The Nigeria Energy Training Program (NETP)

Electric Utility Planning and Strategic Investment

December 1-5, 2003
Arcade Hotel
Abuja, Nigeria

Sponsored by:
U.S. Agency for International Development (USAID)

Hosted by:
National Electric Power Authority (NEPA)

Organized by:
Energy Group
INSTITUTE OF INTERNATIONAL EDUCATION

Agenda & Overview

Electric Utility Planning and Strategic Investment

December 1-5, 2003
Arcade Hotel
Abuja, Nigeria

Workshop Agenda

Monday - December 1, 2003

10:00 AM **Welcome and Opening Remarks**
Senator Liyel Imoke, Honorable Minister of Power, Ministry of Power and Steel
Eng. Joseph Makoju, MD/CE, National Electric Power Authority (NEPA)
Dr. Sam Agbogun, ED, Corporate Planning, National Electric Power Authority (NEPA)
Ms. Sherry Suggs, Deputy Director, USAID Nigeria

11:10 AM **Workshop Overview**
Joanne Dixon, IIE Energy Group

11:15 AM Tea/Coffee Break

11:30 AM **Section 1** **Utility Planning Framework**
Discussion on relationship of electric sector planning with overall economic and energy planning. Electricity business models, nature of competitive environments, contemporary utility business structures (public/private utilities, single/multiple buyers, IPPs, BOO, BOT, models etc). Overall process of utility planning, planning constraints, analysis of issues confronting utilities (SWOT analysis), relationships amongst technical, financial and strategic planning and concepts of short, medium and long term plans. Utility management structures and levels for corporate and functional-level decision making. (Ashfaq Mahmood)

1:00 PM Lunch (provided on-site at the Arcade Hotel restuarant)

2:00 PM **Section 1** **Utility Planning Framework** *(continued)*

3:15 PM Tea/Coffee Break

3:30 PM **Section 2** **Technical Planning**
In this module, demand and supply side planning methodologies will be discussed. The discussion on demand side planning will deal with methods of demand projection, management and conservation. Supply side discussions will include evaluation of supply options, loss reduction, preparation of generation, transmission and distribution plans, preparation of power balances, rural electrification, enhancing access to electricity in rural and urban areas etc. (Roberto D'Addario)

5:00 PM Adjourn

Tuesday – December 2, 2003

9:00 AM **Section 2** **Technical Planning** *(continued)*

10:30 AM Tea/Coffee Break

10:45 AM **Section 3** **Strategic Options**
This will entail discussion on corporate and functional level policies/options. Discussion on corporate level strategies will pertain to cost unbundling, corporatisation, commercialization, restructuring, downsizing, divestment and privatization. Business strategies in competitive environments, financing strategies, target markets, fuel strategies and pricing strategies will also be discussed. (Roberto D'Addario)

Workshop Agenda

1:00 PM Lunch

2:00 PM **Section 3** **Strategic Options** *(continued)*
Discussion on functional level strategies will include options such as demand management vs. capacity expansion, choices of sizes of plants and technology, utility expansion ROE/ROA vs. long term sustainability, short term vs. long term plans, grid expansion vs. locations of generations, distribution investment, inventory management, efficiency improvements, technological choices, load dispatch strategies, reserves policies etc. (Ashfaq Mahmood)

3:30 PM Tea/Coffee Break

3:45 PM **Section 3** **Strategic Options** *(continued)*

5:00 PM Adjourn

Wednesday – December 3, 2003

9:00 AM **Section 4** **Financial Planning**
Basic concepts of financial statements (income, cash flow and balance sheet), principles to check the financial health of a utility (performance ratios, arrears etc) and measures to attract investment (pubic/private) will be reviewed. Future projections of financial statements, capital budgeting for future investments and impacts of new investments on the projected financial health of the utility would be discussed. (Ashfaq Mahmood)

10:30 AM Tea/Coffee Break

10:45 AM **Section 4** **Financial Planning** *(continued)*

1:00 PM Lunch

2:00 PM **Section 4** **Financial Planning Case Study**

3:30 PM Tea/Coffee Break

3:45 PM **Section 4** **Financial Planning Case Study** *(continued)*

5:00 PM Adjourn

Thursday – December 4, 2003

Section 5 **Risk Assessment and Scenario Development**
This module will discuss identification of technical and financial risks of projects, investments, operation and risks associated with various strategies. Discussion will also focus on iterative nature of strategic planning and development of various scenarios. (Roberto D'Addario)

10:30 AM Tea/Coffee Break

10:45 AM **Section 5** **Risk Assessment** *(continued)*

Electric Utility Planning and Strategic Investment

December 1-5, 2003

Arcade Hotel

Abuja, Nigeria

Workshop Agenda

1:00 PM Lunch

2:00 PM **Section 6** **Company Infrastructure Planning**

6.1 Human Resources

This module will cover discussion on the process of assessment of need of human resources in specific areas of expertise, issues of over and under staffing and corresponding adjustments, comparison of utility staffing practices with best practices, training, motivation, incentives, career progression policies, performance efficiency, organizational loyalty, avoidance of obsolescence, appointments based on political vs. merit/competence etc. (Ashfaq Mahmood)

3:30 PM Tea/Coffee Break

3:45 PM **Section 6** **Company Infrastructure Planning** *(continued)*

6.2 Customer Service

Review of customers needs, current state of customer service, plan for improving customers' service, emphasis on quality and standard of service etc., customers' education. (Roberto D'Addario)

5:00 PM Adjourn

Friday – December 5, 2003

9:00 AM **Section 6** **Company Infrastructure Planning** *(continued)*

6.3 Institutional Arrangement for R&D and Planning

Institutional arrangement for R&D in improvements in all facets of utility business, communication, strategic planning etc. (Roberto D'Addario)

10:00 AM **Workshop Review**

11:00 AM **Closing Remarks**

NEPA

USAID Nigeria

11:30 AM **Workshop Graduation**

Tea/Coffee available following Workshop Graduation

** Notes:

1. The workshop will be begin each day, Monday-Friday, at 9:00 AM and conclude at approximately 5:00 PM. – except for Monday, on which workshop opening will begin at 10:00 AM.
2. The Workshop Graduation on Friday will conclude by 1:00 PM.
3. Two coffee/tea breaks will be held each day (at approximately 10:30 AM and 3:30 PM).
4. Lunch will be provided each day, Monday through Thursday, at the Arcade Restaurant (at approximately 1:00 PM)
5. Session timings are approximate and may be adjusted during training to best fit instructor presentations & discussions.

Electric Utility Planning and Strategic Investment

December 1-5, 2003

Arcade Hotel

Abuja, Nigeria

Workshop Instructors

Ashfaq Mahmood

Mr. Ashfaq Mahmood has served in several posts for the federal government of Pakistan, notably as the Secretary of the Pakistan Ministry of Planning and Development (1993-95), and later, Ministry of Water and Power in 1995 through 1997. As Secretary, he planned and directed key activities of Pakistan's power sector, which has an installed capacity of about 18,000 MW and serves a population of about 145 million. He played a major role in developing policies that brought private sector investment to the power sector, and placed Pakistan at the forefront of the worldwide trend towards privatization. As Secretary, Mr. Mahmood emphasized restructuring and privatization of the power sector, including the development of privately owned generation plants, corporatization and commercialization of WAPDA, the dominant public utility, and the creation of a regulatory authority.

Continuing in service to the executive leadership of Pakistan, Ashfaq Mahmood was appointed to the position of Special Secretary of Corporate Finance Ministry of Finance in 1998 and the Secretary of the Ministry of Information Technology and Telecommunications of Pakistan in May 2001. Prior to his positions as Federal Secretary, he worked at different levels in the Planning Commission of Pakistan in the Energy/Power Sector from 1973 to 1993 and became head of the Energy Wing in 1987. Responsibilities included energy analysis and planning, review of investment options, formulation of policies, strategies, and tariff proposals, appraisal of both public and private projects, and negotiation of loans with donors. He acted as the Government's principal counterpart for USAID's $105 million Energy Planning and Development Project between 1987 and 1993.

Mr. Mahmood has also led many delegations for negotiations of loans with multilateral and bilateral donors. He negotiated a $1.2 billion loan with a consortium of World Bank, Asian Development Bank, OECD, Japan, Belgium, and Great Britain for a large hydro project. Other loans that he has negotiated include: $400 million Energy Sector Loans with World Bank; $500 million loan for Social Action Plan with the World Bank, Asian Bank and Japan and $750 million loan for National Drainage Program.

Recognized internationally, Mr. Mahmood has been a Visiting Professor for Energy Planning and Policy at the University of Pennsylvania, Philadelphia, USA, Utility Strategic Investment Planning course for the Energy MBA Program at International Management Institute Kiev, Ukraine and workshop on Formulation & Implementation of Private Power Agreements in Dhaka, Bangla Desh. He is also a Visiting Professor, Strategic Management/Business Policy, in MBA Program of International Islamic University, Pakistan. In his earlier career he was Lecturer in Electrical Engineering, Engineering University, Lahore, Pakistan from 1971 to 1973.

Mr. Mahmood is an Electrical Engineer by training. He possesses an MS degree in electrical engineering from Vanderbilt University, Nashville,TN, USA and various diplomas from Oxford, UK; Berlin, Germany and New York, USA. He is recipient of National Talents medal and a member of Etta Kappa NU.

Workshop Instructors

Roberto D'Addario

Mr. D'Addario is Vice President and Director of the Consultancy Area of Mercados Energéticos, where he also provides advisory services in the Regulation, Restructuring and Public Policies Area.

With more than 20 years of experience in the electricity sector, Mr. D'Addario is an expert in restructuring related issues of power markets and businesses, institutional and regulatory design of electricity markets in competitive environments, design of incentive-based schemes for promoting private sector participation, design and implementation of rules, procedures and operational standards, competition policies, design of regional energy markets, and, in general terms, in the provision of advisory services to governments, regulatory entities, utilities, system operators, risk management and financial companies.

As a former advisor to the Argentine Energy Secretariat, he had a direct responsibility in the transformation process of the Argentinean power industry. He also had a direct participation in the development of the new regulatory framework, procedures and detailed rules drafting for the wholesale market and the power transmission activity, and in the creation and start-up of CAMMESA, the Wholesale Electricity Market Managing Corporation, where he was appointed Director in its first Board. Previously, he occupied various technical and managerial positions at the National Dispatch Center.

In Mercados Energéticos, Mr. D'Addario has been involved in many projects, such as in: Bolivia, for the Capitalization Secretariat - development and implementation of wholesale market rules, power transmission and quality of service; in China, Mr. D'Addario has worked in Sichuan, in the design and development of market rules in transmission; Tanzania, for the Presidential Parastatal Sector Reform Commission - design of the new power sector structure, unbundling of the existing vertically integrated utility, development and implementation of rules and regulations for the wholesale market, transmission, distribution and organization and start up of the new TransCo and Market Operator. Additional countries of experience include Bolivia, Brazil, Chile, Colombia, El Salvador, Guatemala, India, Nicaragua, Nigeria, Peru, Trinidad & Tobago, Ukraine, Uruguay and Zambia.

Mr. D'Addario graduated at the University of Rosario (Argentina) as an Electrical Engineer, and he attended post-graduate courses in Control Centers in Erlangen (Federal Republic of Germany).

Nigeria Energy Training Program
Reform in the Electricity and Gas Sectors

Program Summary

Nigeria is the most populous country in Africa with a rapidly growing population of around 120 million. Despite the country's relative oil wealth, poverty is widespread. Yet despite the low level of income, Nigeria has significant potential economic wealth, which could sustain growth and development. Much of this wealth is in natural resources such as energy and agriculture. Nigeria's economy is highly dependent on the oil sector, which accounts for 50% GDP and 90% of foreign exchange earning.

Rational development of Nigerian energy resources will be a necessary basis for sustainable economic growth. Despite electricity rates that are below the cost of service, and the national utility's (NEPA) inability to invest in system expansion, the company's ambitious growth plans include expanding service access to reach 85% of the population by the year 2010, renovating its generating plants and transmission systems, and adding 2000 MW of new generating capacity by 2003. Within this plan, there is an opportunity to liberate Nigeria's energy sector and to invite participation of the private sector. In order to attract private investment, necessary reform involves the legislation of the electricity law, creation of a regulatory framework and a regulatory commission, unbundling and commercialization of NEPA.

In the gas sector, Nigeria has an estimated 124 trillion cubic feet of proven natural gas reserves (9th largest in the world). The main thrust of current natural gas policy is to eliminate gas flaring (currently at 75% of gas production) and encourage the development of the currently weak infrastructure through private investment. These essential measures will help to realize the government's plan of making gas exploration and production one of its main priorities over the next decade. Although the Nigerian Gas Company (NGC), has a monopoly on the supply of gas to the domestic economy; many of the world's major companies are active in Nigeria (Shell, ExxonMobil, Texaco, Chevron, BP/Amoco, Conoco, Elf, Total and Agip).

Program Activities Completed

• *Training Needs Assessment*: Following a review of the Framework for U.S.-Nigeria Energy Cooperation, the IIE Energy Group (IIE/EG) conducted an on-site analysis of the Nigeria energy sector training needs and made recommendations for training activities, with special attention to cross-cutting initiatives that might integrate existing energy sector support projects. In Abuja the IIE/EG team met with a diverse cross-section of organizations, including the USAID/Mission and its contractors, the World Bank field office, and senior government Nigerian officials. The Nigerian organizations consulted include: Ministry of Power & Steel, Nigerian National Petroleum Corporation (NNPC), Nigeria Electric Power Authority (NEPA), Office of the Presidential Adviser on Petroleum & Energy, Bureau of Public Enterprises (BPE), Petroleum Products Pricing Regulatory Committee (PPPRC), Senate Committee on Petroleum Resources, Senate Committee on Power, and Nigeria Gas Company (NGC). As a result of these meetings, a comprehensive training plan to address key issues in the power, oil and gas sectors over the next two years was drafted and submitted to USAID/EGAT in May 2002.

• *Negotiating Large Power Purchase Agreements*: The one-week workshop designed to improve skills in negotiating and implementing private power generation contracts with international power companies, was held in Abuja, Nigeria at the Sheraton Hotel, January 6-10, 2003. The workshop was successful in transferring key skills and capacities in the vital elements of power purchase agreements (PPA), including project finance and risk, project development and solicitation, PPA structure, and implementation agreements, and offered international experience regarding the integration of Independent Power Projects (IPP) into power markets, PPA under various market structures and the future prospects of IPP/PPA. There was a total of thirty-eight (38) participants comprised of mid to senior-level representatives from Ministry of Power & Steel (10), Ministry of Finance (2), NEPA (9), the Bureau of Public Enterprise (BPE) (5), and others representing private banks and energy companies. The workshop was sponsored by USAID/EGAT, with assistance from the Nigeria Mission, and hosted by the Ministry of Power and Steel.

• *Tariff Structure & Ratemaking in the Power Sector:* This one-week workshop, held in Abuja on the week of April 28, 2003, was designed to improve the participants' understanding of the political and economic aspects of cost-of-service rate making, and their skills computing tariffs according to these principles. The workshop highlighted key features such as: utility organization, electricity reform, revenue requirement, cost of service and pricing, tariff design, rules and regulations, and competitive markets and privatization. A total of 50 participants took part in the training, representing Ajakouta Steel Company (NEPA's largest industrial customer), the Bureau for Public Enterprises (BPE), the Ministry of Power and Steel, NEPA, NNPC, NIGELEC (the electric utility in Niger, and NEPA's largest export customer) (1), the Utility Charges Commission, and a stakeholder NGO, Citizen's Poverty Forum. The workshop was sponsored by the U.S. Department of Energy, Policy and International Affairs, in partnership with USAID/Washington, and with assistance from the Nigeria Mission. The workshop was hosted by Nigeria's National Electric Power Authority (NEPA).

• *Power Sector Regulation and Reform:* This one-week course was held in Abuja, Nigeria during the week of May 19, 2003. The workshop provided participants with an understanding of the benefits of restructuring and regulatory reforms, how to develop a power sector reform program, and how to implement regulatory reform and operate a regulatory commission. A total of 41 participants took part in this workshop. The agencies and organizations represented included the Bureau of Public Enterprises (BPE), Utilities Charges Commission, National Electricity Power Authority (NEPA), the Federal Ministry of Power and Steel, NNPC, NGC, Shell, Eskom and the Energy Commission of Nigeria.

• *Natural Gas Contract Negotiation*: To support the GON's plans for the development of a domestic natural gas infrastructure, the joint USAID/USDOE Nigeria Energy Training Program offered this one-week, in-country workshop in coordination with the Bureau of Public Enterprise (BPE) for government officials and professionals of the gas sector involved in preparing, negotiating, and managing the long term E&P and gas sale and purchase (GS&P) agreements. The course covered E&P and GS&P agreement principles and provisions and discussed them in the overall context of the integrated chain of gas activities from reservoir to market, with emphasis on the gas industry development. Two local Nigerian gas experts also made presentations during the workshop. The workshop took place June 9-13, 2003 in Abuja and was attended by 50 participants, mid to senior-level policy makers, legal advisors, engineers, planners and marketers from BPE (17), NEPA (3), NNPC (7), NGC (2), Federal Ministry of Petroleum Resources (5), Federal Ministry of Power and Steel (2), and local staff of a few energy developers including AES Nigeria and Shell Nigeria.

Future Activities

A USAID-sponsored workshop on *Management of a Distribution Company (DisCo): Customer Service, Metering, and Billing & Collection* is scheduled for January 2004, in cooperation with the National Electric Power Authority (NEPA), Marketing Department.

USAID is also considering a one-week, in-country workshop on *Natural Gas Industry Development* to further support the sector's reform and restructuring effort in the first half of 2004.

Section 1
Utility Planning Framework

<u>Reshaping the Electricity Markets</u>

Electricity business concepts have undergone spectacular transformation over the last decade or so. Previously, most of the utilities were vertically integrated monopolies in the public sector. Utilities were supposed to be natural monopolies because of diseconomies of duplication of infrastructure by competitors. However, new market concepts supported by technology have broken this myth and we are now witnessing reshaping of the markets round the globe. Typically, following are the steps towards reshaping the markets:

1. **Re-organizing the Public Sector Monopolies**
   - *Commercialization (e.g. following commercial accounting practices)*
   - *Restructuring (formation of separate companies such as Gencos, Transcos, Discos, Dispatch etc)*
   - *Privatization (sale of majority shares or strategic sale of shares with management rights etc)*

2. **Opening up the market for competition**

   G*eneration*
   - *Inviting Independent Power Producers (IPPS) to set up Greenfield generation plants under Build Own Operate (BOO) or Build Own and Transfer (BOT) agreements with purchasing utility or on market competition basis*
   - *Buy Existing plant/plants from existing utility and operate in private sector.*

   Transmission
   - *Transmission grid system to become a commercial common carrier, providing a level playing field to everyone. Load dispatch to be done according to a well established economic criteria and/or as per the agreements between the supplier and the purchasers. In other words it becomes a wholesale market.*

   Distribution
   - *Separation of wire business (the distribution infrastructure) from commercial business.*
   - *Enabling end users to enter into direct contracts with suppliers.*

3. **Regulation**
   - *Regulatory are being set up to oversee/regulate the electricity sector in A nondiscriminatory competitive manner, protect the interest of customers And lay down rules and regulations for the market.*

Further discussion on the above will be done in the session on Technical Planning. In brief, reshaping the electric sector introduces many new players in the market and a new competitive environment is created. In sophisticated markets, IPPs bid for their share of market on half hourly basis. Middlemen, buying bulk power for sale to retailers have also come on the scene. Utilities need no more to be vertically integrated!

Section 1 Utility Planning Framework

Utility Planning in the Emerging Paradigm

Whatever the nature of the utility business, some basic steps are common to all utility planning exercises. Essentially these are:

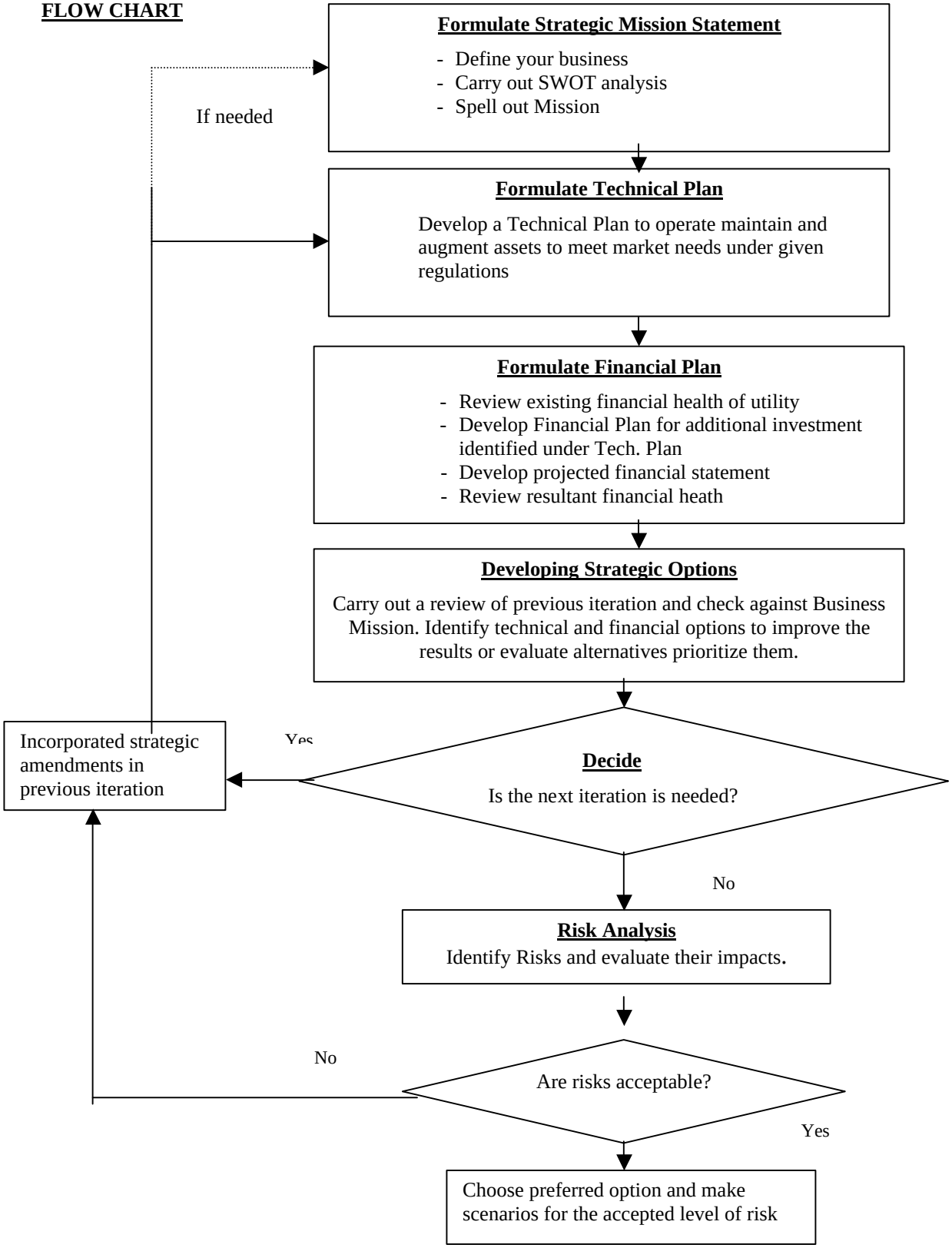
1. Definition of business and formulation of it's Mission (e.g. Generation, Transmission, Distribution)
2. Formulation of technical plans
3. Evolve strategic options
4. Formulate financial plans and analyze options
5. Develop company infrastructure (e.g. organization structure, human resources)
6. Evaluate risks and finalize plans

Figure 1 depicts a utility planning framework. It is further explained in the following paragraphs.

Figure-1

Utility Strategic Planning Framework

FLOW CHART



*N.B. **SWOT**: **S**trength, **W**eakness, **O**pportunity, **T**hreat*

Formulating Utility Strategic Mission Statement

Define Your Business: Understanding the nature of business

The first step in formulating a Mission Statement is to define your business by asking the following sort of questions:

Q.1 What is your business?

e.g. Thermal Power generation nuclear, hydel generation, transmission and Power control, distribution wire and/or commercial business .

Q.2 Who are, your customers, and what are their needs(e.g. reliability, quality of service, price etc)?

The customers for power generators can be the power pool, adjoining system or direct buyers. For a transmission company the customers are the distributors. For distributors, the customers are the ultimate consumers.

What are customer needs?-------quality, reliability, adequate supply capacity, good billing and bill collection arrangements, rational prices etc.

Q.3 What will be your business in future?

If you are a power generator, do you anticipate direct sales to ultimate consumers in future? Will you focus on peak power supply or base load? If you are a power control, dispatch and transmission company, do you anticipate separation of these functions in future.? If you are in distribution business, do you anticipate their separation of wire and commercial business? Do you foresee adding a consultancy arm in your current business? Do you foresee expansions in non-profitable areas etc? i.e. less consumer density (rural, suburban)? What obligations are likely to be imposed by the regulator for access of electricity?

Analysis of Strengths, Weaknesses, Opportunity, and Threats (SWOT)

Keeping in view the nature of business, one should carry out an analysis of Strengths, Weakness, Opportunities and Threats to the business before finalizing Mission Statement. Strengths and Weaknesses relate to the internal environments of a utility i.e. resources available to the company. The Opportunities and Threats relate to environments external to a company. An illustrative set of questions to assess SWOT related to an electric utility is given in the Tables 1&2.

Table 1
Analysis of Strengths and Weakness
(Illustration)

Illustrative set of factors	***Strength***	***Weakness***
1. State of Physical Assets	Efficient, well maintained, reliable, state of the art	Inefficient, frequent breakdowns, old etc.
2. Human resources, capabilities	Well trained, motivated, appropriately staffed.	Ill trained, demoralized, overstaffed.
3. Leadership	Visionary, participative, motivating, well connected, professional, honest.	Myopic, dictatorial, uninspiring, non professional, dishonest
4. Turn-over of trained employees	Low	Very high
5. Organizational Culture	Frank, dutiful, customer friendly, disciplined honest.	Non-cooperative, intrigues, ill disciplined corrupt.
6. Customer satisfaction, service	Customers are loyal, customers have a sense of ownership, customers are satisfied. Good customer service.	Customers are defecting, customers are not happy. Poor customer service.
7. Overall financial health (i.e. arrears, billing, receivables, liabilities, reserves, debt: equity etc)	Financial ratios show that the company is strong.	Poor financial ratios.
8. Operational Efficiency (losses, thefts etc)	Good, efficient	Inefficient
9. Capacity Utilization	High	Low
10. Nature of asset.	Valuable, no capacity constrained	Old, not of much value, constrained.
11. Availability of fuel, water	No constraints	Constrained.

