

All causes of accidents resulting in injury or death shall be thoroughly analyzed to plan preventive measures so that such accidents do not happen again. Therefore, every time accidents (including small-scale) occur an accident report in line with an appointed form shall be made and filed to publicize the occurrence of the accident to the related offices. The number of accidents resulting in injury or death, which causes a closure of 3 days or more, shall be managed. If it comes to the surface that procedures are not followed and an accident report is not properly filed in order to make the numerical value of this index look good by hiding the accident, a penalty system will be established. In this penalty system, the person who tried to cover up the accident, including the safety manager, shall be heavily penalized.

(h) Number of training days attended (man-days)

Training is an indispensable item for human capital development. At the early stage, the number of training days attended are adopted as an index. For the time being, the actual substance of the training will not be considered.

(i) Environmental emissions

Operating the power station has had some kind of influence on the outdoor atmosphere and water quality. There shall be monitoring of these environmental emissions to confirm that the value is within an allowable range. If the value exceeds the allowable range, it is very important to publicize the fact under all circumstances so that the company will gradually establish a relation of trust with the local community. An index regarding environmental emission is evaluated by the rate of deviation between the target and actual levels.

(3) Preparation of environment for putting performance evaluation system into practice

(a) Setting up a virtual PPA

In order to create financial statements as the SBU every year, it is necessary to conclude a virtual PPA between the NWPGC and each power station. Each power station differs in its characteristic in generation operating patterns because the types of generators and fuel are quite different. For this reason, if the same purchase price is equally employed to all the power stations, there will be some power stations which are able to easily earn profits. On the other hand, some plants will go into the red even if they try to work very hard. Considering these circumstances, a different unit price shall be carefully considered for each power station. This results in creating a level of profits for all stations. In addition, when external factors such as fuel prices and the inflation rate fluctuate in the middle of a

year, the equation for compensation calculation is built virtually so it is not necessary to change the contract every time external factors change.

(b) Precise evaluation for the contents of periodic inspections

As an index, which measures the long-term soundness of power generation facilities, the implementation items, or contents of the periodical inspections are employed, and defined as (number of actual implementation items) / (the number of planned items). However, this numerical conversion includes a large variation in importance for each item and it is difficult to simply quantify and evaluate numerically. For this reason, it is necessary that the person in charge of safety and quality management at NWPGCL shall have full responsibility to precisely evaluate the contents of the periodic inspection and revise the marks. Thus, it is required that they have the ability to make such a precise evaluation.

(c) Method for Target Setting

As a method for performance evaluation, this study proposes to evaluate the achievement against the target value. In adopting this method, NWPGCL is required be able to determine a fair and adequate target value for each power plant. The Study Team will propose to adopt yardstick method. Based on yardstick method, purchase price, level of repair work cost, personnel cost (or no. of employees), etc. can be determined and target value can be set based on the various indicators. In doing so, actual data from other companies (BPDB、APSCL、EGCB、IPP, etc.) will be examined for reference. The evaluation items for yardstick method are listed below.

- Scale of power plant (Capacity)
- Heat rate of generating facility
- No. of employees per kW, No. of employees per kWh
- Repair cost per kW
- Age of generation facility (Level of degradation)
- Scale of Repair shop within the power plant
- Type of fuel (gas, coal)
- Type of power plant (gas turbine), combined cycle, steam turbine etc.)

10.2.2 Delegation of Authority to the Director of Power Plant and Evaluation Method

(1) Delegation of Authority to the Director of Power Plant

In order to enable all power plants including Bheramara TPP to operate autonomously and efficiently, a large portion of authority shall be delegated to each power plant by means of manpower, facility, and financial power.

(a) Allocation of budget, expenditure, procurement of materials

All authority regarding expenditure excluding large-scale repair works, which shall affect the balance of payment of the power plant, shall be delegated to the Director of the power plant.

In the power plant, the scale of budget shall be determined considering the revenue & expenditure forecast. Based on the determined scale of budget, a detailed budget plan shall be established and be approved in the Top Management Meeting of the power plant.

If this method is adopted, the HQ of NWPGCL does not need to grasp all of the information of small-scale maintenance works and large amount of workload can be reduced.

(b) Personnel planning

NWPGCL shall assign only a few management class people (about 3 members) for each power plant. The authority of personnel planning shall come under jurisdiction of the Director of the power plant. As a matter of course, the Director shall delegate its authority to the middle-class management accordingly to their appointments.

(c) Operation of the power plant
Regarding the operation of the power plant, each power plant shall generate power accordingly to the hourly dispatching orders submitted from the Central Load Dispatching Center the day before.
Scheduled outages for maintenance works etc. shall be determined after mutual consultation with the Central Load Dispatching Center and HQ of NWPGCL.

(d) Procurement of Fuel and Conclusion of Gas Supply Agreement (GSA)
Fuel is an important property of the country and usage shall be planned based on the government policy. Therefore, procurement of fuel and conclusion of GSA shall be done by HQ of NWPGCL.

(e) Conclusion of PPA (Negotiation of Purchase price)
Negotiation of Purchase Price and Conclusion of PPA shall be done by HQ of NWPGCL.

10.2.3 Line of Business Contents Required from NWPGCL

After performing a large portion of the delegation of power to the manager or the top executive officer at the power station from NWPGCL, a line of business contents required from NWPGCL headquarters office is explained below. It is necessary to establish a system to be able to efficiently execute business.

- Establishment of a mid-to-long term maintenance plan, examination of a large-scale repair work (the contents of repairs, implementation schedule, and cost estimations, etc.)
- Creation of fiscal year construction plan, determination of the annual budget frame of each power station (take into consideration the income-and-expenditure situation of NWPGCL)
- Coordination with affiliated companies such as BPDB, PGCB, gas supply companies, etc. It is the coordination works carried out with a long-term view, such as PPA or GSA contracts, and schedule adjustment of periodical inspection. The power station will directly handle those adjustment works concerning daily operation.
- To set up appropriate management target values, and to evaluate performance for each power station. If necessary, some modifications and adjustments shall be made.
- Establishment of lateral spreading system for good cases of efficient improvement in operation, and, occurrence and cause of accidents, etc., to provide information and data to be utilized at other offices.
- In addition, activities, which result in being wasteful if the power station by itself, carry them out.

10.3 Proto Type of Mid-term Management Plan

10.3.1 Proto Type of Mid-term Management Plan for NWPGCL

Based on the current conditions of six management target items and power sector reform in Bangladesh, the following management target items for NWPGCL are proposed. The top managements shall set the level of the management target items, and clearly show those on the mid-term management plan. It is also essential to establish an environment where all the personnel at the company are deeply conscious of those management targets on their daily jobs.

(1) Indicators regarding Business Efficiency
(a) Revenue-expenditure situation (ROA: Return on Assets)
As a company, financial statements shall be prepared every year. ROA is adopted as an indicator from a viewpoint of financial profitability.

(2) Indicators regarding Soundness of Facilities
(a) Number of Forced Outages
Number of forced outages is the number in which the generation facility stops due to troubles.

(3) Indicators regarding Customer Satisfaction

(a) Total electricity production

Total electricity production is the grand total of electricity generated at each power station.

However, both the Khulna and Sirajganj power stations are for peak hours, and they are expected to generate more electricity during peak hours. Therefore, it is important to define an appropriate target value for peak hours.

(4) Indicators regarding Basic Business Infrastructure

(a) Number of injury accidents

All injury accidents shall be reported using the prescribed form, and distributed to all relevant offices to familiarize and prevent similar accidents. All accidents which result in lost work time or 3 or more days shall be managed.

(b) Record of Training (Man-Days)

For the time being, the content will not be considered, but the total man-days.

(c) The total amount of environmental emission

The total amount of environmental emission is the total amount of contaminants contained in the exhaust gas released to the atmosphere, and the drainage to the river or the sewer.

10.3.2 Proto Type of Mid-term Management Plan for Bheramara Power Station

As discussed in the Section 10.2, an introduction of the performance evaluation system is proposed as well as the power station being transformed into the Strategic Business Unit (SBU). On the Mid-term Management Plan for Bheramara Power Station, the target management items shall be consistent with the target items on the performance evaluation system. This is the most efficient method. (Refer to Table 10. 5 for target items of the performance evaluations)

In addition, an appropriate target level shall be determined based on the actual and foreseen results of existing power units.

10.4 Promotion of TQM

10.4.1 Organizational Structure for TQM Promotion

As discussed in the previous clause, the secretariat division to promote the policy management will be established, and the company secretary shall lead the office to promote not only mid-term management plan, but also Total Quality management (TQM).

In NWPGCL, in order to promote TQM activity smoothly and continuously, establishment of the following two organizational functions are recommended.

