Ghana Power Sector

Review of Reform Programme

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Workshop on 7 February 2003, Accra

Aims and Scope

- ECA's consulting assignment:
- Assist the Government of Ghana (GoG) to take stock of the power sector reform measures to date
- Advise on further development of institutional reforms
- Scope:
  - analysis of power sector restricted to review of previous documents and 1 week visit
  - We were not required to carry out any new analysis of performance

Drivers for Change

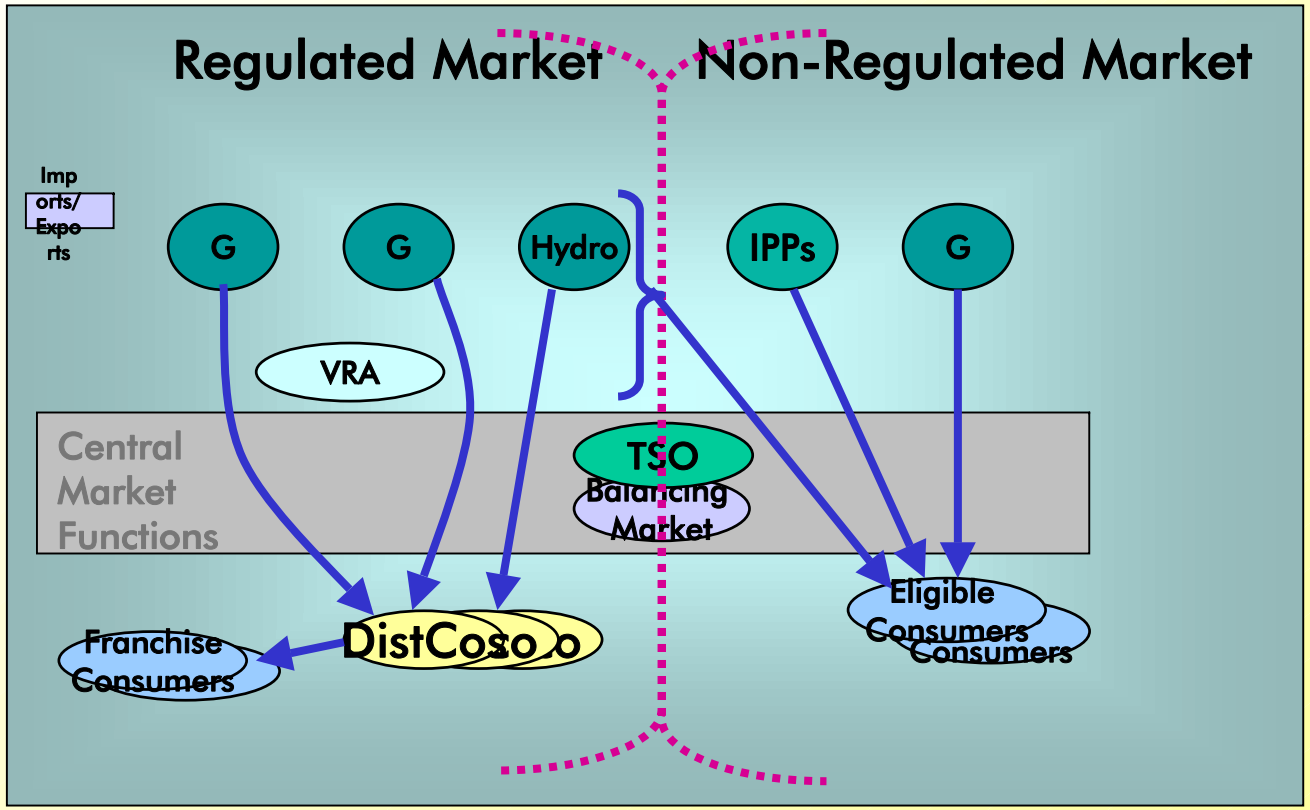
- Increase access to electricity
- Improve efficiency to keep prices as low as possible

- Increase management effectiveness and accountability
- Promote private sector investment:
  - to help meet financing requirement for the growth, including electrification
  - attract private investors while minimising the future requirement for GoG guarantees
- This needs a more modern structure for the industry, a market, and a strong regulatory framework

Status of reform programme

1997 reform proposal	Indicative time
Create 5 distribution concessions (Distco), privatise	Not done
Large consumers. Rationalise and establish basis for bilateral contracts with IPPs	EC considering new definition of eligible consumers
VRA - unbundling into 4 main activities	VRA has started some work on separating accounts
ECG set up a holding company for 5 DistCos	Not done
Establish separated activities as business units	Not done
Put in place performance contracts for ECG and VRA	Not done
Establish regulators and regulatory framework	2 regulators established with 2 acts, limited development of regulatory framework
Issue regulations and technical rules for the grid and creation of wholesale market	Not done

Creating a Wholesale Market



Current Situation

- VRA is the main producer and buyer of electricity, as well as operator of the transmission system
- VRA is a dominant market player, this is a potential barrier to competition and market development

What is a Market?

