

Submission for
Crisil Young Thought Leader Series 2004

**India's electricity sector:
Can government control and private investments
co-exist?**

By

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September 20th, 2004

ACKNOWLEDGEMENTS

I would like to thank the following for sharing their views on the subject and providing guidance and support in writing this paper.

1. Mr. Vinod Masson, Sr. Vice President, Crompton Greaves Private Limited
2. Mr. Rakesh Singh, Professor – Economics, N.M.I.M.S

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EXECUTIVE SUMMARY

Electricity is an essential input in the economy and an efficient and competitive power sector is vital to a country's development. This paper begins by differentiating between private investment and competition. It then lays down the three pillars on which competition depends namely private investment, legal framework and a regulatory structure. The latter two are the context in which the author defines government control. The paper then discusses the electricity sector in India by modularising into generation, transmission, distribution and trading activities. The paper analyses each activity in detail, giving a background, previous impediments to private participation, enabling features under the new electricity act and the impending issues and regulatory challenges. It then gives recommendations addressing the issues regarding open-access, non-conventional energy sources, public-private partnerships in transmission, tariff determination and enabling power trading in India. The paper concludes that in order to have a mature power sector in India, private investments and government control not only must co-exist but also act as synergetic enablers to each other.

Introduction

Electricity is the fulcrum of economic development in any country. After more than a decade of reforms in the Indian economy, electricity appears to be the most intractable part of the infrastructure. Roughly 50% of India's households do not have electricity today. An analysis reveals that at the rate at which electrification is proceeding in Bihar, it would take 700 years for every village in the state to get electrified.

The installed generation capacity in the country is around 107,000 MW. The average energy shortage in the country in 2003-04 was 7% and the peak shortage was 11.2%. It is estimated that over 100,000 MW of additional capacity and an investment of around Rs.900,000 crores will be required to fulfil the 'Electricity for All' vision of the government by 2012. Even with a sharp jump of nearly 106.5% on the total outlay for the power sector in the Tenth Plan, it is an accepted fact that the major role will have to be played by the private sector.

Enacted in May 2003, The Electricity Act 2003 (EA-2003) marks a turning point in India's Power sector reform. The EA-2003 has projected a bold and beautiful vision of the India power sector in its mature state: competitive, efficient and cost effective. Increased Private Sector Investment in the power sector is the basic assumption underlying the attainment of these goals.

Investment Vs Competition

It is important to recognize the difference between investment and competition. Investment is characterized by a willingness of investors to put their time, effort and money into the purchase or development of power projects. Investment must include some degree of private ownership that can be offered through a number of techniques or modalities (e.g., equity holding, build-own-transfer, build-own-operate etc). Investment

does not take a system-wide perspective; it focuses on what it will take to bring in private sector capital. Investment may include the need to compete for the right to develop projects (e.g. power generation projects being awarded on a competitive basis, but once awarded, the owners do not have to participate in a competitive market).

Competition, on the other hand, is a set of conditions in which investors vie for the market as a whole, a market in which they compete against all other players in the market simultaneously to sell their product. Competition is a more rigorous set of conditions and is harder to achieve than investment. This is evident simply from the fact that there are many developing countries that have attracted investment in the power sector (especially in generation), but fewer countries have an emerging competitive market for power, at either the wholesale or retail level.

Three Pillars of Competition

Private investment is thus a necessary but not a sufficient condition to ensure competition. Government control through policy directions and provision of a legal and regulatory framework is the supplementary condition along with private investment ensuring competition.

Thus the three pillars of competition are

- Private Investment
- Enabling Legal Framework
- Independent Regulatory Structure.

During the course of discussion in the paper it becomes clear that these three conditions are not only equi-essential but also self-reinforcing in order to provide for a competitive electricity market in India.

The paper analyses the issues and developments in each of the four set of distinct activities in the electricity sector as outlined by the act namely generation, transmission, distribution and trading.

