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**THE POLITICAL ECONOMY OF POWER**

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This paper could well have been titled "the economics of power". But if it were only a matter of economics, India's power problem would never have descended to the levels it has reached in 2002. "Political economy" suggests not merely the importance of politics but also of the many other vested interests that have worked to make the situation what it is. In this paper I give a short history of the development of the electricity sector in India, list the main interested parties in the sector, the mindset of the players, the issues, problems as well as the consequences of the actions of past years, and their possible solutions, examine the reforms of the last few years, and explore the possibility of electricity trading and the development of markets in electricity. I conclude that it has taken many years of searching to develop a reasonable direction for the improvement of the power sector in India which has found it impossible till now to strike a proper balance between the commercial viability of the sector and the imperative need that power is made available even to those deficient in resources to pay for it.

## History<sup>1</sup>

Before India's independence, electricity was decentralized. It was generated and supplied locally by private entrepreneurs, enterprising municipalities and provincial governments. The hydroelectric project of the Tata's in Khandala supplied power to Bombay, as did the Mettur dam on the Cauvery River, which supplied power to the Madras Presidency. But the emphasis was on supply to large urban concentrations, and there was little coordination or cooperation between the different suppliers. The first legislation was passed in 1877, which provided "for the protection of person and property, from injury and risks, attendant to the supply and use of electricity for lighting and other purposes." This Act was repealed and replaced by the Indian Electricity Act, 1903. "It was clearly recognized to be a somewhat tentative measure", that would be amended with experience. The new Indian Electricity Act, 1910, "to amend the law relating to the supply and use of electrical energy", left "the granting of all licenses, in the hands of the local government, laying down some rules regarding safety". It was a comprehensive piece of legislation to "regulate the generation, supply and use of electricity and dealt with licensing, regulation and safety", giving considerable authority to the provincial governments.<sup>2</sup> In 1948, the Electricity (Supply) Act, 1948, on the broad lines of the Electricity (Supply) Act, 1926, in force in the United Kingdom, was passed "to facilitate the establishment of regional coordination in the development of electricity transcending the geographical limits of local bodies". It provided "for the rationalization of the production and supply of electricity, and generally for taking measures conducive to the *electrical development of the Provinces of India*".<sup>3</sup> It enabled the creation of state electricity boards for promoting the coordinated development of generation, supply and distribution in the Provinces and in other areas of the country. Subsequent amendments introduced significant additions and changes. The Central Electricity Authority was created to develop a national power policy and coordinate electricity planning over the country. The Industrial Policy

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<sup>1</sup>The Report of the Committee on Power. Government of India, 1980, (also called the V G Rajaydaksha Committee report), gives an excellent history of the development of the power sector in India up to that time.

<sup>2</sup>The Indian Electricity Act, 1910-Introduction

<sup>3</sup>This emphasis on electrical development in the Provinces of India was introduced by an amendment in 1950.

Resolution of 1956 reserved generation and distribution of electricity almost exclusively for the States, letting existing private licensees, however, to continue. This led to the gradual domination of the electricity sector by government enterprises. Initially the state governments were apparently reluctant to create SEBs because they would conflict with existing departments of government. However, by the late 1950's all state governments had established SEBs. Amendments in 1976 enabled generation companies to be set up by central and state governments, resulting in the establishment of NTPC, NHPC, NEEPCO, Mysore (now Karnataka) Power Corporation, and the consulting firm WAPCOS. By an office order in 1964 (inserted into the Act in 1991 by an amendment), Regional Electricity Boards (REB) consisting of part-time members were constituted in 1964 to promote regional coordination and operation of power supply. These REBs had as Members, the Chairmen of the SEBs, while Members of SEBs ran the technical committees. The administrative head of the REB was an officer on deputation from the CEA and was therefore also subservient to it. Joint sector projects between states and also the central government were also made possible, as with DVC (Damodar Valley Corporation), NLC (Neiveli Lignite Corporation), etc.

By amendments in 1991, generation was opened to private investment, including foreign investment. Regional Load Despatch Centres were also established at the same time to operate the power system in a region, ensure regional grid security and to integrate with power systems of other regions and areas. Tariffs in cases of interregional movements and transmission charges, were to be determined by the central government on the advice of the CEA.

Further amendments in 1998 opened transmission to private-investment subject to the approval of the central transmission utility (ctu) with a license to be issued by the CERC. The central transmission utility (which would be a public sector undertaking to be designated by the central government) would operate the regional load dispatch centers and state transmission utilities would operate the state load dispatch centres.

The Electricity Regulatory Commissions Act, 1998, enabled the creation of electricity regulatory commissions at the Centre and the States. The primary functions of the commissions were in the case of the CERC, to regulate the tariffs of cpsu generating companies, tariffs of power generated and supplied inter-state, inter-state tariffs for transmission services, regulation of inter-state transmission as such and issue of licenses to private investors in interstate transmission. The SERCs were to determine tariffs to be charged to customers, the tariffs and functioning of intrastate transmission including the operation of the SLDC.

Since 1998, the structure in place has been that there are SEBs generating and distributing power in the States, cpsu's generating and transmitting power to be sold on a pre-agreed basis to different states with tariffs set by the central government, private generating companies, private transmission companies, private distribution companies (in addition to licensees), central and state transmission utilities, regional and state load despatch centres, Central and State electricity regulatory commissions, and the Central Electricity Authority. However, the SEB has a veto over any new generation in its state and supply by any non-SEB generator to customers within its state. Trading as an activity in electricity is not recognized and access to transmission lines is at the discretion of the central/state transmission utility.

