A Review of Restructured Power Development and Reform Programme in India

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Abstract:

The power sector is one of the most important infrastructural aspects of the Indian economy. But of late, it has been facing some serious problems such as old worn-out and poor distribution network leading to frequent outages, skewed tariff structure, huge Transmission & Distribution (T&D) losses largely due to outright theft & unmetered supply, high LT/HT line ratio, overloaded DT/ Lines, lack of accountability at feeder level and in distribution setup of State Electricity Boards (SEBs). Hence, the Government identified Distribution Reforms as the key area to bring about the efficiency & commercial availability into the power sector. The Government took various initiatives in this direction; one of these is the introduction of Accelerated Power Development Programme (APDP) in February, 2000. The main objective of this programme was to initiate a financial turnaround in the performance of the State owned power sector.

KEYWORDS: Accelerated Power Development and Reform Programme (APDRP), Regulatory Commission, Transmission and Distribution (T&D) losses.

INTRODUCTION

Restructuring of the electricity supply industries is a very complex exercise based on national energy strategies and policies, macroeconomic development and national conditions, and its application varies from country to country. It is important to point out that there is no single solution applicable to all countries and there is a broad range of diverse trends. Liberalization, deregulation (or regulation) and privatization and all processes under the general label of market reform. Liberalization refers to the introduction of a less restrictive regulatory framework for companies within a power sector. This could imply deregulation, which is the modification of existing regulation. It can be argued that reregulation is a more accurate term than deregulation since new laws are being imposed on the industry with regulatory watchdogs appointed to protect consumer interest. Ideally, then, a true liberalized energy market would work within a set regulatory framework, overseen by a regulator and with no external political influence upon the participants regarding plant size or fuel choice. In India, till independence, the entire power sector was under the control of private sector. After the enactment of new Electricity Act in 1948, which modified the1910 Act, barring a few licensees in some urban areas, e.g. The Tata Power CompanyLtd in Mumbai, Calcutta Electric Supply Corporation Limited (CESC) in Calcutta, Bombay Suburban Electric Supply Company(BSES) in Mumbai, Ahmadabad Electricity Company (AECO) in Ahmadabad, etc. the entire power sector is mostly owned by State Governments and is largely managed by vertically integrated electricity business through State Electricity Boards (SEBs). During fifties and sixties, Inter-State power projects were established long with the

transmission infrastructure to avail the power in an economical manner. In 1975, Government of India (GOI) entered in the field of generation and transmission through their Central sector utilities. However, distribution sector continued to remain with SEBs as a monopoly business.

Over the period of operations, the sector developed techno-commercial in efficiencies. Restructuring therefore was felt necessary. Accordingly, the power generation was opened up in 1991 followed by transmission in 1998. Electricity Regulatory Commissions Act was enacted in 1998 for establishing regulatory commissions in various States. Recently the Electricity Act 2003 has been notified by Government of India in June 2003. The objective of this act is to accelerate the power sector reforms.

INITIAL STEPS TOWARDS POWER SECTOR REFORMS:

The Government of India has been taking several initiatives to invite private sector participation in generation and transmission. On account of financial weaknesses of the SEBs (who ultimately owned the erring customers through distribution network), private investors by and large have avoided the power sector. Understanding the difficulties envisaged in the process of reforms, GOI in consultation with the States initiated measures to unblock the difficulties. Some of them are discussed as below.

2.1 Unbundling of SEBs

A number of States have initiated the power sector reform process, emphasizing the unbundling, tariff rationalization and corporatization of generation, transmission and distribution. Conceptually this brings the accountability at each level of operations in the power business. The results are not much encouraging although not adverse. Self- sustainability is not achieved through this structure unless privatization is introduced in stages starting from urban areas.

2.2 Setting up of Regulatory Mechanism

The Central Electricity Regulatory Commission (CERC) along with State Electricity Regulatory Commissions (SERC) have been established in 19 states under the Electricity Regulatory Commissions Act, 1998, to discharge the following functions:

1. Regulation of the tariff of generating companies owned or controlled by the Central Government.

2. Regulation of the tariff for generating companies other than those owned or controlled by the Central Government if such generating companies enter into or otherwise have a composite scheme for generation and sale of electricity in more than one State.