Generation

Background

Despite the fact that around 40% of the generated electricity is lost to T&D losses, for a long time the Indian Power sector erroneously focused on generation. There was a yawning demand-supply gap, and it was felt that the private sector would give an impetus to generation. In 1990s the power sector was liberalised with incentives such as guarantees, assured returns, duty cuts, etc. This however failed with only four of the fifty-eight cleared schemes materialising. The single most important factor deterring foreign investment was the fact that SEBs the sole buyers in their respective states were on the verge of bankruptcy. Willingness of state governments to stand guarantee for payment for power purchased by the SEBs didn't work given the poor state of their own finances. Escrow arrangements involving tripartite agreements between the SEB, the IPP and the bank concerned could not be resorted due to absence of large, regularly paying consumers. A delay in setting up the regulatory mechanisms (CERC came up in 1998) and public perception that power supply from an IPP is costlier from a similar publicly owned generating station, led to the reopening of Power Purchase Agreements (PPA's). Enron's Dabhol power project at an installed capacity of 2184MW, largest private power project taken up in the country was the resultant casualty.

Enabling Provisions in EA-2003

- Generating companies free from licensing requirements provided they adhere to technical standards laid by the CEA.
- Government approval required for all hydro projects.
- Captive generation free from controls and granted open access subject to availability of transmission.
- Co-generation and generation from renewable sources to be encouraged.

Impending Issues

Open access induces competition amongst the generation companies to be efficient and low cost producers. However, the timing of introducing the shopping-around facility and open access to consumers is left to the appropriate regulators, and they are also subject to paying a cross-subsidy to the distribution licensee. By leaving the open access grant to the consumers in the hands of the state electricity commissions competition is held back, to be politically postponed. Also the act does not distinguish between the subsidising and the subsidised consumer and requires both of them to pay the surcharge when they demand open access. Thus the subsidised customer will never demand open access. Also the surcharge will kill competition by pricing out the lowest cost options sought by subsidising customers. Vagueness in the definition of cross-subsidy – whether it is the difference between tariff and average cost or the difference between tariff and marginal cost of the highest cost power, also adds to the uncertainty regarding open access. Even though the cross subsidy surcharge is supposed to be limited to the transition phase as the EA 2003 envisions a complete removal of subsidies in a phased manner, political

considerations exemplified recently in the case of Andhra Pradesh and Maharashtra (giving free electricity to farmers) suggest otherwise.

Though captive generation has been made attractive because of a liberal definition of 'captive' and the fact that it is not subject to a surcharge to compensate the loss of surcharge to the SEB or distribution licensee, imposition of a state duty as in the case of Karnataka can make the option less attractive for industries.

Transmission

Background

Worldwide private sector participation in transmission has usually been low owing to the monopolistic nature of business. Power Grid Corporation of India limited (PGCIL) is a centrally owned power transmission company, which, until the enactment of EA 2003, enjoyed a monopoly in transmission. With 42,000-circuit km, carrying 40 percent of the total power generated in India, PGCIL has been entrusted with the mammoth responsibility of building a national grid that will interlink all five regional grids. It plans to add 60,000-ckt km in the next 10 years to that effect.

Enabling Provisions in EA-2003

- CTU (Central Transmission Utility) / STU (State Transmission utility) to be deemed transmission licensee.
- Licensee to provide non-discriminatory open access to any licensee or generating company and to any consumer as and when open access is provided by SERC.
- Open access to be provided against payment of transmission charges as determined by CERC/SERC.
- More than one transmission licensee permitted in a state.

Impending Issues

Private sector participation in the transmission is still suspect owing to large upfront investments and long gestation periods involved. India's electricity markets are of an essentially residual status today. However with increased inter regional trade, transmission systems will be physically stressed and there will be an increased threat of transmission congestion constraints on the power sector. Further more future congestion cannot be predicted. Changing load patterns and new generations constantly alter power flow patterns and can significantly increase congestion costs as in the case of Pennsylvania-Jersey Maryland market in the US.

Regulatory Authorities have to be alert to transmission companies using arbitrarily high transmission charges as that can blunt the power unleashed by open access. At present there are two components in transmission charge: a transmission line use component and a transmission loss component. At present regulation is mute on whether the use component be based on average costs, marginal costs or congestion costs. Also if competition is to be promoted, then the regulator should err on the lower side of transmission cost and loss figures, reducing prices and fostering reduction in T& D losses.