## **The Players**

Electricity is a concurrent subject under the Constitution. There is a view (not so far tested in the Courts), that if there is a central and a state legislation on the same topic, the central legislation will override that of the state. However, the Centre has so far been careful to ensure that it does not tread on state government preferences. The two principal players in the electricity sector are the central and the state governments, who between them, account for the ownership of over 95% of generation, transmission and distribution capacity in the country. Almost all interstate supplies today are of electricity generated by cpsu's, inter-state transmission is a monopoly of the Power Grid Corporation, presently designated as the central transmission utility, and most of the remaining generation is by state controlled SEB's or companies, with distribution in private hands only in Orissa and Delhi (apart from old licensees like TATA, BSES, etc.)

The interests of the center and the states have been increasingly in conflict after the creation of the central generating companies. SEB's have been unable to pay for electricity purchased from the central companies, and for other products and services like rail, coal, etc. The tariffs of the central companies were set in the past (till 2000 when CERC issued its own norms for those tariffs while from 1998 when the CERC was established, the existing tariffs were permitted to be continued) by the central government, and have gone up over the 1990-'s by much more than the rate of inflation on many other services. However, the state boards, because of lack of commercial expertise, lack of accountability for losses that were in any case a charge on the state government, and over the years also because of the guilt of having large unpaid bills, did not strongly resist.

The **State governments, SEBs and their successors**, have politicized power tariffs within the States to such an extent, that power is priced well below costs of service to farmers and domestic consumers in all states. Industry, commercial establishments and railways are overcharged to make up for the losses on these accounts. The drive to supply electricity to all rural locations has led to overloading of LT lines, zero or poor metering, misuse by farmers of free electricity given for energizing one pump set, and poor billing and collections. Thefts in collusion with SEB employees are rampant, especially in urban centres, and by the well off as well as slum dwellers, and by large as well as small industrial units. Overstaffing is rampant, as are the absence of a commercial outlook, of professional management and a sense of accountability among individual employees. Substantial cost reductions are possible if there was improved management. While political parties understand the problems, none is willing to cooperate for their resolution when they are in opposition and not in power.

State governments and SEBs need prosperous customers who pay their bills, like industries, railways, etc., since the extra that they are charged helps to cross-subsidize inefficiencies, thefts and politicized populist tariffs to farmers and households. They would prefer it if such customers could remain with no choice in suppliers. Such choice could be by the customers engaging in captive generation, or buying from someone other than the state entity. States therefore have been very averse to allowing customers to buy direct from other suppliers or to generate their requirements of power. Since states also control the transmission wires within the state, they charge penal tariffs for any use of the transmission lines, and sometimes, even if such lines are not used.

Governments have also looked on the power sector as an important source for **political funding**. Investment expenditures are substantial, there are vast civil works to be undertaken, a good part of the plant and equipment is bought from private parties, many

of whom might be overseas, and all these could be sources for significant amounts of commission earnings. The anticipated loss of this lucrative source of funds if government owned undertakings are privatized, may well be an important reason for the resistance to privatization of electricity at both central and state levels, among all political parties.

The bureaucracy at central and state levels that is responsible for the power sector has a strong vested interest in retaining control. It is a vital sector, and it is very large in terms of turnover and investments. Even if it is not commercially viable, it is a source of giving jobs and favours to people. It is also a source for meeting many apparently legitimate expenditures of Ministers and officers that measly government allowances will not permit.

**The World Bank, ADB** and other multilateral lending agencies, as well as **bilateral** funding agencies, were for long seen as objective bodies giving advice in the best interests of the electricity sector in India. This may well be so. But we must not forget these are lending agencies or agencies of governments whose mandate is to promote business for their countries' suppliers, to protect its lending and make profit. Lenders must have borrowers, and after a loan is given, it must be serviced. It is safer in many instances to lend to a government than to a private party, especially when like India, the government is paranoid about safeguarding its reputation for being a good borrower. In order to ensure debt servicing, such lenders might well promote high front-end tariffs which would enable them to get their money back earlier. It has been said that the World Bank encouraged the creation of NTPC and other cpsu's in generation and transmission because they saw in them, safe credit risks, backed by the government of India, and large prospective borrowing. Similarly, the World Bank was in favour of high returns on equity, protection against foreign exchange fluctuations, sovereign guarantees, etc. At the same time, it was the World Bank that blew the first whistle against the viability of the Dhabhol Project promoted by Enron. It was the World Bank that insisted on the creation of independent regulatory commissions in order to give prospective investors an assurance that tariffs would not be subject to populist influences.

The **central public sector** in generation and transmission was been backward in using its special advantages to speedily set up additional capacities. Instead it has tended, (as NTPC did), to sit on large cash reserves, with poor leveraging of equity to raise debt in relation to that permitted. Power Grid has been very slow to attract private investment into inter state transmission, and it is felt by many that this is primarily due to the desire to maintain its national monopoly position. For these companies, central government ownership and proximity to policy makers is an enormous commercial advantage. Obviously, objective tariff determination by independent regulators, privatization or the opening of the market to competition would make it more difficult for them. It was to be expected that they would resist such changes. They would prefer a tariff policy that allowed them all costs to be passed through to customers, substantial incentive payments for achieving targets surpassed by them many years earlier, accelerated depreciation allowances in order to build up large cash reserves, and operational norms that were fixed at easily surpassable levels to give them extra profits..

