Analysis of Market Prospects for Electricity Distribution Companies in emerging scenario of enhanced Power Trading in India

1. Demand-Supply Scenario

1.1 India has been facing a shortage of electricity over the past few decades, primarily on account of inadequate capacity additions, high T&D losses (around 30%), poor inter-regional transmission links, low PLF of thermal plants, and fuel supply bottlenecks. In 2005-06, the country faced an energy shortage of 52,938 Million Units (MU) and a peak shortage of 11,463 MW (12.3%). However, some regions faced higher shortages on account of the demand-supply in balance at the State level. During the last few years, the demand for electricity grew at a CAGR of 5% while supply during the same period grew at a CAGR of 4%.

1.2 In the medium term, the energy demand is expected to increase at a CAGR of 7.7%. However, a gradual reduction in T & D losses of States will offset the increase in overall energy requirement to some extent. As a result, the requirement of energy is expected to increase at a CAGR of 6.6%. Against this, the supply is expected to increase at a CAGR of 6.8%. Hence, the overall deficit is expected to reduce marginally to 6.4% in 2009-10. The growth in demand will be driven by high levels of industrial investment, rural and semi-urban electrification and urbanisation. Higher urbanisation will raise consumption in the domestic and commercial consumer segments. The increase in supply is mainly on account of high capacity additions expected in 2006-07 and 2007-08.

1.3 By 2009-10, the requirement is expected to be the highest in the Northern and Western region accounting for 32% and 36%, respectively, of the total requirement for power. This will be followed by Southern region (22%) and Eastern region (around 9%). However, the total energy requirement will be lowest in the north-eastern region at around 1 per cent. For the same year, around 30 per cent of energy supply is likely to

come from both northern and western regions and around 25 per cent from the southern region.

1.4 The northern, western and north-eastern regions will continue to witness a deficit situation. The eastern region is expected to remain surplus while the southern region is expected to turn surplus. Power will have to flow from these regions of surplus to ones with deficit.

Bulk Power Supply and Trading:

1.5 Bulk electric power supply in India is mainly tied in long-term contracts. The bulk suppliers are mostly the Central or State owned generating stations, as also a few Independent Power Producers (IPPs). Previously, the bulk buyers were generally the SEBs. The Electricity Act 2003 prohibits the State transmission utilities/transmission licensees from engaging in trading in electricity. Accordingly Power purchase agreements (PPAs) with the generating companies would need to be suitably assigned to the Distribution Companies, subject to mutual agreement. The power allocations from various generating stations are being assigned to **Distribution Companies (Discoms)** as part of the unbundling process mandated by the Electricity Act, 2003. The appropriate commission regulates the price of bulk supply of a generating station to distribution utilities on the basis of its Terms and Conditions of Tariff or as per the PPA.

1.6 The SEBs/ Discoms which have the obligation to provide electricity to their consumers mainly rely on supplies from these long-term contracts. However, it is neither feasible nor economical to meet short term, seasonal or peaking demand through long-term contracts: The concept of power trading helps in meeting the short term demand at an optimum cost. Similarly, power trading is useful for distribution utilities for selling short-term surpluses in order to optimize the cost of procurement. A few captive generating plants participate in trading in order to optimize their operating

cost and in the process, supply electricity to the grid. The Open Access Regulations and Inter-State Trading Regulations of the Central Electricity Regulatory Commission (CERC) have facilitated power trading in an organized manner.

1.7 Now, it is possible to trade electricity between any two points in India through Inter-State Open Access on different basis viz. advance reservation, current reservation, day-ahead and even on real time. Transmission charges for trading are applied on Rs./MW/day basis. For reservation of less than 12 hours, part day charges are applied as per rules. Open Access charges are transaction-specific depending on the regions/transmission systems involved between point of injection and point of drawal. At present, power is mostly being traded between power-surplus distribution utilities in Eastern Region (ER) and deficit utilities in Northern Region (N'R) and Western Region (WR).

1.8 Annual volume of electricity traded through open access route is of the order of 12-13 BU constituting about 2% of the total energy availability. In terms, of the magnitude of power, all-India short-term bilateral trade is in the range of 1000 to 1500 MW compared to installed capacity of 1,26,839 MW (as on June 2006). Captive generating capacity connected to the grid is 14,636 MW (as on June 2006). According - to CEA estimates, the all India peaking shortage during 2005-06 was 11,463 MW (12.3%). The availability of power for trading peaks during monsoon and bottoms out during winter. Gridco (Orissa), West Bengal SEB, Damodar Valley Corporation, Tripura Electricity Department, Himachal Pradesh Government, Malana Hydro Power Station, Jindal Tract etc. are among the notable suppliers. The term 'electricity market' in the Indian context usually refers to the kind of bilateral trading where the price is based on the value attached by the buyer to electricity as a commodity and his willingness or capacity to pay that price.

1.9 The bilateral trading going on at present is mostly among SEBs, IPPs and Discoms. It is either through a trader as a counter-party or direct. Some of the trading is taking place on barter basis. The power trading agreements are mostly inter-State or inter-regional, requiring Open Access through the Central Transmission Utility (CTU) network. The Open Access Regulations have 'been amended to suit the needs of the trade. The Open Access charges are reasonable and simple to apply, and not a single payment dispute or default has been reported to the CERC so far. However, power-trading agreement and open access approvals cannot be concluded separately.