- TQM Steering Committee
- TQM Promotion Office

(1) TQM Steering Committee

TQM Steering Committee has a role, which takes responsibility for TQM activity promotion through the entire NWPGCL. The roles and members of TQM Steering Committee are as follows.

Table II-10-6 Roles and Members of TQM Steering Committee

Item	Contents
Roles	• Development of Activity Plans for Promotion of TQM • Development of Activity Framework for TQM • Provision of Instructions on Implementation of TQM • Provision of Guidance and Support for Implementation of TQM • Evaluation on Performance of TQM • Decision on All Matters related to TQM
Member	• Managing Director, or MD, or CEO • Director (Technical), or COO • Director (Finance), or CFO • Director (HRD), or CHCO • Manager of P/S • Company secretary (in charge of Safety, Total Quality Management, and Environment: Head of TQM Promotion Office)

(2) TQM Promotion Office

TQM Promotion Office supports TQM Steering Committee, and carries out substantial business activities regarding the TQM activity promotion. The role and member of TQM Promotion Office are as follows.

Table II-10-7 Roles and Members of TQM Promotion Office

Item	Contents
Roles	• Support to TQM Steering Committee ➢ Draft of Activity Plans and Activity Frameworks for TQM • Implementation of TQM ➢ Coordination for Implementation of TQM Activities ➢ Coordination for Education and Training on TQM ➢ Coordination for TQM Presentation Conventions ➢ Provision of Guidance and Support for Implementation of TQM • Report to TQM Steering Committee • Collection and Dissemination of Information of TQM Activities
Member	• Company Secretary • Middle class managers at headquarters • Secretary for P/S managers

To properly function, it is desired that the required authority express opinions directly to each division and to make required instructions as an organization under the direct control of Top management is given to the TQM Promotion Office. However, the task of TQM Promotion office is to support each division to improve their performance, and TQM Promotion office shall adequately consider that each division in the company are their customers, and its activities shall be based on improvement of their satisfaction.

(3) Organizational structure for TQM promotion organization at power station level

At each power station, a similar organizational structure for TQM promotion with headquarters is recommended. However, there might be a risk in that only a structure is established, and it gradually becomes a mere façade, having no function at all. TQM activity exists to promote daily business

activities efficiently. Therefore, it is desirable to function as an organization, which supports TQM activity, instead of merely striving for structural formation.

10.4.2 Function of TQM Promotion Office

This Chapter explains the function that is expected in the TQM Promotion Office.

(1) Target Management

TQM activity is an activity to pursue improving working efficiency. In the organization, it is easier to improve working efficiency when all members from Top management to General employees shall perform their work towards the same target.

TQM Promotion Office functions as a secretariat of this target management activity and prepares Corporate targets and grasps the progress of each group and informs the progress information to the Top management.

(2) Lateral Dissemination

To efficiently conduct the TQM activity, it is important to consider lateral dissemination, which is to introduce good practices in one office to others where it can be applied.

In conducting lateral dissemination, it is required to introduce information regarding good practices in an appropriate manner. Presently, the office which is implementing the practice is sharing their experiences. However, there is no special duty and the progress of lateral dissemination is not so efficient.

The TQM Promotion Office shall do this task, and lateral dissemination shall be conducted actively by the following methods.

- Carry articles in Public Relation Magazine (Distribution of Public Relation Magazine)
- Holding presentation of good practices
- Promotion Campaign to offices where the practice can be introduced (Introduction of good practices)
- Provision of cash rewards to offices conducting lateral dissemination (Incentive scheme)

(3) OJT Training for Raising Awareness

It is desirable that instructors who can instruct efficient work management are dispatched to each office at all times. However, the absolute number of instructors is predominantly lacking. Therefore, the members of TQM Promotion Office shall periodically visit each office in such opportunities as PI Solving activities Report meetings and Presentation meeting of good practices. During each visit, TQM Promotion Office shall conduct an instruction session regarding OJT training and promote raising awareness of all staff in the office.

(4) Restructuring of Incentive Scheme and its Precise Operation

A compensation and benefits package shall be considered for staff that is efficiently conducting TQM activities. However, the relationship between the content of activity and the incentive is unclear. Therefore, providing rewards according to the content of activity shall be effective as an incentive scheme to promote TQM activity.

In the Power Sector of Bangladesh, an incentive scheme already exists to some extent, but it cannot be said that it is functioning adequately. The TQM Promotion Office shall restructure the incentive scheme and determine the evaluation plan (how to nominate candidates, interval of evaluation) and evaluation method (person to evaluate, evaluation items, rating method, etc.). The amount of reward for the schemes is explained below.

It shall be noted that budgetary steps shall be taken in advance since the cash reward will be given as an incentive scheme.

(a) Suggestion for Improvement Activity

This is a scheme to make suggestions to improve the current situation. A reward shall be provided to the person or group who submitted the suggestion.

It is needless to say that the level of reward will be determined by the content of suggestion (method, effect, etc). Suggestions without a specific improvement method are difficult to regard as a suggestion. However, from the point of view of bringing up current problems, if the suggestion is worth studying then a small reward may be provided.

(b) Award for Outstanding Practices of Problem solving Activity

For practices where the level of improvement is significant, each practice shall be evaluated under predetermined criteria, and an award and reward shall be given from the Top management for those exceeding the benchmark. Those that are awarded in this scheme are candidates showing that lateral dissemination is possible. It is one way to give awards to offices that conducted lateral dissemination for a certain period.

It is also another way to give an award to good practices which are presented in the meeting at each office.

(c) Performance Evaluation

As explained in the Target Management, each office sets the Corporate Target, and conducts their daily work aiming to reach the target. In this management cycle, a reward may be provided when the target is reached, and a penalty shall be given according to how much they missed the target.

(d) Award for Safety Operation

In this scheme, an award will be given to the field offices which did not have any injury accidents for a certain period (about 3 years). However, it must be assured that all offices do not omit reporting the accident in order to receive the award. Therefore, it is recommended to establish a scheme to carry a heavy penalty to those offices omitting such reports.

(e) Other awards

An award may be given in the cases listed below.

- Those who made a significant contribution to the company, such as prevention of accidents
- Those who contributed in raising the social image of the company through activities such as volunteer activities or lifesaving
- Those who received an authoritative award from an external party
- Those who passed a prescribed national exam, etc.

(5) Establishment of Company Regulations and Promotion of Thorough Compliance

For proper operation of a company, it is required to establish rules which all employees must comply with (Company Regulations) and that the employees actually comply with the rules.

It can be said that the required rules already exist. However, it does not meaning anything if it is not complied with (such as safety rules). Therefore, the adequacy and necessity of the existing rules shall be verified regularly and modified whenever necessary based on the actual conditions. On that basis, an adequate penalty shall be charged to those employees who are not complying with the rules. This is to raise the consciousness to follow the rules.

However, it is recommended that such rules cover the least amount of requirements. If everything is leashed by rules, the autonomy of employees and the environment to express one's opinion freely will be lost.

(6) Establishment of TQM Promotion Plan

To realize the contents explained above, TQM Promotion Office shall establish the TQM Promotion Plan annually. This includes the concrete action plan and to obtain approval of the Board Members.

It is needless to say that the submitted annual plan shall be implemented and the plan and the result shall be compared at the end of the year. In this case, for items which were not achieved, it shall be selectively conducted rotating the PDCA cycle adequately, and revise the plan at any time whenever required.

Chapter 11. Roadmap for Corporatization

A roadmap for NWPGCL corporatization regarding sound implementation guidance has been created in cooperation with the NWPGCL top management team and the JICA study team. A roadmap indicates implementation responsibility position, timing, and period, so that the NWPGCL is easily able to understand what are the minimum requirements for the management implementation at a glance. A certain implementation of all activities in line with the designated roadmap by the designated time frame is highly recommended.

As an implementation period of key benchmarks such as loan agreement and transfer of the existing BPDB power stations is changed, the implementation sub-activities related to the key benchmarks are inevitably changed as well. Therefore, implementation time frame of such sub-activities shall shift in line with the benchmarks.

For reference, an action plan with activities is proposed in order to aid development of NWPGCL for further good practice as a corporation. Among activities on the action plan, the activities, which are described on the roadmap, are highlighted with ID numbering. Meanwile, the activities on the action plan, but not shown on the roadmap mean less priotalized items rather than the highlighted items on the actionplan. Therefore, an implementation of such activities is highly recommended only when the NWPGCL has surplus time and workforces. On the action plan, concrete implementation measures in line with the corresponding references are expected for utilization for the NWPGCL.