The Indian **consumer** of all types regards a government supplier as existing to supply goods and services free or as much close to cost as possible, something that he would not expect from a private provider.

This is especially true of farmers and domestic consumers who have been cultivated by

politicians for their votes and who now resent any attempt to charge them user charges close to cost of service. The result has been financially catastrophic for the **SEBs** and the state governments, customers have suffered erratic supply and quality, and the paying customers have had to pay for the thieving and low-paying customers. There is evidence that at least in some parts of India, many consumers are willing to pay much more for assured supply and quality.

There is considerable anecdotal evidence that a good part of the electricity thefts and non-payments of bills, are by organized and small-scale industry. Obviously they would be against any attempt to make the electricity supplier more efficient and honest. One sign of this is the hands-off approach of Chambers of Commerce to introducing discipline in metering and payments. Perhaps they are reluctant to antagonize some of their own members.

**Regulatory Commissions** are the latest players in this sector. Commercial non-viability was the most urgent problem to be resolved by the SERCs. For this to be dealt with, revenue and expenditure projections and rational tariff determination including subsidies required from government was the most immediate problem. Hence the SERCs have been fixated since their formation, on tariff determination. Tariffs have been determined for a year at a time. This creates regulatory uncertainty among investors and lenders who would prefer multi-year tariffs so that they know what they will earn in future years. The severe lack of data on finances and technical parameters makes determining tariffs for a year at a time unavoidable. But SERCs could have done more to improve commercial attitudes in the sector, impose individual accountability on employees, improve quality, and regulate transmission.

## **THE MINDSET**

There seem to be certain attitudes that are almost axiomatic in the electricity sector.

1. ***Electricity is a fundamental right, and must be supplied irrespective of ability to pay.*** The lives of a large number of very poor and opportunities for their economic advancement, would be greatly improved if electricity were available to them. But this should be a responsibility of government, not of other consumers or of the provider of the service. The mixing of these roles has led to the disastrous state of the sector L Sankar has argued in an unpublished paper that a separate supply company for farmers and the rural poor should be formed in each state, that will access cheap power (from hydroelectric and depreciated thermal generating plants), and be subsidized as necessary directly by governments.<sup>4</sup>
2. ***Government ownership and control is good for society.*** This is a legacy of the heydays of the license-permit raj when profit was not a desirable goal for state owned enterprises. Achievement of social goals was the desired end. Government was believed to be the best owner and provider of services like electricity because it had only the interests of society at heart. This attitude is still to be found among many administrators, politicians, and even those in industry!
3. ***Bureaucratic Control is superior to professional management.*** This is a result of the earlier mentioned attitude. Professional managers are measured on their ability

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<sup>4</sup> T L Sankar: June 3, 2002, unpublished paper ‘‘Rural Electric Supply and Rural Franchise’’. Delivered at a conference on ‘‘Making the Power sector viable’’, organized of Power Government of India, and IPPAI.

to create commercial viability. Bureaucrats however, are expected to try achieve social goals. Achieving social goals and commercial viability are regarded as contradictory goals. One is not expected to limit the other, when in fact, the continuance of the sector itself demands that it has the revenues to meet its expenditures.

4. ***Employment above efficiency and effectiveness.*** This is the attitude that left to substantial overstaffing and indiscipline among staff in banks and other government owned and controlled enterprises including electricity. Jobs were created even when they were not required or could not be afforded by the enterprise. People were not expected to work. Performance was not a criterion for work evaluation. Long service was. Promotions were related to service, not effectiveness and efficiency.
5. ***Electricity is too complicated to study and understand.*** The engineers in the electricity sector treated the politician (as Minister), the administrator in the Ministry, the media and the general public, as ignorant worshippers at a temple. The only access to the God of Electricity was through the priests (who were the engineers). They would dazzle the ignorant with the jargon of engineering. What was absent was the understanding by all parties that electricity was like any other good or service. There was a cost of production and delivery, and a need to operate it at maximum efficiency. If revenues did not meet expenditures, the enterprise would in due course become unviable. The state governments by getting caught in the trap of populism ended up having to also pay for the inefficiencies of the engineers.
6. ***Markets are unfair-government control is better.*** Since there were so many poor households and farmers, it was felt that the market was unlikely to serve them at the low or zero prices that they could afford. Hence government had to own and run the sector because only government was likely to want to support these deprived groups.
7. ***Populism gets votes.*** No politician was willing to test the hypothesis that the electricity sector had to be made commercially viable, and that everyone should pay for the service. They were afraid that in an election they would not get the opportunity to rule again, especially when the Opposition parties promised to continue in the old way. Andhra showed the way out of this dilemma. Even farm-lobby leaders like the Chief Minister of Haryana who in Opposition had encouraged farmers with offers of free electricity are now willing to throw out populism and to develop a more efficient and commercially viable electricity sector. But they face serious opposition.
8. ***Don't take benefits away from large vested interests-thieves,*** farmers, and households. This is a variant on the earlier statement. We have yet to realize that the customer is not merely looking for free goods-he wants it to be available when he wants it and to be of good and consistent quality. Rajasthan has demonstrated the validity of this statement by giving better supplies to farmers who were willing to pay more.
9. ***Quality is of no consequence-supply is.*** The technical staff in the electricity sector fostered this attitude. In the SEBs, engineers disconnected the under-frequency relays that were meant to shut down sectors when load exceeded availability. As a result, frequency that technically, was required to hover around 50hertz, swung between 48 and 50, resulting in untold damage to expensive moving parts. When such damage occurred to turbines in electricity generators, the engineers were not concerned, since replacement would be a capital cost under a tariff regime under which all costs were passed through to the customer. It would be added to the cost base for tariff purposes, and recovered from the customer. They did not invest in

capacitors, though they would have soon paid for themselves because of the improvement in the supply of active power and the consumer would have benefited with better and more stable voltage. The engineers running the generating stations at the central level kept pushing power into the Grid, even when it was not required, thus pushing frequency well above that desired, because they were paid incentives for generating more power in relation to capacity, not for maintaining grid stability.