Distribution

Background

Private investment in distribution has been the most sought after as well as the most controversial developments with respect to the Indian Power industry. Distribution reforms in India in the mid 90s, following the World Bank model of privatisation required intermediate steps of unbundling and corporatisation of vertically integrated state utilities. The first experiment with Orissa ended up in a failure but provided a powerful demonstration effect. The Accelerated Power Development Reform Programme (APDRP)

forms the core of the efforts to bring change into the distribution segment. With funding under two components – investment and incentive, it aims to attack the problems right from the micro level (consumer, feeder, substation) to the macro level (circle, state, national).

Enabling Provisions in EA 2003

- More than one distribution licensee permitted in the same area.
- Wheeling charges payable as determined by SERC.
- Open access allowed in a phased manner and purchase permitted directly from generating company/licensee outside consumer's area on payment of surcharge.
- Surcharge to be utilised to meet the requirements of existing level of cross subsidy within the area.

Impending Issues

One of the key issues with regards private sector participation in distribution concerns with Tariff Setting and regulation. There is an over arching concern that tariff setting and regulation would be dictated by political and popular sentiments rather than rational and economic considerations.

Another key concern is the financial viability of distribution companies given the Californian crises. World over, the wholesale electricity markets are better developed than retail electricity markets. Wholesale market rates are thus demand-supply driven, having high rate variability owing to seasons, peak and off-peak hours and change almost on an hourly basis. The California crisis resulting in the near bankruptcy of two out of its three distribution companies was due to the relative inflexibility in retail tariffs in response to highly variable wholesale rates.

Indian Regulators have been following the cost of service regulation (COSR) approach and also insist on revising the tariffs year after year. This robs the incentive for the private firm to lower costs, since these will be passed on to the consumer by the regulator in the next review period. Also Indian regulators are handicapped by a severe lack of information and require reliable opening data as demonstrated by the Orissa experience.

Power Trading

Background

Power trading owes its origins to the Electricity Act 2003. The Power Trading Corporation has been set specifically for building up a power market in India and also to promote optimal utilisation of existing resources, catalyse development of power projects and promote exchange of power with neighbouring countries. The present level of inter-regional electricity exchange is still quite limited, at hardly 2.5% of the total energy generated. The potential of efficiency gains is enormous considering that the combined PLF of stations at the northern, southern and western region is around 90% compared to 55% in eastern region. Regional trade on relative price differentials will result in cost gains from displacement of costly generation in supply-deficit regions with cheaper units in surplus regions.

Enabling Provisions in EA-2003

- License mandatory for trading activity.
- CERC/SERC may specify technical and capital adequacy requirement as well as credit worthiness.
- CERC/SERC may fix ceiling on trading margin, if necessary.

Impending Issues

Private Investment in power trading will be subject to payment security and financial viability of utilities. PTC has introduced a weekly billing system to this effect. Contractual obligations will have to be honoured and grid discipline has to be adhered to. To ensure a successful wholesale power market in India, there has to be capacity additions in both transmission and in generation with redundancies, strengthening of upstream and downstream transmission networks and better management of reactive power to better utilise existing inter-regional transmission capacity.

The present practice to charge transmission charges on the basis of norms given by state or central regulators or the state governments, are excessive resulting in higher landing costs and acting as a disincentive to trading.

Recommendations

The key recommendations addressing the issues discussed in the paper are: -

- *Addressing Open Access*

The current of provision of subsidy surcharge, which hampers open access, should be replaced by a VAT type subsidy tax on all players in the electricity sector. The proceeds would go towards the development of a subsidy pool. Forecasting the requisite quantum of funds needed and the rate determination would be taken up by the CEA with inputs from the planning commission. Differential rates can be used for targeted promotion of certain sectors such as hydro-electricity.

- *Promoting Hydroelectricity*

Hydroelectric power should also be delicensed as this low-cost and renewable resource can be more vigorously exploited by the private sector. The environmental

issues associated with large hydroelectric projects, like resettlement and rehabilitation, can also be better approached through market orientation by application of the Coase theorem and resorting to voluntary bargaining.