- An electricity market is defined by:
  - **Who are the sellers**
  - **Who are the buyers**
  - **How they trade**

Options for Sellers

- Sellers in Ghana will be VRA (hydro plant, and thermal plant), importers, new hydro and private thermal IPPs
- Short term competition is not possible with current generation configuration
  - too few power plants to operate a pool
- Ghana is too risky for 'merchant power plants
- Competition might be possible in 10 years

Options for Buyers

- Must be creditworthy ...
- ... to be able to guarantee financing for IPP (15 year bankable projects)
- The Tico project developed by CMS is reported to have a high ROE due to perceived risk
- Three potential buyers for privately financed power :
  - VRA
  - Large customers
  - Distribution companies

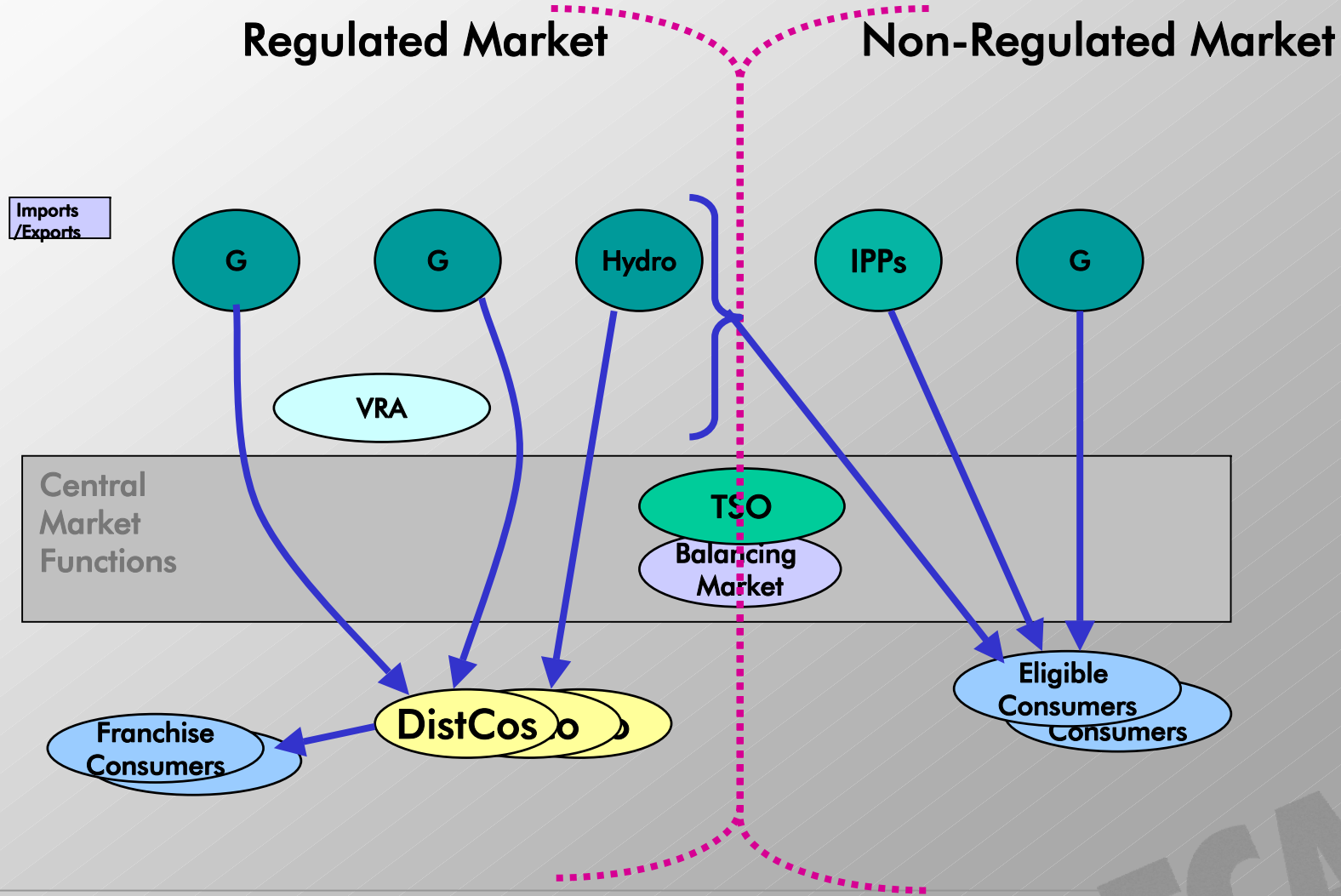
1. VRA as Offtaker

- If VRA procured future thermal power plants…
- VRA's current role as single buyer/seller would continue indefinitely
- VRA is the most creditable buyer, but investors likely to continue to seek government guarantees
- **This is the single buyer market model**
- Need to kick-start the market