10. *Don't punish criminals.* A myth was created that the losses of the SEBs were primarily on account of growing supplies to agriculture, and since it was unmet and led to better crops, it was an acceptable social cost. Such thefts as there were, were attributed to large clusters of slum dwellers. Farmers and slum dwellers were large voting blocks and their thefts or non-payments were to be condoned. In fact of course, it was the collusion of SEB employees at all levels that was resulting in such large amounts of electricity being unpaid for. The thefts that were taking place were real, by the well to do and organized industry, with some by the poor as well. Agricultural consumption was to a great extent being used to mask large-scale urban theft.

## **Consequences and Solutions**

### **Lack of professional management**

A recent publication <sup>5</sup> based primarily on observations of electricity operations in Haryana, Andhra Pradesh and Orissa makes the point that the reform process now generally accepted for state electricity boards, of unbundling, corporatization, privatization and independent regulation. Ignores a fundamental weakness in the electricity sector, particularly in the States. The SEBs have not been run with a view to maximize efficiency and effectiveness, like a corporate enterprise would normally be. They have been given commercially based accounting rules in 1985 but are not companies under the law. Governments contend that the "most serious problem facing the power sector is the lack of investment funds." But in fact, substantial improvements, for example, in reducing technical losses, prioritizing transmission over generation investments, were possible within the financial conditions. The World Bank identified "political interference" but the SEBs did not enforce normal remedies to collect bills, nor bold measures to eliminate non-technical losses. The basic problem is that SEBs are run on executive instructions from governments, eliminating autonomy, accountability and innovation by SEB employees. The SEBs suffer from cost inefficiencies. Irrational management has to change, for which people have to be changed, as has the decision-making process.

The SEB's are characterized by the absence of internal discretionary power and an integrated information system. There is a predominance of paper work instead of a focus on cost. Budgets are paper budgets, with no managerial freedom to make decisions. Officers spend most of their time on clearing formal requests. Every decision is taken collegially, many times with head office involvement. Information is not integrated and reports cannot be used as centralized managerial tools. Reporting on collections and losses is ex post, precluding any monitoring. Accounts are incomplete and inconsistent. There is no formal discretionary power. Preventive maintenance is negligible. Most time is spent in solving breakdowns. Instead of decisions, procedures

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<sup>5</sup> Joel Ruet: "Winner and Losers of the SEB reforms: an organization analysis: No1/2001 of the French Research Institutes in India

are followed and paperwork is completed. Revenue recovery is secondary. The notion of cost is absent. Public accountancy and not commercial accountancy is usually followed at all levels. What is required is "enterprization", moving from administration to enterprise in decision-making. This must precede any change in ownership. In all the debate on electricity reforms, the basic issue of managerial styles has been ignored. Unless people, systems and procedures are changed, no other reform will be effective. This is an important lesson for electricity regulators who find themselves foxed by the apparent nonchalance with which SEB officials accept partial and wrong information, frequently change information and their demands, cannot impose discipline on their employees, and apply misplaced priorities to all aspects of the system. Regulators might be well advised to devote attention to organizational issues of SEBs if they expect their orders to be implemented by SEBs or their successor bodies.

SEBs are almost entirely staffed by engineers while the top job is almost invariably with a bureaucrat-administrator assigned to the SEB for a few years before he moves to some other assignment in government. There are very few (if any) qualified chartered accountants, management accountants, lawyers, management graduates, personnel specialists, etc. There is there no inter-disciplinary working of the kind that is normal in any commercial enterprise. The administrator at the top brings an administrative culture of following procedures, not getting the results.

The accounts of SEBs are inaccurate, that is, when they are published. Figures of transmission and distribution losses are fictitious. Much of this has come to be known when Regulatory Commissions began to scrutinize revenue and expenditure data for purposes of tariff determination.

Cross-subsidies have imposed such a burden on paying customers like honest industries and the Railways that they are moving away from SEBs to other arrangements for buying power.

### **Technical Losses**

Losses in T & D are both on account of inadequate metering, poor billing practices, inadequate effort behind collection and theft-all labeled as non-technical losses, and **technical losses** due to poor equipment, bad maintenance, unwillingness to use available technology, and sheer poor management. Technical losses can be reduced by the actions of those in charge of the operations. Suggestions have been made that could immediately reduce technical losses:

- Distribution transformers to be brought in proximity to consuming areas;
- Cabling losses for which the blame is on the system, not the consumer;
- Fuse panels without fuses;
- no attempt at improvement in the accessibility and maintenance of the electricity pillar boxes-though the example of the new private telecom cables and pillar boxes is there to be seen;
- documentation of matters such as which consumer is connected to which distribution transformer-these are only in the memory of the linesman;
- Meters installed beyond reach;
- Terminal covers that are uncovered, missing, not sealed;