1.10 A couple of years ago, in the initial phase of power trading, the price was settled through mutual negotiations. Presently; the sellers invite bids to which traders generally respond. The trader with highest bid price is selected, who in turn sells this power to a needy buyer after adding his trading margin. In a shortage scenario, when the buyers invite bids, only such traders can respond who already won a supply bid. In this manner, the buyer is left with little choice but to buy at a price already committed by the trader to a seller.

Reforms in Distribution

1.11 The distribution reform was identified as the key area to bring about efficiency and improve financial health of the power sector. Ministry of Power took various initiatives in the recent past for bringing improvement in the distribution sector. All States have signed the Memorandum of Understandings with the Ministry to take various steps to undertake distribution reforms in a time bound manner. All the States have securtised their outstanding dues towards CPSUs. 13 States have unbundled/corporatised their SEBs and 27 States have constituted SERCs. 9 States are expected to unbundled/corporatise their SEBs in near future. Electricity distribution has been privatized in Orissa and Delhi. CERC bas issued ‘inter-State trading licence’ to many players in the field. CERC and many SERCs have issued regulations for open

access in a phased manner and have also determined transmission tariff and surcharge to be paid for availing open access facility.

2. Present Scenario of Power Trading

2.1 Electricity trading is beginning to take the shape of commodity trade although mostly through the bilateral mechanism. The traded electricity is of three types: Round the clock, b) Peak power and c) Off-peak power. Peak power is being valued more than off-peak power.

2.2 The main features of the existing power trading scenario are summarized below:

- Sellers dictate prices by inviting bids from the traders. Traders bidding the highest obtain limited supplies and sell it to deficit entities after topping it with trading margin.
- Transmission access needs to be arranged separately.
- Trading is taking place through non-standard loose bilateral contracts. Generally, there is little or no penalty if the supplier fails to supply or the buyer backs out.
- There is established scheduling procedure at the regional level, which aggregates the trading schedule in day-ahead schedules.
- Payments for scheduled traded energy are settled directly by the concerned parties.
- There is energy accounting mechanism at the regional level and all deviations from schedules are handled through Unscheduled Interchange (UI) mechanism.
- Volume of traded electricity is tending to become stagnant, while its price continues to increase.
- Sellers located in different Regions cannot compete on equal footing due to pan caking (payment of transmission charges to the State to which power is transmitted, in addition to the payment of transmission charges applicable for the use of inter-State regional network).

- In spite of assured demand, the captive and merchant IPPs are not coming for trading in a big way, in the absence of a proper mechanism for energy accounting, etc. Thus, there are barriers for entry into the electricity trading and distribution market.
- Open access to large consumers allowed by the State Regulatory Commissions is not materializing due to technical hitches and lack of supplies.

Challenges of making competition work in electricity trading

2.3 Introducing competition in electricity sector based on the premise that electricity can be treated as any other commodity. There are, however, important differences between electrical energy and other commodities, which pose serious challenges in making it amenable to trading and competition. These challenges arise from the following:

Electricity cannot be stored:

2.4 Electrical energy is linked with a physical system where demand and supply must be balanced on real time. This is because electricity cannot be stored. Since this is a physical constraint, it must be respected at all times (or else the system would collapse and blackouts will ensue).

Demand for electricity varies intra-day and between seasons:

2.5 Demand for electricity fluctuates widely within the hours of the day as also from season to season. When demand is low, only power generated by the most efficient plants will get despatched. Since the marginal producers change as the load increases or decreases, the prices also vary over the course of the day. Such rapid cyclical variation in cost and price of a commodity is unusual.

Electricity travels in accordance with laws of Physics:

2.6 Power flows in networks follow Kirchhoff's laws of physics and cannot be directly controlled {Kirchhoff's Laws are applications of two fundamental conservation laws: the Law of Conservation of Energy, and the Law of Conservation of Charge. At any junction in an electric circuit, the total current flowing into the junction is the same as the total current leaving the junction. (Kirchhoff's Current Law, or Kirchhoff's First Law). The algebraic sum of the potential differences in a complete circuit must be zero (Kirchhoff s Voltage Law, or Kirchhoff's Second Law)}.

2.7 The trader has no control on the way power distributes among the various transmission lines. Thus, electricity, not being a commodity in the conventional sense, has no defined path for delivery. Energy generated from a generator cannot be directed to a specific customer. A customer simply gets whatever electricity was flowing in the wires he is connected to. Power produced by all generators is pooled on its way to the load. Pooling-has-beneficial effects of economies of scale. However, the downside is that any breakdown in a system affects everybody, not just the parties to a specific transaction.

Electricity travels at the speed of light

2.8 The consequence of this property is that it requires advance planning and spilt-second decision-making and control by the load despatcher to co-ordinate the generation and consumption. Speed of decision making by market is often much slower than the speed of electricity. Balancing of supply and demand of electricity is, therefore, difficult to be left to the market.

Lack of elasticity of demand:

2.9 Electricity being essential for modem life, its demand responds only minimal1y to price. Even in a country like India, the demand is becoming less elastic to price.