11.1 Short-term Roadmap

A short-term roadmap for NWPGCL's course of action will be proposed if the Loan Agreement (hereinafter referred to as L/A) relating to a yen loan, which will be concluded in June, 2009, is recognized as a milestone below.
The immediate operation is the preparation of Corporation Governance System, and the selection of Chairman and the administration is very important. And also, Key Executive Managers (KEM) that is expected to occupy the important positions of NWPGCL in the future should be sought and selected by February, 2009. Before the conclusion of L/A, it is necessary to make DPP and get ECNEC's approval.

Table II-11-1 Short-term Roadmap

Phase 0 [from June 2008-June 2009 (L/A)]

				2008												2009											
				1	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
		[Key Benchmark] Conclusion of Loan agreement															L/A ▲						
		[Preparation of Corporate Governance System]																					
1	CG-3	Determination of Job Description and Terms & Conditions for the chaireman, and the board of directors	Board of Directors [BD]																				
2	CG-4	Determination of Job Description and Terms & Conditions for Top Management [TM]	Advised by the JICA Team																				
3	CG-5	Formation of Compensation Committee	Board of Directors [BD]																				
4	CG-7	Finalization of Selection Criteria & Selection Process for Top management Team (TMT)	BD (Selection Committee)																				
5	CG-8	Execution of Selection Process (Advertisement, Initial Screening, Interviews and selection finalization)	BD (Selection Committee)																				
6	CG-13	Formation of Audit and Governance/Environment Comittees	Board of Directors																				
7	CG-15	Holding 1st general shareholder's meeting	Board of Directors																				
8	CG-14 FA-5	Selection of external auditor	Board of Directors																				
9	CG-10	Establishment of Corporate Visions	Board of Directors, NWPGCL TMT																				
10	CG-17	Establishment of web site	NWPGCL TMT																				
		[Selection of Key Executive Managers (KEM)]																					
1	HC-4	Determination of Job Description and Terms & Conditions for KEM and AO	NWPGCL TMT																				
2	HC-7	Finalization of Selection Criteria & Process for KEM, AO	NWPGCL TMT																				
3	HC-8	Execution of Selection Process (Advertisement, Initial Screening, Interviews and selection finalization)	NWPGCL TMT																				
4	HC-9	Conclusion of employment agreement	NWPGCL TMT																				
		[Establishment of Corporate Office]																					
1	CG-16	Establishment of Corporate Office (Head office)	NWPGCL TMT																				
		[Application of Legal Procedures]																					
1	CN-1	Preparation of Gas Supply Application seeking Commitments with Gas Company (Fuel Supply Clearance)	NWPGCL TMT																				
2	CN-2	Issuance of Gas Supply assurance letter from the Government	MoPEMR, NWPGCL TMT																				
3	CN-3	Transfer of new Bheramara Project from BPDB to NWPGCL	BPDB, NWPGCL TMT																				
4	CN-4	Completion of FS(D/D), JICA Study (Viability Assessment by lender)	JICA																				
5	CN-5	Submission of EIA including with SIA and Approval of EIA and SIA from Directorate of Environment	NWPGCL TMT																				
6	CN-6	Preparation/Submission of Detailed Project Proposal and Approval of DPP by planning commission (ECNEC)	NWPGCL TMT																				
		[Preparation of Loan Agreement]																					
1	CN-7	Implementation of Project Appraisal	JICA																				
2	CN-8	Finalization of Loan Agreement (L/A)	JICA, GOB																				

Action Plan ID

Result ← → Plan

11.2 Mid-term Roadmap

A mid-term on the roadmap is basically defined as the period from the conclusion of loan agreement (L/A) relating to the yen loan in June of 2009 to the commissioning of the Bheramara power station at the end of September of 2014. However, NWPGCL shall undertake existing BPDB power stations and conclude L/A for newly constructed Bheramara power station simultaneously and parallel. The Baghabari power station will be transferred into NWPGCL scheduled for June 2009. NWPGCL shall commence a proceeding prior to the L/A in accordance with taking-over the existing power stations. Therefore, the mid-term roadmap including such prior period of L/A (January to May 2009) is proposed. The mid-term period is divided into two parts: 2009 and 2010 when the transfer of the exiting power stations will be conducted is the first half and the period from 2011 through 2014 is the last half.

The transfer of the existing power stations is conducted earlier than commissioning of the new power station, so it is necessary to complete the operations of system improvement of NWPGCL (decision of budget operation authority, decision of budget control method and others) by the transfer of the existing power stations. If the transfer time of the existing power stations is delayed, the implementation time of these items will be also delayed.

Depending on the transfer method, which the staff of the existing power stations will adopt, if the transfer time is set, it is necessary to select the preferred staff ASAP because the transfer time will expire in the last half of the mid-term.

Table II-11-2 Mid-term Roadmap (first half)

Phase 1-1 [from January 2009-December 2010]

				2009												2010											
				1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
		[Key Benchmark] Transfer of existing P/S from BPDB					Baghabari ▲					▲Barapukuria						▲Bheramara									
		[Preparation of Loan Agreement]																									
1	CN-7	Implementation of Project Appraisal	JICA																								
2	CN-8	Finalization of Loan Agreement (L/A)	JICA, GOB																								
3	CN-9	Conclusion of Subsidiary Loan Agreement	GOB, NWPGCL																								
		[Preparation of Tender and Construction Phases]																									
1	CN-10	Preparation of competitive selection of Consultant by NWPGCL	NWPGCL KEM																								
2	CN-11	Selection procedures for consultant	NWPGCL TMT																								
3	CN-12	Preparation of tender (EPC) by NWPGCL	NWPGCL KEM, Consultant																								
4	CN-13	Selection of EPC contractor	NWPGCL TMT, Consultant																								
		[Preparation of Corporate Governance System]																									
1	CG-18	Issue of Annual Report	Board of Directors																								
2	CG-21	Holding general shareholder's meeting	Board of Directors																								
		[Taking-over Existing BPDB P/Ss]																									
1	TF-1 MG-2	Formulation of Mid-term management plan（management objective and numerical target)	NWPGCL TMT																								
2	TF-2 MG-3	Determination of Performance evaluation method for P/S	NWPGCL TMT																								
3	TF-3 MG-4	Determination of sharing roles between HQ and PS	NWPGCL TMT																								
4	TF-4 MG-5	Determination of delegation of power (Administration)	NWPGCL TMT																								
5	TF-5	Determination of personnel transfer method	NWPGCL TMT																								
6	TF-6	Organization structure at P/S	NWPGCL TMT																								
7	TF-7	Determination of top management at P/S	NWPGCL TMT																								
8	TF-8	Determination of Performance evaluation method for individual	NWPGCL TMT																								
9	TF-9	Preparation of Job description and Service rules	NWPGCL TMT																								
10	TF-10	Preparation of Compensation package and Employment conditions	NWPGCL TMT																								
11	TF-11	Conclusion of Power Purchase Agreement between BPDB and NWPGCL	BPDB, NWPGCL TMT																								
12	TF-12	Conclusion of Fuel Supply Agreement	Fuel company, NWPGCL TMT																								
13	TF-13	Conclusion of Vender's Agreement	BPDB, NWPGCL TMT																								
14	TF-14	Agreement of retirement benefits between BPDB and NWPGCL	BPDB, NWPGCL TMT																								
15	SF-1 SF-7	Establishment of Safety policy & Safety Committee	NWPGCL TMT																								
16	OM-2 OM-3	Establishment of Environment management system	NWPGCL TMT																								
17	FA-9	Determination of delegation of power (Finance)	NWPGCL TMT																								
18	FA-10	Determination of Budget management system	NWPGCL TMT																								

Action Plan ID

Table II-11-3 Mid-term Roadmap (latter half)

Phase 1-2 [from January 2011-December 2014]

				2011						2012						2013						2014					
				1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11
		[Key Benchmark] Commercial operation of new P/S										Khulna ▲ Sirajganj ▲											Bheramara ▲				
		[Preparation of Tender and Construction Phases]																									
1	CN-13	Selection of EPC contractor	NWPGCL TMT, Consultant																								
2	CN-14	Construction	NWPGCL, EPC Contractor																								
3	CN-17	Installation and trial run	NWPGCL, EPC Contractor																								
		[Selection of New Employees]																									
1	HC-16	Establishment of manpower planning and employee policy	NWPGCL TMT																								
2	HC-17	Determination of new recruits number	NWPGCL TMT																								
3	HC-18	Determination of pay standard	NWPGCL TMT																								
4	HC-19	Determination of recruitment method for new employees	NWPGCL TMT																								
5	HC-20	Execution of Selection Process (Advertisement, Initial Screening, Interviews and selection finalization)	NWPGCL TMT																								
6	HC-21	Conclusion of employment agreement	NWPGCL TMT																								
		[Operation & Maintenance]																									
1	OM-4	Implementation of OJT training during construction	NWPGCL																								
2	OM-5	Conclusion of O&M (LTSA) contract	NWPGCL TMT																								
3	OM-6	Negotiation with PGCB(responsibility area, command method)	NWPGCL TMT																								
4	OM-7	Implementation of performance guarantee test	NWPGCL																								
		[Application of Legal Procedures]																									
1	CN-15	Conclusion of Power Purchase Agreement between BPDB and NWPGCL	BPDB, NWPGCL TMT																								
2	CN-16	Conclusion of Fuel Supply Agreement	Fuel company, NWPGCL TMT																								
		[Reinforcement of Corporate Framework]																									
1	HC-22	Establishment of incentive and benefit scheme	NWPGCL TMT																								
2	HC-23 HC-24	Formulate training policy, Establishment of training system	NWPGCL TMT																								
3	MG-12	Establishment of TQM Steering Committee	NWPGCL TMT																								
4	MG-13	Establishment of TQM Promotion Office	NWPGCL TMT																								

Action Plan ID

11.3 Long-term Roadmap

A long-term roadmap, related to those items which are to be implemented soon after the commissioning of the Bheramara power station (after 2015) as set out below, is proposed.