Table 2
Analysis of Opportunities and Threats

Illustrative set of Factors	*Opportunities*	*Threats*
Business Related Factors		
1. State of competition	Fair	Unfair
2. Demand Growth	High – because it will enable higher capacity utilization	Low- because it may result in low capacity utilization
3. Fuel/Raw Material Suppliers	Reliable, good quality, diverse sources (not all eggs in one basket)	Unreliable, quality not reliable, dependence on a few suppliers.
4. Spares	Reliable supply	
5. Neighboring utilities	Experiencing power shortages	Not readily available
	Support low cost generation (e.g. flared gasses)	Abundant/surplus in supply
6. Country's energy resources and policies	High – it might result in high demand	Lack of endowment of good energy resources.
Global Factors		
Economic		
-GDP growth Rate	High - may result in high growth in demand	Low- may constrain demand
-GDP Structure	More industrial -relatively more power demand	More agricultural -relatively less power demand
-Inflation	Low	High
-Exchange Rates	Stable	Unstable
-Interest Rates	Low	High
Technological		
Technological changes, (e.g. more efficient technologies such as combined cycle plant coupled with availability of natural gas, dispatching soft and hard wares, high voltage transmission new technologies, DSM technologies new metering and billing systems, new cables,	Less likely in near future	More likely in near future

Illustrative set of Factors	***Opportunities***	***Threats***
constructions technologies etc.)		
Social Consumer demand patterns on the basis of changes in social practices. (more activities in the evenings, heating and cooling preferences) **Demographic** Changes in rural urban mix, population growth rate **Legal** - Regulations (licensing regime, tariff formulae, transfer pricing, standards etc) - Tax Laws - Government Polices (e.g. Universal Access, opening up new areas, fuel policies) **Political Factors** - Form of Government - Governments' support of utilities	Infrequent	Frequent

Considerations in formulating Strategic Mission Statement

To formulate a Mission Statement, it is essential to identify the stakeholders, and their interests. Table 3 identifies key stakeholders in the utility business their expectations.

Table 3
Assessing Stake-Holders Concerns/Claims

Stakeholders	Expectations from business
Inside 1. Stockholders (Provide capital)	Appropriate ROE
2. Employees (Provide labour and skills)	Reasonably high income and job satisfaction
Outside 1. Customers	Value for money, reasonable price quality, reliability of service
2. Input Suppliers	Dependable buyers.
3. Governments	Adherence to rules and regulations
4. Unions	Benefit for their members (Provide labour discipline)
5. Rivals, competitors	Fair competition
6. Local Communities and General Public Citizens	Companies to be responsible corporate Quality of life should not be impaired due to company's existence (e.g. environments).

Keeping in view the interests of the stakeholders and the analysis of strengths, weaknesses, opportunities and threats (SWOT) a strategic mission statement is articulated.

- Vision (e.g. The best and most efficient Guardian Company)

- Strategic Goal (1. e.g. Earn at least an ROE of "x %")

  (2. e.g. Install 500 MW in 3 years)

  (3. _____)

- Corporate Philosophy (1. e.g. treating customer as a boss)

  (2. e.g. environment friendly)

  (3. _____)

Institutional Framework

Article of the Law

- **9 Formation of successor companies**
  - The National Council on Privatization shall, not later than eight months after the formation of the initial holding company pursuant to section 2 of this Act, take such steps as are necessary under the Companies and Allied Matters Act to form such number of additional companies, limited by shares, as the National Council on Privatization may deem appropriate, which shall be the successor companies for assuming the assets and liabilities of the initial holding company including, but not limited to, companies with functions relating to the generation, transmission, trading, distribution and bulk supply and resale of electricity.

15 Licensing of the successor companies

- (1) On the transfer date specified in the relevant transfer order, the Commission shall issue an appropriate interim license, pursuant to subsection (3) of section 54, to each successor company, which shall be valid for a period not exceeding one year.
- (2) A successor company that has received an interim license pursuant to subsection (1) shall, within six months thereafter, apply to the Commission for a regular license in accordance with the provisions of Part IV of this Act.

16 Privatization

- (1) The National Council on Privatization may, at any time or times and by such means as it deems appropriate, begin the process of privatization of the successor companies that are holders of generation licenses, distribution licenses or a transmission license, in accordance with ….
- (2)…, the Commission shall prepare, each year, a report for the Minister as to the potential for competition in the Nigerian electricity supply industry. These reports shall present the Commission's analysis and recommendations as to whether the Nigerian electricity supply industry has developed to the point where a more competitive market ought to be established …., having regard to:
  - (a) the degree of privatization that has occurred;
  - (b) the existence of a sufficiently large number of potentially competitive entities, so as to avoid the likelihood of an abusive market power; and
  - (c) the existence of other preconditions, including the necessary metering and information technology infrastructures, required for the operation of a more competitive electricity market.

16 Privatization (cont.)

- (3) ….. When the Minister, in consultation with the National Council on Privatization and the President is satisfied that the electricity market in Nigeria has developed to the point where a more competitive market ought to be established …….(c), the Minister shall issue a declaration that a more competitive electricity market is to be initiated.

Section 2
Technical Planning

Technical Planning

Preparation of generation plans

Mercados®
Energy Markets Group
Madrid - Washington DC
Rio de Janeiro - Buenos Aires - Montevideo

56 Generation licenses

- (1) Subject to such terms and conditions as the Commission may fix in the license, a generation license shall, as the circumstances may require, authorize the licensee to construct, own, operate and maintain a generation station for purposes of generation and supply of electricity in accordance with this Act
- (2) Subject to this Act, the holder of a generation license may sell power or ancillary services to any of the classes of persons specified in the license.
- (3) The Commission may issue generation licenses to:
  - (a) one or more of the successor companies formed pursuant to section 10, herein described as a "successor generation company"; or to
  - (b) one or more entities that are not successor companies formed pursuant to section 10, herein described as an "independent power producer."

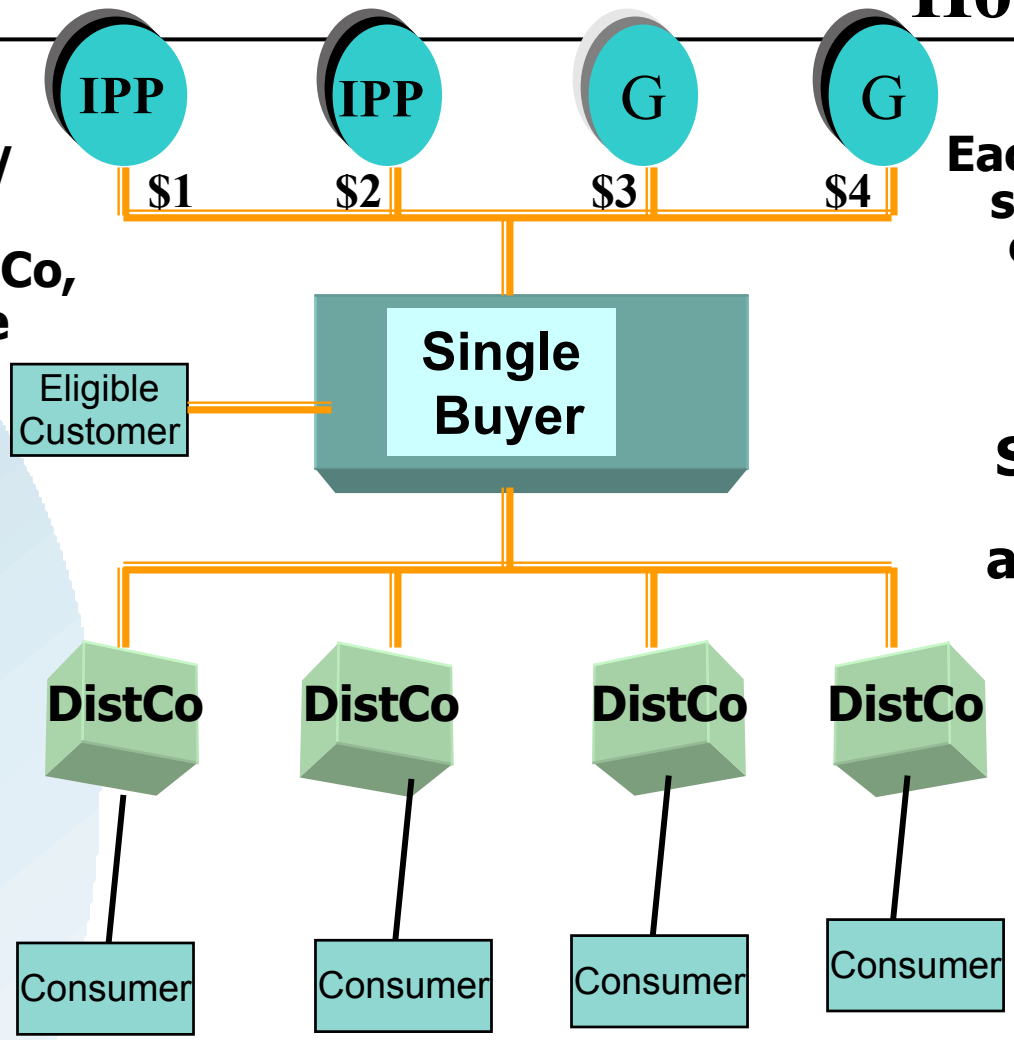
Generation Business in an Unbundled Sector

- Single Buyer model
- Bilateral/multilateral transactions
- Balancing market

Single Buyer (SB) Model : How it works

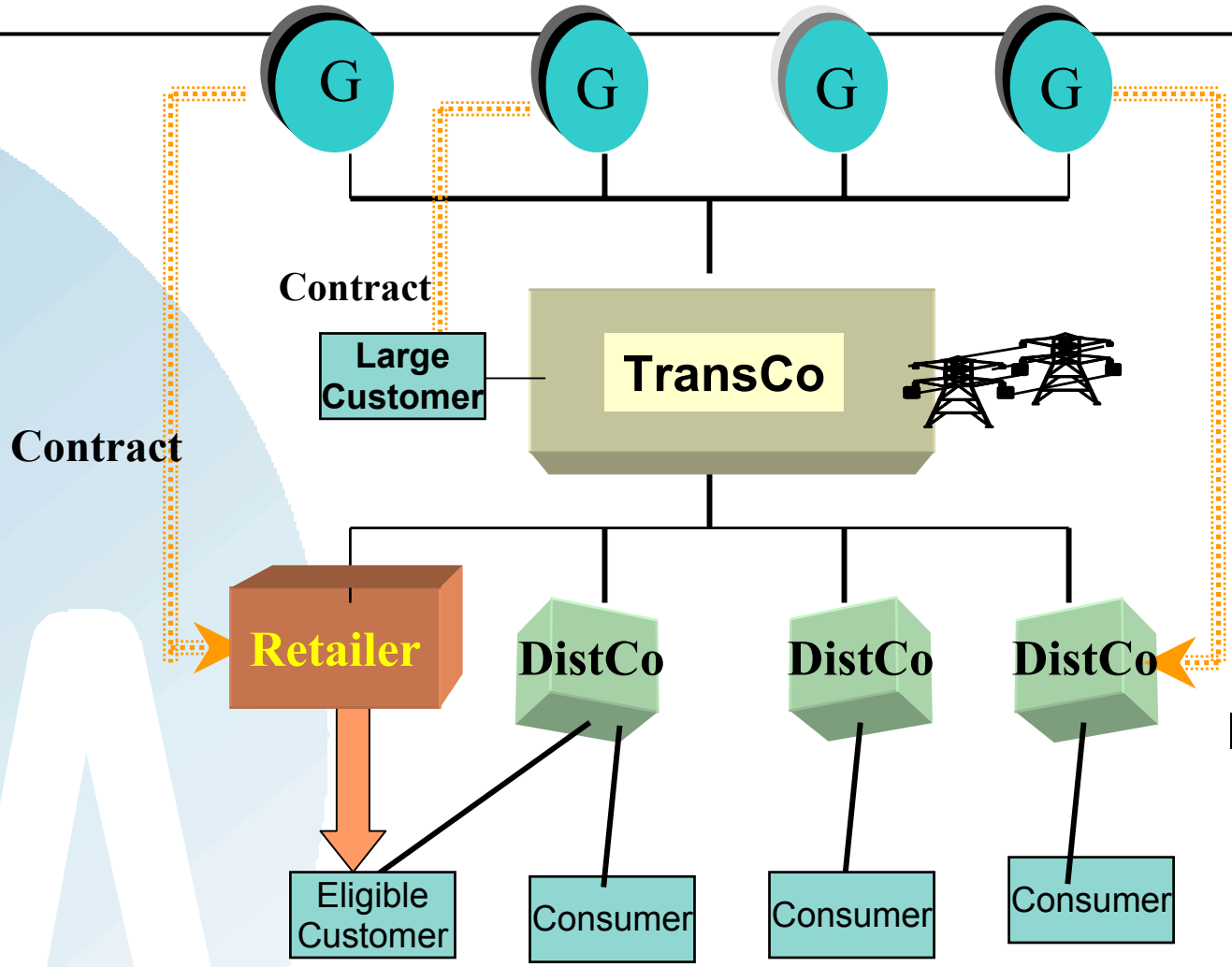
SB has a PPA / contract with each IPP or GenCo, with its price

Each IPP and Genco sells at its PPA / contract prices



SB sells to each DistCo and EC at same price = mix of buying prices

Multiple Buyers and Sellers

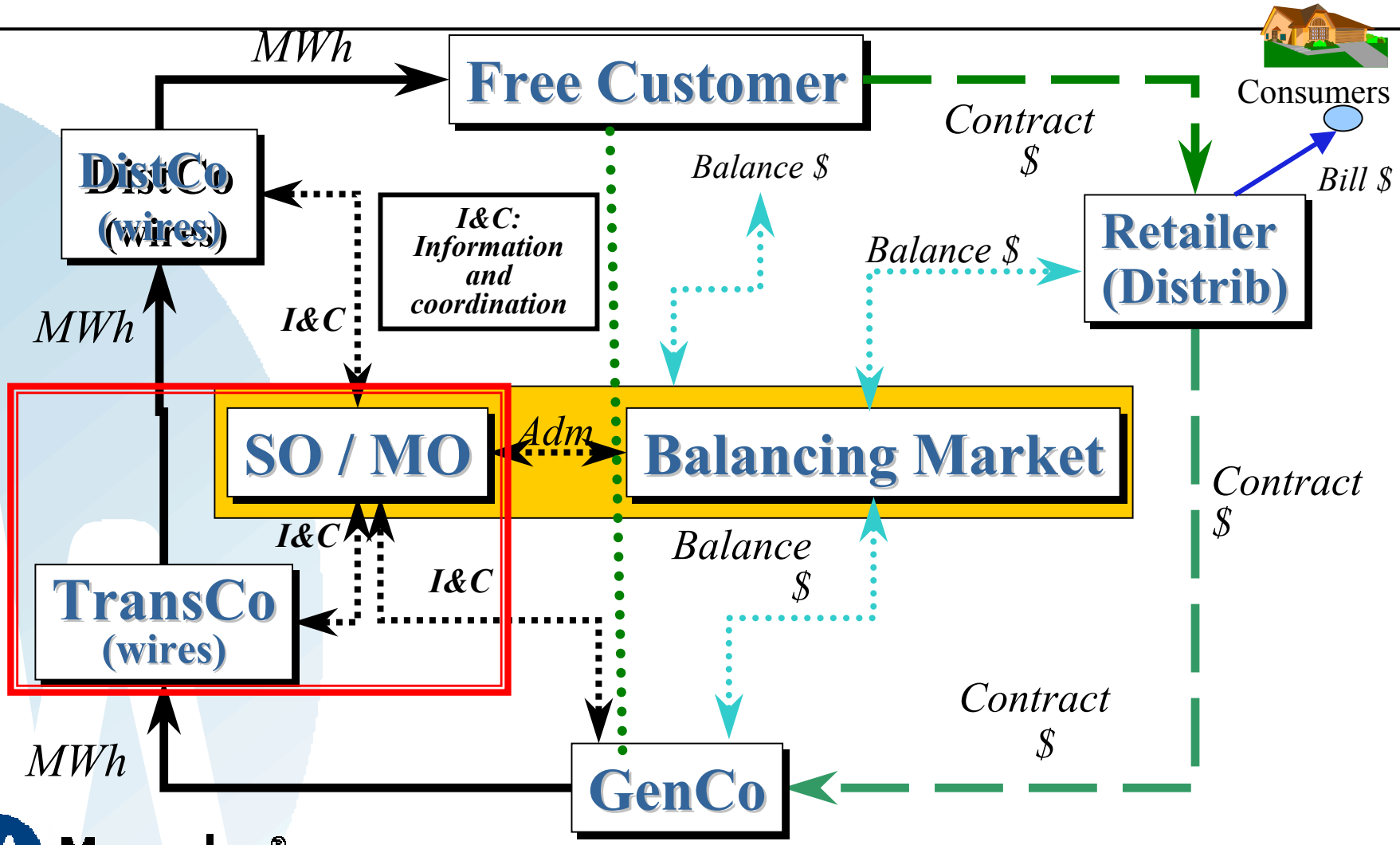


All Transmission users connected by grid.

Direct Bilateral Contract

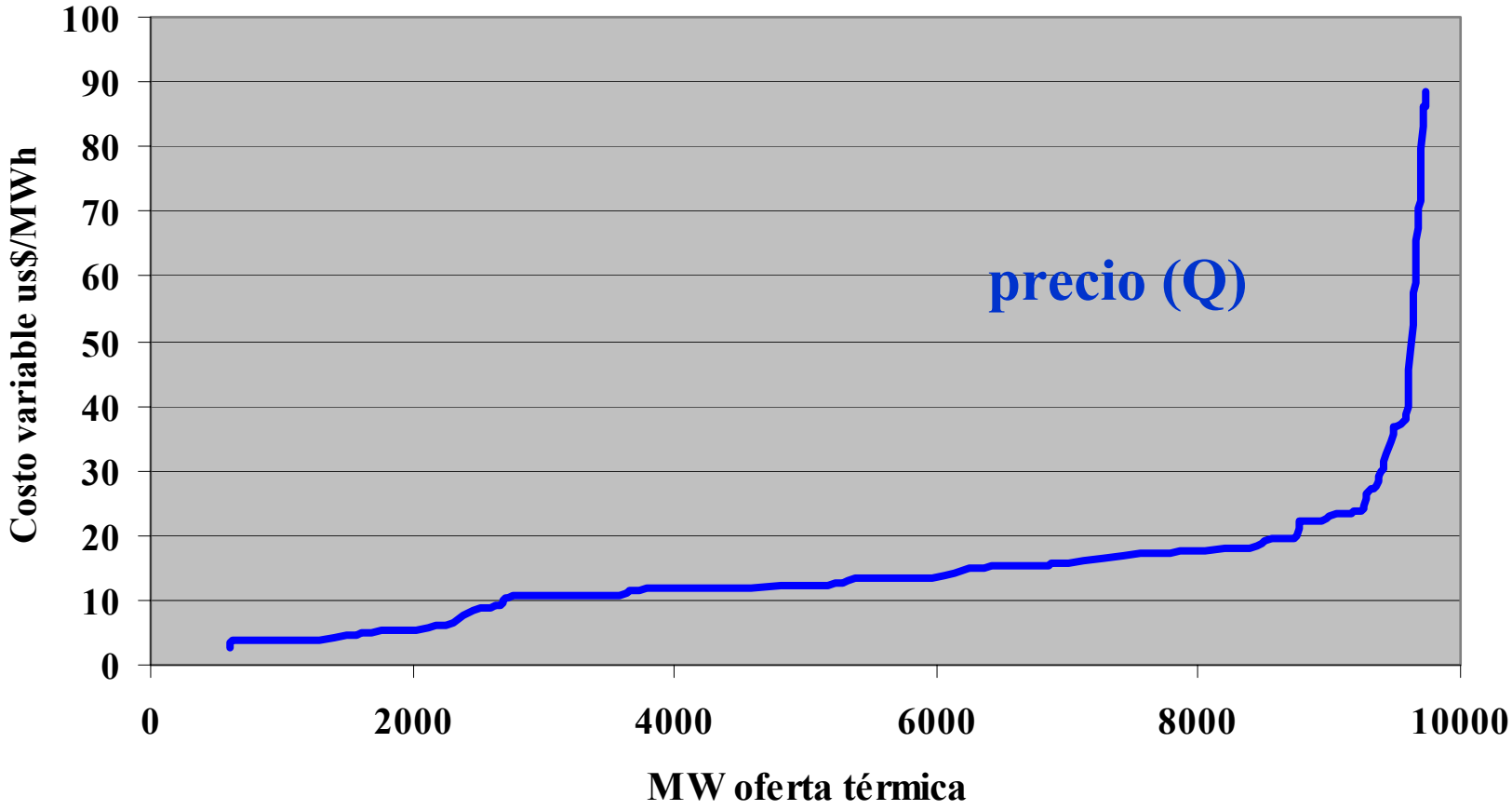
In Contracts, Participants connect bilaterally

Ways to Trade

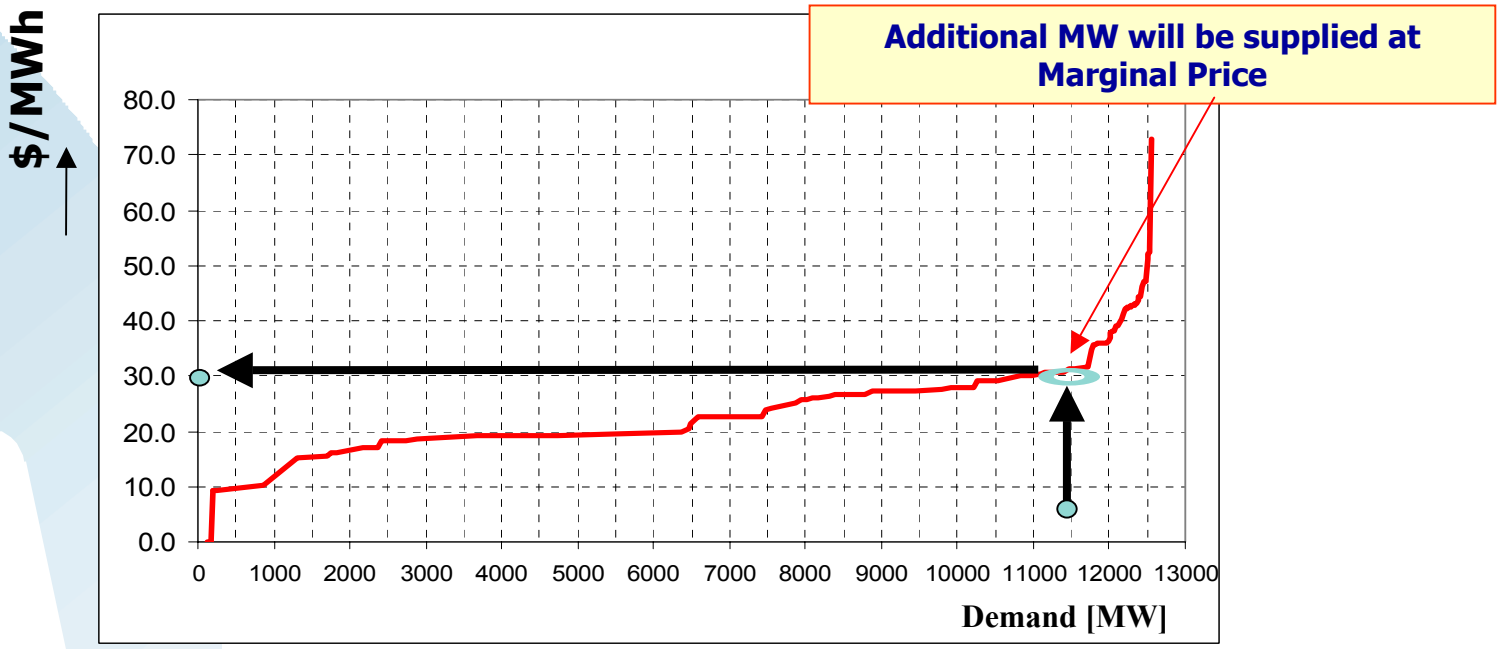


Mercados®
Energy Markets Group
Madrid - Washington DC
Rio de Janeiro - Buenos Aires - Montevideo

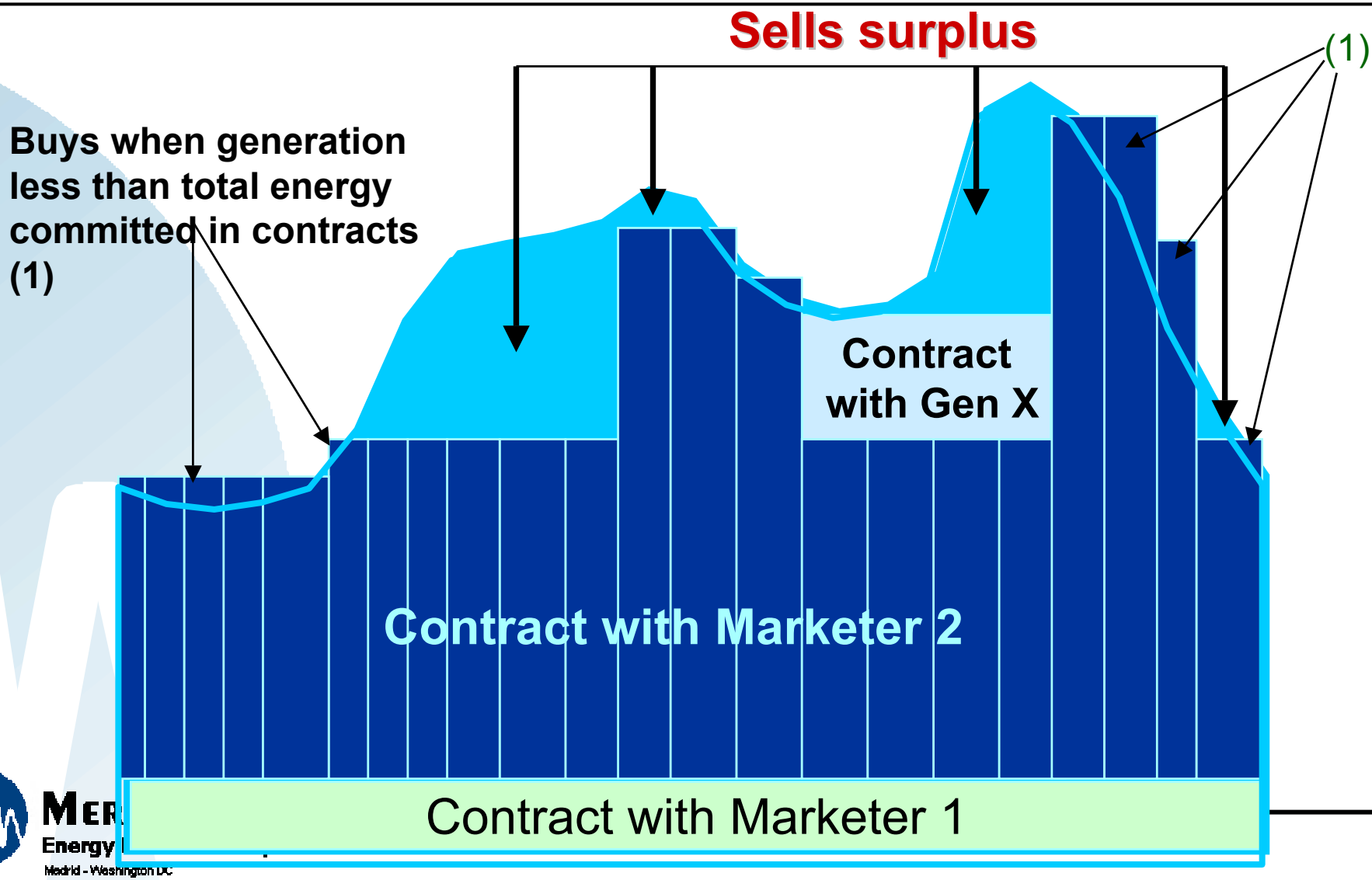
Prices as a Function of the Required Generation