- Frequent ad hoc billing, not on actuals;
- Route reading sheets are prepared with routing in a haphazard manner, making it time-consuming and inconvenient for the meter reader or bill collector, who can quite easily miss addresses;
- Billing errors;
- Preparing a master data base with consumer profile, meter details, consumption pattern, payment details, route sequencing, etc;
- Application of mind to question validity of consumers with very low unit consumption.<sup>6</sup>

Use of **technology**, both as equipment and as processes could help bring down losses. For example:

- Carry out loss diagnostic studies, by modeling the whole network from the HT feeder level down to the level of consumers;

The results will give the information for

1. removing overloads by reconfiguration-re-sizing and re-conductoring the network where required;
  2. placing power factor correction capacitors and sizing them;
- Energy accounting and reconciliation of energy data could determine the mismatch between energy supplied into the feeder and the aggregate of energy actually billed to consumers.
  - Substations must have real time metering all consumers up to 11 kv;
  - Feeders should be linked to consumers so that technical and nontechnical losses can be easily identified;
  - Efficiency targets must be set at substation levels.
  - SEB's must go gradually into I.T. investments, and only after adequate studies, laying down of targets, getting responsibilities right in a revamped organizational structure, etc
  - Enhance the benefits of existing SCADA systems by computing locally the data for higher level monitoring and make it available through fast communication to higher management.<sup>7</sup>

The following figures give an idea of the gap between cost of the power available at the generation point and the actual power sold for some selected SEB's:

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<sup>6</sup> Paper by Dr. L R Rajagopal, Sanda, at a Ministry of Power/PPAI Conference At Delhi on June 5 & 6 2002 quoted in an unpublished by SL Rao

<sup>7</sup> Paper by kumud Goel, M.D., K L G Systel, in an unpublished report prepared by S L Rao on Ministry of Power/PPAI conference on ‘‘Making the Power Sector Viable’’, June 5 & 6, 2002 and private correspondence.

	Cost at generation	Cost at sale	Gap between costs At generation and sale
A.P.	1.81	2.64	45.86%
Delhi	2.08	4.05	94.71%
Gujarat	2.06	2.74	33.01%
Karnataka	1.68	2.40	42.86%
Maharashtra	1.84	2.24	21.74%
U.P.	1.93	2.91	50.78% <sup>8</sup>

This illustrative list for 2001<sup>8</sup> shows how much electricity is generated against how is actually paid for. The extent of technical and non-technical losses is considerable and must be reduced if the power sector is to be viable, attract investment and make power available to all.

### Non-technical Losses

This is a topic that has been discussed extensively. The figures are unreliable, being based on estimates. Metering is partial and what there is, not reliable. What is known for certain is the amount of electricity generated and received from purchases, as is the amount of power actually received. Receivables may not reflect amounts actually due. The difference between power generated and bought minus amounts received would seem to reflect losses. Technical losses are higher than they should be. They could be reduced with better management and some investment. Non-technical losses are on account of faulty metering, inadequate and improper billing, as also collection. In all these there is a significant amount of collusion of electricity employees with customers. In addition there is outright theft, where there is no record of any supplies being made. These can be eliminated only by stringent measures as with any other theft. States like Andhra, Haryana, Rajasthan, among others, have made efforts to do so, some like Rajasthan, with outstanding success, and others with less. New legislation putting severe penalties on those caught strong law and order support to raiding inspectors, compounding of offences, and a drive to meter all supplies, are the measures under implementation. Eliminating these losses may not transform the picture, but will significantly improve collections. It has been estimated<sup>9</sup> that: "Allowing for some improvement in operational, T and D and manpower planning efficiencies...would reduce the unit cost of supply of all SEBs substantially, by 60.77 paise per unit sold, to Rs1.67/unit from Rs2.28/ unit in 1997-98."

### Base and peak loads

The poor state of the power economy is accompanied by other inefficiencies. Power demand is not consistent at all times during the day and night or over the year. It varies a great deal. However there is a minimum base load demand for which electricity has to be generated continuously. Plants that can do this have some flexibility to increase and reduce generation, but not to any great extent. There are others that can be switched on and off to meet peaks and troughs in demand. When there is a shortage of generation capacity, in India it is usually because investors are unwilling to invest in a sector in which

<sup>8</sup> Power Line 2001

<sup>9</sup> Plight of Power Sector in India-ii by Kannan and Pillai-EPW January 20 2001

payments are not received in time for power sold. This leads to all generation plants becoming base load plants, when some should have been kept to meet only peak load demand for which high tariffs would be acceptable, when they would not be, for base load or continuous supply.

### **Reducing generation costs**

There are ways to lower costs of power at the generation stage. Some measures have been identified: for example, NTPC does its own EPC work by having project management teams, breaking the project into an optimized number of packages, thus also ensuring competition between the different teams and negotiating for the best borrowing terms. Another way is by extending existing generating stations to take advantage of existing infrastructures, renovating and modernizing old stations, and improving operational efficiencies, thus generating more power from existing plants. Efficiency improvements are possible by larger plants, using supercritical boilers and keeping thermal plants for base load supply so that they operate continuously.

### **Coal**

The government ownership of cpsu's in generation and of coal mines has meant that poor quality coal, substantial under weight supplies, and rising tariffs (compound annual increase of about 8% in 1990's) have been possible, without any pressure to improve coal costs and quality. Fuel is the major cost and coal has been rising in cost every year. It is now possible for generators to import their requirements of gas and possibly coal, as well as exploring having their own overseas gas fields and captive domestic coalmines. What would be helpful is if there was an independent Coal Regulator. The introduction of some degree of competition in domestic coal supply with private entries would also be useful in improving efficiencies and reducing coal costs.