(1) Public offering of stocks

Although the Bheramara power station is a wholly owned (100%) subsidiary of BPDP, part of the station will be opened to the public as part of the management practice in which the company is conscious of the opinion held of the general stockholders.

(2) Move of headquarters

The address of the headquarters is Dhaka for the time being because procedures to between our headquarters and government offices occur frequently. However, from the viewpoint of coexistence with the location of the power station, the address of our headquarters will be moved to the western part of Bangladesh over time.

(3) Improvement of information infrastructure

Planned installation of a dedicated communication line between headquarters and each power station, and improvement of software such as MIS, ERP and others to share information between headquarters and each power station, will promote operational labor cost savings.

(4) Development of the maintenance department to the profit center

For six years after commissioning, the engineers from the equipment manufacturer mainly implement maintenance based on the agreement of the LTSA. During this period, the staff from the maintenance department improves their technical capabilities and in the future, the maintenance departments of all power stations will be integrated, the profit center will be created independently.

11.4 Fields which need to be strengthened

In order to conduct self-sufficient management, the following fields are to be strengthened for NWPGCL. As formulation and implementation of these measures by the NWPGCL itself comes with difficulties, providing assistance form the Japanese government is expected for these areas.

11.4.1 Improvement of management capability by introducing TQM activities

(1) Objective and expected effects

Up to present, Japan has cooperated with Bangladesh for the hardware of power sector through JICA/JBIC support, and in addition, technical assistance of Total Quality Management (hereinafter TQM) and entry-level operation and maintenance, especially for BPDB by dispatching short-term experts and country-wise training since 1999. As a result BPDB has gradually implemented TQM since 1999, and launched TQM Promotion office in 2002 to disseminate TQM activities throughout the board. However, the knowledge and experience of BPDB was not sufficient to deploy TQM activities by itself, and further capacity building was necessary. From these backgrounds, the Bangladesh government has requested Japan for the technical cooperation project targeting the deployment of TQM activities and improvement of operation and maintenance skills through TQM activities from 2006 to 2009 at the selected 4 model offices (Generation, Transmission & substation, and distribution).

The Bhagabari P/S, which will be transferred to the NWPGCL, is included among the model offices of the JICA TQM project. Through the project at the power station, the selected middle class managers are trained to find the problems and to find its solutions by themselves. At the same time, the training for trainers (TOT) is also implemented to promote TQM activities.

However, the JICA project at the Baghabari P/S is just to provide with the first opportunity to plant seeds at this stage. To utilize these seeds of the Baghabari P/S as a TQM management resource to carry out the lateral spreading and standardization through the whole NWPGCL organization is the ley factor for NWPGCL. Successful promotion of the lateral spreading and standardization for the TQM activity at NWPGCL help improve self-sufficient management of the NWPGCL.

(2) Reinforcements

(a) Support for TQM activities by the middle class management and staff/worker level

Issue solving activities generally conducted at field level can be broadly categorized in 2 types.

- Activity which Middle-level management realize the solution against priority issues in his division by proposing the solution to the top management (or higher-level management) by his own
- Staffs/Workers realize the solution against familiar issues by establishing the solution by group activities (QC Circle Activity)

The aim to implement these activities in a formal manner is mainly to change the consciousness. If all staffs always have the consciousness of solving the issue, it is expected that efficiency of production activity can be naturally improved regardless of specific method.

At present in power sector of Bangladesh, QC Circle activities of staff/worker level are active. However, the middle-level management is mainly managing the activities only, and it seems that not so much are tackling with their own theme to solve the issue. Considering this point, the Consultants will conduct promotion activities to change the consciousness against issue solving, focusing on the middle-level management.

(b) Fostering of trainers within the NWPGCL

In disseminating TQM activities throughout all offices in the organization including field level at once, many trainers from outside shall be required. Generally, it is difficult to secure many trainers from outside; dissemination of activities will be gradually conducted by fostering several trainers within the organization at the same time. Considering this point, to continuously conduct TQM

activities, OJT style technology transfer will be conducted to the selected personnel who have discipline of being a trainer in the future.

(c) Suppor for lateral spredding and standarization of TQM activity

Recongnition and understanding of TQM activities and leadership by the top managements are nessesasssy for lateral spredding and standarization of TQM activity through whole NWPGCL organization.

The top managements shall set the mid-to long-term target to be achieved by the next year, and establishment and implementation of specific plans to achieve it.

Also, the Consultants will support each office to establish mid-term management plan (Mid to long-term business plan). In specific, the consultants will make a template and support each offices to actually establish the mid-term management plan.

The mid-term management plan shall be a compilation of plans such as those listed below. The Consultants will also support each personnel to independently establish their plans based on the established mid-term management plan.

- Human capitak management plan (Organization restructuring plan, Personnel plan, Perso nnel fostering plan, etc.)
- Facility maintenance plan (Expansion plan, refurbishment plan, repair plan, etc.)
- Financial management plan (Financial soundness restoration plan, etc.)
- Others (Research & Development plan, Environmental preservation plan, Safety ensure plan, etc.)

11.4.2 Improvement of operation management capability by introducing operating simulator

(1) Objective and expected effects

Introduction of a simulator for operator training or analysis of thermal power plants help improve operator ’s capability and contribute to safety and stable operation at the power station is expected. The simulator works on PCs, making it inexpensive and compact, allowing for installation in power plants. The simulator is expected to be highly effective for training, since it is created exclusively for the target thermal power plant and is therefore capable of describing the characteristics specific to the plant.

(2) Reinforcements

(a) Baseline examination for customization of simulator

1) Establishment of plant model

A plant model shall numerically formulate mechanical behavior of boilder, turbine, heat exchange, pipework and valves, and to precisely express behavior such as temperature, discharge, and pressure by thermal and fluid dynamics based on design drawings and test run data.

2) Establishkemt of C&I system model

Boiler and turbine works in line with C&I system commands, which are programmed to properly work for the expected behavior. Threfore, simulating C&I system program on a simulator precisely is nessesarry to realize a high quality simulator.

3) Establishment of control panel

A control panel on a simulator’s PC is a duplication of the contril panel at the real power station. Trainees are able to simulate a manipulation of “pushing button”, and “twisting lever” at the power station’s control room by clicking, touching on a control penel on a simulator’s PC for pushing button. Whole control panel and magnified view of a selected part is displayed on the multiple displays on the PC. This function provides trainees with opportunity to learn fundamental operating training of manipulation by carefully monitoring indicators.

(b) Delivery, installment, and test run of simulator

In one example, a whole system of the PC-based simulator is shown as the figure below. The system is composed of trainer’s PC which incorporats plant and C&I model systems, and Trainees PC having control panels. Such three systems (plant, C&I, and control panel models) are mutually controlled on a customized softwere.