3. Regulating the Inter-State transmission of energy including tariff of the Transmission utilities.

4. Promoting competition, efficiency and economy in the activities of the Electricity industry.

5. Advising the Central Government in the formulation of tariff policy which shall

(i) Provide fairness to consumers

(ii) Facilitate mobilization of adequate resources for the power sector.

6. Association with the environmental regulatory agencies to develop appropriate policies and procedures for environmental regulation of the power sector.

7. Framing of guidelines in matters relating to electricity tariff.
8. Resolving the disputes involving generating companies or transmission utilities.

9. Assisting Central Government on any other matter referred to the Central Commission by that Government.
10. Licensing any person for the construction, maintenance and operation of Inter- State transmission system.

2.3 Private Sector Participation in Transmission

With the opening of transmission sector for private investment, it was hoped that this will provide necessary fillip to the investment. Until recently, the sector has remained a monopoly. A beginning has been made with the signing of agreement between Tata Power and Power grid Corporation of India for constructing transmission networks in joint venture. However, the sector as such will largely remain under monopoly with private sector augmenting the resources.

2.4 Privatization of Distribution

The experience of privatization of distribution sector in the State of Orissa has been far from satisfactory. This is due to the lack of independently verifiable base-line data before privatization. The private utilities in Delhi, however have taken right clues from the experiences with Orissa model and they are trying to become a role model for the distribution sector in India. The key improvements made in Delhi model are in three areas: first one is more sustainable initial valuation of the enterprise that was to be privatized. Secondly, clear government commitment to provide financial support to the distribution companies through subsidized power purchases during a five year transition period, and lastly, better specified multi-year tariff setting regime based on more realistic improved loss targets that can be more accurately measured. Some of the targets achieved in one year of operation of Tata Power/North Delhi Power Limited are very encouraging and are as follows:

Aggregated Transmission and Commercial losses reduced from 54% to 47.6%
Distribution transformer failure rate reduced from 8% to 4% by better maintenance and load planning
SAIFI improved from 41 to 23 and SAIDI improved from 56 to 47 minutes
Billing data of all 0.8 million customers is available on WEB and payment of bills made possible by credit cards.
40000 no's of high bill (100%) and 0.15 million (19%) low bill meters converted to digital from electromechanical

GOVERNMENT INITIATIVES FOR POWER SECTOR RESTRUCTURING

Power sector across the world is undergoing a lot of restructuring; India is no exception to this. In India, the need for restructuring the power sector was felt due to the scarcity of financial resources available with the Central and State Governments.

3.1 Guidelines from Ministry of Power, Government of India

Power is critical infrastructure for the life supporting activities and economic development, aimed at improving quality of life. The increase in installed power capacity since independence is impressive in absolute terms. However, still a large number of villages have no access to electricity. The per capita consumption of electricity in India is among the lowest in the world. Still there are several problems like

power cuts, erratic voltage conditions and changes in supply frequency. All these problems are due to inadequate power generation capacity, inadequate inter-regional transmission links, ageing of sub transmission and distribution networks, large scale unaccounted power supply, etc. Ministry of Power has suggested some remedial actions so as to overcome these problems.

3.1.1 Accelerated Power Development and Reform Programme (APDRP)

APDRP has been undertaken from the year 2000-01 with the twin objectives of financial turn-around in the performance of the power sector especially in electric distribution and improvement in quality of supply. The role of APDRP is to act as a catalyst for bringing about the desired changes through funding arrangements for implementing schemes. The schemes are targeted towards improving financial viability and customer satisfaction. The scheme comprises of 25% grant and 25% of soft loans from the Central Government to the State Government. The remaining 50% resources have to be generated by State Government. The states also have to commit themselves for agreed loss improvement and collection improvement.
APDRP mainly focuses on six aspects i.e. Customer, Feeder, Distribution Circle, SEB, State and the Nation. The objectives of APDRP are:

1. Improving financial viability: This can be achieved by reducing Transmission and Distribution (T&D) losses and improving revenue collections.