2. Large Consumers as Offtakers

- Private participants should have open access to the transmission network at fair and cost-reflective prices
- VRA as transmission owner must be regulated:
  - Transmission charges must be cost-reflective
  - No discrimination between users
  - PURC should ensure transmission charges do not over-recover costs
  - one option is full unbundling of VRA
  - another option is the accounting separation of VRA with third party access (TPA)

Market Model: Bilateral Contracts with Balancing Market



Is Unbundling of VRA Necessary?

- Full unbundling of VRA would ensure 'level playing field' for IPPs
- Why not unbundle VRA immediately?
  - cost of restructuring would be high
  - still not certain that IPPs would come
- First step should be:
  - Accounting separation and functional separation of system operator
  - Creation of market rules and grid code
  - Strong regulation
- **If this fails, move rapidly to complete unbundling**

Eligible Consumers

- Large consumers meeting the criteria (5 MW) for eligibility in the unregulated market
- Energy Commission is considering a change of eligible customer definition
- What is most important is the percentage share of the market opened to competition and the number of customers
- Will the eligible customers be large enough to support financing of next generation plant?

Trading Arrangements (Market Rules)

- Competition in this market is for bilateral contracts
- A potential new entrant must aim to deliver lower average prices than those from VRA
- **Issue**: VRA currently has the benefit of the existing hydro generation and could under-cut a new thermal plant
- **Result**: VRA ends up building next thermal plant even though IPP's plant could have been cheaper

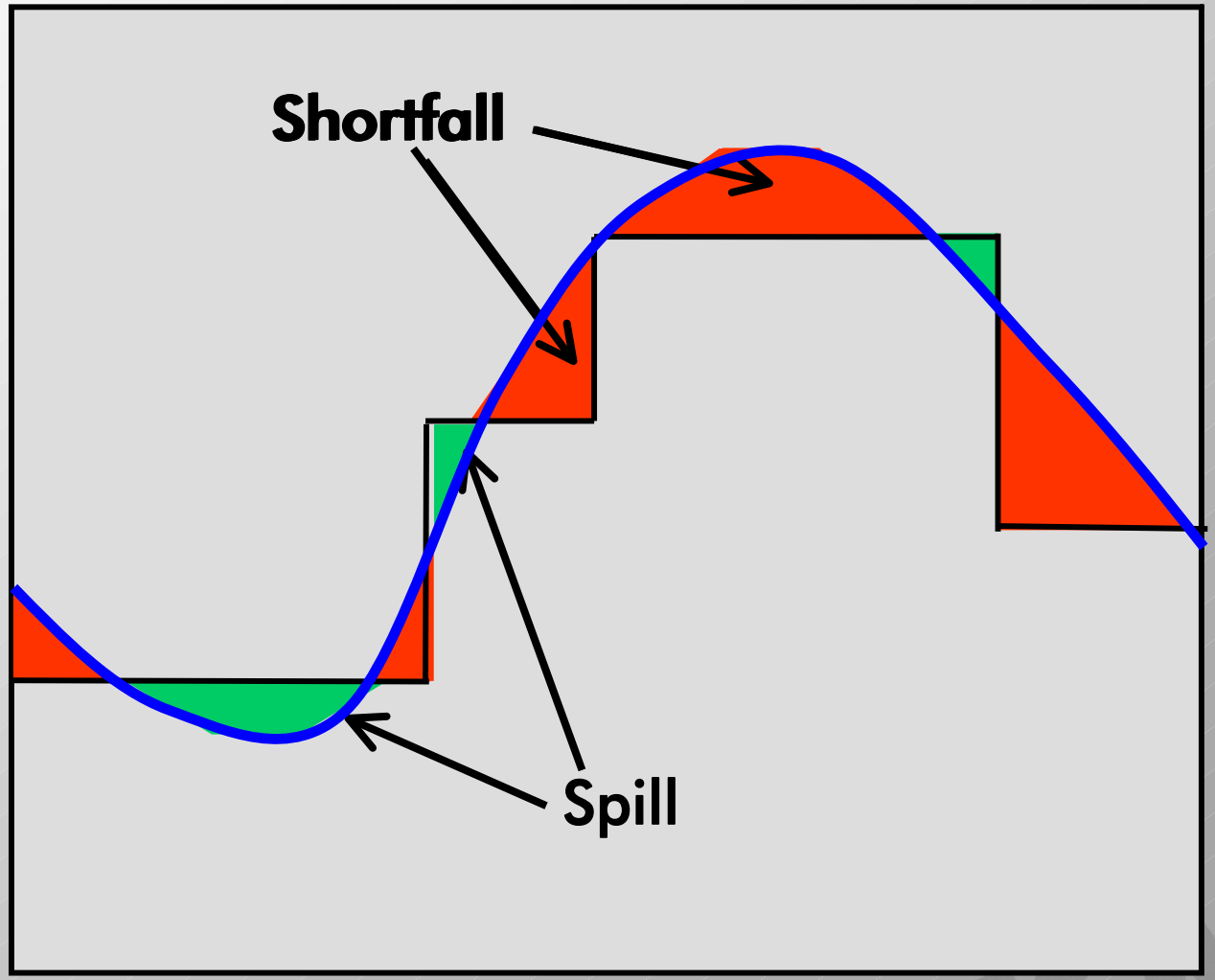
Competition for Contracts and Cost of Generation