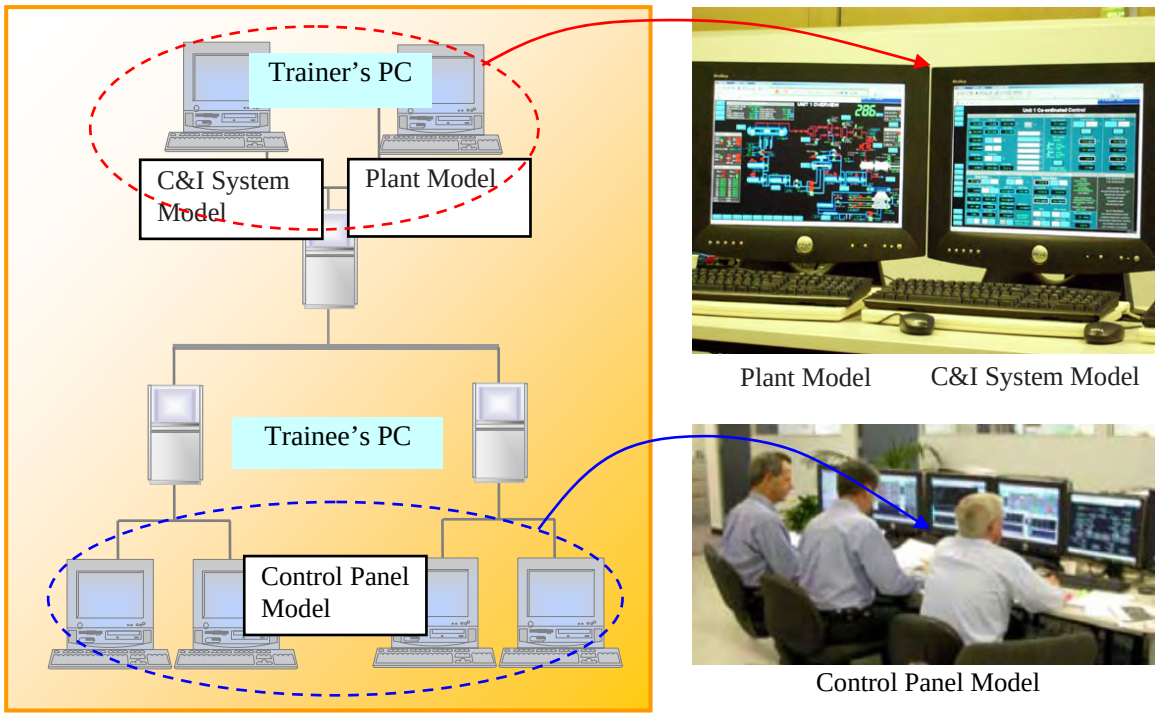


Figure II-11-1 Introduction of simulater at P/S
(Yokogawa Electric Corporation, Eraring 660MW, Australia)

(c) Implemetation of trainings for trainees by invitation of the experts

The experts provide instructive trainings of a series of operation mode such as ignition preparation, boilder ignition, turbine start-up, parallel, and rated load operation, and parallel off. PC-based simulater equips trouble mode. An instructor creates some troubles in line with a given scenario, and trainees shall estimate trouble point and causes, and take measures to solve given trouble.

(d) Implemetation of trainings for trainers candidates by invitation of the experts

The experts from the simulatore manufacture provide training for trainers (TOT). Implementation of TOT is an important process to foster internal trainers within NWPGCL in order to improve and maintain training level on the simulator.

11.4.3 Improvement of maintenance management capability by introducing non-destructive inspection method

(1) Objective and expected effects

Non-destructive inspection is a technical maintenance tool to provide with an assuarance of the quality for material, parts, and structure at the power station without scratching or breaking on it, by knowing the conditions of the surface and inside of the material.

As discussed in the Chapter 6, there is little engneers who has a detailed knowledge of the non-destructive inspections in Bangladesh, and the implementation of such inspections shall rely on foreign experts.

Therefore, an introduction of the non-destructive inspection equipment and implementation of the training programs for both trainees and trainers by the experts are recommended to strengthen an autonomous maintenance management for the NWPGCL, and to contribute to safety and stable operation at the power stations.

(2) Reinforcements

(a) Introduction of the non-destructive inspection equipment

- Magnetic testing (MT) device
- Ultrasonic testing (UT) device for measuing flaw thickness

- UT device for detecting vertical and angled flaws

(b) Training program (part 1): Therly and explanation of the device, non-destructiveinspections, identification of needs and concrete measures
- Outline of method and application cases
- Outline of penetrant testing (PT), MT, UT devices
- Pretreatment of inspection parts and accuracy of defect detection
- Safety and health management for inspection works
- Case examples of detected defect parts
- Measuring data and trend analysis
- Field-work, safety and health management (PT)

(c) Training program (part 2): PT inspections
- Basic knowledge
- Handling guideline
- Techunique for detecting flaws
- Measurement accuracy
- Evaluation of detected flaws and Criterio for judgement

(d) Training program (part 3): MT inspections
- Basic knowledge
- Handling guideline
- Techunique for detecting flaws
- Measurement accuracy
- Evaluation of detected flaws and Criterio for judgement

(e) Training program (part 4): UT inspections
- Basic knowledge
- Handling guideline
- Techunique for detecting flaws
- Measurement accuracy
- Evaluation of detected flaws and Criterio for judgement

(f) Training program (part 5): Practical training on site
- PT inspection
- MT inspection
- UT inspection

Action Plan

Corporate Governance

Corporate Governance								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
CG-1	0	3.5.2	Organization structure of the board	Outlining of Board Structure	Recommended	High	Low	NWPGCL Board
CG-2	0	3.5.2, 3.5.4	TOR for Board Committees	Designing Board Roles and Terms of Reference for Board Committees	Recommended	Medium	Low	NWPGCL Board
CG-3	0	3.5.2	Job Description for Board of Directors	Determination of Job Description and Terms & Conditions for the chairman, and the board of directors [BD]	Obligatory	High	Medium	NWPGCL Board
CG-4	0	3.5.3	Job Description for NWPGCL TMT	Determination of Job Description and Terms & Conditions for Top Management Team [TMT]	Obligatory	High	Medium	NWPGCL Board, TMT
CG-5	0	3.5.4	Board structure, Committee member list	Formation of Compensation Committee to determine compensation package	Obligatory	High	High	NWPGCL Board, MOPEMR, and BPDB
CG-6	0	4.6.3	Compensation package for TMT	Compensation Package Finalization for TMT	Obligatory	High	High	NWPGCL Board, compensation committee, TMT
CG-7	0	4.4.6	Selection criteria, selection process, test preparation, interview sheet	Finalization of Selection Criteria & Selection Process for TMT	Obligatory	High	High	NWPGCL Board (selection/compensation committee)
CG-8	0	3.5.1, 4.4.6	Candidate list, advertisement	Execution of Selection Process (Advertisement, Initial Screening, Interviews and selection finalization)	Obligatory	High	High	NWPGCL Board (selection/compensation committee)
CG-9	0	3.5.1, 4.4.7	Induction letter, Employment agreement	Induction of BD and TMT	Obligatory	High	Low	NWPGCL Board
CG-10	0	2.4.2	Mission and vision statement	Establishment of Corporate Visions	Obligatory	High	High	NWPGCL Board, TMT
CG-11	0	3.5.2, 4.5.3	Board Performance KPIs	Formulating Board Performance KPIs	Recommended	Medium	Low	NWPGCL Board
CG-12	0	3.5.4	Corporate Governance Policy	Adoption of Corporate Governance Model	Obligatory	High	Medium	NWPGCL Board, TMT
CG-13	0	3.5.2, 3.5.4	Board structure, Committee member list	Formation of Audit and Governance/Environment Committees	Obligatory	High	Medium	NWPGCL Board, TMT

Corporate Governance								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
CG-14	0	3.5.2, 5.2.6	Contract with external auditor	Selection of external auditor	Obligatory	High	Medium	NWPGCL Board
CG-15	0	3.5.1	Minutes of meeting for shareholder's meeting	Holding 1st general shareholder's meeting	Obligatory	High	Medium	Board of Directors, shareholder's member
CG-16	0	11.3	Building lease contract	Establishment of corporate head office	Obligatory	High	Medium	NWPGCL TMT, Key Executive Managers [KEM], Company Secretary
CG-17	0	6.6.4	NWPGCL's Internet web Site	Establishment of web site	Obligatory	High	Medium	NWPGCL TMT, KEM, Company Secretary, GM(IMS)
CG-18	1	3.5.5	NWPGCL Annual Report	Issue of Annual Report	Obligatory	High	Medium	NWPGCL Board, Audit Committee, TMT, KEM, Company Secretary
CG-19	1	3.5.2	NWPGCL Internal control code	Adoption of internal controls	Recommended	Medium	High	NWPGCL Board, Audit Committee, TMT, KEM, Company Secretary
CG-20	1	3.5.5	NWPGCL Shareholder's Handbook	Preparation & Circulation of Shareholder's Handbook	Recommended	High	Medium	NWPGCL Board, Audit Committee, TMT, KEM, Company Secretary
CG-21	1	3.5.1	Minutes of meeting for shareholder's meeting	Holding general shareholder's meeting periodically	Obligatory	High	Medium	NWPGCL Board, TMT, Company Secretary, Shareholders