Marginal Price



Balancing: Generator



Real time Balancing market

- Bids used to modify generation scheduled (contract) to correct imbalances and congestion
  - Most trading will be by bilateral contracts
  - Also to correct load (shortages), manage congestion

The Generation Business in Competition

- The market price
  - Short Run Marginal Cost
- The Market Price is the reference
- Whatever the market model is, the most sustainable investment is the one that is profitable with market prices

Business Strategy

- By far the capital component is the most relevant in the Generation business
- Success in this business is mostly equal to success in the investments
- There is business opportunity when competing in the market, with it prices arising from the competitive process, the ROA and ROE are perceived satisfactory
  - Correlate with country risks and other risks

Typical Approach to Decide Investments

- Scenarios Analysis
- Dispatch ability for each scenario
- Prices for scenarios
- Revenues
- Expenses
- Financial analysis

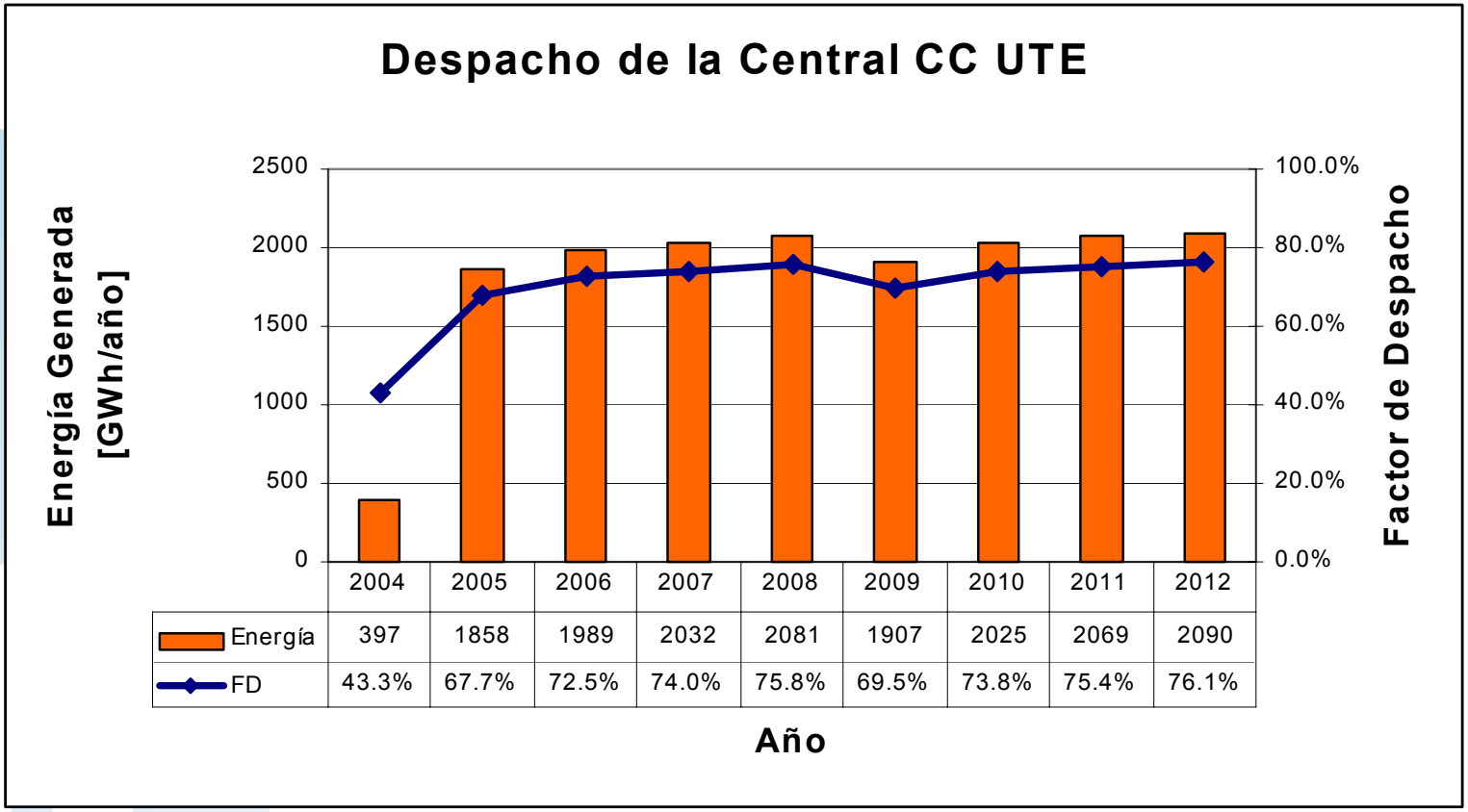
Scenarios Analysis

- Market (Demand) evolution
  - Domestic
  - regional
- Other investments and decommissioning
- Fuel cost evolution
- Technology
- Hydro conditions

Dispatch ability for each scenario

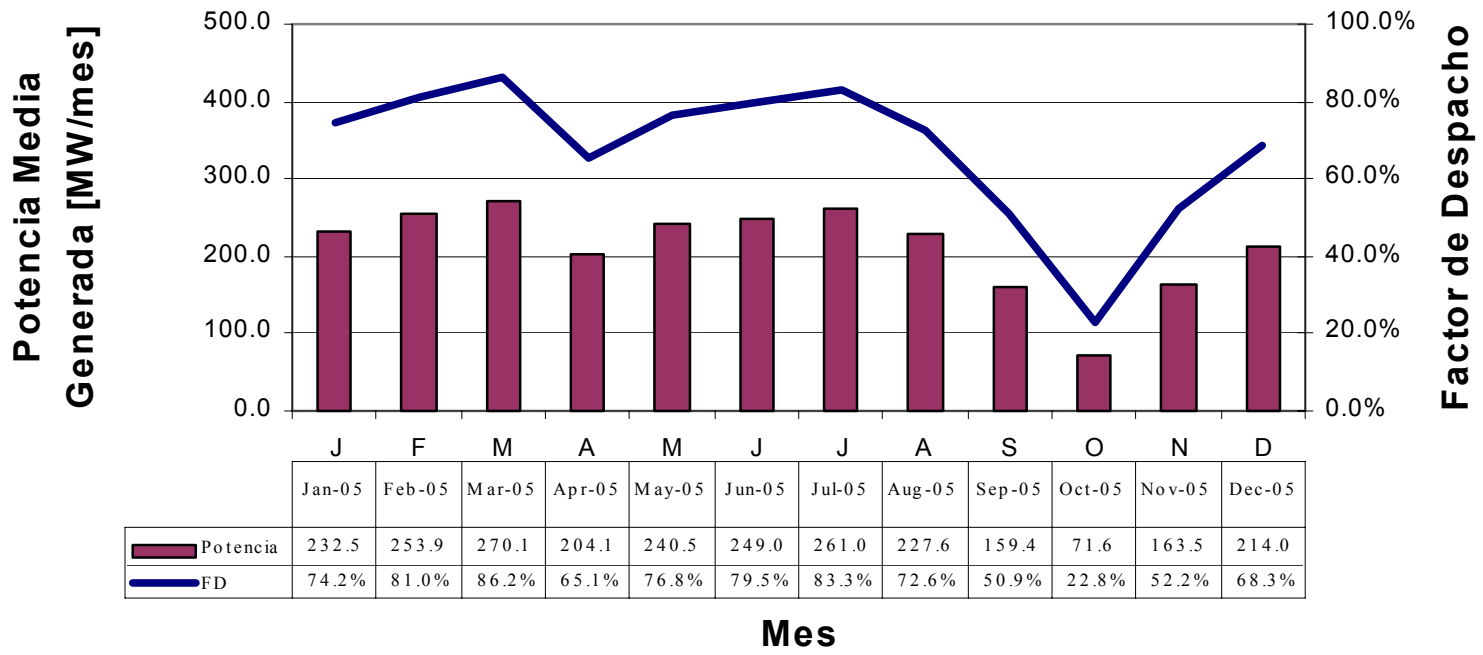
- Simulations using proper models. Results:
  - For the electricity system as a whole:
    - Load - Generation balance (energy balance)
    - generation by plant,
    - supplied load
    - transmission losses
    - demand response
    - imports/exports for the scenarios with interconnectors.
    - Un-served energy (Risk of shortages)
    - Spilled Energy
  - For each Power Plant
    - Energy production
    - Fuel consumption

Energy Generated



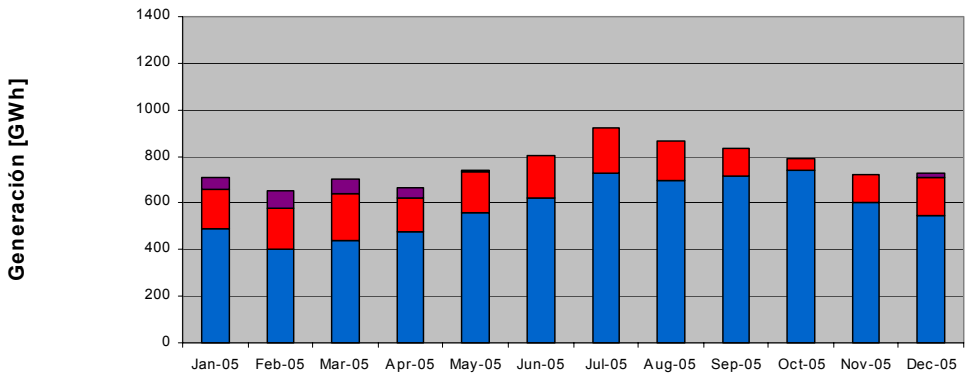
	2004	2005	2006	2007	2008	2009	2010	2011	2012
Energía	397	1858	1989	2032	2081	1907	2025	2069	2090
FD	43.3%	67.7%	72.5%	74.0%	75.8%	69.5%	73.8%	75.4%	76.1%

MW - months



	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
Potencia	232.5	253.9	270.1	204.1	240.5	249.0	261.0	227.6	159.4	71.6	163.5	214.0
FD	74.2%	81.0%	86.2%	65.1%	76.8%	79.5%	83.3%	72.6%	50.9%	22.8%	52.2%	68.3%

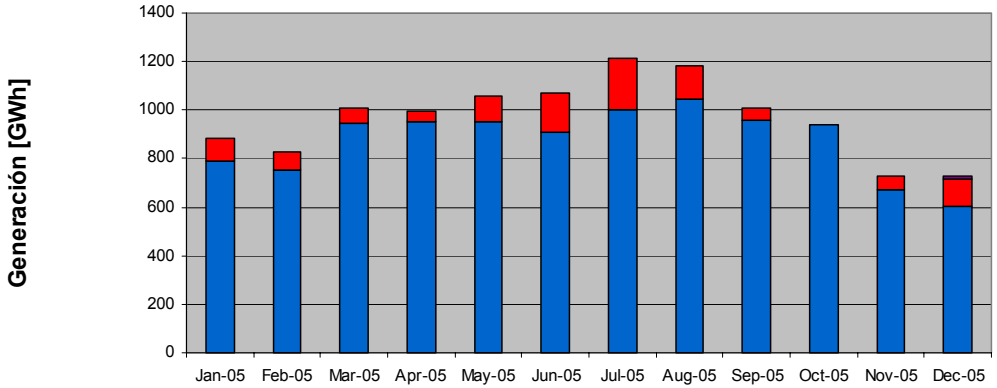
Market Share Average Hydro



	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
RESTO+IMP/EXP	49	79	68	43	6	0	0	0	0	0	0	18
CC-UTE	173	171	201	147	179	179	194	169	116	53	119	159
Hydro	488	404	438	476	556	622	731	698	719	739	604	548

Hydro Risk

GENERACIÓN POR TIPO - AÑO 2005 - RICO

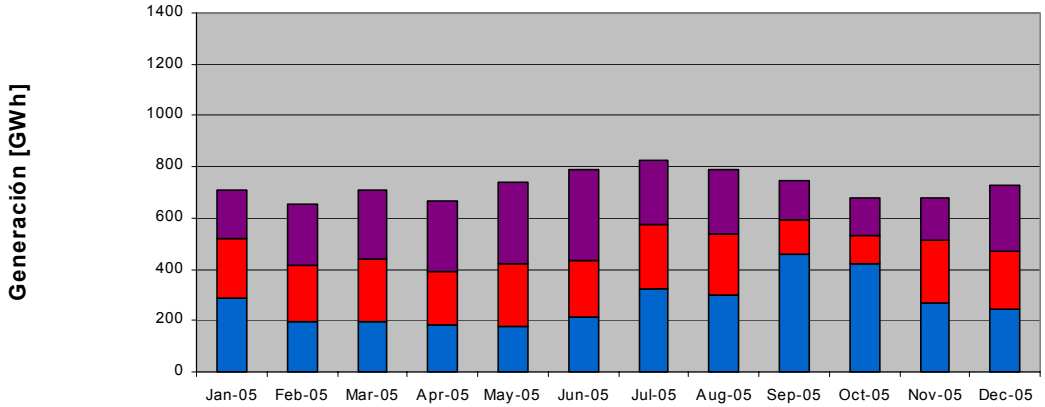


	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
RESTO+IMP/EXP	0	0	0	0	0	0	0	0	0	0	0	11
CC-UTE	93	69	62	44	106	166	211	140	50	0	54	113
Hydro	789	755	946	949	953	907	1002	1045	955	938	675	601

Wet Year

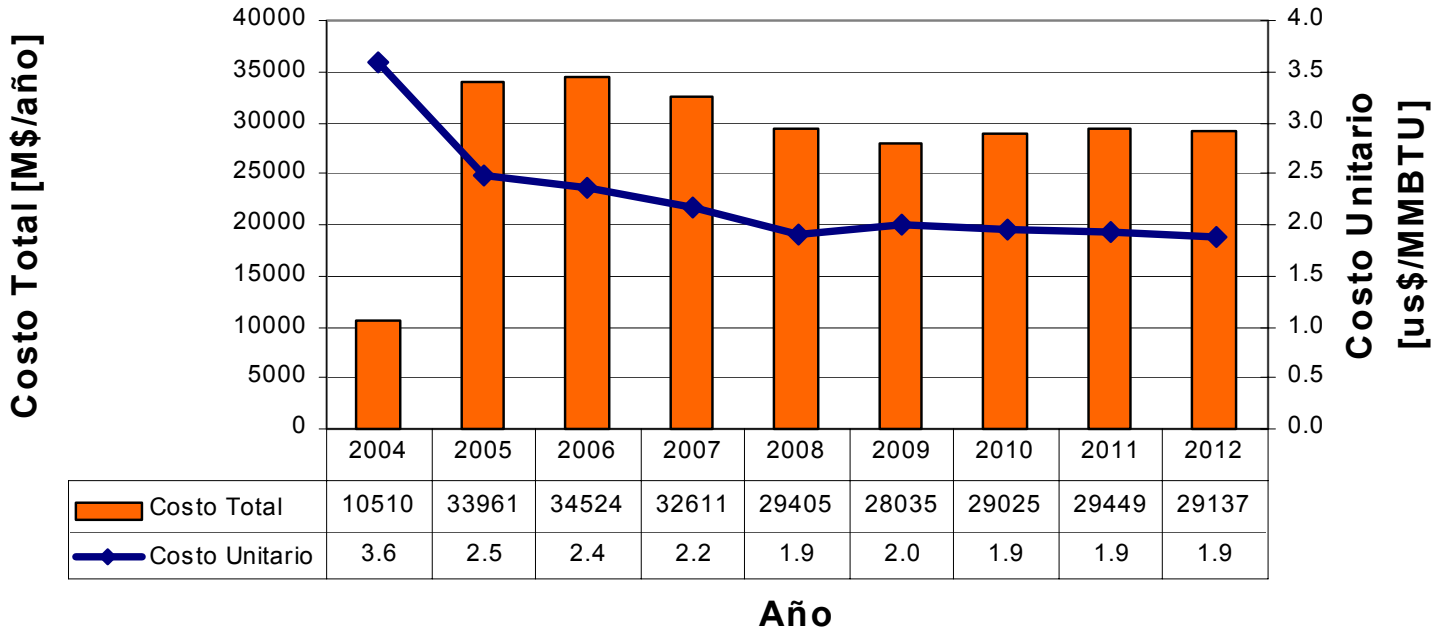
Dry Year

GENERACIÓN POR TIPO - AÑO 2005 - SECO



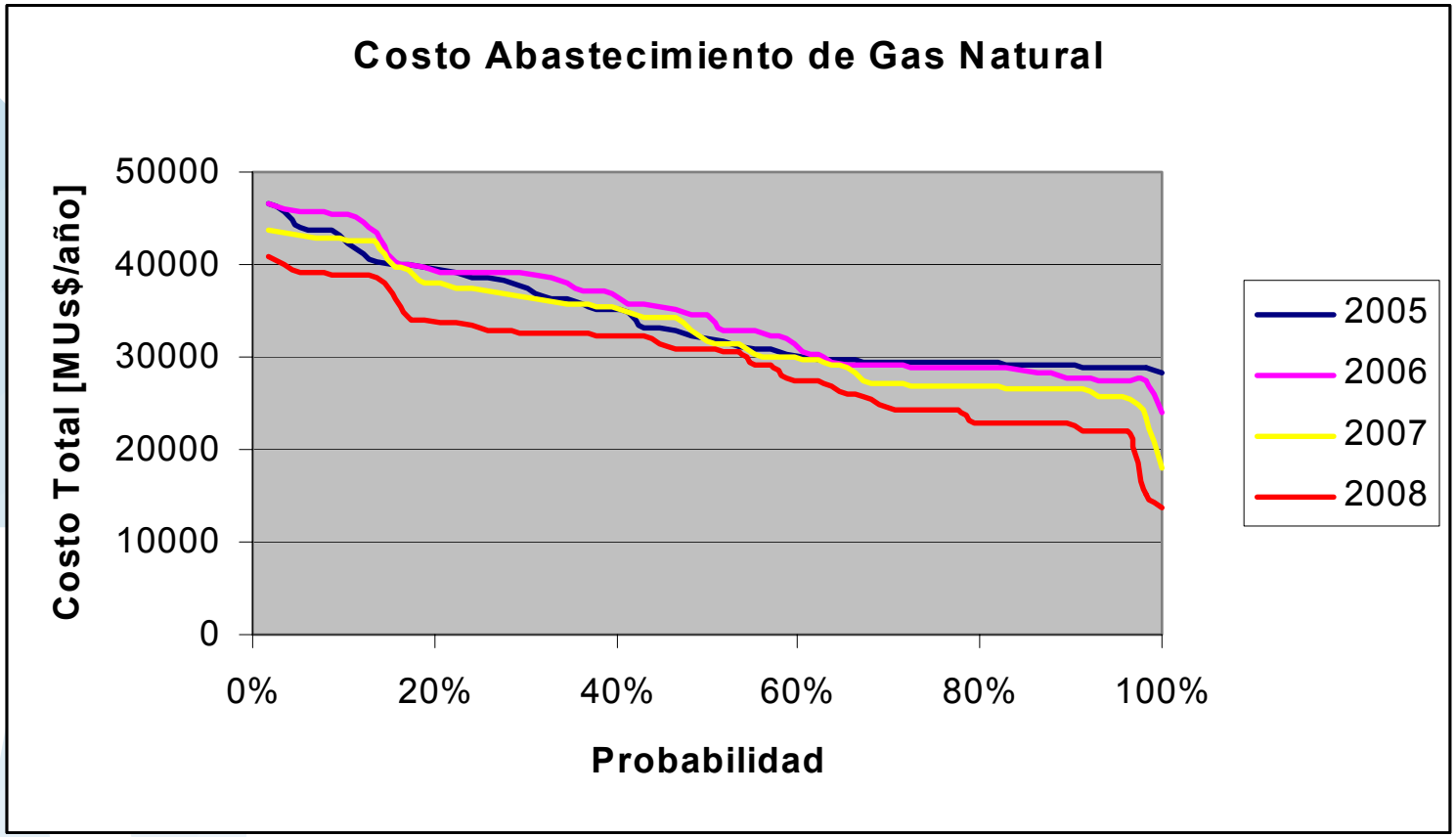
	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
RESTO+IMP/EXP	192	236	263	274	319	352	254	248	150	146	163	252
CC-UTE	232	221	249	211	246	221	249	240	140	115	241	228
Hydro	287	197	194	180	176	215	323	301	456	419	272	246

Fuel costs

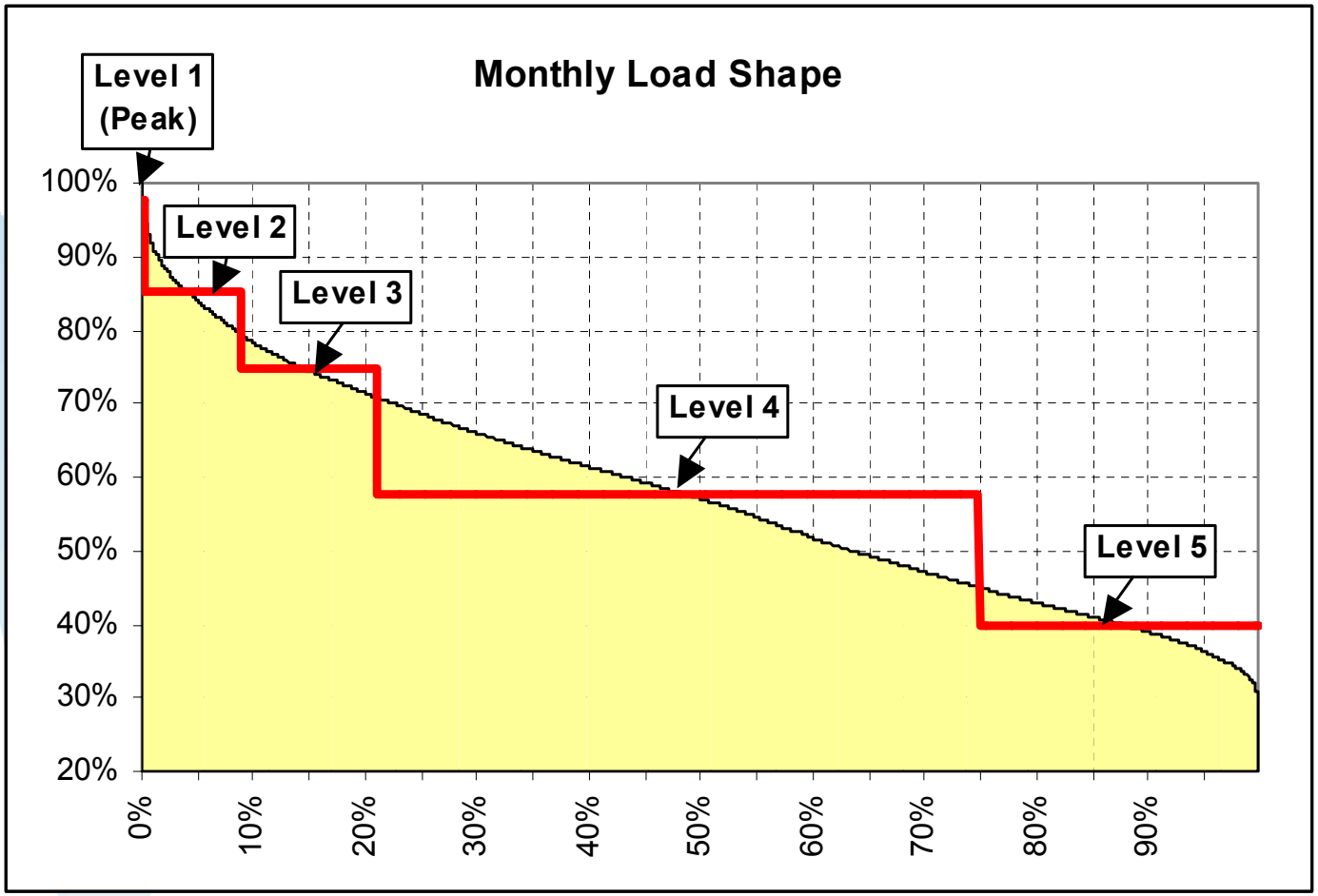


	2004	2005	2006	2007	2008	2009	2010	2011	2012
Costo Total	10510	33961	34524	32611	29405	28035	29025	29449	29137
Costo Unitario	3.6	2.5	2.4	2.2	1.9	2.0	1.9	1.9	1.9

Fuel costs Probability



Discriminating Demand Level



Methodology for the Market Assessment

Step	Description	Objectives	Results
1	Model Load	Represent expected consumption and load shape (e.g. peak demand)	Reference load forecast to be used for market assessment. This forecast is input to the Market assessment model. (step 2)
2	Use Market assessment model to evaluate system operation and economic results of the generation and transmission segment.	Optimisation and simulation of system operation and dispatch. Evaluate transmission losses	Generation: By unit / power plant / PPA: Energy generated, variable costs. Transmission system losses Economic system operation and PPA costs, that are input for the tariff calculation (step 6) and the financial model (step 7).
3	Model operation and maintenance costs of existing transmission generation assets.	Assessment of TANESCO operation and maintenance costs. Assessment of efficient operation and maintenance costs.	Reference operation costs that are input for the tariff calculation (step 6) and the financial model (step 7).

Methodology for the Market Assessment

4	Model fix cost of transmission investment and capacity payment for generation.	Assessment of capacity payment for signed PPAs, TANESCO hydro Generation and new IPPs. Assessment of transmission investment to improve reliability.	Reference generation capacity payments (cost) and Transmission reference investment costs that are input for the tariff calculation (step 6) and the financial model (step 7).
5	Model distribution segment.	Assessment of TANESCO distribution costs, distribution losses and collectable. Assessment of reference efficient distribution costs, distribution losses and collectable.	Reference operation costs and reference assumptions on non-technical losses and collection that are input for the tariff calculation (step 6) and the financial model (step 7).
6	Model tariff consistent with system costs.	Total system costs (generation + transmission + distribution), and calculate tariff required to cover these costs. Assess differences with existing tariff.	Required Distribution Tariffs, that is input for the financial model (step 7).
7	Financial analysis.	Assess financial results of the sector as a whole, and for the proposed structure.	Reference operation costs that are input for the financial model.