### **Gas**

Gas accounts for almost 25% of commercial energy consumption in the world against about 8% in India. But it has been growing by about 5 to 6 % every year in the last decade, except for a slowing down since 1999. Private production has been growing at a faster rate than by the public sector. In India the use has been almost entirely for power generation, as feedstock for fertilizer production and in some industries, but residential and transportation usage has been negligible. There is at present only the HBJ pipeline going North from the West coast. Domestic production is likely to be static in coming years while imports will grow. Imports will be as LNG and as piped gas from neighbouring countries. The present projects are almost entirely on the West Coast and involve LNG imported by sea, handled at specially built terminals and regasified. However there appear to be good prospects of piped gas from Bangla Desh going all the way to Delhi. Gas is at the early stages of development as an important fuel and feedstock for India. Many issues remain to be decided in advance so that the country can derive maximum benefit, at the same time keeping considerations of economy and security in mind. There are as yet no clear legal provisions to regulate the import of LNG. The present formula for gas pricing does not take account of domestic and international market forces. It does not provide for open access to pipelines. GAIL has an effective monopoly on gas pipelines, and also the marketing rights for the gas that it transports. Jurisdictional issues between the Centre and the States have to be resolved. A Gas Regulator must be in place to look in a coordinated way at the regulation at both

levels and must regulate transmission, distribution, trading, import, storage, safety and prices for transportation as well as for the gas itself. The question of a uniform rate of indirect taxation over the country as a whole also has to be resolved. Pricing must ideally be left to market forces, or to the Regulator. The uncertainty regarding the ability of government owned power generators to pay bills, is likely to lead to 'take or pay' clauses for some time to come. These are burdensome to end consumers. Such commitments must be at best limited and reviewed every five years or so. The creation of spot, future and contract markets that are independently regulated and with open access to pipelines might do away with such long-term off-take commitments. Gas for power generation may not offer price economies, but environmental considerations, availability of economic and low capacity packaged plants, as well as the ability to erect them quickly, will drive its use.

There is perhaps scope for **nuclear power** in a bigger way than in our present power economy. However, the excessive secrecy that surrounds nuclear power plants makes any cost comparisons impossible. Countries like France have almost 70% of electricity supplies as nuclear power, at low tariffs and acceptable levels of safety. In India, the facts of experience so far are unavailable. Costs are concealed perhaps since the plants are used for other purposes as well.

**Fuel coordination** is absent in India, with the scattering of responsibility between different Ministries in government. A coordinated policy is absent. Independent regulation of all fuels and energy might be the answer, but it is unlikely that different Ministries will give up their individual authorities.

### **IPP's, private and foreign investment, and Return on Investment**

There is yet another consequence of the poor state of our power economy. That is the wooing of private and foreign investment at any cost.

During the 1990's, central and state governments wooed foreign and domestic investors to invest in new power generation. In this period, the central government owned generating stations, which were the major investors in new power generation in the 1980's, could not achieve their targets. To some extent this was because many new projects identified by them (primarily NTPC) were passed on to private promoters. Few of these have fructified, almost entirely because of doubts about SEB ability to pay for the power supplied and the consequent need for guarantees and escrows. Overall generation capacity added in the 1990's was slightly behind that in the 1980's. There was no lack of resources. As pointed out earlier, NTPC for example had substantial cash resources, and had also done little leveraging of its equity. Private investors could also have raised the resources.

Government owned new generation capacities is added at lower costs per megawatt of power added, than the little that has been added by private promoters. The major reason is that project execution in government owned projects is undertaken by the promoter utilities. This requires the employment and training of a large number of trained engineers to supervise the projects. The result (though sometimes has been delay and cost over runs), in overall terms the comparative costs per megawatt were at lower levels. Their fixed charges per unit of power generated were consequently, also lower. This was also because of the substantially higher rupee content in their overall costs. As a result, tariffs did not rise by as much as in foreign promoted projects, despite a depreciating rupee.

Indonesia, Pakistan and the Philippines are examples of developing countries that have had public unrest because of the rising cost of power generated by private producers. These countries expected foreign promoters to bring in their own money. With their expertise they were expected to produce power at relatively low costs, and make the electricity available quickly. India has well-developed financial markets and a fairly high level of saving. Hence foreign promoters also raised funds (as with Dhabhol) within the country, primarily as debt. The funds brought in from external sources also have a high debt component. Lenders require maximum reassurance that their principals and interest would be repaid when due. They cannot be blamed for this. Indian lenders also look for such high levels of reassurance. The recourse is to power purchase agreements, which guarantee a level of purchase, and payment of the full fixed charges even if the guaranteed quantity is not purchased. This is expected even by central government owned generating companies in India. This practice is in contrast to most other private investments. For example, a car factory has no guaranteed off take. It finds for itself in the market. But in India as in most developing countries, there is no power market and no trading as such in power. The customer is usually financially weak.

Because the promoter and his financiers want to minimize risk even further, they ask for government guarantees or escrows. In either case the financial risks are transferred to the guarantor, which is a government. This potential liability due to the risk exposure reduces the government's ability to raise funds for its other activities. Programmes for improving health, nutrition and education lose funding support.