2.10 As a load can technically draw power from the grid without a prior agreement with supplier, it is often impossible to enforce bilateral contracts, as customers who exceed then-contracted demand cannot be disconnected. In such an event, some other supplier becomes the default supplier. In an organized power market, the system operator often discharges this responsibility.

3. <u>Development of Power Exchange</u> (Present role of Po~er Trading Corporation and towards development of common trading platform)

<u>PTC India Ltd</u>

3.1 PTC India Ltd (formerly known as Power Trading Corporation of India Limited), was incorporated in 1999. Its objective is to act as an entity which would undertake trading of power to achieve economic efficiency consistency and stability of supply. FTC has a two-fold mandate; to facilitate the development of generation projects inc1uding through private investment, both resulting in reliable, economic and quality power in the long-term and to develop a full-fledged, efficient and competitive market mechanism for trading in power. A vibrant power market, which is deep and liquid, needs to be developed in the long run.

3.2 In accordance with its mandate PTC entered into Power Purchase Agreements (PPAs) with Independent Power Producers (IPPs) / Power Utilities, in India and abroad as also engaged into multipartite Power Sale Agreements (PSAs) with users I State Electricity Boards under long term arrangement. The PPAs and PSAs range from 10 to 35 years, and provide for tie-up of long-term capacity at competitive tariffs.

3.3 The second part of PTC'S two-fold mandate is to develop a full-fledged, efficient and competitive market mechanism for trading in power, which would result in optimal utilization of the existing resources as also promoting exchange of power with

neighboring countries. PTC has been instrumental in the creation of a commercially vibrant power market in the country.

3.4 PTCs demonstration of the concept of trading as well as successful implementation of the same has prompted the inclusion of trading as a distinct licensed activity in the Electricity Act, 2003. It has also prompted many organizations, both public and private, to enter into the power sector especially in trading operations, bringing in competition and other drivers for efficiency in the sector in a very short time period PIC is a de facto power exchange at the moment.

Development of Power Exchange (a common electricity trading platform) Developing depth (large number of buyers and suppliers) & liquidity (adequate supply):

3.5 Unlike the bilateral trading and Unscheduled Interchange (UI) mechanism, Power Exchange (PX) is a centrally controlled mechanism requiring considerable planning, investment in hardware, software development and institutional engineering. The Power Exchange would have to electronically interact with hundreds of entities and create a credible financial settlement system. A well-defined relationship with the system operator on one hand and the clearing house on the other is vital for successful functioning. Even though sufficient experience of Power Exchange operation is available world-wide, it would still be quite a challenge to develop software suited to Indian conditions, and to train all the participants to use it. Power Exchange would be a 'no profit no loss organization' and all the costs would have to be recovered through transaction charges.

3.6 In order to keep the transaction fee low, e.g. 1 paise/KWh, it would be necessary to have adequate trading volume. In case of voluntary Power Exchange, it would have to compete with other available trading options. During the year 2005-06, the volume of energy traded bilaterally was of the order of 12.9 billion units while energy transacted under the UI mechanism was about 18 billion units. The scarcity of supply

and further division of trading volumes into bilateral, PX and UI routes is likely to result in low volume through the Power Exchange. In case the trading volumes are low, the per unit transaction cost would increase. Ensuring adequate trading volume is perhaps the biggest challenge for the viability of common trading platform.

3.7 The bilateral trading route of individually contracting energy in time horizon of a few months helps in managing seasonal requirements on one-time basis rather than depending on day-to-day bidding. It requires accurate demand forecasting and arranging open access separately. Day-ahead load forecasting is much easier and a PX can conduct day-ahead trading efficiently. Energy transactions through the PX are based on matching generation and load, and have positive effect on the grid stability. Therefore, energy exchanges through the PX need to be encouraged in order to reduce the headache of the Regional Load Despatch Cen1res (RLDCs) in real-time grid operation. The Power Exchange would provide its own pricing mechanism along with transmission and payment security. However, if participation in Power Exchange is voluntary in the beginning, the suppliers may not like to participate in the Power Exchange in case they feel bilateral or ill mechanism is a more profitable option.

Harnessing captive generation:

3.8 Long term PPA with two-part tariff, whether determined by the regulated norms or through tariff-based competitive bidding, provides price certainty to both buyers and suppliers. It is not in the interest of the consumers to disturb these contracts. Therefore, it is necessary to look for new supplies in order to increase the volume of the tradable power. There is significant captive generating capacity, which could be targeted for this purpose. However, captive generating stations are embedded in the State networks and the present metering arrangements may not be suitable for energy accounting for trading/UI settlement. Without the active support of the State Electricity Regulatory Commissions (SERCs) and State entities, it will not be possible to harness this source.

Stimulating and without matching supplies:

3.9 Since Power Exchange will be a convenient platform for purchase of power, it will give rise to expectations from all types of buyers. Apart from distribution utilities, open access consumers would also expect the Power Exchange to meet their demand. Special Economic Zones, tourist complexes, software centres, industrial estates, private townships, shopping malls, etc will look forward to Power Exchange. Unless there are adequate supplies, it may not be possible to serve open access consumers. Seeing the trend of rising prices of bilateral trading, it appears that elasticity of demand is 'reducing. Recently, in some transactions, the traded prices have pierced the threshold of ill ceiling rate of Rs 5.70 in some transactions. Under such acute shortages, when the distribution utilities are willing to pay more than Rs 5.70, the true price discovery in the Exchange may not materialise.