Simulation Models

	Simulation Model
Transmission system:	Grid is modelled to evaluate transmission losses and constraints, under different hydrologies and dispatch conditions.
• Input	Grid configuration, technical characteristics and constraints.
• Output	Transmission losses and congestion costs.
Load Forecast:	Load forecast is an input.
• Input	Monthly energy consumption and load shape by typical day.
• Output	For each month, demand supply balance for the modelled hourly load shape (generation schedule).

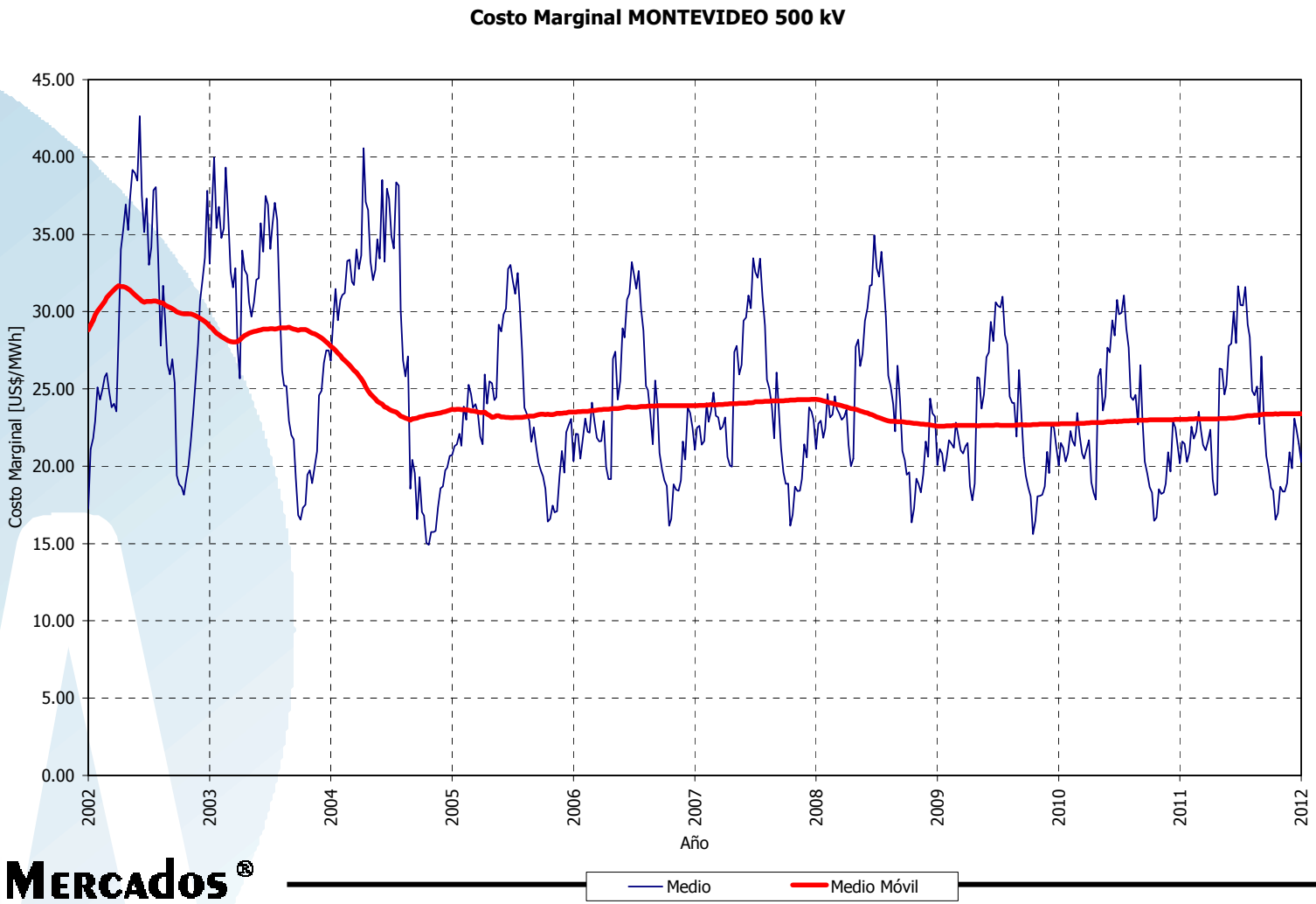
Simulation Models

Reservoirs:	Find the optimal reservoir policy to minimise system costs
• Input	Reservoir characteristics and constraints, historical inflows and water losses.
• Output	Reservoir "Water value" (policy to minimise system operation costs). Reservoir trajectory, spilling
Power Plants:	Calculate expected generation and short-term marginal costs, for the economic dispatch (including the optimal reservoir operation policy).
• Input	Power plants characteristics and operation constraints, fuel prices, PPA energy prices (when these correspond to thermal variable costs, as in IPTL and SONGAS)
• Output	Generation (energy and schedule shape), unserved energy, variable operation costs, system total variable costs (including unserved energy and water value), short-term marginal costs.

Prices for Each Scenario

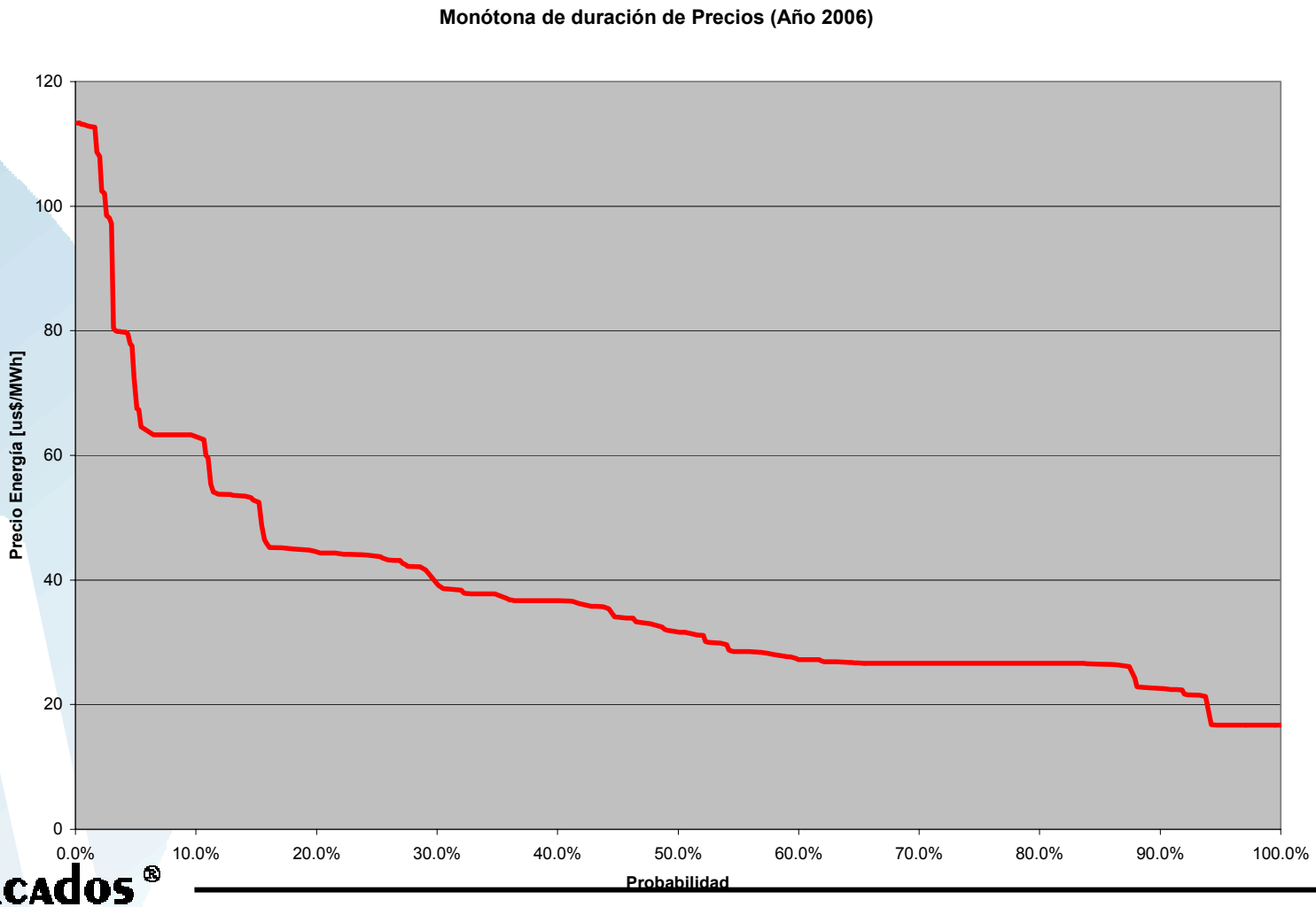
- Energy Prices
  - Short Run Marginal Costs on a monthly basis and for variations according to load profile (e.g., peak and off peak).
- Capacity payments

Energy Spot Prices



Mercados®
Energy Markets Group
Madrid - Washington DC
Rio de Janeiro - Buenos Aires - Montevideo

Spot Prices Probability (Hydro)



Revenues

- For each Power Plant
  - Energy Incomes by power plant at short term prices using short-term marginal costs and calculation Balancing Market prices
- Capacity incomes
- Total revenues, for example yearly

Cash Flow

RESUMEN ANUAL - RESULTADO OPERATIVO C.C. UTE

Período: 2004/2012

Año	Producción Energía [GWh]	Energía Contrato [GWh]	Venta Ene. Spot [10^3 US$]	Venta Ene. Contrato [10^3 US$]	Compra Ene. Spot para cubrir Contrato [10^3 US$]	Costo Abast. de GAS [10^3 US$]	Costos Variables No Combustible [10^3 US$]
2004	397	488	8922	8143	11141	10510	794
2005	1858	1992	54131	33236	57802	33961	3716
2006	1989	2122	55031	35414	58487	34524	3977
2007	2032	2168	57005	36167	60511	32611	4065
2008	2081	2224	58729	37102	62439	29405	4162
2009	1907	2039	50858	34030	54212	28035	3814
2010	2025	2162	53013	36067	56340	29025	4051
2011	2069	2201	54542	36731	57874	29449	4137
2012	2090	2235	55649	37296	59436	29137	4179

Expenses

- Capital expenditures
- Labor force costs
- Fuel costs
- Other costs
- Taxes

Financial Analysis

- Based on the operational revenues, expenses, capital expenditures, financial leverage, etc, it is determined the ROE and ROA of the project, expectable under these market conditions, technology used, fuel costs, taxes, etc.
- When ROE reaches, within reasonable risks, the corporate targets for new investments, this is the moment to invest
- Same methodology can be used to determine the opportunity prices to obtain a specific profitability of a project.

Cuadro de Resultados 10^3(US$)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total ingresos	-	-	30.5	127.8	130.9	133.6	136.2	125.3	129.5	131.7	133.4
Vta. Ene. Spot [10^3 US$]	-	-	8.9	54.1	55.0	57.0	58.7	50.9	53.0	54.5	55.6
Vta. Ene. Contrato [10^3 US$]	-	-	8.1	33.2	35.4	36.2	37.1	34.0	36.1	36.7	37.3
Vta. Pot. Contrato [10^3 US$]	-	-	13.5	40.4	40.4	40.4	40.4	40.4	40.4	40.4	40.4
Total egresos	-	-	(24.9)	(102.6)	(104.4)	(104.8)	(103.7)	(93.6)	(97.0)	(99.1)	(100.5)
Cpr. Ene. Spot para cubrir Contrato [10^3 US$]	-	-	11.6	58.5	59.2	61.2	63.2	54.9	57.0	58.5	60.2
Retenido [10^3 US$]	-	-	0.2	0.9	0.9	1.0	1.0	0.9	1.0	1.0	1.0
Contrato GAS [10^3 US$]	-	-	5.6	18.3	19.3	19.5	20.0	18.8	19.7	19.8	19.8
Link [10^3 US$]	-	-	2.0	5.9	5.7	3.7	-	-	-	-	-
Contrato Transporte [10^3 US$]	-	-	1.8	6.4	6.3	6.4	6.3	6.2	6.3	6.6	6.3
Cruz del Sur [10^3 US$]	-	-	1.2	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Costos Variables No Combustible [10^3 US$]	-	-	0.8	3.7	4.0	4.1	4.2	3.8	4.1	4.1	4.2
Costos Fijos [10^3 US$]	-	-	1.8	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Contribución Marginal	-	-	5.6	25.1	26.5	28.8	32.5	31.7	32.5	32.6	32.9
Depreciación	-	-	(11.1)	(11.7)	(11.7)	(11.7)	(11.7)	(11.7)	(11.7)	(11.7)	(11.7)
Costos Financieros	-	-	(6.2)	(5.9)	(5.0)	(4.1)	(3.2)	(2.3)	(1.4)	(0.6)	(0.0)
Ingresos antes de impuestos	-	-	(11.7)	7.6	9.8	13.1	17.7	17.7	19.4	20.4	21.2
Impuesto a las ganancias	-	-	-	-	(1.7)	(3.9)	(5.3)	(5.3)	(5.8)	(6.1)	(6.4)
Ingresos netos	-	-	(11.7)	7.6	8.1	9.1	12.4	12.4	13.6	14.3	14.9

Cash Flow del Proyecto 10^3(US$)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Inversión	(43.8)	(87.5)	(43.8)	-	-	-	-	-	-	-	-
Ingreso Neto	-	-	(11.7)	7.6	8.1	9.1	12.4	12.4	13.6	14.3	14.9
Depreciación	-	-	11.1	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Deuda Financiera	-	-	6.2	5.9	5.0	4.1	3.2	2.3	1.4	0.6	0.0
I.V.A.Saldo I.V.A.	(10.1)	(20.1)	(8.8)	5.8	6.1	6.6	7.5	7.3	5.7	-	-
Valor Residual	-	-	-	-	-	-	-	-	-	-	-
Cash flow	(53.8)	(107.6)	(46.9)	30.9	30.9	31.5	34.7	33.7	32.4	26.5	26.5
Cash flow acumulado	(188.3)	(1,345.3)	(2,434.8)	(2,286.1)	(1,916.2)	(1,550.3)	(1,141.6)	(735.3)	(329.2)	11.1	329.2

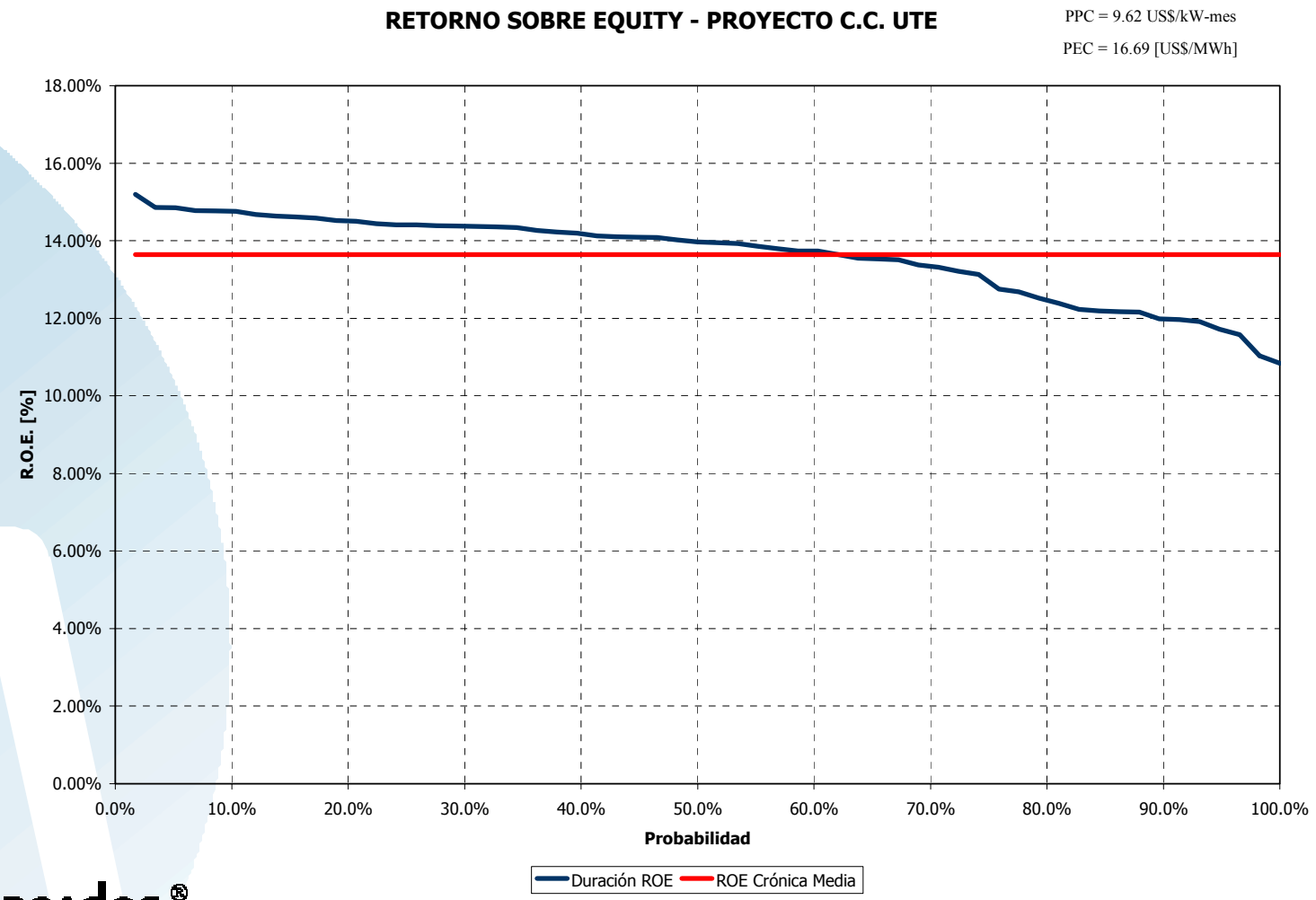
TIR = 12.00 % Anualizada

Cash Flow del Inversor 10^3(US$)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Inversión	(23.2)	(46.4)	(65.8)	(0.5)	(0.4)	-	-	-	(0.0)	-	-
Ganancias	-	-	2.2	14.1	14.8	15.9	20.0	19.9	19.5	14.5	25.6
Valor residual del negocio	-	-	-	-	-	-	-	-	-	-	-
Cash flow	(23.2)	(46.4)	(63.6)	13.6	14.4	15.9	20.0	19.9	19.4	14.5	25.6

ROE = 13.6 %

Rdo.Operativo	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Producción Energía [GWh]	0	0	397	1858	1989	2032	2081	1907	2025	2069	2090
Energía al Contrato [GWh]	0	0	488	1992	2122	2168	2224	2039	2162	2201	2235

ROE Sensitivity Analysis



Technical Planning

Preparation of Transmission Plans

Mercados®
Energy Markets Group
Madrid - Washington DC
Rio de Janeiro - Buenos Aires - Montevideo

57 Transmission licenses

- (1) Subject to such terms and conditions as the Commission may fix in the license, a transmission license shall authorize the licensee to carry on grid construction, operation, and maintenance of transmission system within Nigeria, or that connect Nigeria with a neighboring jurisdiction.

  (2) The transmission licensee that is a successor company formed pursuant to section 9 may also have an obligation to carry out system operation, including the procurement of ancillary services, pursuant to the terms of a system operation license issued by the Commission to such licensee.

The role of transmission

- Role in competitive markets: The classic roles plus to joint sellers and buyers making feasible the market. Energy but also prices move through wires.
- Transmission unbundling is not and end in itself but rather a means to:
  - isolate potential market power abuse problems coming from vertically integrated companies
  - promote specialization, costs "disclosure" and allow specific regulation with incentives for efficiency and economy.

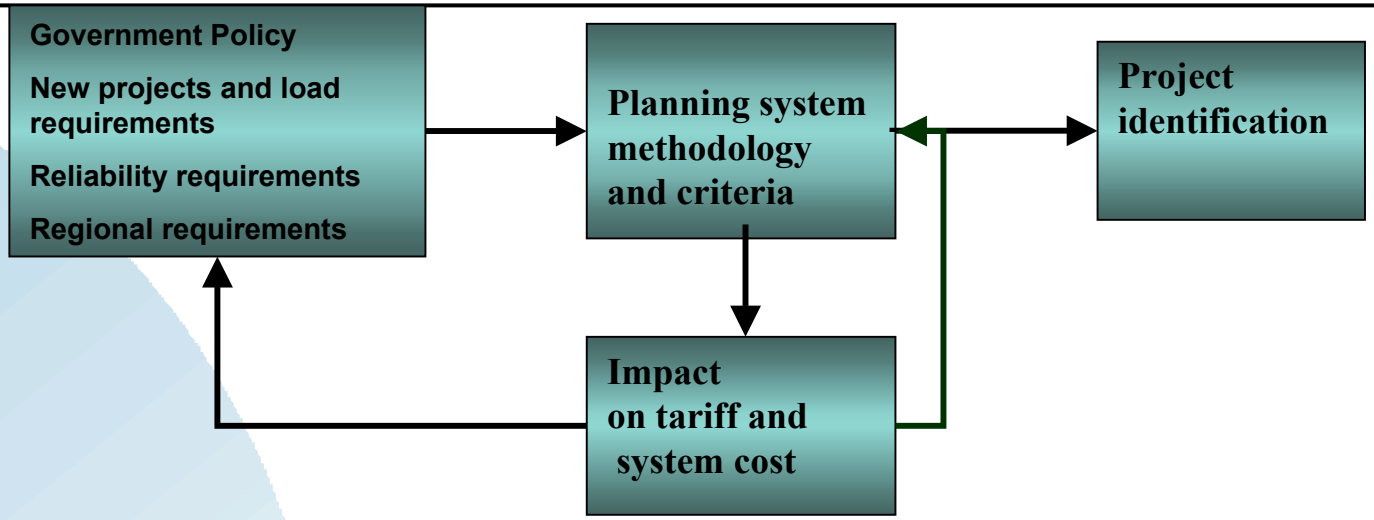
Transco expansion role

- "Active":
  - Responsible for expansion and management of network, including losses, ancillary services and congestion. Takes these risks and is remunerated for that risk. Needs to have decision and control on expansion, operation and maintenance and system operation.
- "Passive":
  - Responsible for its operation and maintenance, quality of service (availability targets), minor expansions and upgrades. Does not make the final decisions about design and expansion.

TransCo and Users Obligations and Rights

- Transco
  - Obligations:
    - Cannot buy or sell energy
    - evaluate access applications and connect transmission users
    - provide transmission services with the regulated quality of service and performance targets, or pay compensations
    - identify and inform facilities that do not meet technical standards
    - transmission expansion planning
  - Rights:
    - Disconnect the user's installation that affect the integrity and security of the grid as a whole and others
- Transmission Users
  - Obligations:
    - Install, maintain and operate connection equipment according to technical standards and others
  - Rights:
    - Non discriminatory Services with regulated quality of service;
    - agree connection Conditions with TransCo;
    - Review and comment maintenance outages plans
    - Request expansion

The Planning System



- State centralized planning (Brazil, Colombia)
- Transco's or TSO planning with state control (Spain, Ecuador, Panama)
- TSO planning (England)
- State indicative planning and TUs initiative (Argentina)
- Market based models (Argentina, Brazil for international interconnectors, USA)

Transmission costs

- Variable cost
  - Losses
  - Congestion
  - Some ancillary service cost
- Fixed cost:
  - Investment cost (depreciation, net asset remuneration)
  - Operation and Maintenance (O&M) costs
- The transmission fixed cost and the operation cost can be separated, considering the last into market cost

Fixed cost

- Investment
  - Regulated Assets Base
    - New replacement value of assets
    - Accounting value
  - Rate of return: considering equity and debts
- Operation and Maintenance + administration cost
  - A proportion of new replacement cost
  - Obtained from a benchmarking with efficient transmission companies

Quality in transmission

- Faults in the transmission system may have a very high cost for market participants, mainly load supply
- Regulations normally impose transmission companies to maximize reliability of supply.
  - Quality of Service Regime based on premiums and penalties
- Penalties for outages of transmission facilities had shown to be a suitable method to encourage transmission companies to achieve a service with high reliability.
- Premiums are awarded when actual reliability better than regulated targets

Technical Planning

Preparation of Distribution Plans

Mercados®
Energy Markets Group
Madrid - Washington DC
Rio de Janeiro - Buenos Aires - Montevideo

59 Distribution Licenses

Wires

- (1) Shall authorize the licensee to construct, operate and maintain a distribution system and facilities, including, but not limited to, the following activities as may be specified in the license:
  - (a) the connection of customers for the purpose of receiving a supply of electricity;
  - (b) the installation, maintenance and reading of meters, billing and collection; and
  - (c) such other distribution service as may be prescribed for the purposes of this section.