- VRA currently sells at a bundled price
  - The hydro is priced at financial cost - low cost
  - thermal plant is high cost
  - But VRA's price would be lower than IPPs
- One possibility is:
  - all contracts including hydro (other than VALCo) priced at no less than LRMC
  - hydro-based contract offered to IPPs and large customers
  - offer different wholesale tariffs
  - the windfall profit on hydro could be applied to rural electrification or transmission investments
- **Problem**: it could raise prices
- **Opportunity**: but offset by recycling the windfall profit
- **Benefit**: IPPs can compete with VRA on equal terms

Contracts Require Balancing

An IPP and the set of large customers they supply can never exactly match the generation to the load.

VRA must supply the balancing service and recover its costs (part of market rules)



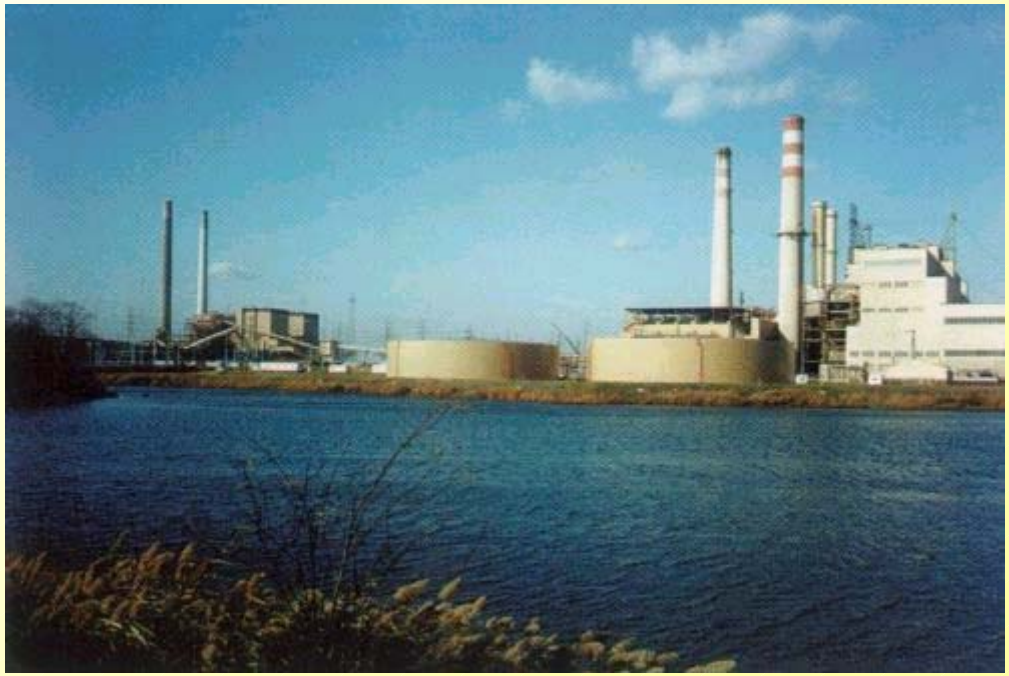
3. DistCos as Offtakers

- Could DistCos to be one of the principle offtakers?
- Might not be viewed as strong creditable counter parties by IPPs
  - ECG is facing major challenges , eg losses, revenue collection etc
  - management strength is key factor
  - Strong requirement for regulation of power procurement at least cost
  - Horizontal unbundling into several companies is more likely to weaken the distribution companies as buyers
- **Market model**: 'multiple' single buyers

Way Forward

- Create opportunity for large consumers to contract with IPPs
- This would require
  - non-discriminatory transmission prices and fair access
  - provision of balancing market
  - must be able to compete against VRA on fair basis
- Strengthen DistCos so they become credible counter-parties in future
- Longer term there are opportunities in the regional market (WAPP)

Generation Issues



Introduction

Who will build the next thermal plant?