Human Capital Management

Human Capital Management								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
HC-1	0	4.3.2	Corporate-level Organogram	Finalize the corporate organization structure	Obligatory	High	High	NWPGCL Board, TMT
HC-2	0	4.4.6	Recruitment methods and procedures	Develop and design recruitment methods and procedures	Recommended	High	Medium	NWPGCL Board, TMT
HC-3	0	4.4.6	Recruitment plan	Obtain Board Approval for Recruitment Plan	Recommended	High	Low	NWPGCL Board
HC-4	0	4.3.3, 4.3.5	Job Description for NWPGCL KEM and AO	Determination of Job Description and Terms & Conditions for Key Executive Managers [KEM] and Administrative Officers [AO]	Obligatory	High	Medium	NWPGCL Board, TMT
HC-5	0	4.6.1, 4.6.2, 4.6.3	Compensation package for KEM and AO	Compensation Package Finalization for [KEM] and Administrative Officers [AO]	Obligatory	High	Medium	NWPGCL Board, TMT
HC-6	0	3.5.4, 4.4.6	Selection compensation committee member list	Selection/compensation committee formation for recruitment of [KEM] [AO]	Obligatory	High	Medium	NWPGCL, Executive Search
HC-7	0	4.6.3	Selection criteria, selection process, Compensation package	Finalization of Selection Criteria & Process for [KEM] [AO]	Obligatory	High	Medium	NWPGCL TMT
HC-8	0	4.4.6	Candidate list, advertisement, test preparation, interview sheet	Execution of Selection Process (Advertisement, Initial Screening, Interviews and selection finalization)	Obligatory	High	Medium	NWPGCL TMT
HC-9	0	4.4.7	Employment agreement	Conclusion of employment agreement	Obligatory	High	Medium	NWPGCL TMT
HC-10	1	4.6.1	Compensation survey results	Review of compensation Survey	Recommended	High	Medium	NWPGCL Board, TMT, KEM
HC-11	1	4.6.1	Benchmark pay scale	Review of Benchmark pay scales with other utilities/ corporative entities	Recommended	High	Medium	NWPGCL Board, TMT, KEM

Human Capital Management								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
HC-12	1	4.5.2, 4.5.3	KPIs for Individual Positions	Define KPIs for Individual Positions along with targets for appraisal	Recommended	High	Medium	NWPGCL TMT, KEM, Middle class managers, Individual employees
HC-13	1	4.5.2, 4.5.3	KPI form	Design / Update Forms to incorporate KPI and targets for employees	Recommended	High	Low	NWPGCL TMT, KEM, Middle class managers, Individual employees
HC-14	1	4.5.2, 4.5.3	Discussion paper based on KPI form	Introduce discussion with appraises and appraiser after forms are filled before submission to review	Recommended	High	Medium	NWPGCL TMT, KEM, Middle class managers, Individual employees
HC-15	1	4.5.2, 4.5.3	Feedback for KPI	Allow for feedback to employee after procedure is conducted	Recommended	High	Low	NWPGCL TMT, KEM, Middle class managers, Individual employees
HC-16	1	4.4.6, 4.8.1, 4.8.2	Manpower Planning and employment policy	Establishment of manpower planning and employment policy for new P/S	Obligatory	High	Medium	NWPGCL TMT
HC-17	1	4.4.6, 4.8.1, 4.8.2	Manpower Planning and employment policy	Determination of new recruits number for new P/S	Obligatory	High	Medium	NWPGCL TMT
HC-18	1	4.6.3	Employment condition, Compensation package	Determination of pay standard for new P/S	Obligatory	High	Medium	NWPGCL Board, compensation committee, TMT
HC-19	1	4.4.6, 4.6.3	Selection criteria, selection process, Compensation package	Determination of recruitment method for new employees at new P/S	Obligatory	High	Medium	NWPGCL TMT
HC-20	1	4.4.6	Candidate list, advertisement, test preparation, interview sheet	Execution of Selection Process (Advertisement, Initial Screening, Interviews and selection finalization) for new P/S	Obligatory	High	Medium	NWPGCL TMT
HC-21	1	4.4.5, 4.4.6	Employment agreement	Conclusion of employment agreement for new P/S	Obligatory	High	Medium	NWPGCL TMT

Human Capital Management								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
HC-22	1	4.6.3	Incentive and benefit scheme	Establishment of incentive and benefit scheme	Obligatory	High	Medium	NWPGCL Board, compensation committee, TMT
HC-23	1	4.7.2, 4.7.3	Training Policy	Formulate Training Policy	Obligatory	High	Medium	NWPGCL TMT, CHCO, KEM (HC)
HC-24	1	4.4.6, 4.7.4	Career path planning report, Human Capital Development Planning	Establishment of training system (human capital development planning)	Obligatory	High	High	NWPGCL TMT, CHCO, KEM (HC)
HC-25	2	4.6.1, 4.6.2	Review for pay structure and scale	Conduct Periodic review of pay structure and scale, and compensation package (every 3 years)	Recommended	High	Medium	NWPGCL Board, compensation committee, TMT
HC-26	2	4.7.2	Result of training needs	Conduct Training Needs Analysis	Recommended	High	Medium	NWPGCL TMT, CHCO, KEM (HC)
HC-27	2	4.7.2, 4.7.3, 4.7.4	Training courses	Identify training courses (existing and new)	Recommended	High	Low	NWPGCL TMT, CHCO, KEM (HC)
HC-28	2	4.7.3	Training budget	Prepare a budget for the annual employee training and development activities	Obligatory	High	Medium	NWPGCL TMT, CHCO, KEM (HC)

Construction of New P/Ss

Construction of new P/Ss								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
CN-1	0	5.4.5, 9.1.4, 9.2.1, 9.3.2	Gas Supply Application	Preparation of Gas Supply Application seeking Commitments with Sunderban Gas Supply Company (Fuel Supply Clearance)	Obligatory	High	Medium	NWPGCL TMT
CN-2	0	5.4.5, 9.1.4, 9.2.1, 9.3.2	Gas supply agreement	Issuance of Gas Supply assurance letter from the Government	Obligatory	High	Medium	MoPEMR, NWPGCL TMT
CN-3	0	3.5.6	Asset transfer	Transfer of new Bheramara Project from BPDB to NWPGCL	Obligatory	High	Medium	BPDB, NWPGCL TMT
CN-4	0		JICA Study Report	Completion of FS(D/D), JICA Study (Viability Assessment by lender)	Obligatory	High	Medium	JICA
CN-5	0	6.6	EIA	Submission of EIA including with SIA and Approval of EIA and SIA from Directorate of Environment	Obligatory	High	Medium	NWPGCL TMT
CN-6	0	5.5.1, 11.1, 9.1.1	DPP	Preparation/Submission of Detailed Project Proposal (DPP) and Approval of DPP by planning commission (ECNEC)	Obligatory	High	Medium	NWPGCL TMT
CN-7	0	11.1	Project Appraisal	Implementation of Project Appraisal	Obligatory	High	Medium	JICA
CN-8	0	9.1.1	Loan Agreement	Finalization of Loan Agreement (L/A)	Obligatory	High	Medium	JICA, GOB
CN-9	1	9.1.1	Subsidiary Loan Agreement	Conclusion of Subsidiary Loan Agreement	Obligatory	High	Medium	GOB, NWPGCL
CN-10	1	11.1	Selected consultant	Preparation of competitive selection of Consultant by NWPGCL	Obligatory	High	Medium	NWPGCL KEM
CN-11	1	5.4.1, 11.1	Selection procedures	Selection procedures for consultant	Obligatory	High	Medium	NWPGCL TMT
CN-12	1	5.2.6, 11.1	Tender documents	Preparation of tender (EPC) by NWPGCL	Obligatory	High	Medium	NWPGCL TMT, KEM, Consultant

Construction of new P/Ss								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
CN-13	1	5.2.6, 11.1	EPC contract	Selection of EPC contractor	Obligatory	High	Medium	NWPGCL TMT, KEM, Consultant
CN-14	1	6.5.1	EPC contract, Construction management by owner engineers, training during construction	Construction	Obligatory	High	High	NWPGCL, Consultant EPC Contractor
CN-15	1	5.4.5 9.1.3 9.4.2 (1)	Power Purchase Agreement	Conclusion of Power Purchase Agreement between BPDB and NWPGCL	Obligatory	High	High	BPDB, NWPGCL TMT
CN-16	1	5.4.5 9.1.4 9.4.2 (2)	Fuel Supply Agreement	Conclusion of Fuel Supply Agreement	Obligatory	High	High	Fuel company, NWPGCL TMT
CN-17	1-2	6.5.1	EPC contract, Construction management by owner engineers, training during construction	Installation and trial run	Obligatory	High	high	NWPGCL, Consultant EPC Contractor