2. Reduction of T&D losses to around 10 %: The reported total T&D losses are24 % on an all India average basis. Losses including pilferage and wrong classification are much higher in some pockets of India. Thus, the higher losses are mainly due to commercial losses. The T&D losses are pegged at around10% in better managed power systems In the developed countries. In some States of India where private utilities are in place, the T&D loss is about 11 %, which is close to the world benchmark of 7 to 8 %. This also points out that theloss figure of around 10 to 15 % are achievable in better administered organizations. Privatization has better scope to show efficiency improvement.

3. Improving customer satisfaction: Customer satisfaction can be improved by providing better quality power through reduced voltage fluctuations and improved availability.

4. Transparency through Computerization: Along with 100 % energy metering in the districts, it is necessary to enforce energy accounting and auditing as per Energy Conservation Act 2001. Energy accounting system should be able to take input data automatically at various levels from central meter reading control system. Based on this data, energy accounting system should be able to provide information about the losses and pilferages at various levels.

Most of the States have initiated actions to implement schemes under APDR programme. Tamil Nadu has introduced the concept of reliability index for power supply in six cities and towns - Chennai, Coimbatore, Tiruchi, Madurai, Salem and Tirunelveli. Tata Power monitors reliability indices such as CAIFI, CAIDI, SAIFI, SAIDI, etc. for Mumbai distribution. Andhra Pradesh has started computing powers supply reliability index for 20 towns and has also put in place an effective anti-pilferage legislation. The State has set up call centres in all district headquarters and has planned to set them in the rural areas in near future. In States where feeder and consumer metering have been completed, immediate gains in revenue ranging from 20 to 30 %have been visible. Other States are in the process of implementing such projects.

3.1.2 Rural Electrification

The issue of supplying electricity to rural areas in the context of distribution reforms requires to be specifically examined. This is because supplying electricity to rural areas inevitably costs more than the revenues that are collected from rural consumers and thus requires to be subsidized. The subsidy needs to be reduced in phased manner as the system efficiency and operational performance is improved. Some of the reasons for increased cost of supply are as follows:

1. Large size of distribution systems.

2. Electricity loads in the rural areas are relatively small and widely dispersed resulting in higher technical losses.

3. Rural electricity management by the existing SEBs or distribution companies results into heavy burden of high cost administrative system and high overheads.

4. Extension of transmission lines to un-electrified villages implies high capital expenditure with lesser returns.

5. Irrational tariff structure resulted into misuse of energy.

6. Political patronage for commercial violations.

On account of the problems highlighted above along with the lesser capacity of rural consumers to pay, the need for subsidization in some form may have to be continued for quite some time to come. Thus, for accelerating the pace of rural electrification it should be treated as part of the socio-economic development plan of villages and the investments should be supported from the Government budget. The rural electrification should be managed in a decentralized manner by rural cooperatives or rural entrepreneurs approved by the local communities or through panchayats. In some States, co-operative movement is quite successful. In order to upgrade the existing supply system, Distributed Generation (DG) or Captive Power Plants (CPP) is an attractive option. Central Electricity Authority (CEA) [5] has given some recommendations regarding CPP which include terms and conditions related to Permission and approval.

2. The nature of the usage of the captive power.

3. Grid connectivity and wheeling charges.

4. Pricing for firm and infirm power.

5. Billing strategy between SEBs and CPP.

3.2 Electricity Act 2003

The Electricity Bill 2003, notified in June 2003, aims to enhance the scope of power sector reforms. This act consolidates all the existing laws and introduces provisions with respect to new developments in the sector. It

focuses on creating competition, protecting consumer interests, rationalizing tariff, etc. The main highlights of the act are:

1. Generation has been deli censed and captive generation is being freely encouraged and permitted. For hydro projects, an approval of the State Government and clearance from the CEA are needed to check the safety, environmental, social aspects and optimum utilization of water resources.
2. Provision for private transmission licensees has been made in this act.
3. Open access to transmission as well as distribution of electricity: For exploring the possibility of effective competition for supplying power to bulk consumers, electricity generators and distribution trading licensees are allowed non-discriminatory open access to transmission lines.