Facilitating additional supplies to Power Exchange:

3.10 In all future generation projects, 15% capacity may be earmarked for free market and corresponding capacity charge liability should not be passed on to long-term beneficiaries. Further, in spite of generation having been de-licensed, investors are yet to show interest in setting up significant capacities through merchant generation plants. It is important to facilitate setting up of merchant power plants and ensuring their connectivity to the grid. Providing transmission for power trading:

3.11 There is a robust inter-State transmission system in place, which is being expanded and strengthened continuously to take care of power evacuation need of inter-State power stations. Many inter-regional links have also been built to facilitate inter-regional energy exchanges. We have institutional arrangement~ for planning the expansion of transmission systems with Central Electricity Authority (ECA) as the apex planning body and involving Central Transmission Utility (CTU) and State Transmission Utilities (STUs). CTU and STUs are also mandated to provide non-

discriminatory open access. Open access in inter-State transmission was implemented in 2004.

3.12 The Open access customers are categorized into long term or short term. The short-term access, which is sought for electricity trading, is provided depending on the availability of surplus transmission capacity without disturbing long-term contracts. So far, the magnitude of trading has been small and the transmission system has been able to cater to it. However, it needs to be kept in view that power trading has the potential to increase manifold through a PX. Accordingly, in future, planning for transmission network expansion would also have to give adequate weightage to the need of power trading.

Adequate balancing and settlement mechanism:

3.13 Other requirements include balancing and settlement mechanisms in the Open Access scenario. A wholesale bulk market for trading where the State Load Despatch Centre (SLDC) or Regional Load Despatch Centre (RLDC) acts as a surrogate for the pool, can be complex and difficult to implement. The institutional capabilities of the licensees and the SLDC would be key considerations in the phased implementation of open access. The SLDC/RLDC would need draw up overall schedules and despatches of generators, as per the contracts held by various parties.

4. Regulatory Framework for Distribution

Electricity Act 2003

4.1 Initially, Reform Acts passed by various States [Orissa, Haryana, AP, Rajasthan, etc.] amended the Electricity (Supply) Act 1948 to introduce regulatory framework, functional unbundling of SEBs (including formation of Discoms subsequently) and operations of these unbundled entities as licensees supervised by the Regulator.

4.2 With Electricity Act 2003 ("EA03") coming into force from June 10,2003, the previous Acts governing the electricity supply in the country, viz., the Indian Electricity Act 1910, the Electricity (Supply) Act 1948, and the Electricity Regulatory Commissions Act 1998 stand repealed. The provisions of 'EA03' consolidate and augment the previous Acts.

4.3 Electricity Act 2003 requires licence for distribution and supply (hereinafter called 'licensee'), transmission and trading. No licence is required for generation or franchisee working within distribution or captive supply. For distribution and supply, the SERC fixes the value as part of bundled tariff.

4.4 A Licensee can engage in activity (other than that listed in the licence) only with the approval of the Regulator. Areas of supervision by SERC over a licensee, include:

- Approve licences in the area of business
- Examining Costs/ Efficiencies -as set out in Tariff Order
- Right to receive petitions for/against licensees business conduct
- Right to receipt of subsidy by the licensee as set out in the Tariff Order
- Right to perusal of connection, quality standards, servicing standards, etc.
- Right to studying and analysing
- Tariff charged to consumers

Regulatory Process

Licensing:

4.5 A person including a company can apply for licence. SERC/ CERC (referred henceforth as ERC) examines the organisational capability of the licensee by conducting public hearing and eliciting technical analysis from the staff of the Commission backed by rejoinders from the licensee. Based on this, it prepares an order disposing off the application -either granting or rejecting the request.

5.6 According to EA'O3, there are certain conditions relating to issuing ,of licenses. It states that in case an application is made for second distribution and supply licence

for an area, the Commission cannot reject the application because of the situation of an incumbent licensee.

Annual Revenue Requirement (ARR) and Tariffs application:

4.7 Currently, when there is an overall generation deficit scenario and where most of the generation capacity (owned by Central and State Governments and even IPPs) is contracted through long-term Power Purchase Agreements (which typically cannot be disturbed), the transition to competitive market-based power pool will take more time. Hence, the tariff is still regulated by ERCs in country.

4.8 Accordingly, every year, a distribution licensee has to file with the Commission, a return showing the activities of the previous year, the activities for the current year and the activities projected for the ensuing year. Activity would mean expected/ actual revenues from sale of power, costs to be incurred including network costs, transmission charges, SLDC charges and power procurement costs, subsidies received/receivable etc.