Taking-over Existing BPDB P/Ss

Taking-over Existing BPDB P/Ss								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
TF-1	0	10.1, 10.3.2	Mid-term management plan	Formulation of Mid-term management plan (management objective and numerical target)	Obligatory	High	Medium	NWPGCL TMT
TF-2	0	10.2.1	Performance evaluation method for P/S	Determination of Performance evaluation method for P/S	Obligatory	Medium	Medium	NWPGCL TMT
TF-3	0	4.2.3, 10.2.2, 10.2.3	Delegation of power to P/S Manager	Determination of sharing roles between HQ and PS	Obligatory	High	Medium	NWPGCL TMT
TF-4	0	10.2.2	Delegation of power (Administration)	Determination of delegation of power (Administration)	Obligatory	High	Medium	NWPGCL TMT
TF-5	0-1	4.8.1, 4.8.2, 9.2.2	Manpower Planning, Transfer condition, Employment condition, Compensation package, Personnel transfer method (rule or manual)	Determination of personnel transfer method	Obligatory	High	High	NWPGCL Board, TMT, KEM, MOPEMR and BPDB
TF-6	0-1	4.3.5	P/S-level Organogram, Job Description for P/S	Organization structure for existing P/S	Obligatory	High	Medium	NWPGCL Board, TMT, KEM
TF-7	0-1	3.5.3, 4.3.4, 4.3.5	P/S-level Organogram, Job Description and Terms & Conditions, Selection method, employment condition	Determination of top management at P/S	Obligatory	High	Medium	NWPGCL Board, TMT, KEM
TF-8	0-1	4.5.3	Performance evaluation system	Determination of Performance evaluation method for individual	Obligatory	High	Medium	NWPGCL TMT, KEM
TF-9	0-1	4.3.3, 4.3.5	Job description and Service rules	Preparation of Job description and Service rules	Obligatory	High	Medium	NWPGCL TMT

Taking-over Existing BPDB P/Ss								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
TF-10	0-1	4.6.3	Compensation package and Employment conditions	Preparation of Compensation package and Employment conditions	Obligatory	High	Medium	NWPGCL Board, compensation committee, TMT
TF-11	0-1	5.4.5 9.1.3 9.4.2 (1)	Power Purchase Agreement	Conclusion of Power Purchase Agreement between BPDB and NWPGCL	Obligatory	High	High	BPDB, NWPGCL TMT
TF-12	0-1	5.4.5 9.1.4 9.4.2 (2)	Fuel Supply Agreement	Conclusion of Fuel Supply Agreement	Obligatory	High	High	Fuel company, NWPGCL TMT
TF-13	0-1	4.8.2 (2) 5.4.5	Vender's Agreement	Conclusion of Vender's Agreement	Obligatory	High	High	BPDB, NWPGCL TMT
TF-14	0-1	4.8.2 (2) 5.4.5	Agreement of retirement benefits	Agreement of retirement benefits between BPDB and NWPGCL	Obligatory	High	High	BPDB, NWPGCL TMT
TF-15	0-1	9.2.2	Discussion with the management and the Labor Union	Discussion with the management and the Labor Union to avoid dispute	Recommended	High	High	BPDB, NWPGCL Board, TMT, Labor Union

Finance and Accounting

Finance and Accounting								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
FA-1	0	4.3.3	F&A personnel	Recruitment of F&A personnel for corporate F&A set-up	Obligatory	High	Medium	NWPGCL TMT
FA-2	0	4.7.4, 5.2.7	Training program	Training of recruited F&A personnel	Recommended	High	Medium	NWPGCL TMT
FA-3	0	5.3	Accounting Policy	Framing and design of the accounting policy	Obligatory	High	Medium	NWPGCL CFO
FA-4	0	5.2.6	Project Accounting Rules and Guidelines	Design of project accounting rules and guidelines	Recommended	High	Medium	NWPGCL CFO
FA-5	0	3.5.2, 5.2.6	External auditors	Appointment of External Auditors	Obligatory	High	Low	NWPGCL Board
FA-6	0	5.4.4	Corporate bank account	Opening of bank account	Obligatory	High	Medium	NWPGCL Board
FA-7	0	5.7	Enterprise Financial Model	Preparation of Enterprise Financial Model	Recommended	High	High	NWPGCL Business Planning Cell , CFO
FA-8	0	3.5.4	Financial KPIs	Adoption of Financial KPIs for Performance Audit	Recommended	High	High	NWPGCL TMT
FA-9	0-1	5.4.3	Delegation of power (Finance)	Determination of delegation of power (Finance)	Obligatory	High	Medium	NWPGCL TMT
FA-10	0-1	5.5.2	Budget management system	Determination of Budget management system	Obligatory	High	Medium	NWPGCL TMT
FA-11	1	5.2.7	Chart of Accounts	Development of chart of accounts	Recommended	High	High	NWPGCL CFO
FA-12	1	5.3	Accounting Standards and Reporting Formats	Aligning the policies with mandatory requirements of accounting standards and reporting formats prescribed under BAS / IFRS and Companies Act 1994	Obligatory	High	Medium	NWPGCL CFO
FA-13	1	5.3.1	Accounting policy	Board approval of the accounting policy	Obligatory	High	Low	NWPGCL Board
FA-14	1	5.2.7	Store Accounting and Price Stock Ledgers	Development of store accounting with store related registers- Quantity and price stock ledgers	Recommended	Medium	High	

Finance and Accounting								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
FA-15	1	5.2.7	Integrated Accounting & Financial System and Operation Manual	F&A development of integrated accounting and financial system with operation manuals	Recommended	High	High	NWPGCL Board, CFO
FA-16	1	5.5	Budget system	Design of the budget system	Recommended	High	Medium	NWPGCL CFO
FA-17	1	5.5.3	Budget Manual	Development of budget manual	Recommended	Medium	High	NWPGCL CFO
FA-18	1	5.5.3	Budget Manual	Roll out of budget manual	Recommended	Medium	High	NWPGCL CFO
FA-19	1	5.4.4	Financial Policy	Framing and design of the financial policy	Recommended	Medium	Medium	NWPGCL CFO
FA-20	1	5.2.4, 5.2.7	Accounting Manual	Development of accounting and financial manuals	Recommended	Medium	High	NWPGCL CFO
FA-21	1	5.2.7	Various Registers and Forms	Design of various registers and forms	Recommended	Medium	High	NWPGCL F&A Department
FA-22	1	5.2.7	Various Registers and Forms	Roll out and circulation of registers and forms	Recommended	Medium	High	NWPGCL F&A Department
FA-23	2	5.6	Management Accounting System	Development of management accounting system	Recommended	Medium	High	NWPGCL CFO
FA-24	3	5.2.7, 5.6	Financial MIS System	Development of financial MIS system	Recommended	Medium	High	NWPGCL CFO
FA-25	3	5.2.7	Financial MIS System	Implementation of MIS system	Recommended	Medium	High	NWPGCL F&A Department

O&M

O&M								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
OM-1	0	6.4	O&M strategy	Strategic Decision on O&M Model - Own O&M vs. Outsourced O&M with LTSA / O&M Contractor	Obligatory	High	Medium	NWPGCL Board, TMT, LTSA Contractor
OM-2	0-1	6.6.1	Environmental Management System (Corporate level)	Establishment of Environmental Management System (Corporate level)	Obligatory	High	Low	NWPGCL Board, TMT,Manager attached to GM (Environment.)
OM-3	0-1	6.6.2	Environmental Management System (Management level)	Establishment of Environmental Management System (Management level)	Obligatory	High	Low	NWPGCL Board, TMT,Manager attached to GM (Environment.)
OM-4	1	6.5.1, 6.5.2	O&M Training program	Implementation of OJT training during construction	Obligatory	High	Medium	NWPGCL TMT, CHCO, KEM(HC, O&M)
OM-5	1	6.4, 9.1.5	LTSA contract	Conclude O&M Contract / LTSA Contract (as applicable)	Obligatory	High	High	NWPGCL TMT, LTSA Contractor
OM-6	1	6.3.2	Discussion with PGCB	Negotiation with PGCB（responsibility area, command method)	Obligatory	High	Medium	NWPGCL TMT, KEM(O&M)
OM-7	1	11.4.2	Performance guarantee	Implementation of performance guarantee test (test run)	Obligatory	High	Medium	NWPGCL TMT, KEM(O&M)
OM-8	1	6.3.2	Maintenance management policy	Development and finalization of maintenance management policy	Recommended	High	Medium	NWPGCL TMT, KEM(O&M)
OM-9	1	6.3.2	Standing Instruction & Procedures for Operation	Preparation and finalization of Standing Instruction & Procedures for Operation	Recommended	High	Medium	NWPGCL TMT, KEM(O&M)
OM-10	1	6.3.2	Technical handbook	Preparation and finalization of technical handbook with process parameters limits	Recommended	High	Medium	NWPGCL TMT, KEM(O&M)
OM-11	1	6.5.1	OJT	Pre-Commissioning Training and on job training of Recruited O&M Personnel	Recommended	High	High	NWPGCL TMT, KEM(O&M)
OM-12	1	6.5.1	Training at EPC	EPC training of the O&M officials	Recommended	High	High	NWPGCL TMT, KEM(O&M)