IPPs invariably look for power purchase agreements that extend over the life of the project, usually 25 to 30 years. During this period, the utilities—backed by their governments—have to purchase the guaranteed off take or pay the full fixed charges, at tariffs that may be rising in local currency because of its depreciating value. The agreements are difficult to change. There is also the fear that any attempt to change them will put off other investors, and not merely in power. Private investments in generation have been accused in many countries of having bribed their way to agreeable terms and conditions. In democracies with a free press, the truth comes out wholly or partially, after the agreement is signed. This happens when the tariff for the power generated by the private producer is expensive and leads to public agitation. The private producer is left with little option but to restructure debt, reduce his earnings, and improve efficiencies. As far as India is concerned, it is now recognized that it was a bad mistake to invite private, and particularly foreign, investment in generation, when the distribution setup was inefficient and unprofitable.

It was a mistake to invite them to establish large capacities in one station. This increases the liability on the buyers since large quantities of power are generated and have to be paid for. With smaller plants the liability would be less. Thus there was almost no risk for the investor. The guaranteed returns on equity that were built into the tariffs, were excessive, and could have been much lower. For something that would be sold only in local currency, it was a mistake to guarantee against exchange rate fluctuations. It was a mistake to get private producers into the market without first changing the law to allow trading and open access to transmission. With trading, the producer could have been left to charge what the market was willing and able to pay, as in any other industry. If foreign currency was to be invested, a developing country should not guarantee against exchange rate fluctuations. For this to be possible, the project must be initiated on the basis of competitive bids, which would place a ceiling on the tariff.

After the experience of ten years of inviting private investment in generation Government guarantees and escrows seem to be now out of the picture. But not high guaranteed returns, protection against foreign exchange risks, high levels of guaranteed off take failing which full fixed charges have to be paid, closed markets, lack of free access to transmission, and most importantly, a financially unviable distribution system. So long as the distribution systems are not financially viable, private and particularly foreign promoters will demand many measures to mitigate risks. Domestic resources, and especially from the public sector are the only way to reduce prospective government liability.

### **Have contracts become unenforceable in India?**

The renegotiation of agreements giving high guaranteed returns raises the question as to the enforceability, the sanctity, of contracts. The fact is that Indian Courts and regulatory bodies have been careful about reopening of agreements during their lifetime, but have not given up their right and responsibility to examine them if there is suspicion about their legitimacy. (The APERC for example has done so and found that many contracts signed earlier were not in the interests of the society). The Dabhol debacle resulted from an unviable situation. Many of the investors who sought 'fast track' projects in power, were basically financiers. They raised money at the best possible rates, had no special technical expertise to offer and used turnkey engineering contractors to build and operate their plants. They expected exceptional returns guaranteed by the Government of India. In some of the 'contract violations', there were problems of other influences. In others, the investor did poor homework and suffered as a result. Investor greed many times resulted in a rush to enter into agreements that were essentially unviable for both sides.

For contracts to work, we must have transparency, an opportunity for everyone to be heard, clarity in the terms, good homework by both sides so that information of acceptable quality about markets, consumers and businesses is available, the buyer is seen to be financially viable and able to pay for his purchases, returns are related to real and not imaginary risks, and there are no guarantees.

We must have an agreement on 'stranded' costs. By this is meant that if for any reason the investor is asked to close down, there is prior agreed compensation. An independent regulatory commission rather than 'deals' by Ministers and their bureaucrats would be a transparent way of ensuring that all the facts and worries are considered in the open. Establishment of markets with rules for their operation and a regulator to see that they are followed will give acceptable results both for investors and consumers. Competition and markets do not have to wait for shortages in supplies to be overcome. Trading is a lubricant even in shortage situations and the regulator and governments can be expected to look after the interests of the weak and the vulnerable.

### **Subsidies**

A study by the International Energy Agency of the OECD in 1999 <sup>10</sup> on the under pricing of electricity in China, India, Indonesia, Iran, Kazakhasthan, Russia, South Africa, and Venezuela, found that reducing price subsidies in India would

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<sup>10</sup> World Energy Outlook: Looking at Energy Subsidies-Getting the price Right. IEA 199 Insights

- Reduce primary energy consumption by 13 %
- Increase GDP through higher economic efficiency by 1%
- Lower CO<sub>2</sub> emissions by 16%
- Produce domestic environmental benefits including lower local air pollution

Subsidies encourage demand growth. They distort relative prices and send signals to the user to switch to the lower priced input. For example in many parts of India, farmers have changed cropping patterns to water intensive crops because of free or cheap electricity that enables using electricity to energize pump sets to pull up ground water. Thieving industries that use stolen electricity may not be viable if they had to pay for the electricity. Thus subsidies and thefts create demand, which may not be sustained if they were reduced or eliminated.

### **Financial impact**

The financial deficits in the state electricity sector have been mounting over the years. They account already for over half the combined revenue deficits of state governments. Electricity is choking the ability of state governments to spend on activities like roads, health, education, nutrition, etc.

By April 30,2001, the dues from SEBs to cpsu have amounted to Rs41473 crores. Of this, Rs25727 was as principal and Rs 15746 was as interest. The payables amounted to 205 days and the receivables of SEB's were 233 days. Clearly, the financial management of SEB's is unsatisfactory. The central government and some state governments are now aiming to securitize these outstanding payments, subject to certain conditions being met.