Multi fear Tariff (MYT) Framework:

4.9 Many ERCs have contemplated MYT idea, right from the beginning (1998 onwards), to move from the 'cost +' approach of Sch VI: Electricity (Supply) Act, 1948 towards performance-based cost of service tariffs with a longer time horizon. As per National Tariff Policy, SERCs have to introduce the MYT framework in their respective States with effect from April. SERCs will be required to set out the principles of MYT as suited for the State and invite the utility to respond to these concepts. Based on the agreed concepts and principles, SERCs would ask the utility to provide data and analysis. This submission would be heard in public (similar to the current tariff hearings) to arrive at the MYT order, wherein SERCs will fix certain parameters at the beginning of the control period (3 to 5 years) and evaluate the result

only at the end of the control period. If the utility has improved the parameters in the interim, it stands to make profits till the end of control period and vice-versa.

5. Distribution -A Separate Activity

5.1 Electricity Act 2003 allows distribution to be separated from supply. Supply circles even up to the level of sub-stations could be given to private parties, thus effectively doing away with the requirement of large utilities and business firms. A much wider choice of business entities could thus be tapped for privatization of distribution than has been possible in the Orissa and Delhi models. Due to 1he positive environment provided by the Act, competition in the Distribution sector will increase in the medium to long -term, especially due to Open Access condition. The larger consumers will have access to various suppliers. Hence, Distribution Companies (Discorns) will have to work on strategies to retain consumers. The players will also have. to focus on controlling the costs, and hence will have to concentrate on improving the existing infrastructure.

Implications of parallel licenses

5.2 Parallel distribution networks in a supply area take away the exclusivity of the distribution licensee. In such cases, the regulator may fix only a ceiling on tariff for retail sale in order to promote competition. The existing licensee typically serves a. mix of subsidizing and subsidized consumers. The second distribution licensee may focus only on a selected area where the consumer mix may have a high proportion of lucrative industrial and commercial consumers in urban areas to whom he can supply at lower tariffs as there will be no burden of cross subsidy burden. Thus, with cherry picking by the parallel distribution licensee, the cross subsidy available to the incumbent licensee will get reduced and the same will be forced to raise the tariff for subsidised categories of consumers. This may lead to tariff shock requiring intervention by the respective State Government in the form of higher grant of subsidies.

5.3 Huge investment is required for constructing parallel network and lack of corridors for the same may hinder the entry of second parallel licensee. However, multiple distribution licences allow for introduction of competition from the supply side. In a developing country laying out the network for the first time in many areas, multiple distribution licences might well be a desirable option. Typically, an increase in load density reduces distribution costs per kWh consumed and thus simply adding new customers does not reduce such costs beyond a low threshold of about 10,000 customers per Distribution Company. As long as load density is sufficiently high, one can conceive of a distribution company serving as few as 10,000 customers. This explains the rationale for such I provision in the new legislation.

Impact of Oven Access

5.4 Open Access means the non-discriminatory provision for the use of transmission lines or distribution system or associated facilities with such lines or system by any licensee or consumer or a person engaged in generation in accordance with the regulations specified by the Appropriate Commission.

The Open Access regime is likely to give rise to complex multi-party transactions between generators, licensees (distribution and trading) and consumers for different tenures (short-term and long-term) and from within and outside a Licence Area / State.

- Generator to Dist. Licensee (Within / Outside State)
- Generator to Trader (Within / Outside State)
- Generator to Consumer (Within / Outside State)
- Distribution Licensee / Trader -Trader / Dist. Licensee (Inside / Outside Licence Area)
- Trader to Consumer (Inside / Outside Licence Area)
- Distribution Licensee to Consumer (Inside / Outside Licence Area)

5.5 These transactions need to be tracked and recorded for grid management and appropriate levy of charges for recovery of costs from the transmission / distribution utility. The multiple transactions would need to be scheduled, billed and subsequent collections have to be ensured. Presently, these services are being managed with simple systems in view of the few players accessing the grid network and the linearity among their services. The complex multi-party transactions being allowed under the Open Access would require sophisticated and resilient systems that would facilitate smooth and safe operation of the Grid.

5.6 Discoms need to put in place proper contractual framework for entering into various agreements relating to wheeling/ transmission, trading grid access with Centra1t State transmission utilities, electricity trading companies and State/regional load despatch centers.

5.7 The inter-state open access customers using intra-State transmission system or distribution system of Distribution Licensee in conjunction with inter-state transmission Open Access have to pay the transmission charges and/or wheeling charges for use of intra-State system in addition to payment of transmission charges for inter-State transmission.

5.8 If a consumer opts to take supply from a party other than the existing distribution licensee, then the consumer has to pay wheeling charges to existing licensee for use of network in addition to the surcharge as applicable. However, this requires the existing licensee to segregate-the wires business from retail supply business as the wheeling charges would be linked to the costs incurred by the incumbent licensee on wires business only.

5.9 Migration of customers may not be a threat in the near term for Discoms, but over a period of time, the Regulatory Commissions may revise the surcharges down as

per the National Tariff Policy and possibly minimise the present disadvantage of paying higher surcharge for migrating consumers.

5.10 Open Access regulations will promote the trading activity (competitive buying and selling) which will benefit the distribution companies in a Multi Buyer Model scenario.