- *Developing Public Private Partnership in Transmission*

Promoting and developing a model for Public Private Partnership in transmission on the lines of the Tala transmission project in Bhutan, which is a 51:49 joint venture between PGCIL and Tata Power Company. Promoting private sector participation to build a congestion management system.

- *Fair and Rational Tariff Setting*

In distribution, tariff setting should be done on reliable and verifiable data. For example as in case of Delhi, using Aggregate Technical and Commercial (AT&C) losses (difference between units supplied and units for which payment is realised) rather than T&D losses, as the criterion of commercial efficiency. Indian regulators will also have to show flexibility in deciding retail tariffs. Being ready for the future might involve replacing the current practice of once a month meter reading by time-of-use meters passing some of the intra-day price variation to the consumers.

- *Enabling Trading*

Regulators must streamline the levy of transmission charges, wheeling charges and losses on power to be traded, in order to make trading competitive. Transaction losses should be charged on actuals rather than arbitrarily determined norms.

Conclusion

An analysis of the issues and recommendations regarding the development of a competitive power sector in India as discussed in the paper clearly illustrate that all impediments to private investment as well as the solutions to the same arise out of the two aspects of government control namely the legal and regulatory framework. The legal framework as provided by the Electricity Act 2003 does remove most of the hurdles and must be complemented by the requisite regulatory framework and effective implementation.

The Golden Path to Development



Source: World Bank

For India to move away from a sector risk position and follow the golden path of development, it needs the both private sector investment as well as regulatory and competitive environment. Thus the answer to the question that whether government control and private investments can co-exist is that it is not only a possibility but also a necessity for the development of a competitive electricity market in India.

BIBLIOGRAPHY

Indian Journals & Magazines

- V Ranganathan: 'Electricity Act 2003: Moving to a Competitive Environment', Economic and Political Weekly, May 15, 2004
- T L Sankar: 'Electricity Act 2003: Dark Shadows over a Bright Vision', Economic and Political Weekly, February 21, 2004
- Madhav Godbole: 'Resolving Dabhol Tangle', Economic and Political Weekly, June 5, 2004
- Dhiraj Mathur: 'Power Sector: More Sound than Light', Economic and Political Weekly, August 21, 2004
- V Ranganathan, D N Roa: 'Power Sector Reforms in India', IIMB Management Review, March 2004
- T R Satish Chandran: 'Power Sector Reforms in India: History of Reforms', IIMB Management Review, March 2004
- Ajay Shankar: 'Power Sector Reforms in India: Reform Initiatives', IIMB Management Review, March 2004
- D V Ramana, Allen Eisendrath, P K Kukde, TVSN Prasad, Jagdish Sagar : 'Power Sector Reforms in India: Distribution Reforms', IIMB Management Review, March 2004
- J L Bajaj, R Shidharan: 'Power Sector Reforms in India: Reform Initiatives: Regulatory Issues', IIMB Management Review, March 2004
- T N Thakur, V Ranganathan, D N Rao: 'Power Sector Reforms in India: Electricity Trading and Wholesale Trading', IIMB Management Review, March 2004

International Journals

- L Birnbaum, J Aguila, G Orive, P Lekander: 'Why electricity markets go haywire?', The Mckinsey Quarterly 2002, Number 1
- J Colledge, J Hicks, J Robb, D Wagle: 'Power by the minute', The Mckinsey Quarterly 2002, Number 1

Reports

- Asian Development Bank: 'Developing Best practices for Promoting private Investment in infrastructure: Power', 2000
- Fitch Ratings: 'Back to the Basics: The Indian Power Sector', September, 2003
- IL&FS Investmart: 'Corporate Advisory Services: Reliance Diversified Power Sector Fund', 2004

Others

- Indian Infrastructure: Power Sector Focus, May 2004
- Akshay Grover: 'Electricity Act 2003: Opportunities & Threats', Crisil Young Thought Leader Contest 2003
- Business Standard Online Archives
- www.ficci.com