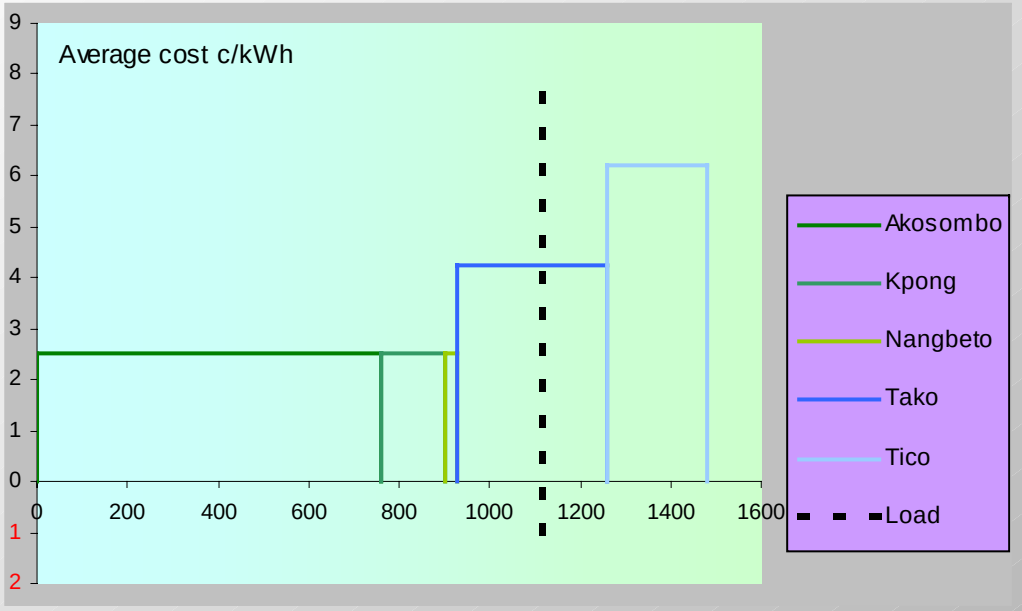
- VRA is facing almost no reserves
- In 2000, system has 1250 MW of capacity with generating capability of 7960 GWh compared to a requirement of 1380 MW and 8340 GWh of energy
- Even after building of T2 energy will still be constrained by water
- GoG wants private sector participation, however problems have occurred with CMS project
- The AES project has not progressed

Competition in Electricity Markets

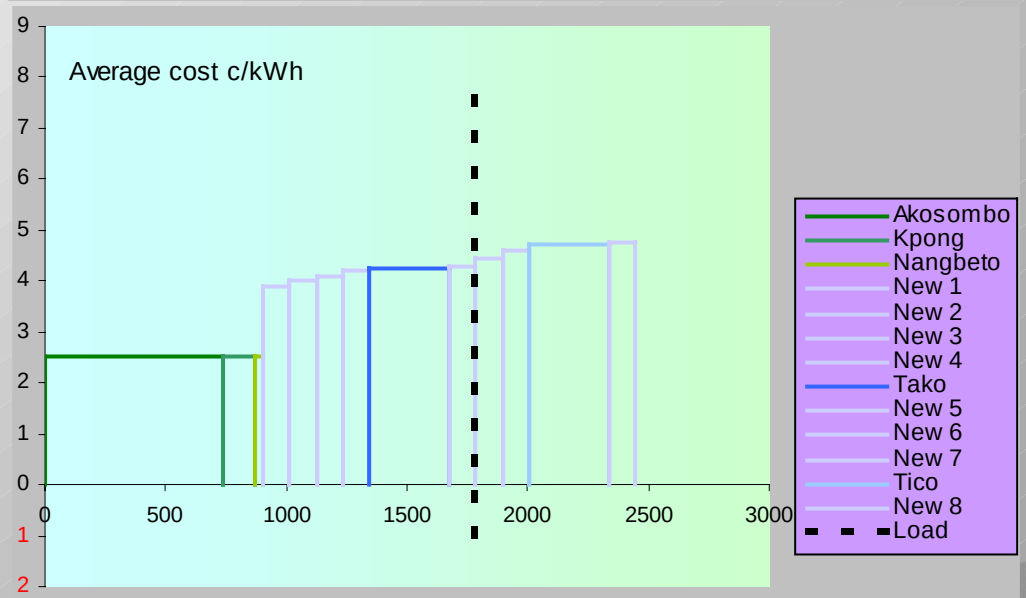
- 3 arenas:
  - between existing generators for dispatch in the short term ('pool')
  - for long term contracts between generators and large customers
  - for new entry between investors
- Short term - difficult due to small number of plants and highly predictable merit order
- Long term bilateral market requires competing wholesale suppliers and eligible customers