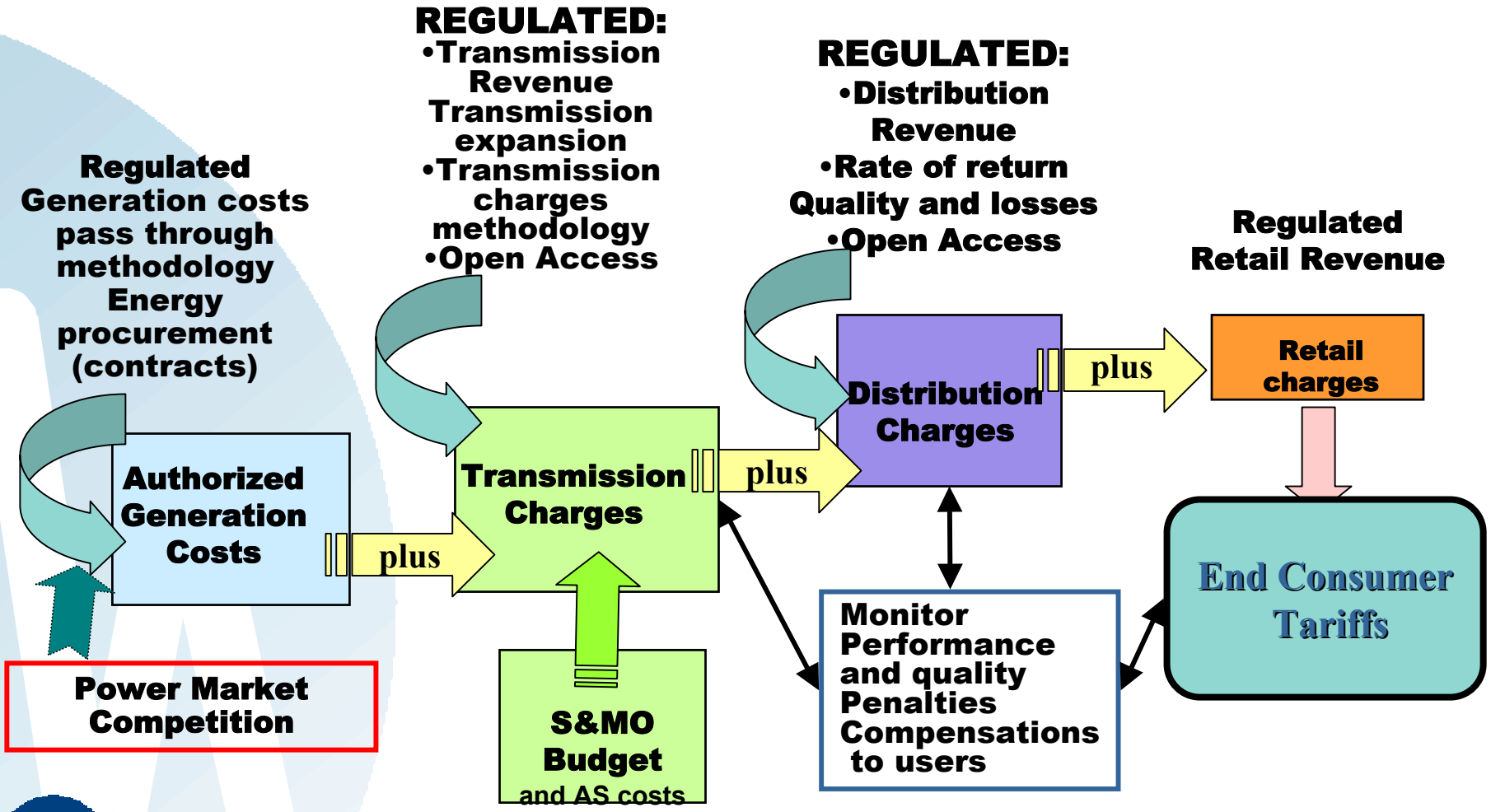
Trading

- (2) A distribution licensee may also have the obligation to provide electricity to its distribution customers, pursuant to the terms of a trading license issued by the Commission to the distribution licensee.

Transparency

- (3) … bulk purchase of power by a distribution licensee shall be awarded according to an open, transparent, and competitive manner ….

The Distribution Business



Key Issues

- The wire business is a monopolistic activity
  - Highly regulated tariffs and obligations
- The trading business is candidate to evolve toward a competitive activity
  - The trend is to deregulate
  - Normally takes long time to implement
  - Usually starts with large consumers (threat)
- Universal Public Service obligations
  - Normally some limits apply

Tariff Regulatory Trends

- One method widely in use in developing economies is Multiyear Tariffs (MYT)
- Benchmarking systems (with adaptation to local conditions): Reference Utility
- Wholesale costs are transferred using Pass Through Mechanisms (formulas)
- Capital costs recognized in the tariffs are based on efficiently designed networks for specified quality of service
- Quality of service requirement and enforceable (penalties)
- O&M costs recognized in the tariffs are based on Reference Utility with standard costs (local)
- Losses and non collectables are targets fixed by the regulation

Market Size for a Distribution Company

- In developing economies, normally high degree of suppressed demand
  - Lack of investments led to unsupplied demand
- In general, and during long periods of times, the demand growth will be governed by:
  - Availability of installed capacity, in terms of generation and networks
  - Attractiveness of the regulated tariffs for the operator
  - Access to capital markets
  - Risks and financial exposure
  - Public affordability to pay
  - Consumption level (average consumption for consumers profile)

Regulated Business

- The regulator fixes tariffs based on specific assumptions, normally related to efficiency
  - e.g. Optimal network for geographically referenced demand (GRS), considering quality of service requirements
  - This constitutes the assets based, based on which the capital annuity recognized is determined
  - Other costs are also independent from the real company (reference utility)
- Losses and degree of collection (payment) are considered as part of appropriate transition periods (giving time to the utility to adapt to the new conditions)
- Quality of service imposes extra costs
  - Investments to comply with the standards
  - Penalties when standards are not achieved

How to Position the Company

- In this type of regulation, where the regulators forces the companies to develop their business within very strict limits, also based on optimized criteria, from the regulatory point of view, the optimum for the utility is to align its corporate targets with the regulator's targets
- If eventually improves the regulators targets, in the next tariff period, this improvements will probably be considered a new optimum
- If positioned below the targets set by the regulator, the utility would loose money

Conclusions

- In this type of regulation, if a utility is properly operated and the investments are efficiently decided and implemented, the operator might achieved the return on the capital as explicitly pursued by the regulatory provisions (most probably established in the licenses)
- The trend is to monitor if all expenditures are consistent with the assumptions made in the regulatory provisions

Tools and Procedures

- Regulatory accounting systems
  - Procedures through which utilities must systematically inform the regulators specific costs that are necessary to supervise the companies performance
  - This procedure must be used by all utilities, independently of their internal accounting systems.
- Consistent with the Regulatory accounting system, the regulator also uses standard monitoring systems, based on indicators, with different degrees of aggregation, showing the deviations between the assumptions used to establish the tariffs and the actual values achieved by the companies
- Normally both the regulator and the utility use the same tools
  - The utility to determine gaps between regulatory targets and real achievements
  - Powerful tool to identify strengths and weaknesses

Some Other Aspects Related to the Technical Planning

- Demand and supply side planning methodologies
- Demand side planning, methods of demand projection, management and conservation
- Supply side options evaluation
- Loss reduction
- Preparation of power balances,
- Rural electrification, enhancing access to electricity in rural and urban areas etc.

Customer Service

- Customers needs
  - Typically satisfaction level is measured against Quality of Service obligations
    - Voltage quality (product)
    - Interruptions (service)
    - Commercial quality (time responses in many occasions, metering(invoicing accuracy, etc)
- Current state of customer service
  - Normally it is recognized by the regulation that during a transition period no penalties would apply or partially
  - Investments required to put the new requirements in place
- Customers' education
  - Newly privatized companies require costumer involvement to minimize social rejection

Section 3
Strategic Options

Strategic Options

Corporate and functional level policies/options

- Discussion on corporate level strategies:
  - cost unbundling
  - corporatist
  - commercialization
  - restructuring
  - downsizing
  - divestment
  - privatization
- Business strategies in:
  - competitive environments
  - financing strategies
  - target markets
  - fuel strategies
  - pricing strategies

Strategic investment options depend on the nature of utility business. Generation utilities may face market competition while the utilities doing transmission and distribution business (being regulated) have different options. The main challenge faced by a utility in a competitive environment is to provide a suitable positive return to the shareholders while maintaining the best possible performance in delivery of service. To make a profit, they have to either (i) reduce their costs, or (ii) be "different", i.e. strategically position themselves in the market so as to be able to obtain higher prices for electricity (e.g. peak time, location where there is transmission capacity constraint, provision of auxiliary services such as for power factor improvement) or both.

Strategic Objectives

In brief, strategies are devised to strive for the following objectives:

1: Make profits above the industry average in competitive environments (say in generation, where the business is least regulated), or within the bounds of a price formula set by a regulator (say in transmission and distribution).

2: Carry out utility business in such a way that the profits are sustainable in the long term (not to trade long term interests with short term gains).

3: Adhere to "good utility business" practices, i.e. remain within the parameters of the regulations, provide good customer service and comply with utility standards and specifications.

How to keep Costs Low and Make Profits?

To keep the costs low the utility investment strategy may be driven by the considerations of making only essential investment (i.e. no over capacity, obtaining financing for new investment on competitive terms), reduce fixed costs, improve capacity utilization, reduce O&M costs, improve efficiency obtain lower fuel prices than competitors, carry out timely maintenance and maintain good customer relationship.

How to be Different

Better reliability, customer care, better maintenance, better billing and bill collection arrangements, equipment with better real time response to load variations and special features such as synchronous condenser etc.

Strategic Investment Options

Strategic investment options can be described in the following two categories:

I: Corporate (business) level investment options

II: Functional level investment options

I. Corporate (Business) Level Strategic Options

At the corporate level, the managers are concerned with overall directions and strategies for the utility. The functional level managers have to develop plans within this framework. Some of the corporate level strategies are discussed below:

1. Business Strategy

Corporatization, Commercialization, Unbundling

A utility has to decide how it intends to conduct its business, i.e. as an integrated utility, wholly owned corporations dealing with functions of generation, transmission and distributor, or to restructure into separate independently owned private companies. It also has to decide whether the power control and dispatch center will be part and parcel of a grid company and whether commercial functions of distribution will be separated from line (wire) operations. Such choices are exercised on the basis of following considerations:

1: Existing utility's size and burden on management.
2: Cost unbundling, need for keeping commercial accounts for each function and financial discipline.
3: Emerging regulatory regimes and competitive markets.
4: Need to restructure, exit from non-core areas or transforming public utilities to private companies.
5: Empowering customers by making choices available to them.
6. Raising funds from capital markets.

Price and Quality

The utility has to decide whether it wants to compete on the basis of low cost, quality of supply or both. It also has to decide whether it wants to compete for base load, middle load or peak load. Once they have decided their overall strategy, the investment would then flow to areas that suit their corporate guidelines.

Target Market and Market Share

In competitive business (e.g. generation) the utility has to assess the overall size of the market and estimate the share of market that it intends to capture. It has also to analyze the market it is

targeting (e.g. industrial area, commercial sector, domestic, multiple sectors etc.) Will it be required to fulfill obligations for providing access to rural or suburban populations?

The utility has to decide whether its target market is the area in which it is located or it is also targeting the adjoining areas. Depending upon the target market the utility may choose, the level and type of investment will vary. For instance, a generation company may choose bigger size plant or a transmission company may plan an inter connection etc.

2. Pricing Strategy

Within the prescribed regulatory regime the utility has to consider its pricing strategy in a competitive market. Possible strategies are:

(a) Offering different prices at different times (of the day)
(b) Offering different prices for long-term contracts.
(c) Offering different prices in different seasons.
(d) Looking at the need of the purchaser, vary the price bid trying to drive up the marginal prices.
(e) Pricing various generating units differently.

Related with the pricing strategy, investment will be required in software support and seasonal or time of day or peak demand meters.

3. Upward Integration vs. Alliances

A utility may also consider upward integration with its input or raw material suppliers if it is likely to help improve its profitability and quality of service. Similarly, utilities, with surplus cash may like to invest or acquire other utilities. These options should, however, exercised by only those utilities who have good and efficient management. The contemporary practice is to avoid over integration and instead reorganize and restructure along functional lines (e.g. generation, transmission, distribution). To substitute for the benefits of integration, companies may build medium term alliances or contracts. For instance, fuel purchase contracts to buy fuel from a particular source at a pre-agreed discount from the prevalent (at the time of actual purchase) competitive spot price.

4. Growth Strategy

A utility company has to determine the quantum and schedules of investment it can afford while maintaining a minimum level of financial health of the utility (measured by financial ratios). Such a determination thus sets the limits to a sustainable growth of a utility. The utility can then prioritize which investments to undertake. For instance, investments involving less costs and greater dividends are preferred. Examples are investment in reducing losses, monitoring and surveillance, hiring advisory services for efficient load dispatch services.

5. Energy Policy and Fuel Strategy

Choice of fuel strategy should be made after careful review of the country's resources, energy policy and fuel options from other markets. For instance, if a country has excess natural gas or flared associated gases, it may be possible to get this fuel at much cheaper price than the competitors. This will be a valuable competitive advantage (in the country or markets in the adjoining countries).

6. Procurement Strategy

Minimizing cost of projects while maintaining the required quality and specifications is a desired objective. The procurement strategy should be such that competitive costs are attained. For this purpose, it is an accepted practice to invite competition from potential contractors for equipment or civil works instead of purchases through negotiated contracts.

II. <u>Functional Level Strategic Investment Options</u>

Some of the functional level investment options are illustrated below:

1. Demand Management vs. Capacity Expansion Investment

Suppose that the present and projected load duration and daily load curve of the maximum demand day of a utility are as in Figure 2 (below). If by certain demand management measures (such as reduced off-peak prices, system for interruptible loads, load shifting devices, customer education and advertisement), we can shift the shaded portion of the curve in the figure to the time period 0 hr to 2 hour, the need for 1000 MW new capacity will be obviated. The investment in demand management measures will be a small fraction of the investment required for creation of new capacity. Shifting of load will also help improve capacity utilization of existing plant. *Invariably all utilities favour this option.*

2. Investment in Power Factor Improvement at Supply-end vs. Consumer-end

The lines losses are determined by I * R where I is the current and R is the resistance of the line. If the load power factor is less than unity, then the amount of I to provide 'real' amount of power is higher than when it is unity. Therefore, lower than unity power factor results in higher losses. To reduce losses, the options are to install capacitors at the sending-end or the receiving-end of lines. If the capacitors are installed at the receiving-end, then it helps reduce losses at the up-stream side as well.

The receiving (consumer) -end measures reduce the investment of the utility at the sending (up-stream) -end. Thus a utility may find it advantageous to invest at the distribution-end instead of supply-end. Further, investment in promoting the of use of Power Factor Improvement devices

by consumers can also be regarded as a good strategic investment, as it reduces the overall system costs and hence enhances the competitive position.

3. Choice of Technology

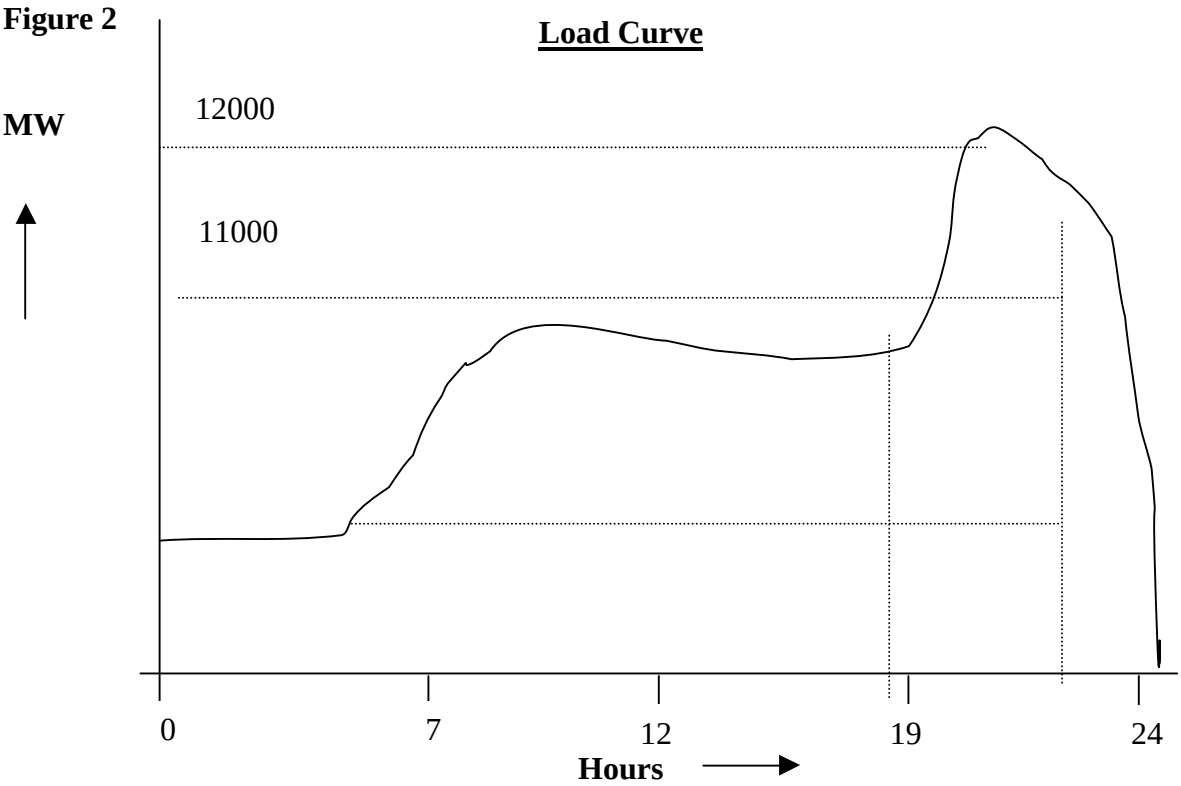
Plants based on certain technologies require more up-front cost but are cheaper in electricity production cost due to their higher efficiency and capacity utilization. For instance, two gas turbines of 100 MW each compared with a combined cycle plant of 200 MW (125 MW gas turbines and 75 MW of heat recovery turbines) may be cheaper in investment cost but more expensive in per kwh cost due to lesser efficiency. On the other hand, the gas turbines may be more suitable for peak loads where as combined cycle may be more suitable for base load. Thus while making investment, one should be clear whether the investment is being made with the strategy to compete for base power or peak power?

4. Choice of Fuel

A generator may have the option to choose coal, heavy oil (3.5% sulfur fuel oil), or gas as fuel for new proposed generating capacity. From the investment point of view, it has to be decided whether one would like to invest in facilities for treatment of exhaust effluents to comply with environmental standards or buy natural gas even if it is more expensive (per k cal), as it obviates the need for upfront investment and cost of building fuel storages.

Another investment option could be between building a gas pipeline instead of fuel oil storage.

Figure 2



5. Unit Size vs. Financing Constraints

Larger unit sizes usually offer economies of scale. However, these require large investments, which may be difficult to arrange. So, depending upon the demand supply gap, it may be better to make a strategy to install an affordable unit size, generate cash flows from it and then augment capacity using the cash flows of the first unit.

6. Efficiency Improvement vs. New Capacity

Many power systems, particularly those which have a past history of public sector control, are very inefficient. Their losses are quite high.

To meet the future increased demands in such systems the options are to:

(a) Improve efficiency, reduce losses.

(b) Add new capacity

Investment in loss reduction can be of the following nature.

i) In generation, improving maintenance, reducing down time, increasing capacity utilization and plant availability, plugging energy losses (leakages), verification of fuel specifications and checking fuel pilferages etc.
ii) In transmission, installing compensating or synchronous condensers, better load dispatch, using higher voltage lines where feasible, adding lines to remove overloading, optimal choices of transformation capacities etc.
iii) In distribution, installation of capacitors, measures of load management, line maintenance, appropriate voltage choice, augmenting overloaded lines and transformers, reducing length of radial service lines etc.

If the investment in loss reduction releases capacity which is financially cheaper than installing new capacity, then a strategy of system improvements can pay off quickly.

7. Choice of Location of Plant

The options for location of a generation plant are that it could be close to the load center or away from the load center. The latter may also be closer to a fuel source. Some times for distant locations, the environmental costs are low or the land is available at much cheaper prices than the area in close proximity of load center. Distant sites may have greater availability of land allowing setting up a bigger power complex or future expansions. All costs associated with various options related to location are examined and their impact on the financial projections is determined to arrive at an investment strategy.

8. Choice of Routes for Transmission Lines

New transmission lines can run along the existing Right of Ways (ROWs) or through new routes. Use of the existing ROWs is usually cheaper because it only involves incremental costs for maintenance. However, new routes may offer advantages of opening up new demand centers and may help system reliability, stability and load flows. If the utility is following a strategy of growth and opening up new areas, the latter option need serious evaluation.

9. Choice of Voltage

Depending upon distances involved, quantum of power to be transmitted and technical feasibility, choice of appropriate can help reduce losses, improve system reliability and operational performance.

10. Choice of Distribution System Technology

Distribution systems are low voltage systems and can be both overhead or underground. The overhead systems are much cheaper but more exposed to seasonal and weather effects. Underground systems are expensive, but more reliable. If the utility's strategy is to give priority to reliability then it may opt for underground systems.

11. Inventory Management Strategy

Inventory hold-up has a cost. For instance having storage of fuel for one month vs. 15 days vs. gas fired plant requiring no storage. Piling up reserves of spares for a one-year need vs. a scientific plan of inventory stocks. Costs released from inventory hold-up can be a good source of working capital or financing investments.

12. Capacity Reserves Strategy

Operational reserves have a cost. Private companies, in the deregulated markets, tend to not invest in creation of reserves as excess capacity has a cost. Regulators are expected to devise incentives and/ or require private companies to maintain reserves. In transmission a strategic decision is taken by the company to adopt a policy of single line contingency or double line contingency. Similarly the distribution company may adopt guideline to provide redundant supply feeders for critical customers e.g. hospitals, governments, etc.

13. Metering, Billing and Collection

Many utilities suffer due to faulty meters, non-availabilty (non installation) of meters, un-metered supply (bulk supply) and inadequate metering at generating stations, grid stations and distribution stations. This makes technical audits impossible. The utility loses revenues and malpractices flourish.

Similarly billing and collection of revenue is also a weak area with many utilities. In many cases, billing and collection cycles are also very lengthy. All these are causes of losses to utilities.

A utility may decide to give strategic importance to checking meters, replacing faulty meters, installing meters, training staff, increasing bill collection points, facilitating bill payments, prepayment card schemes etc.

Financing Strategy

Financing strategies may include the following:

1. Reducing the level of equity to the minimum level (to the extent permissible) in project finance, as equity is more expensive than debts.
2. Minimize the foreign component of debt as it is a liability on required foreign currency reserves of the country and is also prone to currency rate fluctuations.
3. Choose a suitable mix of loans; balance between commercial and long-term loans; balance between fixed rate and floating rate loans; balance between suppliers credit and bank loans etc.
4. Issuance of financial paper by the utility to raise financing directly from the market against its good will/assets and projected income, instead of banking channels.
5. Leasing plants, lines etc.
6. Debt to debt swap (e.g. expensive debts can be retired by obtaining cheaper debts, debts can be rescheduled etc) or debt to equity swaps etc. Reduction in debt service, cash for investment.

Conclusion

- Choose a set of strategic options, cost them and carry out financial analysis to evaluate results.
- Try a few iterations.
- Adopt the best possible strategy suited to your situation.

Section 4
Financial Planning

Planning Framework

Broadly speaking, funds are required for (a) meeting the cost of doing business; i.e. for meeting operation expenses, asset maintenance, debt service, expectations of share holders and (b) to finance future developments of the utility infrastructure. A utility should be able to generate sufficient revenues to meet the cost of doing business and a reasonable portion of the investment required for new development works (infrastructure), along with additional resources to be raised from the financial markets. Additional resources can be mobilized from lenders or through additional equity. There are, however, limits to which resources can be raised. Such limits can be due to endogenous factors (such as company's own financial health, track record and management) and exogenous factors (such as the host country's rating in the international financial markets, political situation or general market sentiments depending upon the country's macroeconomic performance, strength of the country's financial institutions, and depth of financial markets). A broad financial planning framework is shown in Figure 3. The main steps for making a financial plan are described below:

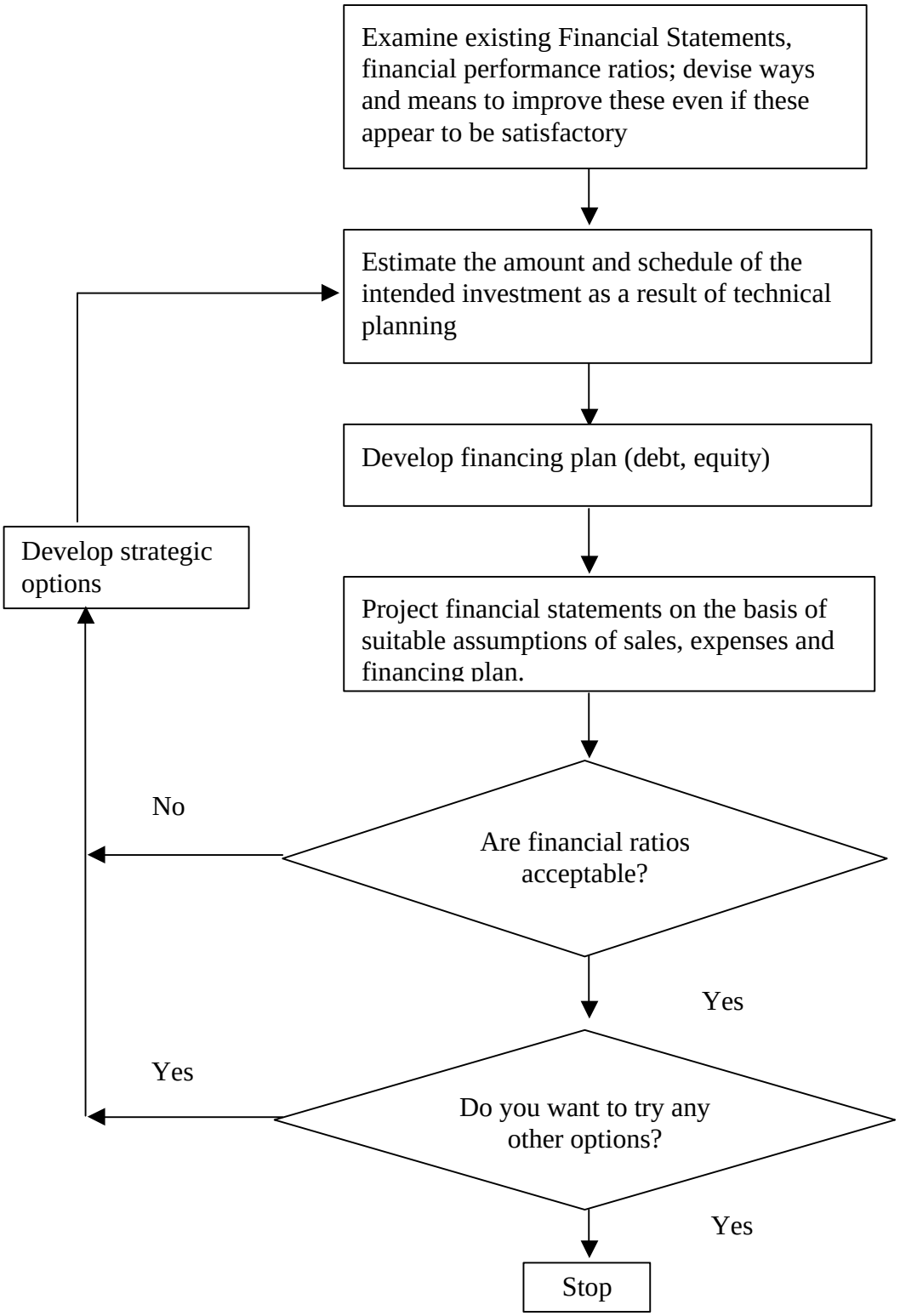
1. The **first step** in financial planning is to review, the existing financial health of the utility. This can be done by analyzing the following three basic accounting statements and examining the adequacy of various financial performance ratios.

    i. Income Statement (Profit and Loss account)
    ii. Cash Flow statement (sources and application of funds)
    iii. Balance Sheet

    Elements of the above financial statements are illustrated in the case study (annex). Evaluation of these statements relate to assessment of adequacy of return on equity (share holders' earning compared with other available options), dividend payout to share holders, recovery of receivables, inventory management, status of liabilities and liquidity to discharge these liabilities, debt equity ratio etc. Based on this analysis, strategies are devised to overcome the shortcomings so identified.