FUTURE ROAD MAP

Power sector reforms through techno-commercial intervention together with organizational restructuring all over the country are essentially required for the SEBs/Utilities to achieve financial viability. The reforms should be completed in a time period of four to five years. The reform process has some gestation period before it will start generating surplus funds for investment in distribution. State Governments are under financial crunch and may not find it expedient to provide the kind of resources required to bring about reforms. Hence, the power sector reforms needs to be proactively pushed by the Central Government. Another important requirement is enhancement in generation capacity so as to reduce the huge gap between generation and demand (according to the 16th Electric Power Survey conducted by CEA, the country has energy shortage of 7.8 % and peaking shortage of 13 %.). As per Government's Xth plan (2002-2007), around 41000 MW capacity additions is expected till the end of year 2007 and as per XIth plan (2007-2012), 59000 MW addition is expected till the end of year 2012. Captive power generation is likely to remain a major contributor, which could cater for the increasing demand particularly in semi-urban areas.

4.1 Technical Up gradation

(i) While the efforts are on for improvement in the overall reliability and financial conditions of Indian Distribution system through restructuring, the added dimension and opportunity offered by Distribution Automation (DA)needs to be explored. Automatic Meter Reading (AMR) with digital photography and optical character recognition can have integration with the web for on-line metering and billing. This will improve billing and collection efficiency with a reduced scope for human intervention.

(ii) Presently in India the highest transmission system voltage is 400 kV (500 kV for High Voltage DC Transmission) and it is going to be increased to a level of 765 kV in some sectors. Central Government plans a construction of additional 5400 km of 765 kV line by the year 2011-12. Some private utilities are planning for High Voltage Distribution System (HVDS), which will curtail the conventional low voltage (normally 415 V) network resulting into reduction in technical as well as commercial losses.

(iii) Remote operation of distribution substations using Supervisory Control and Data Acquisition (SCADA) will minimize customer interruption and increase the overall productivity.

4.2 Reduction in T&D Losses

T&D losses comprises of two components, viz. technical losses and commercial losses. In order to reduce technical losses, up gradation of voltage levels is necessary. By upgrading the voltage level, one not only reduces the transmission losses but also creates additional transmission capability. The commercial losses can be reduced by using tamper - proof static meters, which will be able to record the detailed load survey data along with the tamper status. Utilities need to set up flying squads and separate task force to eliminate un-metered/unaccounted power supply. The T&D losses should play an important role in formulating the new

tariff structure of SEBs. The CEA has decided the norm that total technical losses should been the range of 8.5 % to 15.5 %. In the case of Maharashtra State Electricity Board (MSEB), Maharashtra Electricity Regulatory Commission (MERC) [7] estimated the present T&D losses to be as high as 39 %. The gap of nearly 24 % predominantly contributes to commercial losses, which is indicative of the fact that the revenue collection and metering is not effective. Recently in January 2003, MERC has issued an interim order in the matter of levying of T&D loss charges on the basis of differential (circle/zone wise energy accounting data) T&D loss evaluation. Accordingly, the circles/zones with T&D loss lower than the current benchmark of 26.87 % (the benchmark is expected to be reduced progressively to the internationally acceptable level) will be exempted from levy ofT&D loss charge. The circles which have T&D losses above 26.87 % will continue today the existing T&D loss charges. Since the Captive Power Plants (CPP) or Distributed Generation (DG) can improve the T&D losses, evaluation of these losses is important for finding their impact on the tariff .Due to the possibility of open access in near future the uncertainty in market development can be minimized by switching over to market based price (with ceiling), and thus eliminating the process of cross subsidy over a reasonable period of time and reflecting it transparently in the tariff.

CONCLUSION

In this paper we have discussed power sector reforms and restructuring in India. After the initiation of economic reforms in the year 1991, the Government of India also embarked on the reforms in the Power Sector. Unbundling of inefficient State Electricity Boards, establishment of Regulatory Mechanism, encouragement of private sector participation were some of the initial steps taken by the Government in the Reform process. In the year 2000-2001, the Ministry of Power initiated Accelerated Power Development and Reform Programme scheme which has started yielding results in various regions of the country. The projects funded under this scheme are aimed at: improving financial viability of State, reducing T&D losses, improving reliability and bringing transparency. Needless to say, the major task of guiding the power sector through reforms needs appropriate attention and support from utilities, State and Central Governments, regulators as well as consumers.

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