Competition in a 'pool'

Now:
not possible



in 10 years:
maybe possible



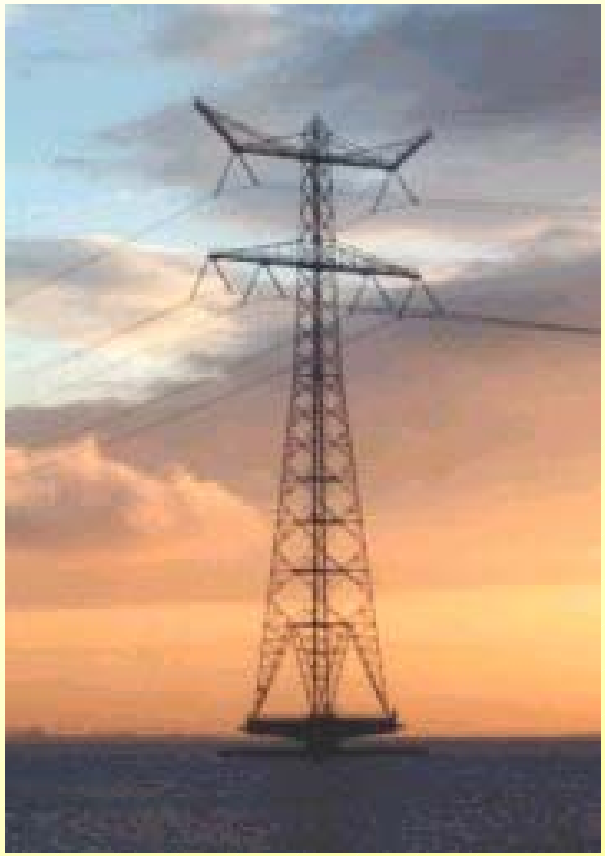
Options for Creating Competition for Bilateral Contracts

- Privatisation of Takodari 1
- New Imports
- New thermal power plants contracted to parties other than VRA
- VRA required to contract some of their capacity to independent wholesale suppliers (VIPPs)

New Generation

- Preferred option is new IPPs/eligible customers
- Requires effective TPA (access)
- Single buyer model has failed in several countries
- If VRA procures an IPP, should pursue an open competitive tender approach
- Why should VRA be the 'producer of last resort'?
- … because it is dominant generator

Transmission Issues



Transmission

- Open Access is critical
- Bilateral contract market is the preferred option, therefore TPA is essential
- Must establish an independent System Operator (functional unbundling)
- Transmission (wires business) can stay with generation
- Accounting separation is difficult to achieve, therefore tough regulation is essential

Transmission Prices

- High transmission charges would discourage new IPPs
- In other countries, integrated utilities try to load their costs onto transmission charges
- VRA benchmark of 0.9c/kWh is high (but not highest) compared to other countries
- PURC should approve major investments in advance
- Wheeling charge is only half but customer pays total 0.9
- Calculation must be transparent

Transmission Access

Conditions for fair open access:

- Legal access right
- Planning (intentions of third parties to be considered)
- Congestion management rules
- System operation and ancillary services
- Public announcement of network capacities and availability
- Independent governance of rules (technical and market rules)

Responsibility for planning

- VRA currently has responsibility
- Indicative planning must be done centrally even in a market
- The SO should assume responsibility
  - security of supply
  - regular and transparent planning
  - transmission investments subject to approval
  - Regulator/GoG to instruct VRA to carry out investment if there is a shortage of IPP capacity

VRA's Role in the New Market Arrangements

Current Situation

- VRA is the main producer and single buyer of electricity
  - VRA owns the hydro capacity and Takoradi 1 thermal power plant
  - VRA buys power from Takoradi 2 under a PPA with CMS Energy
  - VRA buys imports from CIE
  - VRA owns the transmission system and offers bulk electricity for sale at bundled prices
  - VRA has a small distribution activity
  - VRA has non-core activities
- **VRA is the dominant player**
- In the medium term, VRA will be fully unbundled

Generation

- Short term:
- Focus on hydro investments
- Role in thermal generation should be restricted:
  - support development of markets by providing balancing services
  - prevented from under-pricing hydro
- Principal buyer for competitively tendered thermal power projects (only if instructed by government)
- Act as supplier of last resort
- Longer term: divest thermal plant

Transmission and System Operation

- Implement accounting separation
- Functional separation of SO
- Transmission assets continue to be owned by VRA
- VRA's transmission function should then be strongly regulated
  - prices
  - access
- SO should operate system according to technical and market rules
- Long term: could divest transmission

Distribution

- There is no strong reason for VRA to retain a role in distribution (through NED)
- The future of NED should be considered along with the restructuring of ECG

Gas

- VRA has taken a role in development of WAGP
- As a principal buyer of gas it is likely to be involved in the guaranteeing of the gas purchase
- No strong justification for VRA to be involved in gas supply
- Must fully separate gas activities from power generation
- PURC to ensure IPPs are offered gas on non-discriminatory terms

Distribution Issues: Distribution Restructuring, Tariffs and Electrification

Current Situation

- Two entities, ECG and NED
- Large customers can, in theory, choose supplier
- Some management areas to improve: losses, collections etc
- Shortage of investment
- **What is agreed?**
- PSP can help improve:
  - management performance
  - capital for network expansion
  - establish distcos as creditworthy buyers
- Some re-organisation of ECG needed

How Many Companies?