2. The **second step** is to estimate the amount of investments which is intended to be made as a result of technical planning exercise discussed earlier and to determine its schedule.

Figure 3: Financial Planning Framework



3. The **third step** is to prepare a financing plan for the proposed investment comprising of debt and equity. This has to be made on the basis of realistic assumptions about the debt and equity market.

4. The **fourth step** is to project the financial statements using appropriate assumptions and incorporating the financial plan.

5. Finally the **fifth, step** is to examine the resulting financial performance ratios and develop financing options as feedback for the next iteration to improve these ratios.

Analysis of Financial Statements

Key elements of simplified financial statements with illustrative data are given in the case study (annex). Key financial ratios and their significance discussed below.

Return on Equity (ROE)

$$\text{Return on Equity (ROE)} = \frac{\text{Net Income}}{\text{Equity (Paid up capital plus reserves)}}$$

Equity is shareholders' money. It comprises of the shares held by them (paid up capital) and reserves. Return on Equity (ROE) shows the earning to shareholders in any year. Shareholders want these returns to be at least suitably above the bank interest rates for long-term deposits yielding them a premium for risk of making investment. A company's performance in generating ROE can be evaluated on the following basis:

1. Comparison of ROE with the company's historical performance
2. Comparison with industry average
3. Judgmental comparison with other investment options or bank rate plus perceived risk premium.
4. Compare with a benchmark, with highest performing utility

Return on Assets or Return on Investment

$$\text{Return on Investment} = \frac{\text{Earning before Interest and Taxes}}{\text{(Debt) + Equity (Paid up + Reserves)}}$$

The Return on Investment shows how well the company used its capital without considering how much of its permanent capital came from equity and /or debt.

Days Receivables

$$\text{Days Receivables} = \frac{\text{Accounts Receivables}}{\text{Sales Revenue}}$$

This ratio indicates how many days of sales revenues are tied up in accounts receivable (defaults/arrears in recovery of bills). The greater this ratio, the poorer the performance. For a utility, this number should not exceed billing cycle time (i.e. time from meter reading, preparation of bills, delivery of bills and time allowed for payment). A utility should also try to reduce the billing cycle time to reduce revenue hold-up time.

Inventory Turn Over

$$\text{Inventory Turn Over} = \frac{\text{Cost of Sales}}{\text{Inventory}}$$

This ratio indicates the inventory turned over during a year. Slow moving equity ties up capital and increases that some of the inventory may become obsolete. Therefore, the higher this ratio, the better it is, as it shows efficiency of inventory management.

Current Ratio

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Current assets are cash and those assets which can be converted into cash in a short period. Current liabilities are the accounts payable by the company such as fuel bills, spares etc i.e. obligations which become due within a short period of time (not exceeding a year). Current ratio is a measure of ability of the company to meet current obligations. If the current ratio is too low, the company might not be able to pay its bills to its suppliers (fuel suppliers, spares etc). However, if the ratio is to too high, the company would not be taking advantage of the opportunity to finance current assets with current liabilities (because increased current liabilities leaves cash with the utility which can be interest earning). Usually, a current ratio in the range of 1.3 to 1.5 for a utility is considered satisfactory.

Quick Ratio

$$\text{Quick Ratio} = \frac{\text{Quick Assets}}{\text{Current Liabilities}}$$

Quick assets are cash or current assets that can be quickly converted to cash to discharge current liabilities. This ratio measures a company's ability to pay off the claims of creditors without relying on the sale of its inventories. The higher the number, the greater the comfort.

Debt Equity Ratio

$$\text{Debt-Equity Ratio} = \frac{\text{Long Term Debt}}{\text{Equity}}$$

Debt-Equity ratio measures the stakes of shareholders. The higher the stakes, the more comfort it provides to lenders. However, since equity is usually more expensive than debt, it makes the product (electricity) more expensive. Therefore, a suitable balance is required between debt and equity. A debt equity ratio of 75:25 is usually considered satisfactory for a utility.

Estimating Capital Costs and Investment Needs

Investment may be required for construction of new projects or in existing assets. The first step is to carry out a preliminary feasibility study, determine project parameters and broad specifications of equipment, estimate capital cost either through quotation from suppliers or arrived at on the basis of information about some recently completed projects of similar nature and size. Actual procurement at the time of implementation be preferably done through competition process. If the project is proposed to be a Turnkey Contract (TKC) or Engineering, Procurement and Construction Contract (EPC), then quotations are invited from such contractors to arrive at competitive prices. Based on such a preliminary study, elements of costs are identified. The main elements of cost are shown in Table 1:

Table 1

Elements of Capital Cost

A. *Cost of Plant*

i. Design, Engineering and Supervision
ii. Plant and Equipment
iii. Construction.
iv. Plant erection.
Commissioning.

These costs generally constitute elements of Engineering, Procurement and Construction Contract (EPC Contract).

B. *Balance of Plant*

vi. Cost of land (including land development, rehabilitation, etc.)
vii. Project development costs (consultancy, legal, travel, office, establishment).
viii. Off-site facilities (access roads, housing, building, water supply, fuel lines, storages, etc.)
ix. Duties, taxes, fees, commissions, levies and octrois etc.
x. Financial costs (interest during construction, fees, insurances, etc)
xi. Project Development and management.

Total cost = A + B

Based on technical plans, a portfolio of investment projects along with implementation timetable is developed. The estimates of capital costs can be categorized as under:

1. Preliminary Estimates or Order of Magnitude Estimates.

   These are based on some sort of extrapolation of the unit costs of some existing facility. For example, cost per MW, cost per km of lines of different voltage levels, cost per MVA of transformers etc. The accuracy tolerance on such estimates is ± 20 %

2. Budget Estimates (Feasibility Estimates)

   These are based on a basic layout plan: list of project components, preliminary work schedule, broad material specification and estimates of construction charges. The accuracy tolerance on these estimates is ±10-15 %

3. Detailed Estimates

   These are based on detailed engineering and bill of quantities prepared for inviting tenders. These use firm prices and are prepared after completion of design, drawings and specification work. These have an accuracy tolerance of ± 5%.

Usually budget estimates are available at the planning stage and are used for evaluation of financial impacts and strategic options. A risk analysis is then carried out to assess the likely impacts of uncertainty of cost. Table 2 illustrates a format for preparing implementation schedule and corresponding phasing of expenditure.

Table 2

Illustrative Format for Preparation of Implementation and Investment Plan

Name of Project	*Cost of Project*	*Completion Date*	***Implementation Plan and Phasing of Expenditure****									
				Year 1				Year 2				Year 3
				1st Q	2nd Q	3rd Q	4th Q	5th Q	6th Q	7th Q	8th Q	9th Q
Project 1			Feasibility	1.0								
			Engineering		5.0							
			Implementation				5.0	20.0	25.0	10.0	5.0	1.5
Project 2			Feasibility	0.3								
			Engineering		1.0							
			Implementation				1.0	3.0	8.0	2.0		
Project 3			Feasibility	0.5								
			Engineering		3.0							
			Implementation				2.0	10.0	10.0	5.0	2.0	
			Total	**1.8**	**9.0**	**--**	**8.0**	**33**	**43**	**17**	**7.0**	**1.5**

* Expenditures shown in $US millions

Estimation of Annual Costs

The components of annual costs are:

I) Variable Costs

a) Fuel cost
b) Consumables and spares, lubricants dependent upon number of running hours of the equipment)

II) Fixed Costs

a) Establishment i.e. manpower, rents, offices, etc.
b) Interest and Depreciation

The fuel cost is arrived at by taking into account the efficiency of the plant, expected plant factor, purchase price of fuel, number of starts and stops and other power system related functions (VAR supply, standby operation, etc.). The efficiency of plant may deteriorate over the life of the plant and dependable capacity of the plant may also decline. Therefore, such factors are also taken into account while determining projections of annual costs. The cost of consumables, spares and lubricants etc., are estimated on the basis of specifications provided by the equipment suppliers.

Fixed establishment cost depends upon management efficiency of operator. It is quite customary that the utility may employ O&M contractors with requisite experience. In such a case, the O&M costs can be finalized through a competitive bidding process. Interest charge depends on the loans obtained for the investment in projects while the depreciation is determined on the basis of prescribed schedules

Preparation of Financing Plan

Projects can be financed though companies retained earnings e.g. profits, reserves and depreciation, additional equity, consumer deposits/fees and loans. Typical financial structure is as follows:

1. Loan
2. Additional Equity
3. Self Generated Funds from cash flows (Reserves, depreciation funds, consumers' deposits, etc.)

Estimation of Financial Charges Debt, Equity Ratio

To meet the cost of the project a financing plan is to be evolved identifying possible sources of funds and the costs of funding. The first step is to decide how much of the capital cost will be financed through equity and how much through loans. Usually the lenders specify a minimum ratio. This ratio essentially reflects a perception regarding the level of stakes of equity holders that may provide comfort to the lenders. Based on the cost estimates a financial plan is developed. It entails:

1. Decision about debt to equity ratio to finance the capital cost.
2. Plan for raising equity from possible sources.
3. Identification of potential sources of loans, expected terms and conditions and collaterals required.
4. Preparation of schedules of implementation and funds draw down (schedules of equity and loan draw downs).
5. Annual repayment schedule of loans.

Arranging Equity

The sources for equity may comprise of existing shareholders (who may be offered right shares) and new equity through investment companies, banks, investment houses, equipment suppliers and other institutional investors. The financial plan may also envisage a suitable amount of equity to be raised through public offering.

For making estimate of successful mobilization of new equity from sources other than the existing shareholders a minimum acceptable level of return on equity, likely to be attractive to them, may be *tentatively* estimated for the sake of plugging it in the financial models to arrive at a corresponding level of electricity price. It is termed as *'tentative'* because after analysis of various scenarios of price of electricity under different assumptions, the returns may be further adjusted. The whole process of financial planning is iterative and parameters have to be adjusted for various scenarios and iterations.

Some of the considerations for determining the return are the country risk, desired pay back period and opportunity cost of capital i.e. likely returns through other investments and bank deposits. Ultimately the return should be attractive to shareholders considering all the risk factor while still maintaining an affordable end user price.

Arranging Loans

As regards loans, potential lenders may be sounded off about the project to assess the interest of lenders in the project. Some lenders may be interested in financing specific components of projects (e.g. some may be interested in supplying turbo generator, others may be in grid station equipment and in civil works, etc.) while others may lend for any component if they are convinced about the viability of the project. In this way, a possible portfolio of loans is evolved to match the financing requirements. Lenders usually require suitable collaterals to lend money. Following are the three broad category of financing opportunities:

a) Balance Sheet Financing

In this kind of financial structure, the investors try to obtain the financing for projects on the basis of the strength of the balance sheet of their on-going business (i.e. parent company). Since the financial health of the on-going business is well known to the market and can be projected with reasonable level of certainty, it lends much greater confidence to the lenders to provide credits for the new power generation projects. This is the speediest and easiest way to secure financing but at the same time it exposes the principal companies of the investors to risks. If the new investments do not produce the anticipated cash flows, the principal company has to make up the deficits in debt servicing as the lenders have recourse to it.

b) Project Finance (Non-recourse financing)

Project finance implies financing structure “off the balance sheet” of the project sponsors (investors). In such a case, a separate company is formed for the project and funds are raised against the project assets. In other words, the principal companies of the investors are not exposed to any risk if the project fails and the only recourse the lenders have is to the cash flow of the project. As is obvious, such financial structures are less attractive to lenders. Such a company, while soliciting investment, has practically no assets or track record. In such cases, the financiers have to look to the projects’ cash flow to drive confidence. As the project is implemented, the assets of the project become collateral to their investment. If for some reason the projects performance is poor and the cash flows are lower than the projections, the lenders recourse is to the project company’s assets and not to the parent company’s balance sheet. If the project is abandoned, midway its construction, the lenders may find themselves, inadequately covered. Obviously, the lenders undertake a very close scrutiny of the project in such schemes and have very stringent requirements of performance and securities before lending.

c) Limited Recourse Project Financing

Project finance or non-recourse financial structure is less attractive to lenders and difficult to realize particularly in developing countries, where cash flows can be subjected to many unforeseeable non-commercial hazards (risks). In practice,

project finance in developing countries is backed by limited support of sponsors or government guarantees to give the lenders additional comfort. For example, such a support could be in the form of a balance sheet support from the sponsors parent company for cost over-run or government's guarantees for export credits or partial/limited investment of the government or pubic sector agencies in the project finance etc. Such a financial structure is called limited recourse project financing. Clearly the greater the comfort to the lenders, the lesser would be the financing costs and so will be the price of electricity. However, it depends upon the willingness of the project sponsors and the governments to agree to limits of their exposure for the success of the project.

The lenders to the project carry out a full risk analysis of the project with the fundamental question in their mind—how much is the security that their debts would be served uninterruptedly and on scheduled dates? Towards this end, all risks of the project (i.e. commercial, country/political, *'force majeure'* and financial discussed in the text in the next chapter) are fully evaluated. Judicious apportionment of the risks and a security package relevant to a country's environment results in a successful project financing. Further discussion on risks will follow in the next session. Different lenders may offer different terms of lending. A typical term sheets of bank loans is given in Table 3

The term sheet needs to be examined very carefully as some loans may appear to be cheaper in terms of interest rates but in ultimate analysis, these may become more expensive than others because of differences of grace period, front end fees, repayment schedules.

To fully analyze relative merits of various loans, computerized financial models are made. Selection of appropriate loan package may depend upon various considerations some of which are:

i) Present value of the loans (based on discounted stream of repayment schedule).
ii) Repayment profiles, i.e.
    a) equal installments through the repayment period; or
    b) declining repayments and extent of front load (high payments in the initial years).
    c) grace period.

Table 3

Typical Term Sheet for Banks Lending
(Illustrative Terms)

Items	**Loan I**	**Loan II**	**Loan III**
1. Name of Lender			
2. Amount of Loan			
3. Currency of Lending			
4. Interest Rates			
5. Default Interest Rate			
6. Up-front fee (frond-end fee)			
7. Commitment fee			
8. Term of Loan			
9. Availability Period			
10. Repayment Period			
11. Repayment Installments			
12. Payment Dates			
13. Final Maturity Date			
14. Security			
15. Guarantee			
16. Pre-payment or Accelerated Repayments			
17. Risk Insurance			
18. Premium			
19. Other fees (under-writer, management, arrangements)			

The next step is to decide a schedule of draw down of debt and equity in accordance with the schedule of project implementation. Proportion of equity draw down in relation with loans also needs to be decided. Equity can be drawn up-front, towards the end of project implementation or in a pre-determined proportion of loan. Normally, lenders and power purchasers prefer "*Parri Passu*" arrangement (i.e. each payment to have the same proportion of debt and equity as set for the overall project) or up-front draw down.

After examining the profiles of individual loans, it is pertinent to examine the options of loan package as a whole. It is necessary to see whether the resultant profile of loans is the best suited. It is possible that one of the two apparently acceptable profiles may result in higher initial cash outflow than other apparently expensive options in the initial years. Higher initial outflows will necessitate higher power prices to meet cash flow requirements. This may not be acceptable; therefore, generally effort is made to develop a

package which results in the minimum *'front loading'*.

Projection of Financial Statements

Using the financial plan, information about tax and company laws and adopting suitable assumptions regarding business revenues, expenses, working capital etc, the financial statements are projected for the plan period. The results of financial projections are then analyzed to judge whether the performance indicators (the ratios) are acceptable or not or how can the ratios be improved. Based on this analysis, the appropriate number of iterations are carried out to get acceptable results. An illustration is given in the case study (see Annex).

Case Study: Financial Planning for a Small Power Utility

Description of Salient Features.

The power system of a country has been recently unbundled into separate generation, transmission and dispatch, and distribution companies. The size of the power system is about 1000 MW in which 4 generation companies compete to get their share. The demand of the system is growing. One of the companies called "GENCO" has an installed capacity of 120 MW. On the average, it is operating at a plant factor of 60% per annum and receiving a price of ¢5.5 per KWh for sales to the power pool (grid system). The future outlook is that in the competitive market the pool price is not likely to be less than ¢5.5/KWh. The company has, therefore, made its base case financial projections on the basis of receiving ¢5.5/KWh (See Spread Sheet).

The above financial projections will be discussed in the workshop.

Section 5
Risk Assessment and Scenario Development

Risk Assessment and Scenario Development

Electricity sector risks

- Specific business risks should be assigned to each business
- Regulatory risks: should be reduced with long term rules and ensuring the regulator independence
- Prosecution of power theft and vandalism based on the rule of law should be established.
- Political risk associated to:
  - Currency Risk
  - Repatriation Risk
  - Civil War/Disturbances Risk
  - Expropriation (Nationalization) Risk

  Should be covering in the market environment

Private companies strategy

- Unbundling is forcing players to examine functionality of assets.
- Rank order differentiators between competitors are:
  - Price (only for generators)
  - Customer Service
  - Brand values
- The private companies are focused in:
  - Short term benefits that depends on
    - Reducing operative cost
    - Optimizing investment
    - Reducing risks
  - Increase the business volume

Multi Utility Response

- Mutual skill set justification
  - Asset planning
  - Risk management
- Regulatory diversification
- Operational risk diversification
- Shared characteristics essential

Outsourcing Response

- Driven by cost minimization.
  - Avoids duplication
  - Specialization "Best in Class"
- Economies of scale.
- Partial outsourcing, reduces risk but dilutes benefit

Operational Segmentation

- Core activities
  - Asset ownership – capital intensive, low risk
  - Asset planning & operation – potentially high return on minimal additional investment
  - Asset maintenance & construction – contestable & low margin

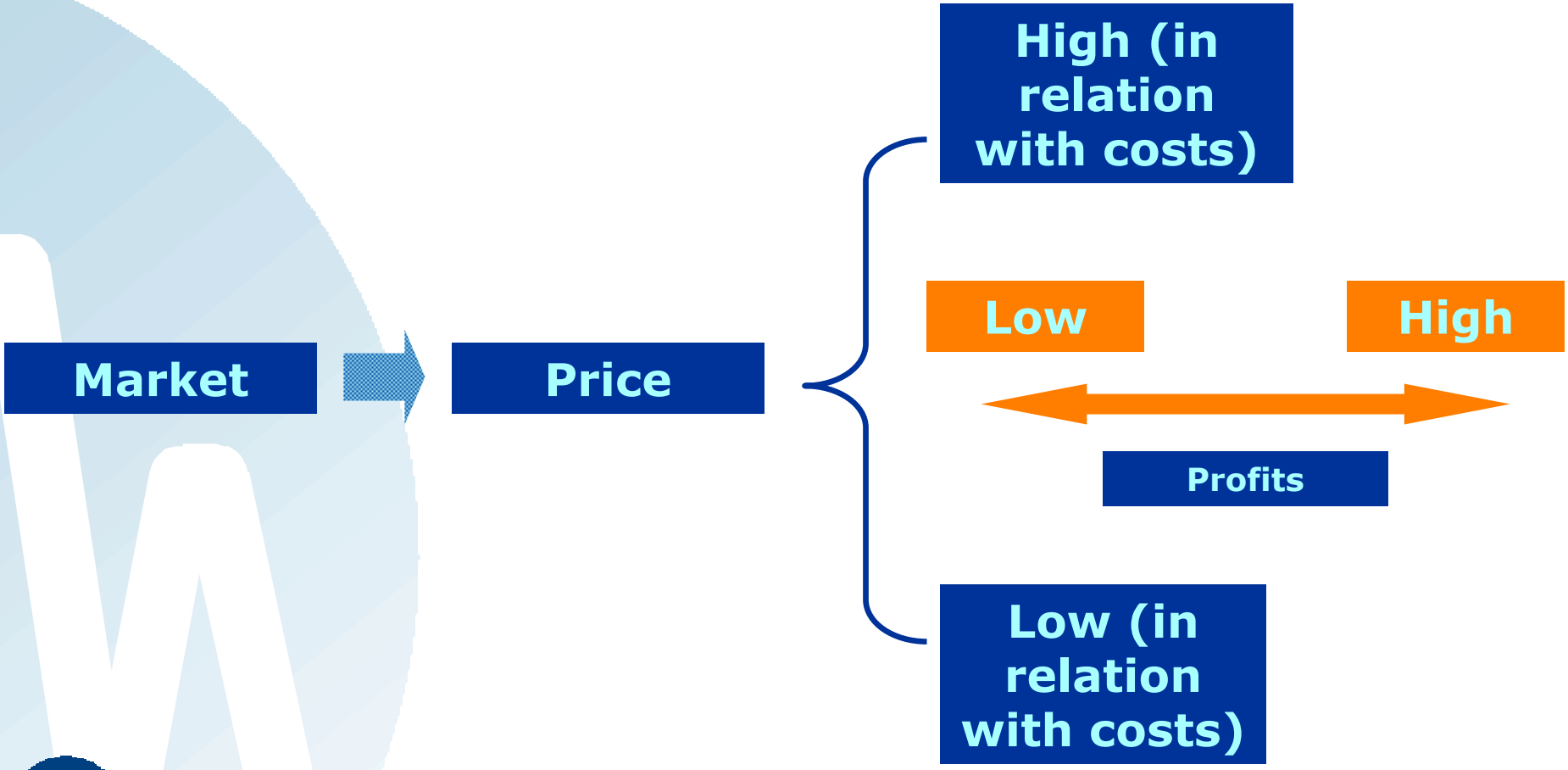
Generation business

- Market oriented and focused to increase benefits and reduce risks that are:
- Market risks (exposed to unstable revenue stream, to higher fuel costs)
  - Systematic if they affect all the assets
  - Specific if they affect only one asset
- Operational risks
- Credit risks: related with non-fulfillment of clients
- Risks of covering due to the holes in the full covering
- Regulatory risks
- Political risk

Risk management

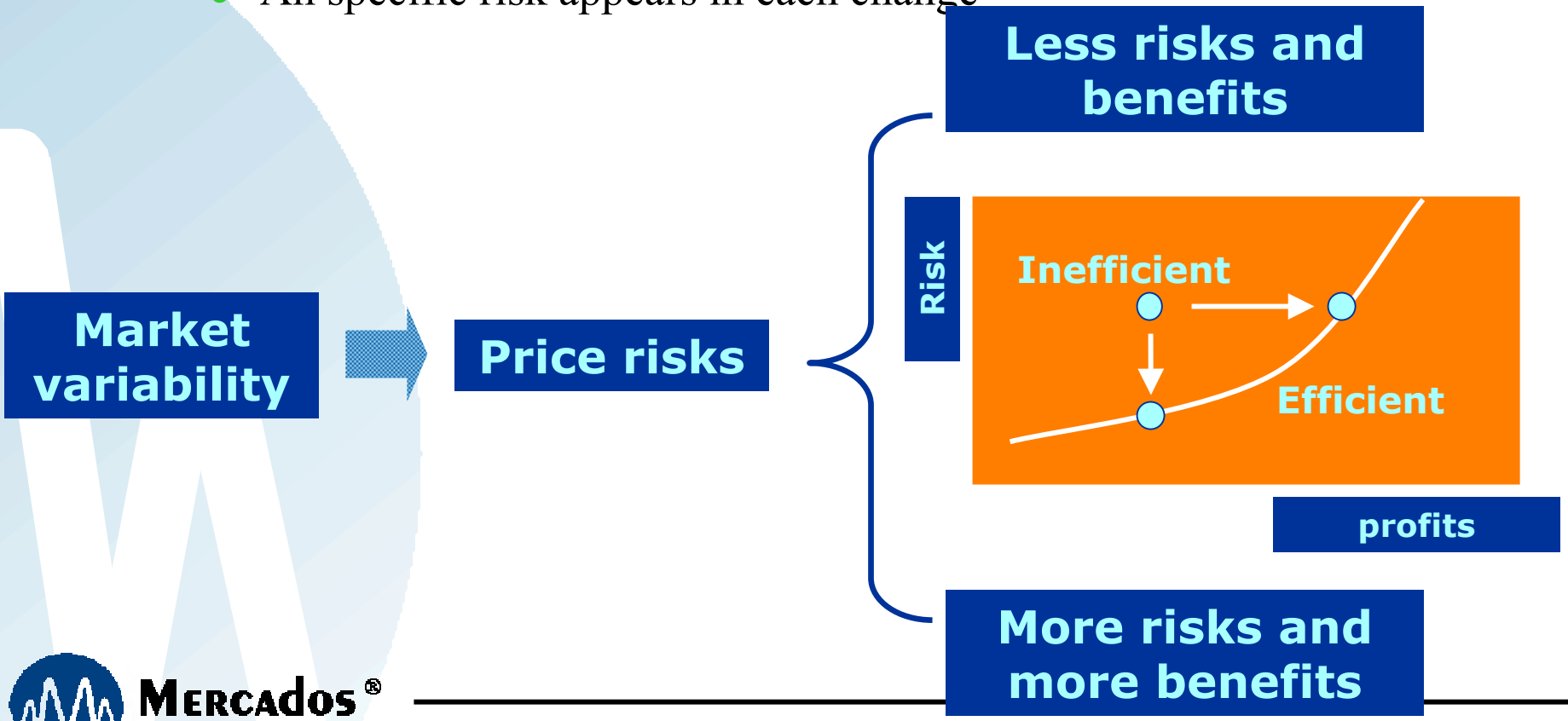
- Diversification: To substitute active for others of equivalent profitability and not correlated risks.
- Covering: To acquire active with risks inversely correlated.
- Insurance: To hire compensation when a certain facts happens.