6. Privatisation of Discoms: Different Models

6.1 Several Discoms, which are currently wholly owned by State Governments, are likely to be privatised in the near future. Differing models of privatisation have been used in the country so far (the Delhi model, for instance, uses a fixed transitory support along with a defined trajectory of AT&C loss reduction) and several others are likely to be used in future. The impact of privatisation on Discoms in a particular geographic region has to be evaluated.

Business A1odels and financial issues

6.2 Business models associated with electricity distribution are typically categorised as under:

- Wires only utilities
- Wires plus metering and billing (M&B) utilities;
- Wires, M&B plus supply utilities (that is, power procurement, hedging and sale to retail customers); and
- Wires, M&B, supply, plus generation utilities (also referred to as vertically-integrated utilities)

6.3 Unbundling will reduce the size of utility corporations, and separate the risks, opportunities, and revenue streams associated with each utility function. Consequently, the new corporate structure, the scope of competition in the restructured industry, and the type of regulation over the remaining monopoly functions will affect the risk to

reward ratios of the regulated utility. Future merger and acquisition activity will also impact each segment's access to financing. The financing issues relating investments in different business models listed above are discussed below.

Wires' Functions

6.4 The cost of wires service and metering and billing service account for approximately 20% of the delivered cost of electricity. The 'Wires Only' model represents a utility that has approximately 15% of the capitalization of a traditional, vertically-integrated utility. While a Wires' utility has substantially reduced capital requirements, its smaller size and lack of experience and regulatory history may make access to capital more difficult and costly in the near term. Wires' utilities may find that they are competing with the generation, transmission sector and retail marketing sector for available capital. Clearly-defined regulation and experience regarding treatment of capital expenditures may improve Wires' utilities scope of obtaining finance from investors seeking stable investment.

6.5 The magnitude of future investment in distribution capacity will depend on numerous factors such as growth in the customer base, changes in the design of the distribution system (from a radial to a network design to accommodate increased usage), and a need for better monitoring and control {investment in Supervisory Control And Data Acquisition (SCADA)} of the network. It is likely that utilities have under-invested in distribution assets in order to free up cash for other activities in emerging competitive markets, thus increasing the need for better investments in the near term. Countering these uncertainties is the reality that most customer loads are stable or growing in a predictable fashion. Even dramatic changes in generation despatch that result from wholesale competition will have little or no impact on the physical flows of power on the distribution network. Distribution utilities prefer more stable pricing of distribution service. Regulation allowing fixed monthly charges for distribution service is likely to increase investors' confidence.

Metering and Billing Functions

6.6 As with the Wires' only model, a M&B utility has substantially reduced capital requirements. M&B utilities has a more accepted role to play in restructured energy markets as compared to Wires' only utilities. More fixed monthly charges and fewer usage-based charges for distribution service may reduce the need for additional metering function. This implies that design of a simpler tariff structure lessens the need for improved metering capabilities. The future metering needs resulting from restructuring involve some uncertainty. Investments in new metering technologies may. result from restructuring requirements for particular classes or sizes of customers. For example, all customers above a particular load (say, one mega watt) may require advanced metering capabilities. However, the impact on overall M&B utility investment will not be significant unless there is a widespread call for enhanced metering for a large number of small customers.

6.7 The willingness to invest in metering technologies may also be affected by regulatory policy regarding recovery of stranded metering costs. However, investments in new billing systems will be required to implement restructuring. The magnitude of these investments will be a function of the specific market and regulatory decisions in respective States.

Energy Procurement, Hedging and Sale Functions

6.8 In an enhanced power trading scenario, the electricity distribution companies are entrusted with the responsibility of purchase of the commodity from the spot market (power exchange) for resale to retail customers. While the selling price to the retail customers is fixed by regulation, the purchase cost of the commodity of electricity is not fixed. The regulatory regime designed for supply utilities in a restructured market has created a mismatch between risks and revenue potential. Bulk Supply Tariffs are governed by existing PPAs, which will be allocated to DISCOMS in Multi Buyer

Scenario. The pass-through of increase in power supply costs will be decided by the respective State Commissions.

7. Financing: issues

State Government Support:

7.1 As a key stakeholder in the restructuring. of the industry, the extent of State Government support is an important rating criteria for financing a Discom, at least in the initial stages. State Government support manifests itself in various forms, with some of the most important ones being as follows:

- Takeover of liabilities of the erstwhile SEB by the State Government at the time of operationalisation of Discoms to enable the new entities start operations on a clean slate.
- Write-off of State loans against receivables from State bodies, and securitisation of past dues.
- Transitory subsidy support to the utilities to ensure stability of cash flows during the interim period, i.e. before the entity attains commercial viability on a stand-alone basis. It is clear that the gap between costs and revenues can be expected to be bridged only gradually.
- Implementation of anti-theft laws.
- Under the Accelerated Power Development and Refonns Programme (APDRP), Government of India, makes available concessional funds, including incentives linked to cash loss reduction, for undertaking Distribution Reforms. The timely release of such funds by the State Governments to the Discoms is also a reflection of State Government's sincerity in supporting them and carrying out the reforms.