O&M								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
OM-13	1	6.3.2	GRID connectivity documents	Preparation and finalization of documents required for GRID connectivity and submission of the same to LDC	Obligatory	High	High	NWPGCL TMT, KEM(O&M)
OM-14	1	6.3.2	GRID connectivity documents	Interfacing with PGCB to ensure Transmission evacuation availability	Obligatory	High	High	NWPGCL TMT, KEM(O&M)
OM-15	1	6.3.2	Maintenance management procedures	Development and finalization maintenance management procedures	Recommended	High	Medium	NWPGCL TMT, KEM(O&M)
OM-16	1	8.3.4	Data Archiving and Analysis for Maintenance	Preparation and finalization of Data Archiving and Analysis for Maintenance	Recommended	High	Medium	NWPGCL TMT, KEM(O&M)
OM-17	1	7.4.2	Permit to Work System	Establishment of Permit to Work (PTW) System	Obligatory	High	Medium	NWPGCL TMT, KEM(O&M)
OM-18	1	5.2.7, 5.3.4	Construction of stores	Establishing the site stores for storage of materials	Recommended	High	Medium	NWPGCL TMT, KEM(O&M)
OM-19	1	5.3.4	Stores manual	Preparation and finalization of stores manual	Recommended	High	Medium	NWPGCL TMT, KEM(O&M)
OM-20	1	6.3.2	Procurement policy guidelines	Development of procurement policy guidelines for plant equipments/items	Obligatory	High	Medium	NWPGCL TMT, KEM(O&M)
OM-21	1	6.3.2, 5.2.7	Inventory management system	Development and finalization of Inventory management system	Recommended	High	High	NWPGCL TMT, KEM(O&M)
OM-22	2	6.3, 8.3.4	Procedures for trend analysis	Development and finalization procedures for trend analysis of various operation parameters	Recommended	High	High	NWPGCL TMT, KEM(O&M)
OM-23	2	6.3.2	Procedures for scheduling of overhauling	Development and finalization procedures for scheduling of overhauling	Recommended	High	High	NWPGCL TMT, KEM(O&M)
OM-24	2	6.3.2 5.5.2	Database for Plant Budgeting	Estimation of the O&M cost and establishing database for Plant Budgeting	Recommended	High	High	NWPGCL TMT, KEM(O&M)

O&M								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
OM-25	2	8.3.3	Procedures for reviewing the plant performance	Development and finalization procedures for reviewing the plant performance on a Daily basis, Monthly basis, Quarterly basis, Annual basis	Recommended	High	High	NWPGCL TMT, KEM(O&M)
OM-26	2	8.3.4	Plant performance audit	Development of Plant Performance Audit	Recommended	High	High	NWPGCL TMT, KEM(O&M)
OM-27	2	8.3.4	Plant performance audit	Execution of Plant Performance Audit	Recommended	High	Medium	Energy Audit Cell, NWPGCL TMT, KEM(O&M)
OM-28	2	6.4	Training plan	Rolling out of training plan for the employees at regular interval of time	Recommended	High	Medium	NWPGCL TMT, KEM(O&M)
OM-29	3	8.3.4	Inventory Optimization Program	Rolling out of Parts management system	Recommended	High	Medium	NWPGCL TMT, KEM(O&M)

Safety Management

Safety								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
SF-1	0	7.4	Safety Policy	Formulation of Safety Policy	Obligatory	High	High	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-2	0	7.4	Safety guidelines	Development and finalization of safety guidelines for employees working in the plant	Recommended	High	High	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-3	0	7.4.2	Reward and penalty mechanism	Development and finalization of reward and penalty mechanism	Recommended	High	Medium	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-4	0	7.4.2	Organogram of the Safety department	Designing Organogram of the Safety department	Obligatory	High	Medium	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-5	0	7.4.2	Organogram of the Safety department	Getting Board Approval of the Organogram	Obligatory	High	Low	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-6	0	7.4.2	Job description for Safety department	SM Identification of skill-set required and defining detailed job description for different designated post in the Safety department	Recommended	High	High	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-7	0-1	7.4.2	Safety committee	Establishment of Safety Committee	Obligatory	Medium	Low	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-8	1	7.4.2	Reward and penalty systems	Design reward and penalty systems to motivate employees for safety management	Recommended	High	Medium	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-9	1	7.4.2	Guidelines for the Safety Committee	Formulation of Safety Committee and developing guidelines for the functioning of same	Recommended	High	Medium	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)

Safety								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
SF-10	1	7.4.5	Reporting system, Database fo accidents	Development and finalization of procedures for Inspection, Reporting/analyzing of an accidents, Emergency procedures, Maintaining database of Accidents in the plant	Recommended	High	High	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-11	1	7.4.6	Guidelines for PPE	Development and finalization of guidelines for Usage of PPE's in the plant, Risk prevention activities	Recommended	High	High	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-12	1	7.4.6	Guidelines for PPE	Identification of Personal Protective Equipments (PPE) required in the plant	Recommended	High	Medium	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-13	1	7.4.2	Safety training plan	Development and finalization of Safety training plan for employees	Recommended	High	High	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-14	2	7.3.2	Safety budget	Estimation of the safety budget required in the plant	Recommended	High	High	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-15	2	7.4.4 7.4.5	Safety audit	Implementation of Safety Audit at P/S	Recommended	High	High	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)
SF-16	2	7.4.5	Safety statutory reporting system	Development and finalization of Safety statutory reporting system	Recommended	High	High	NWPGCL TMT, KEM(O&M), Manager attached to GM (Safety)

Management Plan

Management Plan								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
MG-1	1	10.1, 10.3.1	Draft Business Plan	Preparation of the Draft Business Plan including, Long-term Human Capital Development Plan, Long-term Financial Management Plan, Long-term Operation & Maintenance Plan	Recommended	High	High	NWPGCL TMT, KEM, Manager attached to GM (Management)
MG-2	1	10.3.1, 10.3.2	Mid-term Management Plan	Formulation of Mid-term Management Plan（management objective and numerical target）	Obligatory	High	High	NWPGCL TMT, KEM, Manager attached to GM (Management)
MG-3	1	10.2	Performance evaluation method for P/S	Determination of Performance evaluation method for P/S	Obligatory	High	High	NWPGCL TMT, KEM, Manager attached to GM (Management)
MG-4	1	10.2	Sharing roles between HQ and P/S	Determination of sharing roles between HQ and P/S	Obligatory	High	High	NWPGCL TMT, KEM, Manager attached to GM (Management)
MG-5	1	10.2.3	Delegation of power (Administration)	Determination of delegation of power (Administration)	Obligatory	High	High	NWPGCL TMT, KEM, Manager attached to GM (Management)
MG-6	1	10.1.4, 10.3.1	KPIs for the Business Plan	Adoption of KPIs for the Business Plan	Obligatory	High	Low	NWPGCL TMT, KEM, Manager attached to GM (Management)
MG-7	1	10.2.1, 10.3.1	Target values of each KPI	Define target values of each KPI for the Business Plan	Obligatory	High	Low	NWPGCL TMT, KEM, Manager attached to GM (Management)
MG-8	1	10.3.1	Business Plan	Board Approval of the Business Plan	Obligatory	High	Low	NWPGCL Board
MG-9	1	10.1.3	Target management	Define the schedule/ interval for target management	Recommended	High	Low	NWPGCL TMT, KEM, Manager attached to GM (Management)

Management Plan								
ID	Phase	Corresponding	Outputs	Activities/Outputs	Obligatory/ Recommended	Potential Impact	Resource Requirement	Action Agents
MG-10	1	10.2.1	Performance evaluation system	Establishment of performance evaluation system for each SBU (Power Station)	Recommended	High	Low	NWPGCL TMT, KEM, Manager attached to GM (Management)
MG-11	1	10.2.1	Virtual PPA	Setting up a virtual PPA between NWPGCL and each SBU	Recommended	High	Low	NWPGCL TMT, KEM, Manager attached to GM (Management)
MG-12	1	10.4.1	TQM committee	Establishment of the TQM Steering Committee	Obligatory	High	Low	NWPGCL TMT, KEM, Manager attached to GM (Management)
MG-13	1	10.4.1, 10.4.2	TQM promotion office	Establishment of the TQM Promotion Office	Obligatory	High	Low	NWPGCL TMT, KEM, Manager attached to GM (Management)