Price risks

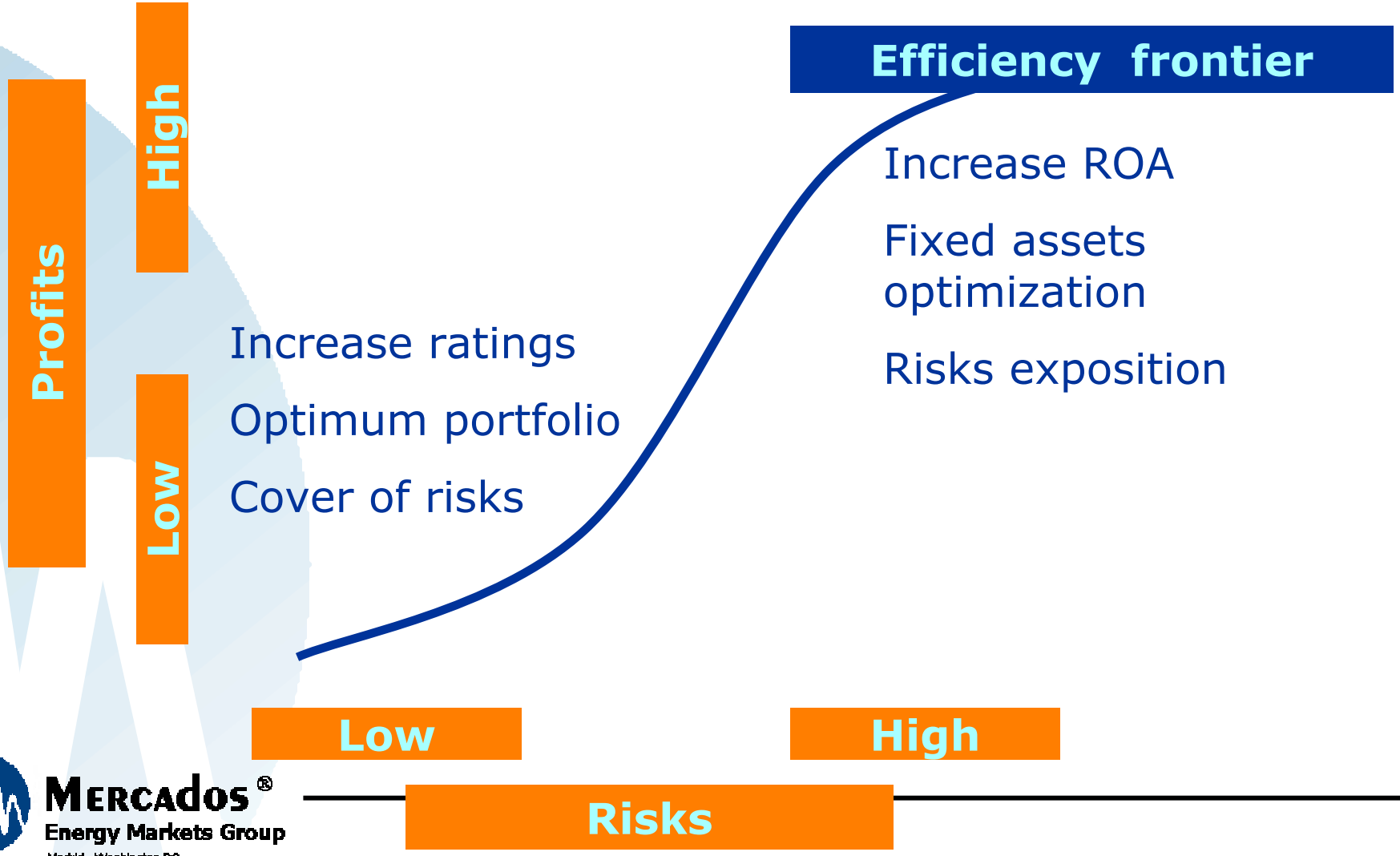

Market
Price
High (in relation with costs)
Low
High
Profits
Low (in relation with costs)

Price risks

- In liberated markets
  - The offer and the demand change the prices.
  - The change affect all the participants
  - An specific risk appears in each change



Risk management and profits



Credit risks

- The crisis of ENRON has been the beginning of a great distrust in the electricity sector
- It has decreased the rating and the ratios of indebtedness has increased
- The market crisis has reduced the capitalization of the energy companies
- The mechanisms to negotiate the credit risk are not standardized.

Operational Risk

- Technical Risk
  - Outage of technical equipment, fire etc. -> mainly hedged by producer guaranties and insurances
  - Waste of revenues
- Human Resources
  - Recruitment of adequate staff is key-task
- Model Risk
  - Examination and verification of your risk-models have to be established
- Organizational Risk
  - Ensure the process-chain (responsibility, time-schedules, effectiveness)

Other Types of Business

58 System Operation License

- (1) …. a system operation license shall authorize the licensee to carry on system operation, including, but not limited to, the following activities…:
  - generation scheduling, commitment and dispatch;
  - transmission scheduling and generation outage co-ordination;
  - transmission congestion management;
  - international transmission co-ordination;
  - procurement and scheduling of ancillary services
  - system planning for long term capacity;
  - administration of the wholesale electricity market …
  - ….
- (2) All contracts for procuring ancillary services must be awarded according to an open transparent and competitive manner, pursuant to a procedure established by the Commission……

60 Trading Licenses

- (1) A trading licensee shall be permitted to engage in the purchasing, selling, and trading of electricity ……
- (2) The Commission may also issue a temporary bulk purchase and resale license, giving the licensee, the ability to purchase electrical power and ancillary services from independent power producers and successor generation companies for the purpose of re-sales to one or more other licensees, or to an eligible customer. All contracts for purchases of electrical power and ancillary services by the holder of such temporary license shall be awarded according to an open, transparent, and competitive manner, pursuant to a procedure established by the Commission……...

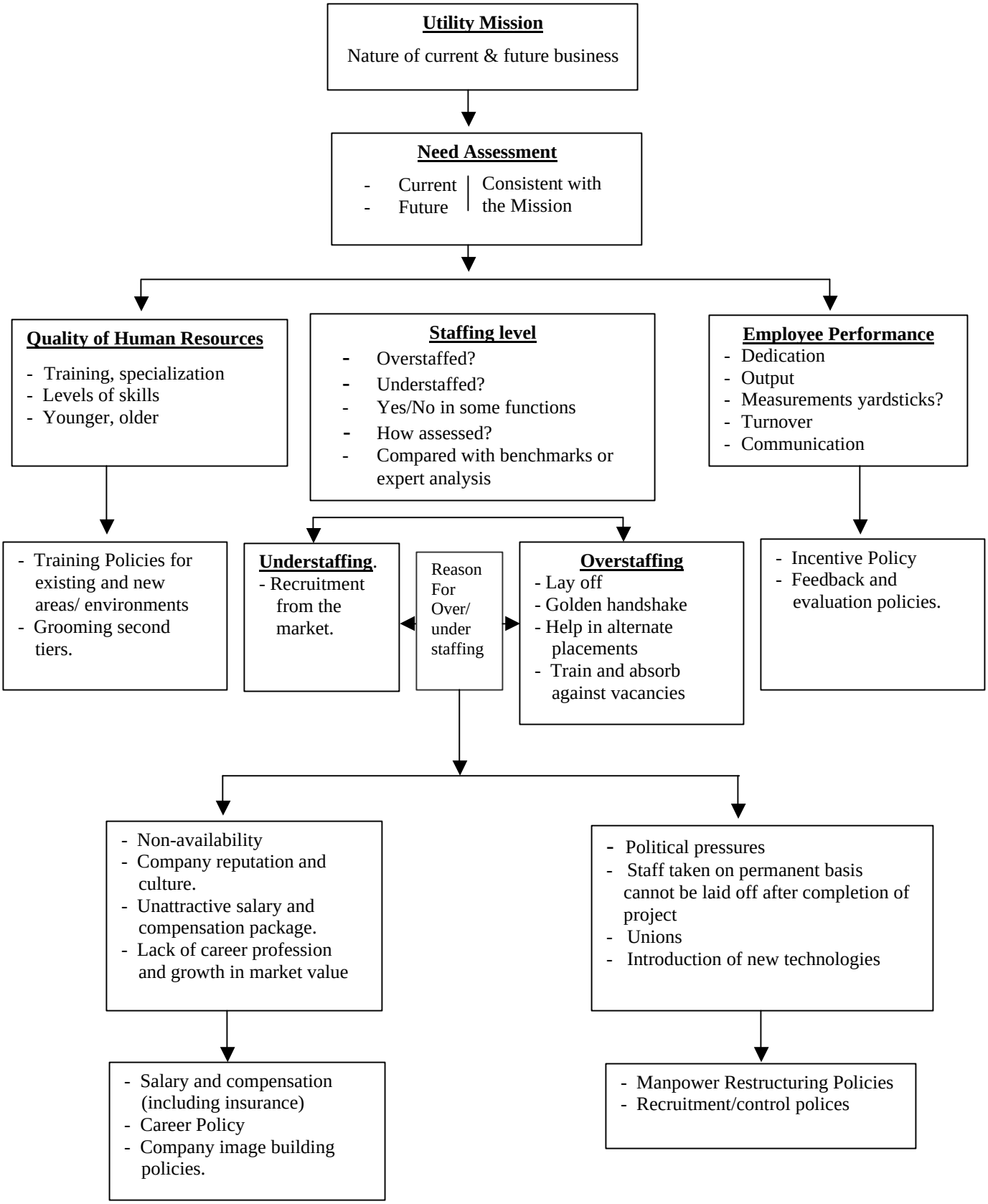
Section 6
Infrastructure Planning

Section 6 Company Infrastructure Planning

6.1 Human Resource Planning

Human resource planning is often a neglected area. Unless a utility is properly staffed and its manpower motivated and trained, the financial and technical plans cannot be implemented properly. The utility also has to define its future role and build its human resources to meet the requirements of emerging business environments. For instance, with the reshaping of electric markets, public sector utilities may require trained manpower in areas of company finance, company laws, market analysis, load dispatcher/control, and data base/information management (MIS). Some of the old staff may have to be laid off to make way for new entrants well versed in state of the art utility businesses and new technologies. The company may also have to invest in continuing training and education to prevent obsolescence. The following chart sums up a utility human resource planning approach.

Human Resource Planning



Annex
Case Studies

	Test Case								Years									
			Formula/source		Construction Period				Commissioned & Operational									
					-3.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
						2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Income Statement																	
A	**Revenue Calculations**																	
1	Generating Capacity	MW	a=assumed system size		120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0
2	Plant factor	%	b=assumed to be current		60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
3	Electricity Generation	GWh	c=a*b/100*8760/1000		630.7	630.7	630.7	630.7	630.7	630.7	630.7	630.7	630.7	630.7	630.7	630.7	630.7	630.7
4	Generation Losses	%	d=assumed for the system		4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
5	Sale of Electricity (Gwh)		e=(1-d/100)*c		600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
6	Sale Price	c/KWh	f=assumed market price		5.500	5.500	5.500	5.500	5.500	5.500	5.500	5.500	5.500	5.500	5.500	5.500	5.500	5.500
7	**Sales Revenue**	**$Million**	**A=e*f/100**		**33.0**	**33.0**	**33.0**	**33.0**	**33.0**	**33.0**	**33.0**	**33.0**	**33.0**	**33.0**	**33.0**	**33.0**	**33.0**	**33.0**
1a	Generating Capacity(**New**)	MW	a=assumed system size			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2a	Plant factor	%	b=assumed to be current			0.0	0.0	0.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
3a	Electricity Generation	GWh	c=a*b/100*8760/1000			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4a	Generation Losses	%	d=assumed for the system						4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
5a	Sale of Electricity (Gwh)		e=(1-d/100)*c						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6a	Sale Price	c/KWh	f=assumed market price						0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7a	**Sales Revenue**	**$Million**	**A=e*f/100**						**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	Fuel cost for new Generation																	
8a	*Unit Fuel Costs*	c/KWh	g=assumed based on efficiency		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
9a	Fuel cost	$ Million	h=g*c		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	Test Case								Years									
			Formula/source		Construction Period				Commissioned & Operational									
					-3.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
						2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
B.	**Expense Calculation**																	
8	*Unit Fuel Costs*	c/KWh	g=assumed based on efficiency		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
9	Fuel cost	$ Million	h=g*c		12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6
10	*O&M rate*	%	ii=% 0f gross assets (£)		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
11	O&M Cost	$ Million	i=ii% of gross assets		1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
12	*Establisment basis*	%	jj=% of gross assets		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
13	Establishment	$ Million	j=jj%of gross assets		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
13 a	Cost of Sale	$ Million	h+i+j		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
14	*Depreciation Rate*	%	k=weighted average of gross assets		3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
15	Depreciation	$ Million	l=k/100*gross assets		4.8	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
16	**Operating Expenses**	**$ Million**	**B=m=h+i+j+l**		**19.8**	**20.2**	**20.2**	**20.2**	**20.2**	**20.2**	**20.2**	**20.2**	**20.2**	**20.2**	**20.2**	**20.2**	**20.2**	**20.2**
17	**Op Earning/Income**	**$ Million**	**n=A-B**		**13.2**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**
18	Interest	$ Million	o=See rows92 &87		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
19	**Profit Before Tax**	**$ Million**	**p=n-o**		**7.2**	**6.8**	**6.8**	**6.8**	**6.8**	**6.8**	**6.8**	**6.8**	**6.8**	**6.8**	**6.8**	**6.8**	**6.8**	**6.8**
20	*Tax Rate*	%	q depends on authority		20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
21	Tax	$ Million	r=q*p/100		1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
22	**Net Profit/Net Earning**	**$ Millon**	**s=p-r**		**5.8**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**
	No New Plant				**5.8**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**
					0.0	**0.0**	**-5.2**	**-7.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0 #**
23	*Dividend Rate*	%	t= depends on decision		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
24	Dividend	$ Million	u=t/100 of paid up cap		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25	**Retained Earning**	**$ Million**	**v=s-u**		**2.8**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
	£ can be reated to electricity generation																	

	Test Case				Years													
			Formula/source		Construction Period				Commissioned & Operational									
					-3.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
						2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Balance Sheet																	
	Assets																	
	Fixed Assets																	
26	Gross Assets	$ Million	a=Cost on commisioning		130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00
27	*Depreciation Rate*	%	b=Assumed % of 'a'		3.72	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
28	Yearly Depreciation	$ Million	bb=b/100*a		4.84	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20
29	Cumulative Depreciation	$ Million	c=Prev.+current		4.84	10.04	15.24	20.44	25.64	30.84	36.04	41.24	46.44	51.64	56.84	62.04	67.24	72.44
30	Operating Assets	$ Million	d=a-c		125.16	119.96	114.76	109.56	104.36	99.16	93.96	88.76	83.56	78.36	73.16	67.96	62.76	57.56
31	Work in Progress	$ Million	e=From construction prog		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	Total Fixed Assets	$ Million	f=d+e		125.16	119.96	114.76	109.56	104.36	99.16	93.96	88.76	83.56	78.36	73.16	67.96	62.76	57.56
	Current Assets	$ Million																
33	Inventory,spares,tool	$ Million	g	1.65	1.65	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05
34	Accounts Receivables	$ Million	h	2.5	2.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
35	Cash & bank balance	$ Million	I		0.45	3.13	5.80	8.48	11.16	13.83	16.51	19.19	21.86	24.54	27.22	29.89	32.57	35.25
36	Total Current Assets	$ Million	j=g+h+i		4.60	7.18	9.85	12.53	15.21	17.88	20.56	23.24	25.91	28.59	31.27	33.94	36.62	39.30
37	**Total Assets**	$ Million	**k=f+j**		**129.76**	**127.14**	**124.62**	**122.09**	**119.57**	**117.05**	**114.52**	**112.00**	**109.48**	**106.95**	**104.43**	**101.91**	**99.38**	**96.86**
	Liabilities & Equity																	
	Long Term																	
38	Paid up capital	$ Million	I+new equity as injected		30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
39	Reserves	$ Million	m=last year'sreserve+v		1.75	4.23	6.70	9.18	11.66	14.13	16.61	19.09	21.56	24.04	26.52	28.99	31.47	33.95
40	**Total equity**	$ Million	**n=I+m**		**31.75**	**34.23**	**36.70**	**39.18**	**41.66**	**44.13**	**46.61**	**49.09**	**51.56**	**54.04**	**56.52**	**58.99**	**61.47**	**63.95**
41	**Debt**	$ Million	**o=5/annum+new debt balance**		**95.00**	**90.00**	**85.00**	**80.00**	**75.00**	**70.00**	**65.00**	**60.00**	**55.00**	**50.00**	**45.00**	**40.00**	**35.00**	**30.00**
42	**Total Long Term**	$ Million	p=n+o		126.75	124.23	121.70	119.18	116.66	114.13	111.61	109.09	106.56	104.04	101.52	98.99	96.47	93.95
	Current Liabilities	$ Million																
43	Payment to Fuel Supp	$ Million																
	& Other Creditors		q	1	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
44	Short Term Borrowing	$ Million	r=previousborrowing -h from c.f	2	2.00	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
45	**Total Current**	$ Million	s=q+r		3.00	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
46	**Total Liabilities**	$ Million	**t=p+s**		129.75	127.13	124.60	122.08	119.56	117.03	114.51	111.99	109.46	106.94	104.42	101.89	99.37	96.85
	Check Row				0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Test Case					Years													
			Formula/source		Construction Period				Commissioned & Operational									
					-3.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
						2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013

	Test Case																	Years
			Formula/source		Construction Period				Commissioned & Operational									
					-3.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
						2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
		Sources & Application of Funds(Cash Flow) Statement																
	In-flows																	
47	Operating Income	$ Million	a=Row 17		13.21	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85	12.85
48	Add back Depreciation	$ Million	b=Row 15		4.84	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20
49	Consumer Deposits	$ Million	c		0.00	0.00	0.00	0.00										
50	Total	$ Million	d=a+b+c		18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05
	Adjustments																	
51	Change in Receivables	$ Million	e=Row 34(prev-current yr)		0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
52	Change in Inventory	$ Million	f=Row 33(prev-current yr)		0.00	-0.40	0.00	0.00										
53	Change in Payables	$ Million	g=Row 43 (currenr-prev yr)		0.00	1.00	0.00	0.00										
54	Total Adjustments	$ Million	h=e+f+j		0.00	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
55	**Additional Equity**	$ Million	i=Row74		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
56	**Borrowing**	$ Million	j=Row73		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
57	**Net In-flow**	$ Million	k=d+h+i+j		18.05	19.15	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05	18.05
	Out-flow																	
58	Debt Service (interest+princ	$ Million	l=rows88+93		0.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
59	Repayment of Short Term L	$ Million	m=row44(decrease in borrowing)		0.00	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	Capital Cost	$ Million	n=row72/100*row67		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61	Tax	$ Million	o=row21		1.44	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
62	Dividend	$ Million	p=row24		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
63	**Total Out -flow**	$ Million	q=l+m+n+o+p		4.44	16.47	15.37	15.37	15.37	15.37	15.37	15.37	15.37	15.37	15.37	15.37	15.37	15.37
64	**Net Increase/Decrease**	$ Million	**r=k-q**			**2.68**	**2.68**	**2.68**	**2.68**	**2.68**	**2.68**	**2.68**	**2.68**	**2.68**	**2.68**	**2.68**	**2.68**	**2.68**

	Test Case					Years												
			Formula/source		Construction Period				Commissioned & Operational									
					-3.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
						2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
			Investment															
65	**New Proposed Invest**	$ Million	a	0														
66	Invest ment through cash wi	$ Million	b	0	$ Mill													
67	New Investment (net)	$ Million	c=a-b	0														
68	Debt Ratio	%	d=73% of Capital Cost	73														
69	Debt Amount	$ Million	e=d/100*c	0														
70	Equity	$ Million	f=(1-d/100)*c	0														
71	**Draw -down Schedule**		based on const. Schedule															
72	Loan Draw-down	%	g=based on const. Schedule		%		40	60										
73	Loan Draw-down Amount	$ Million	h=g/100*e				0	0										
74	Equity Draw-down Amoun	$ Million	I=g/100*f				0	0										
75	**Total Investment**	$ Million	j=h+I				0	0										
			Repayment Schedule															
76	Repayment Period		k	10	yrs.													
77	Grace Period for Principal		l	2	yrs.													
78	Grace Period for Interest		m	2	yrs.													
79	Installment of Principal		n=row69/(row76-77)	0														
80	Interest per annum		o=depends on borrowing	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
81	Installment frequency				End yr.													
82	**Repayment Schedule**																	
83	Years								1	2	3	4	5	6	7	8	9	10
84	Openning Balance		p						0	0	0	0	0	0	0	0	0	0
85	Payment of Principal		q=n		0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	Closing Balance		r=p-n						0	0	0	0	0	0	0	0	0	0
87	Interest Schedule		s=o/100*p		0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	Total Debt Service		t=q+s						0	0	0	0	0	0	0	0	0	0
90	**Previous Debt Service**																	
91	Principal		u			5	5	5	5	5	5	5	5	5	5	5	5	5
92	Interest		v			6	6	6	6	6	6	6	6	6	6	6	6	6
93	Total		w			11	11	11	11	11	11	11	11	11	11	11	11	11

	Test Case		Formula/source		Years													
					Construction Period				Commissioned & Operational									
					-3.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
						2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
			Financial Ratios															
94	Return on Equity		Net Profit(row22)/Equity(row40)		18.17	16	14.921	13.978	13.15	12.409	11.75	11.157	10.62	10.134	9.6904	9.2835	8.909	8.564431
95	Return on Investment		EBIT(row17)/Debt+EquityRow42)*100		13.91	14.27	15.113	16.057	17.13	18.351	19.763	21.41	23.36	25.692	28.546	32.115	36.7	42.81939
96	Days Receivables		Receivables(row34)/Sales Revenue(row		0.076	0.061	0.0606	0.0606	0.061	0.0606	0.0606	0.0606	0.061	0.0606	0.0606	0.0606	0.061	0.060606
97			Months=row96*12		0.909	0.727	0.7273	0.7273	0.727	0.7273	0.7273	0.7273	0.727	0.7273	0.7273	0.7273	0.727	0.727268
98	Inventory Turn Over		Cost of sale(13a)/Inventory(33)		9.063	7.295	7.2948	7.2948	7.295	7.2948	7.2948	7.2948	7.295	7.2948	7.2948	7.2948	7.295	7.294829
99	Current Ratio		Current AssetsRow36)/Current Liabilitie		1.533	2.475	3.3977	4.3207	5.244	6.1666	7.0896	8.0126	8.936	9.8586	10.782	11.705	12.63	13.55051
100	Quick Ratio		Quick Assets(row35)/Current Liabilities(		0.15	1.078	2.0011	2.9241	3.847	4.7701	5.6931	6.6161	7.539	8.462	9.385	10.308	11.23	12.15396
101	Debt-Equity Ratio		Debt(row41)/Equity(40)		2.992	2.63	2.3159	2.0419	1.8	1.5861	1.3946	1.2223	1.067	0.9252	0.7962	0.678	0.569	0.469142

EBIT= Earning Before Interest and Tax

CASE STUDY 2

GENERATION COMPANY 2 (GENCO 2)

INTRODUCTION **3**
EXECUTIVE SUMMARY **3**
BUSINESS VISION AND MISSION **3**
BUSINESS STRATEGY **4**
CURRENT SCENARIO 4
FUTURE SCENARIOS 4
ROLES AND RESPONSIBILITIES OF THE COMPANY **5**
CUSTOMERS 5
MARKET PARTICIPANT 5
BUSINESS OBJECTIVES **5**
KEY BUSINESS STRATEGIES **6**
MAJOR DRIVERS **7**
PRIVATE SECTOR PARTICIPATION 7
WATER RIGHTS, AVAILABILITY, COSTS AND LOSSES 7
REGULATORY REGIME 7
MAINTENANCE AND REHABILITATION 8
COMPETENCY DEVELOPMENT AND TRAINING 8
BACK-UP CONTRACTS (PURCHASE AGREEMENTS) 8
CONCLUSION 8
CUSTOMER NEEDS **8**
STAKEHOLDER REQUIREMENTS **9**
KEY PERFORMANCE INDICATORS **10**
TECHNICAL MEASURES 10
FINANCIAL MEASURES 10
PEOPLE MEASURES 10
STAKEHOLDER MEASURES 11
CRITICAL INDICATORS 11
GAP ANALYSIS **11**
RISK ASSESSMENT **12**

Introduction

1. This Strategic Plan is based on a 2-year time frame from point of incorporation/unbundling to point of privatisation. The company functions in a commercial manner during this time. That is no political influence, a high degree of autonomous leadership and decision making and consequent performance based remuneration.
2. The management contractors will play a major role in the success or failure of the transformation. In view of this, their contract objectives and operational improvement initiatives must dovetail with this plan. They need to have full opportunity to critique and add to this business plan soon. This is mission critical and if not attended to will cause major failure in the implementation phase.
3. This is a living document, which is regularly updated as required.

Executive Summary

GENCO 2 will be the generation company in charge of technical and commercial management of the hydroelectric plants on the XX River:

- Plant 1: with installed capacity 68 MW, effective capacity 66 MW, best efficiency 0.9 and design head 159.6 m
- Plant 2: installed capacity 21 MW, effective capacity 17 MW, best efficiency 0.6 and design head 70.0 m
- Plant 3: installed and effective capacity 8 MW, best efficiency 0.9 and design head 26.5 m
- Plant 4: installed and effective capacity 180 MW, best efficiency 0.9 and design head 798.0 m.

GENCO 2 is a company focused on excellence in the operation and maintenance of its assets to generate electricity. Its hydro power stations aim to provide maximum available capacity for the power system administered by the System Operator (SO). Improvement in water management is a key issue. This includes decreasing losses through good practice in water measurement and control.

It is important to note the high number of uncertainties in the environment at present. Clearly regulatory uncertainties, time frames and investor interest will have a major influence.

Business Vision and Mission

In our context, the vision is the desired end state whereas the mission is how to get to the end state. Each Company develops its vision and mission when operational. The creation of the vision and mission is a participative process involving the actual people responsible for the business. Hence we cannot realistically define such thing for the COMPANY members in isolation. The following is a starting point for further discussion during implementation phase.

Vision:

To be an efficient generation company that maximises effective availability of installed capacity, meeting regulated standards on quality of supplied energy and other parameters related to system operation, and therefore supporting sustainable development of electricity market.

Mission:

To maximise availability and reliability of installed generation capacity at the lowest possible cost, produce energy as required by the System Operator, meeting regulated standards on quality of supply and system operation rules. Ensure commercial results to stakeholders and become an attractive option for private investors. To reach the best and most cost effective options for upgrading and rehabilitation of the generation facilities that allows maximizing availability and reliability requirements.

Business Strategy

Current Scenario

The current situation is described using the well know SWOT analysis

Strength: The physical assets are in reasonable condition. The competence levels are acceptable in the technical aspects of electricity generation. The system network is reliable. The demand for energy is high.

Weakness: Weather patterns are unpredictable and often lead to water shortages. The national water policy is of such a nature that water supply is unpredictable. In turn this leads unreliable electricity generation. Resources and plans are not clearly focused on maximising availability. Current focus is on maximising energy output. Labour costs (especially administration) appear to be excessive if compared with similar generation units.

Opportunity: The existing plant and technical expertise is in place to run the stations as required by the new industry structure and legal framework. Long-term growth in demand is expected. A good return on investment can be expected if the future demand levels are attained.

Threat: Vesting contracts are of concern if not implemented correctly and with enough protection for the company. A second major threat is the availability of water. The third and very important threat is the lack of control over stranded costs and GENCO 2 is entirely dependent on government to cover these costs.

Future Scenarios

There are three broad scenarios. One option is the full privatisation of GENCO 2. (This is unlikely in an initial stage of the reform process, according to the market start up strategy). The second option is that the Government as owner chooses to keep this GENCO as the conduit with which to manage the price of electricity at the wholesale level, in order to minimise impact on tariffs to final consumers at current levels. This can be achieved through vesting contracts to be signed between GENCO 2

and DISCOS. The third option is some private sector participation.

In all cases mentioned above, the future ("steady state") environment for GENCO 2 is clearly as a competitor in the market. This will be very different from what it is now. The impact of a changing electricity industry and introduction of regulator will be large. Political and bureaucratic influence will diminish over time. The power purchasers (GENCO 2 customers) and regulator will be a major focus. This differs from the current situation where technical focus prevails. People will need to be nurtured through the changes as the systems and structures about them are changed.