Payments of Dues by Government Departments

7.2 Traditionally, the track record of payment by Government departments the utilities has been unsatisfactory. Ensuring prompt payment of dues to a Discoms from these departments may also be considered as indicative of State Governments' implicit support to the power sector reforms and may improve creditworthiness of the Discoms for the bankers. However, the key determination this regard will be the financial strength of the State and its track record of of actual Subsidy vis-a-vis what is promised in the Financial Restructuring Plan (FRP).

Regulatory Process:

7.3 The transparency, predictability and consistency of the regulatory process have a key influence on the cash flows. of a Discom. The key aspects of the regulatory process that require evaluation are classified as below:

7.3.1 Ideally, tariff orders should be passed and implemented by the first month of a financial year so that Discoms know clearly the efficiency parameters that are expected to be complied with, as also avoid the problems associated with implementing tariff orders with retrospective effect. The other related issue is the implementation of tariff orders, especially relating to increases in agricultural tariff, which many State Governments have routinely delayed.

Efficiency Improvement Targets:

7.3.2 Under the existing cost-plus tariff setting process, the distribution network cost is a pass-through, subject to certain operating efficiency targets being met. The actual efficiency levels may be at variance with the ones assumed by the Electricity Regulatory Commissions (ERCs),which would mean that the Discom is not able to recover, through tariffs, the costs it has incurred. The most contentious issue is that of distribution losses that are allowed by the ERCs vs the actual, and the feasibility of meeting the distribution loss reduction targets that have been set by the ERC.

Multi-Year Targets:

7.3.3 Lack of predictability in the tariff setting process is a key uncertainty from the credit perspective. Multi-Year Tariff policy (with incentives and cost pass through factors) goes a long way in mitigating such uncertainties, and initiatives by certain ERCs in delineating the broad contours of a Multi-Year Tariff Policy are a welcome sign in this discretion.

Demographic Profile:

7.4 The demographic profile of the licence area that a Discom serves, determines the quality of cash flows, as well as the extent of likely threat from competition. Given the level of cross-subsidy currently prevalent in the tariff structure, a high proportion of agricultural consumption inevitably implies relatively higher levels of cross-subsidy and far greater burden of subsidy payment on the State Government. On the other hand, a higher proportion of Commercial and High Tension (HT) segment in the consumer mix means greater vulnerability to competition in a liberal regime allowing captive power plants (CPPs) as well as freedom to consumers to source power from alternative sources in an Open Access Scenario. The key determinants of demographic profile are:

- Proportion of various consumer segments
- Growth rates in different segments
- Extent of agricultural consumption
- Geographical dispersion of HT consumers

7.5 The extent of geographical dispersion within the HT segment is an indicator of concentration risk and hence threats of competition. Initiatives by the State Governments to minimise the impact of high-paying consumers switching from the incumbent licensee will improve their rating. For instance, Discoms in some States have initiated supply of power to HT industrial consumers through a special incentive

scheme of tariffs which are substantially lower than the normal tariff applicable to such consumers. Further, some State Governments have been levying taxes on captive power generation, which also mitigates the threat from CPPs to some extent, although questions remain about the sustainability of such measures.

7.6 Different Discoms, even within a State, can have greatly varying consumer mixes, and consequently, different levels of cost coverage from revenues, implying divergent credit profiles. It may be noted that despite the progress of reforms, it is unlikely that many Discoms will be able to attain 100% coverage of costs from revenues: in the immediate future. Therefore, the issues of relevance are the extent of the gap between the Average Cost of Supply (ACS) and Average Revenue Realisation (ARR), the trends in this gap, and the way the gap is bridged.

Cost Competitiveness:

7.7 Wth an increasingly liberalised environment emerging in the country's power sector, the ability to withstand competition depends largely on cost competitiveness. Cost competitiveness, :in the case of a Discorn, is a function of two factors:

- Power purchase cost
- Operating efficiency

7.8 Presently, power purchase cost is beyond the control of an individual Discom, governed by long-term PPAs with the Transcos. Besides, power purchase cost is normally allowed as a full pass-through for recovery through tariffs. However, with the implementation of the Electricity Act, 2003, Transcos are not allowed to trade in power and Discoms have to contract directly with the generating units. Several Discoms are likely to explore opportunities to procure power more profitably, either by acquiring their own generating stations or buying power from cheaper sources even outside the State. Power purchase costs also may then be scrutinised more rigidly by the ERCs.

7.9 The key determinants of a Discorn's operating efficiency are as follows:

- Trends in Aggregate and Technical Commercial (AT&C) losses .
- Employee per 1,000 consumers served
- Distribution costs per unit energy procured/distributed
- Proportion of metered sales
- Quality and reliability of service

7.10 The most important efficiency parameter for a Distribution Licensee is the success in reducing AT&C losses, especially in relation to the regulatory targets that have been set. The AT&C loss, besides the T&D losses, is a reflection of the impaired Collection efficiency, which is an important efficiency indicator for a Discom. Since collection efficiencies typically tend to be on the lower side, especially where the service area bas a large proportion of agricultural consumers. Manpower cost is also an important element of a Discom's cost structure. However, several Discoms have been taking steps to outsource a part of meter reading, billing and collection function to lower the manpower intensity of operations. The other key components of a Discom's cost structure are essential Operation & Maintenance (O&M) costs (largely inflexible), depreciation, and interest charges. Interest charges are a function of the debt stock with which a Discom start its operations, the extent of uncovered deficit that needs to be debt funded and the working capital requirement.