- Advantage of 1 Distco is:
  - the avoidance of major restructuring
  - financial strength and ability to cross-subsidise
- Advantages of more than 1 Distco:
  - presence of more than 1 investor
  - differentiation between urban and rural areas (create focused RE entity)
  - management closer to 'problem'
- ECG proposes several business units with management autonomy
- **Issue**: Restructure first? = delay
- **Opportunity**: Attract private partner to assist with restructuring

Attracting Private Operators

- To attract strong private sector participant should be 1 or 2 separate companies, ie larger companies
- **Private sector can help, but which way?**
- What form of private sector participation (PSP)?
  - Management contract
  - Strategic investor (eg 25% of shares)
  - Concession
  - Full privatisation

Management Contracts and Strategic Investors

- Opportunities for management strengthening - bring in private operator (utility, not consultant)
- But many well-known problems with some management contracts
- Design contract very carefully - good incentives
- Many options:
  - Performance based incentive contract
  - Management contractor not allowed to be investor
  - First select Strategic Investor (SI), then require them to do management contract for 3 years

One Possible Approach

- Select SI, grant option to buy 25% in 3 years
- Immediately must undertake management contract, steps:
  - year 1, service contract to reorganise
  - year 2, performance based contract
  - year 3, allowed to buy shares at option price subject to satisfactory performance of management contract
- How many DistCos? 2 DistCos:
  - 1 focused on existing urban and industrial customers, commercial operation, no subsidies
  - 1 on RE, focused output-based subsidies for investment and to cover lifeline tariff