Overall GENCO 2 is reasonable well positioned for a new future. The profitability and financial analysis will determine specific outcomes.

Roles and responsibilities of the company

Customers

GENCO 2 has an industry wide responsibility to provide energy and firm capacity in the country, neighbouring countries and the electricity industry in general. The company will be responsible for efficient operation and maintenance of hydropower stations under its management. Power generation will follow SO requirements, meeting regulated standards on quality of service and other system operation rules. This implies, in particular, duties on management of the water resource.

Market participant

It also has a role as a competitor among other generators. It will cooperate with other players in the industry such as the System Operator, Transmission Company, Power Purchase Agency, and the Regulator. All these interactions are governed by the rules, policies and procedures as set up in the new dispensation. It has a further role of contributing to balancing tariffs through the low costs of hydro generation. Specific roles are defined further in the legal and regulatory framework yet to be defined, agreed and implemented.

Business Objectives

Business objectives include all parts of the Company. Objectives are planned, responsibilities allocated to individuals or teams, and implemented and monitored by those teams. Objectives all have indicators. An indicator shows which way things are going. They are to be reported monthly at Management meetings. The strategies in the following section are the means to reach these objectives. They are broadly stated here as guidelines.

Objective		Source
1.	Meet firm generation capacity requirements	Contract with power purchase agency
2.	Increase availability by X % in years 2003/4/5	Monthly technical performance report
3.	Improve water supply predictability, control and reduction of water losses (%). Finalise the study to determine the amount of	Monthly water report. Final Report of the study to determine the amount of

	bypass that will lead the issue of "water right" to plant xx (supervised by the National Environmental Management Council and currently underway).	bypass that will lead the issue of "water right" to plant xx
4.	Develop and maturate business processes and structures towards commercialisation and shareholder value	Privatisation Unit reports
5.	Improve availability of hydrological information through construction and operation of river-gauging stations of interest. Complete the rehabilitation program implemented by the Ministry of Water and Livestock Development under River Basin Management project installing electronic water level recorders and necessary facilities to carry out river flow measurements.	Progress and completion reports of the rehabilitation program implemented by the Ministry of Water and Livestock Development.
6.	Develop contractual and commercial skills for excellent performance in the marketplace	Attending training and getting course certification or certificate of competence. Claims, loss and audit reports arising form poor contract management
7.	Develop up to date maintenance approaches and programmes	Maintenance reports including forced and planned outage duration, availability, firm capacity target vs. actual
8.	Increase safety and environmental compliance	Monthly safety statistics
9.	Implement performance management approaches, including incorporation of Management Information Systems (MIS)	Performance review reports

Key Business Strategies

The following strategies when implemented with appropriate resources and management competence will ensure the objectives are achieved. It is important that a critical mass of managers in the new unit i.e. a participative approach, reach broad consensus on the objectives and strategies detailed below. The strategies may need some updating and refining before implementation. This will be determined by how the environment has changed at that time.

1. Create a transformation steering group reporting to the Board of GENCO 2.
2. Reward top managers for success. Develop this plan further and combine it with a new management philosophy. Components to be included are setting up incentives for the managers, via performance management, reward and recognition, transformation manager and management committee, performance contracts with review process, measurement system and competency development.
3. Place sustainability as a critical success factor on behalf of the major shareholder (at

present, the Government).

4. Create a small elite customer service infrastructure with appropriate strategies for the small number of high profile customers.
5. Implement improved corporate finance plan and financial structures. Focus on return on investments for investors and stakeholders and operational cost reduction.
6. Develop strategy for income stream enhancement.
7. Investigate and apply maintenance techniques such as condition based monitoring, and reliability centred maintenance. Incorporate Management Information Systems (MIS) for the execution of key activities (maintenance and others).
8. Develop policies governing areas of interaction with power market, including tariffs and service standards.

Major Drivers

The major high impact drivers that affect the business are detailed below. These are derived from the environmental analysis above. Key issues can be summarized as follows:

- Power plants availability, reliability and performance must be increased. Decision-making methods on maintenance and rehabilitation need to be revised and improved. New approaches to maintenance management will be required.

- Pressure to achieve financial success within the new regulatory framework and market rules will also increase.

- The new regulatory environment will introduce service obligations and revenues related to cost of supply (at least operation and maintenance), but with significant constraints to investments. Governmental requirements related to setting tariffs for final consumers will impact on the possibility of upgrading or rehabilitating the power generation plants. Therefore, external forces will introduce constraints to a commercial behaviour of the company.

Private sector participation

The main focus of the company leadership is to determine how to make the hydro plants perform well. The proposed vesting contracts with distribution companies renders GENCO 2 unfavourable to private sector involvement, it is still in the best interest of management to improve performance.

Water rights, availability, costs and losses

Water availability is not predictable because procedures and priorities for water use for other needs are not clear. Water losses in 2000 were higher than expected. Secondly, river gauging stations are needed in some places to improve hydrological data and manage efficiency.

Regulatory regime

The regulatory regime affecting generation operation and returns is not yet in place. This will remain unknown until the regulator is in place and has addressed the matter. The company must keep track of the events as they unfold, and set goals and action plans to deal with regulator issues as they

arise.

Maintenance and Rehabilitation

It is possible to reduce operational costs if the GENCO 2 is managed on a commercial basis. It seems to be a large room to lower present values of operation and maintenance (O&M) costs.

It is also possible to reach significant improvements in availability, reliability and performance of generating units, through the incorporation of low cost control equipment and cost effective maintenance, upgrading and rehabilitation activities.

Reduced downtime and operational efficiency are critical. These efforts are aimed at maximising availability of capacity for SO. New approaches to maintenance management will be required to reduce the frequency and duration of outages.

Competency development and training

Competence development for the new business is critical for success. Staff motivation, well-being and training are key issues. The people that join the restructured business and well as any newly recruited staff are the people that will unlock the value in the new company. Specific development needs identified early on includes basic power contract management, commercial management skills and computer literacy and functionality.

Back-up Contracts (Purchase Agreements)

During the initial stage of the reform process, vesting contracts (combined with other regulatory options) allow GENCO 2 to get a remuneration potentially covering costs of efficient operation.

One this stage ends, the possibility of creating a commercially profitable company, potentially attractive for private investors, becomes clear.

Conclusion

These six major drivers are either in the control of or are highly influenced by what company management can do. The chances of success are very high if all seven drivers are regularly attended to in terms of action plans.

Customer Needs

The Customer is defined as an external person or entity that directly uses the services of the company. These can be different customer groups with different profiles and needs. The table below shows a basic breakdown of customer grouping as well as a high level definition of their basic needs. A brief overview of the future load forecast is provided below. This is aimed at sensitising the reader to the anticipated future demand for capacity maximization and power generation.

Table Customer Needs

Customer	**Basic Needs**
Power Purchase Agency	Fulfilled contracts as per requirements
System operator	Available capacity for dispatch and peak loading
Distribution companies	Energy and firm capacity
Large end users	Energy and firm capacity Zanzibar
International	Energy and firm capacity
Transmission	Metered connection point

One of the first tasks of the new company management is to initiate a proper customer survey to confirm and expand on the table above. Electricity companies with advanced customer management programmes also have service level agreements specifying level for forced and unforced outage time, duration and depth of power dips, time to respond to requests for service and call centre response times targets. They also have customer account executives responsible for each client. The company management team can consider the options in terms of need and affordability.

Stakeholder requirements

Stakeholders have an investment or interest in the results and approach used by the companies. Each stakeholder group is identified and plans and structures put in place to manage these relationships. A list of key stakeholders and their high level requirements is provided below.

Table Stakeholder Requirements

Stakeholder	**Basic Requirements**	**Status**
Government - owner of GENCO 2	Return on investment, power for the people, right price service,	
DISCOS – vesting contracts (initial stage of the reform)	Contract fulfilment	
Power Market participants	Firm capacity and energy – participate in electricity power value chain	
Staff – management and employees	Employment opportunities, personal development	
Investors	Hidden value in order to generate promising returns	

Another major task of the new business unit management is to initiate a proper stakeholder survey to confirm and expand on the table above. The business unit management team can allocate responsibility to members for each of these relationships and the results.

Key Performance Indicators

How are the successes of the key strategies going to be measured and what indicators of performance will be employed? Note that this is a balanced set of measures including technical, financial, people, customers and stakeholders. This is a very high level scorecard and includes only measures or indicators absolutely critical for overall success of the company.

The aim is to agree on a set of about 10 critical indicators. Too many indicators often result in a lack of focus, while too few means that critical measures are not monitored. The scorecard must be easy to use and understood by all managers. The scorecard is the driving force behind the performance management system. Finally, the indicators must show the management board, future investors or board of directors how well the overall business is doing at a glance.

Technical measures

Availability of installed generation capacity (for each generating unit at each power plant),

Forced and planned plant outages (hrs/month), frequency and duration, for each generating unit in each power station,

Overall efficiency and efficiency in use of water (m3/kWh) of each generating unit and water losses of each power plant,

Peak demand, kWh generated, kWh sales for each plant on a monthly basis,

Operational expenses, for each generating unit in each plant, on a monthly basis

Financial Measures

Costs of technical losses, Costs of water losses, Return on investment, Expenses (e.g., Salary, maintenance, General & Administrative), Gross Margin, Net Income, Total current assets, Sales/Total Assets, Short-term debt, Long-term debt, Debt Service Ratio, Cost of operation/installed kW, Cash flow coverage ratio (cash flow/interest, aid), Quick ratio (current assets – value of inventory or stock /current liabilities)

People Measures

Ratio of head office and support staff to technical staff, Ratio of management staff to other staff, installed kW/employee, kWh sold/employee, Revenue/employee, Absenteeism, Accidents, Total number of employees, Employee turn over rate, Some measure of employee skills and, take-up rate of new skill and technologies, Report timing.

Note: Ratios linking labour costs to actual generation are in general not adequate in the case of hydropower plants, as production is depending on water flow to the power station and labour costs are almost constant. People are employed to keep generators available whether used or not. Also,

plant operated under water shortage conditions still requires the same level of staff. The type of generating units and station design used also affects staffing levels.

Stakeholder Measures

Annual reports, Return on investment, Response time to queries by stakeholders

Critical indicators

- Availability of generating units (hrs/month)
- Forced outages of generating units (hrs/month)
- Planned outages of generating units (hrs/month)
- Operational efficiency of generating units (m3 water/kWh produced)
- Unit Operation costs (USD/MW installed capacity)
- Unit Maintenance costs (USD/MW installed capacity)
- Unit Administration costs (USD/MW installed capacity)
- Employees/MW installed capacity
- Ratio of management staff to other staff
- Cash flow health
- Debt/equity ratio

Gap Analysis

The gap analysis that follows highlights high-level areas, which require attention by the managers of the new unit. The new company manager is advised to review and prioritise these gaps as soon a possible.

1. There is a competence gap to manage and operate a business that is now not only technical.
2. The costs of support functions to the business will need to be reduced.
3. The service provided by the support functions needs to improve.
4. There is a small gap, which is planned, to complete the required refurbishment programme.
5. There is a difference in the future employee attitude and culture required to succeed.
6. It is critical for management to create the environment in which employees can achieve.
7. There is no capacity to deal with the regulator and power purchase agency at this time.

Risk Assessment

The gap is defined as the difference between the current and future state. The risks shown as high, medium, low or very low and are as follows:

Table: Risk Evaluation

Value	**Probability of occurrence**	**Impact**
1	Very low	Insignificant
2	Low	Low
3	Medium	Critical
4	High	Very critical

No transformation plan and accountability	2
Competence to deal with new marketplace is not developed (medium)	2
Support functions are too expensive (high)	4
Employee dissatisfaction (very high risk)	3
Market malfunction (medium)	3
Currency Risk (external high)	4
Weather Risk (external high)	4

CASE STUDY 3

TRANSCO AFRICA

INTRODUCTION **3**

EXECUTIVE SUMMARY **3**

BUSINESS VISION AND MISSION **4**

BUSINESS STRATEGY **5**

CURRENT SCENARIO 5

FUTURE SCENARIOS 6

ROLES AND RESPONSIBILITIES OF THE COMPANY **6**

BUSINESS OBJECTIVES **6**

OBJECTIVE 7

KEY BUSINESS STRATEGIES **7**

MAJOR DRIVERS **8**

CUSTOMER NEEDS **8**

STAKEHOLDER REQUIREMENTS **9**

KEY PERFORMANCE INDICATORS **10**

GAP ANALYSIS **11**

RISK ASSESSMENT **12**

Introduction

1. This Strategic Plan is based on a 2-year time frame from point of incorporation/unbundling to point of privatisation. The company functions in a commercial manner during this time. That is no political influence, a high degree of autonomous leadership and decision making and consequent performance based remuneration.

2. The management contractors will play a major role in the success or failure of the transformation. In view of this, their contract objectives and operational improvement initiatives must dovetail with this plan. They need to have full opportunity to critique and add to this business plan soon. This is mission critical and if not attended to will cause major failure in the implementation phase.

3. This is a living document, which is regularly updated as required.

Executive Summary

Transmission Company (TRANSCO) will be the company in charge of transmission of electric power through high voltage grids (66 to 220 kV). In addition, as a completely separated function, it will be the System and Market Operator (SMO).

TRANSCO is expected to stay under state ownership, and its functions and responsibilities are clearly defined from the beginning of the reform process. This is a significant issue, specific to TRANSCO, and gives to the business plan of this company a high degree of predictability. The company can start moving without delay towards achievement of its main goal of efficient provision of transmission services and transparent and cost effective performance of system and market operator functions.

The transmission system, referred to as the interconnected system, is rather well developed. It connects the main hydro power plants with the load centers in the country. However, there are certain regions of the country, the isolated systems, which have not yet been tied into the grid due to their remote location.

The transmission system operates at 220 kV (2,605 km), 132 kV (1,440 km) and 66 kV (486 km). This includes a 38-km, 132 kV a submarine cable. In addition, there are international transmission interconnections with Zambia and Uganda.

Under the new institutional and regulatory framework proposed for the electric power sector a new company (TRANSCO) will perform two separate key functions: a) operation of the existing transmission system and development of intended for its expansion, according to specific rules and procedures; b) administration of the electricity wholesale market to be created, being the System Market Operator (SMO).

Business Vision and Mission

In our context, the vision is the desired end state whereas the mission is how to get to the end state. Each Company develops its vision and mission when operational. The creation of the vision and mission is a participative process involving the actual people responsible for the business. Hence we cannot realistically define such thing for the Company members in isolation. The following is a starting point for further discussion during implementation phase.

Vision:

To be an efficient transmission company that maximizes amounts of energy transmitted through the transmission facilities, meeting regulated standards on quality of service and therefore supporting development of electric market.

Mission:

To provide transmission services at maximum possible capacity allowed by existing installations and meeting regulated standards on quality of service. Perform the role of the System and Market Operator service to the market agents at the regulated tariff. Ensure commercial results to stakeholders. To reach the best and cheapest options for upgrading and expansion of the transmission system that allows meeting the new transmission requirements.

Business Strategy

Current Scenario

The current situation is described using the well known SWOT analysis.

Strengths	***Weaknesses***
• Technical knowledge of the transmission activity of existing staff is in general terms the best available in the country . • Administrative staff is enough and properly trained to meet TRANSCO requirements	• Different people perform administration, planning, technical control, and operation and maintenance activities. Specificity in functions is the basic rule. Need to move from functional jobs to multi-skills • Execution of activities related to dispatch and to power system electrical studies requires incorporating additional skilled professionals to the existing staff • Present levels of quality of service are characterized by unacceptably long-term unavailability of important transmission interconnections • Current operational condition of the transmission system is weak, due to several reasons related both to the design and difficulties to maintain and/or repair existing facilities • Present values of outage time in the system are high due to unavailability of required resources (transportation, tools and other facilities).
Opportunities	***Threats***
• The number of employees dedicated to the regional operations should be reduced. • The reengineering process requires from the very beginning introducing changes in management in order to improve financial condition of the TRANSCO. This is essential to allow the incorporation of “state of the art” operation and maintenance facilities and techniques (stock of spare parts and materials, land vehicles and perhaps a helicopter to witness operation and perform maintenance, and equipment for system remote control). • The benefits that the TRANSCO will have will depend dramatically on achievable cost savings. • Increase in TRANSCO revenues will be closely related to a more efficient use of the existing system, maximizing its capacity and availability and to a rational expansion of the transmission facilities. • The National Transmission Company will be responsible for preparation and presentation to the market agents of an Indicative System Plan, containing proposed expansions of the transmission system and clear explanation of their feasibility and necessity or convenience.	• Problems with the establishment of the new regulatory system and absence of defined performance measures

Future Scenarios

It is possible to forecast the following scenarios:

- Optimistic scenario: can be defined through these key issues: a) remuneration of transmission service is that required for efficient performance; b) Government is not involved in the daily operation of TRANSCO but requires the company to be an efficient commercial utility; c) Funds needed for rationale expansion of the transmission system are available.
- Baseline scenario: characterized by: a) remuneration of transmission service is that required for efficient performance; b) Government is not involved in the daily operation of TRANSCO but requires the company to be an efficient commercial utility; c) Funds needed for rationale expansion of the transmission system are not available, but there are available for existing system upgrading.
- Pessimistic scenario, where: a) remuneration of transmission service is that required for efficient performance; b) Government becomes involved in the daily operation of TRANSCO; c) Funds needed for rationale expansion of the transmission system and/or upgrading of existing facilities are not available.

Roles and Responsibilities of the Company

TRANSCO will be responsible for providing transmission services meeting regulated standards on quality of service, operating its transmission facilities in full compliance of technical rules, preparing the studies for the Indicative System Plan and granting non-discriminatory open access to the transmission system.

It will have the rights of receiving revenues from the regulated tariffs paid by Market Participants as set in its License and sign Connection Agreements with Transmission Users.

As the company performing the role of System and Market Operator, it will prepare the load forecast, maintenance co-ordination, optimization of operation of reservoirs of hydro plants, operation planning, daily dispatch of generation facilities, real time monitoring and control of generation dispatch and evaluation of system performance.

The above roles provide the foundations for not only the development of Corporate Strategy but also the more detailed organizational development.

Business OBJECTIVES

Business objectives include all parts of the Company. Objectives are planned, responsibilities allocated to individuals or teams, and implemented and monitored by those teams. Objectives all have indicators. An indicator shows which way things are going. The strategies in the following section are the means to reach these objectives. They are broadly stated here as guidelines and for starting serious debate and will need adjustment as implementation occurs.

OBJECTIVE		Source
1.	Install, commission and reach commercial operation of the National Grid Control Centre (NGCC) and Market Information Systems (MIS)	NGCC and MIS in commercial operation
2.	Meet regulated standards on quality of service in years 2003/4/5	Monthly technical performance report on quality of service
3.	Meet pre-set availability targets of transmission equipment by reducing forced failure rates	Monthly technical performance report on availability of equipment
4.	Prepare the annual transmission plan for market agents	Report containing annual transmission plan
5.	Develop and maturate business processes and structures towards commercialisation and shareholder value	Performance reports
6.	Develop contractual and commercial skills for excellent performance in the marketplace	Attending training and getting course certification or certificate of competence. Claims, loss and audit reports arising form poor contract management
7.	Develop up to date maintenance approaches and programs	Maintenance reports including forced and planned outage duration, availability of transmission capacity (target vs. actual)
8.	Increase safety and environmental compliance	Monthly safety statistics
9.	Implement performance management system	Performance review reports

Key Business Strategies

The following strategies when implemented with appropriate resources and management competence will ensure the objectives are achieved. It is important that a critical mass of managers in the new unit i.e. a participative approach, reach broad consensus on the objectives and strategies detailed below. The strategies may need some updating and refining before implementation. This will be determined by how the environment has changed at that time.

1. Create a transformation steering group reporting to the Board of TRANSCO.
2. Reward top managers for success. Develop this plan further and combine it with a new management philosophy. Components to be included are setting up incentives for the managers, via performance management, reward and recognition, transformation manager and management committee, performance contracts with review process, measurement system and competency development.
3. Place sustainability as a critical success factor on behalf of the major shareholder, at

present, the Government.

4. Create a small elite customer service infrastructure with appropriate strategies for the small number of high profile customers.
5. Implement improved corporate finance plan and financial structures. Focus on return on investments for investors and stakeholders and operational cost reduction.
6. Develop strategy for income stream enhancement.
7. Investigate and apply maintenance techniques such as condition based monitoring, and reliability centred maintenance. Incorporate Management Information Systems (MIS) for the execution of key activities (maintenance and others).
8. Develop policies governing areas of interaction with power market, including tariffs and service standards.

Major Drivers

The existing external environment and reform process under development allow identifying relevant challenges for the transmission business:

- System reliability and performance must be increased.
- Pressure to achieve financial success within the regulated tariffs will also increase.
- The new regulatory environment will introduce service obligations and a remuneration associated with cost of service, but with significant constraints to expand the system.
- The role of System and Market Operator must be performed with efficiency and transparency.
- Requirements for enhancing the transmission capacity of the existing system will arise.
- External forces will introduce constraints to a commercial behavior of the company.
- Political requirements related to tariff setting will impact on the possibility of upgrading the existing system, and, in particular, in the implementation of remote control of substations.

Customer Needs

The Customer is defined as an external person or entity that directly uses the services of the company. These can be different customer groups with different profiles and needs. The table below shows a basic breakdown of customer grouping as well as a high level definition of their basic needs. .

Table Customer Needs

Customer	**Basic Needs**
DISCOS and Large Consumers	To be supplied meeting acceptable standards on quality of service
Generators	Availability of transmission capacity without congestion and constraints
Market Participants	Good quality general services

"General services" include:

- Forecast of constraints on load supply and generators congestion and "on time" preparation of proposals for capacity expansion.
- Short-term planning of operation of transmission service including upgrading of capacity through incorporation of operational and control elements.
- Provision of accurate measuring system.
- Transparent and efficient performance of the SMO role.

One of the first tasks of the new company management is to initiate a proper customer survey to confirm and expand on the table above. Electricity companies with advanced customer management programmes also have service level agreements specifying level for forced and unforced outage time, duration and depth of power dips, time to respond to requests for service and call centre response times targets. They also have customer account executives responsible for each client. The company management team can consider the options in terms of need and affordability.

Stakeholder requirements

The stakeholders here include Government, Board of Directors and Management. Others are the staff/workers, company creditors/financing agents, Suppliers, the Government (tax authority) and trade unions. These are people or organizations, which have an interest in and can benefit from the company. Various stakeholders require the following from the company:

- Company economic growth
- Revenues and costs that allow sustainable value added
- Tax payment for boosting Government revenue
- Workers' rights and welfare to keep workers and trade unions satisfied.

The shareholders and financing agents (creditors) are the stakeholders who have invested in the company in monetary terms so that success of the firm means increase in their share values (profit and dividends) to the shareholders. The financing agents and other creditors see the success of the company as an assurance for the recovery of their debts. Consequently, the Shareholders or Board of Directors and Management work towards company growth and prosperity through increase sales volume, pay low taxes and reduce costs.

The workers' welfare and employment are of high concern to the workers and their trade unions. They would consider company as and end in itself that provides employment. Workers link their salary increases and security of employment with the success of the utility.

On the other hand, the Government relates the success of the company with the support it gets from it through payment of income tax, provision of employment opportunities and company role in national development. The country energy policy conceives electric power as a primary catalyst of economic development.

Stakeholders have an investment or interest in the results and approach used by the companies. Each stakeholder group is identified and plans and structures put in place to manage these relationships. A list of key stakeholders and their high level requirements is provided below.

Table Stakeholder Requirements

Stakeholder	**Basic Requirements**
Government-owner of TRANSCO	Return on investment, power for the people, right price service,
Power Market participants	Provision of transmission services meeting regulated standards on quality of service at regulated tariffs
Power Market participants	Efficient and transparent administration of the electric wholesale market
Staff – management and employees	Employment opportunities, personal development

Key Performance Indicators

How are the successes of the key strategies going to be measured and what indicators of performance will be employed? Note that this is a balanced set of measures including technical, financial, people, customers and stakeholders. This is a very high level scorecard and includes only measures or indicators absolutely critical for overall success of the company.

The aim is to agree on a set of about 10 critical indicators. Too many indicators often result in a lack of focus, while too few means that critical measures are not monitored. The scorecard must be easy to use and understood by all managers. The scorecard is the driving force behind the performance management system. Finally, the indicators must show the management board, future investors or board of directors how well the overall business is doing at a glance.

The key indicators will be:

Indicator
Financial ratios
Number of personnel every 100km of lines
Number of forced outages (R)
Average duration of forced outages (R)
Maximum duration of outages (R)
Average re-connection time (R)
Amount of power and not supplied energy. (R)
MW/km of available capacity
Available transformation capacity (MVA).
Number of complaints issued by agents to the System and National Grid Control Center service (R)
To produce the planning studies on time
Maintenance plus upgrading cost (% of remuneration)
Operation cost (% of remuneration)
Corporate cost (% of remuneration)

For parameters with (R) it is expected that the Regulator will set targets to be achieved by TRANSCO and a related regime of penalties

Gap Analysis

The gap analysis that follows highlights high-level areas, which require attention by the managers of the new company. New company manager is advised to review and prioritise these gaps as soon a possible.

There is a competence gap to manage and operate a business that is now not only technical.

The costs of support functions to the business will need to be reduced.

The service provided by the support functions needs to improve.

There is a small gap, which is planned, to complete the required refurbishment programme.

There is a difference in the future employee attitude and culture to succeed.

It is critical for management to create the environment in which employees can achieve

There is no capacity to deal with the regulator and market agents at this time.

More specifically, main requirements in the core business processes and activities of TRANSCO are:

- Maintenance.
    - Staff training in system operations, live line work and outage control
    - Market administration conceptualization and training
    - High availability and reliability of equipment
    - Higher maintenance costs of coastal lines
    - Sub-optimal deployment of live line activities
    - Sub-optimal application of extension of equipment service life policy
    - Inadequate information systems
    - Need to upgrade communications systems
    - Lack of regulatory performance targets
    - Organization of maintenance resources
    - Revision of maintenance criteria and techniques
    - Maintenance information record
    - Maintenance programs updating
- Operation
    - Automation of substations
    - Control Center with SCADA /EMS
    - New communications system
    - Adapted protection system

Risk Assessment

The gap is defined as the difference between the current and future state. The risks shown as high, medium, low or very low and are as follows:

Table: Risk Evaluation

VALUE	Probability of occurrence	Impact
1	Very low	Insignificant
2	Low	Low
3	Medium	Critical
4	High	Very critical

1. No transformation plan and accountability	2
2. Competence to deal with new marketplace is not developed (medium)	2
3. Support functions are too expensive (high)	4
4. Employee dissatisfaction (very high risk)	3
5. Market malfunction (medium)	3
6. Currency Risk (external high)	4
7. Regulatory risk (external high)	4

Notes