7.11 The proportion of metered sales is a crucial indicator of a Discom's operating efficiency since it directly impacts a Discom's ability to appropriately recover costs through tariffs. However, universal metering at the consumer end is an expensive process, and a key challenge for Discom is, therefore, to balance the conflicting requirement of minimising capital expenditure and reducing losses. Quality and reliability of service have to be measured with respect to variables like Distribution Transformer Failure Rate, Interruptions, Outages, an9 Reliabi1ity Index.

7.12 The current financial position of a Discom is reflected in its capitalisation, debt servicing and profitability. The key parameter for assessing profitability is coverage of costs by revenues, without subsidy support from the State Government. However, to the extent that agricultural consumption is subsidised on specific directives from the Government, the subsidy component has to be factored assuming that it has been received in a timely manner. Excessive dependence on such subsidy support has to be viewed as a negative aspect from the financing perspective, given the concerns over sustainability and timeliness of subsidy inflows.

7.13 The other indicators of financial position include the ratio of debt to net worth, debt service coverage, interest coverage, and ratio of cash flows to total debt. Given that a Discom's cash flows are usually stable and predictable, it would be in a position to support a larger debt on its book as compared with an entity operating in a cyclical industry. However, a Discom's ability to start operations with moderate capitalisation is almost wholly dependent on the State Government support extended during operationalisation and the transitory phase.

Cash Flaw Adequacy:

7.14 Cash flow projections have to be examined to determine its adequacy in relation to the debt being serviced. The key variables that have an impact on a Discom's debt servicing ability are:

- Ability to attain the AT &C loss targets specified by the ERC
- Capital expenditure that will be required to meet projected load growth, improve service and lower distribution losses

7.15 The ability of a Discom to meet distribution loss targets hinges on progress in areas like:

- Achieving metering at all levels, viz. 33 KV and 11 KV, distribution transformers and consumers, which facilitates the process of energy audit to identify high-loss feeders / areas.
- Other steps like improving the proportion of HT lines, introducing High Voltage Distribution System (HVDS), rationalisation of load profile and strengthening of transformers.
- Strict implementation of anti-theft laws.
- Using Information Technology (IT) systems like SCADA2.

7.16 Discoms usually have to incur large capital expenditure to meet the projected load growth, reduce losses and improve the quality and reliability of power. The major sources of funding are consumer contribution, retained earnings (if any), funds under APDRP scheme, and commercial loans from banks and financial institutions (FIs). The cash flow analysis therefore factors in the likely funding requirements, the sources of funds, and the maturity profile of loans expected to be contracted.

8. Conclusion

8.1 In the medium term, the energy demand is to increase at a CAGR of 7.7%. After factoring in the trend in reduction in T&D losses, the requirement of energy is expected to increase at a CAGR of 6.6%. By 2009-10, the requirement is expected to be the highest in the Northern and Western region accounting for 32% and 36%, respectively, of the total requirement for power. This will be followed by Southern region (22%) and Eastern region (around 9%) and NE region (1%). For the same year, around 30 per cent of energy supply is likely to come from both Northern and Western regions and around 25% from the Southern region. The Northern, Western and North-Eastern regions will continue to witness a deficit situation. The Eastern and Southern regions are expected to be surplus in power.

8.2 Thus, in the context of enhanced scope of power trading, Discoms will be sourcing power from surplus regions, for distribution in the deficit regions. Financing of Discoms will depend on the following factors:

a) Demographic & Demand factors:

- Proportion of various consuming segments
- Growth rates in different segments
- Extent of agricultural consumption
- Geographical dispersion of ill consumers

b) Ownership:

- State Government owned
- Private owned
- Franchisee

c) Business model:

- Wires only utilities
- Wires plus metering and billing (M&B) utilities
- Wires, M&B plus supply utilities (that is, power procurement, hedging and sale to retail customers}, and
- Wires, M&B, supply, plus generation utilities (also referred to as a vertically – integrated utilities)

d) State Government and Regulatory Frnmework:

- Treatment of past assets/liabilities
- Treatment of regulatory assets
- Progress in regulations regarding Multi Year Tariff policy, transfer of trading and power procurement to distribution licensees, competitive bidding for power procurement, performance standards of licensees, Grid Code, intra-State ABT and captive power policy
- Transparency, predictability and consistency of the regulatory process

- Release of concessional funds under the Accelerated Power Development and Reforms Programme (APDRP) to States
- Payment / Securitisation of past dues of SEBs

e) Presence of Competitive Forces:

- Entry of Parallel licences which in turn depends of cherry picking and universal obligation issues
- Power market will take time to evolve. Migration from a Single Buyer Model to Multi Buyer Model will transfer the buying power to Discoms. However the purchase of power will still be governed by the past PPAs and hence true price. discovery as can be obtained form a fully developed power market will not be possible till sufficient power (in terms of volume and transactions) is traded in the market.

f) Tariff Issues:

- Restrictions on Retail Tariff as regulated by respective Regulatory Commissions
- Volatility in Bulk Supply Tariff (Contracts and price discovery through markets)