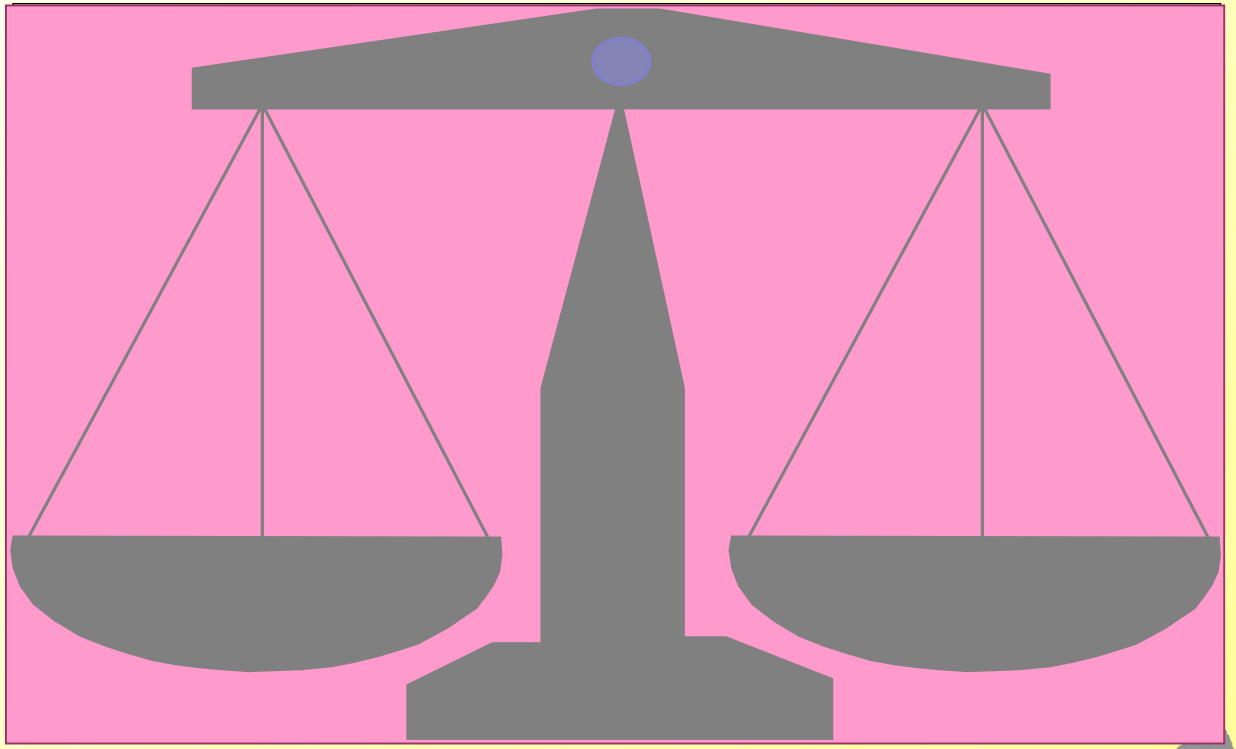
Tariffs

- Major constraint of low tariffs has been substantially removed:
  - PURC has a transitional plan for tariff increases
  - In 2003 tariff levels will be raised by approximately 11% and reviewed adjustment mechanism to take account of fuel prices and inflation, but needs improving
  - Tariffs do not cover electrification investment requirement
- Lifeline block is too low to cover operating costs in some areas
- Need targeted subsidy to compensate utility for lifeline tariff

Rural Electrification

- RE should be a key part of reform process
- RE has generally been implemented by external funds
- RE has not been strongly supported
- A benefit of stronger RE would be to make reform more acceptable
- Need focused RE entity
- Targeted subsidies for capital
  - subsidies should be transparent
  - if necessary, also for lifeline tariff block
- Issue: What form should RE entity be:
  - an independent fund
  - a utility with RE focus

Regulation and Sector Management



Regulatory Risk

- Strong regulatory framework required to implement a market
- Why 2 regulatory bodies? Is 2 better than 1?
- Split of regulation between two bodies weakens rather than strengthens regulation
- Main concerns for private investors:
  - Split of regulatory function increases regulatory risk
  - lack of independence
  - inadequate dispute resolution procedures

Roles of Regulators

- **The differences:**
- Energy Commission (EC) not independent, arm of government
- PURC independent
- EC focuses on advice to Minister, plans, resource utilisation, technical issues
- PURC focuses on fair play between utilities and consumers, prices and competition = the market
- Therefore functions requiring independent regulation and balance between participants should be done by PURC

Regulatory Functions

- Roles of the MOE, PURC and EC need to be clarified and rationalised
- Policy making and advice, responsibility of the MOE
- Licensing, continue to be carried out by the Commission for now, although PURC could assume this role in future
  - PURC may need to use licensing to enforce competition in the market

Functions of Regulation

- Technical standards - EC
- Customer service quality standards - PURC
- Technical standards of performance - EC
- Tariffs - PURC
- Promotion of indigenous resources and network development - EC
- Oversight of the development of the market and competition -PURC
- Technical rules ('grid code') - EC
- Market rules - PURC

Independence

- Independence is necessary to protect interest of consumers and producers
- Private investors want to see regulators make independent decisions
- Key conditions for sufficient measure of regulatory independence:
  - terms for appointment and dismissal
  - terms for funding of the organisation
  - PURC needs a source of independent funding

Weakening of Regulatory Framework

- PURC's functions include the setting of tariffs, the promotion of competition and the monitoring of standards of performance. Limitations include:
  - standards of performance overlap between PURC and EC
  - PURC does not have power to set standards
  - removal or suspension of licence can only be recommended to EC
  - PURC must set uniform tariff but does not have the power to create financial mechanism to compensate loss of revenues to distribution areas (subsidies)

Dispute Resolution

- Energy Commission Act:
  - disputes in relation to licensing referred as a complaint to the Minister
  - Minister's decision may be challenged in court
- Public Utilities Regulatory Commission Act
  - Complaints initially submitted to PURC
  - PURC determines own procedures for investigating complaints
  - No provision for appeal or dispute against the decisions of PURC
- Need mediation and arbitration steps

Key Issues for Discussion

- Restructuring of VRA
  - What criteria to apply for success (of gradualist approach) or failure (hence need to fully unbundle)
- Restructuring of distribution
  - transitional management contract, then Strategic Investor, or
  - direct to Strategic Investor
  - If more than one DistCo, how to define their territory, size and role
- Regulation
  - which steps to strengthen the regulatory framework?

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Privatisation

- Sale of all or some of the equity to a private investor
- Advantages
  - kick start the reform process
  - improve creditworthiness of distribution
  - clear governance situation
  - creates strongest incentives for efficiency improvements
- Disadvantages
  - little experience of privatisation in Africa
  - current climate among international investors is weak
  - no certainty that a privatisation transaction would succeed today
  - price for assets would be lower than if distcos were in a stronger shape

Concessions

- Concession can be viewed as being positioned between a management contract and privatisation
- Advantages
  - some investment risk immediately transferred
  - improve credit-worthiness of distribution
  - innovative benefit sharing formulations
- Disadvantages
  - similar uncertainties to those with privatisation
  - hard to adjust the concession contract later
  - dispute risk
  - insufficient interest