Part of the reason for the rising level of non-payments has been the rapid escalation in tariffs for bought out power, almost entirely supplied by the cpsu's, whose tariffs were until 2000, determined by the central government, without consultation with state governments. Between 1992 and 1998, the central government raised the return on equity for such electricity cpsu's from 10 to 12 to 16%, changed depreciation rates to enable over 90% of capital costs to be written down in the first twelve years (against a normal ranging from over 20 years), kept low targets for incentive earnings, maintained operational norms at levels fixed in 1992 though they were reviewed and were to have been tightened in 1996, all of which led to sharp rises in the price of power purchased by SEBs.

### **Demand Forecasts**

Forecasts by the CEA have invariably exaggerated demand. They have been based on projections of current demand with the addition of new projects expected to come into operation. No reviews were made till the next forecast five years later. Nor was there an attempt to estimate demand elasticities and the likely effect of more remunerative tariffs to suppliers and the control of theft and subsidies.

Nor was there an attempt to reevaluate demand on the basis of possible improvements in user industries in their more efficient use of energy and consequent reduction in the required power. This has happened in many countries especially the USA, where

electricity usage per unit of output has dropped in many industries.

The orders issued by the CERC on availability based tariffs and reactive charges, will when implemented, enable a better balancing of demand with supply without sacrificing quality, and also in improving voltage.

### **Quality**

A consumer survey was conducted in 1997 to rate the power sector on various parameters. Some findings were: 53% claimed that they had to pay electricity staff for supposedly free services. Grievance redressal was said to be poor or worse by 68%. General staff attitudes were poor or worse said 76%. Similarly 55% said repair fault services were poor or worse. 42% of respondents said they had to make between 6 to 10 calls in order just to register their complaints. 57% knew that there were power thefts in their areas, meaning that the electricity staff must also have known of them. While 35% complained of excess billing, 76% complained of inconvenience in actually paying bills.

The overall situation has not improved since then. If consumers could see improvement, they might perhaps be more willing to accept tariff increases compared to the below-cost tariffs charged at present.

### **Trading and Markets**

While the demand-supply situation is one of overall shortage, electricity availability in India is not one of continuous shortages. There are parts of India like the East and the North East that have surplus power in the monsoon months. Delhi has wide fluctuations in its requirement between summer and winter. Demand during daylight hours and night fluctuates greatly. A good part of our shortages are due to our inability to optimize the supplies at different times in the day and the year in relation to demand. If we were able to buy, sell and transmit power freely and easily, and if there was a network of brokers, agents and power exchanges, this might be possible. It would also demand a transmission network that is interconnected and with enough capacity to transport power from one place to another as needed. None of this is possible today. Further, the present law does not permit power to be bought or sold except by or to a SEB and certain designated government undertakings. Access to transmission lines is not a matter of right subject to grid security. The law does not recognize trading in power. .

What we do have is the Power Trading Corporation of India, a Government of India undertaking, registered as a generating company that arranges the sale and purchase of large blocks of power between SEBs, and also from the cpsu's. The PTC can secure payment for the power that it arranges to exchange in this way because it has the support of the central government. Amounts due to a state government from the Centre can be set off against such dues. PTC functions as an agent between two States. It does not engage in small trades, or in forward or futures contracts. It is a step forward, but not anywhere near the potential that exists for trading even in the transmission constraints of today. Ultimately we could conceivably have a Power Exchange like a Stock Exchange that could deal in power in the same manner as the stock market. For such an exchange to operate we must ensure that the Grid is protected at all times from imbalanced loads or dispatches. For this we need independent and efficient market regulators and real time information of all power that is to move on the wires, and the transactions between the parties.

The swindle through electricity trading in California led by Enron in 2001 was a result of rogue companies and insufficient regulation of trading. We must therefore subject the market and trading activity to tight regulation, with strict rules in place that will not allow arbitrage or take advantage of regulatory lacuna.

What trading does require is the freedom to buy and sell and to pick suppliers and customers, at least at the level of bulk purchases. This is not presently possible because the legislation today does not permit free purchases or sales without SEB permission, does not allow open access to transmission, does not permit the setting up of generation plants for purposes of trading, and does not allow captive generators to contract for sale of their expected surplus electricity. In any case our transmission capacity needs considerable expansion before we have a well-integrated national market. P””aid staff for repairs.

### **Independent Regulation of Electricity**

Independent Regulators are a phenomenon of recent origin in India. Earlier regulatory bodies were either under a Ministry or were with no powers of enforcement. The Reserve Bank of India and SEBI are both under the Finance Ministry. The Press Commission, the Human Rights Commission or the National Commission for Women, have no powers to enforce their orders, Even after becoming primarily a recommendatory body, TRAI is independent of the Ministry of Telecommunications. So are the CERC and the SERCs. Though the independent regulatory bodies are of relatively recent origin, would they have been more effective in the peculiar Indian conditions, if like the financial regulatory bodies, they were also under the ultimate control of the Ministry concerned? This would make for a common approach to government policy, and no need for 'policy directives' and arguments as to what is and is not policy. It would make it possible for a private consultative process with government to take place. Giving the regulatory body a high status would ensure that such consultations take place at the highest levels of government. Insisting on transparency, an open consultative process with all interested parties, and detailed reasons for all decisions, would deal with the objection that the present system of governmental discretionary decision-making is excessively opaque. Ensuring that the selection process is transparent would help ensure that the best available candidates are selected, on merit. Being under the control of the Ministry would deal with the objection that the 'independent' regulatory bodies are not accountable on the floor of the legislatures. An important reason for creating an independent regulatory framework was to raise the confidence of private and foreign investors who were concerned about the slow pace of government decision-making, its opacity and possible bias towards its own enterprises.

If regulators function as part of the Ministry they cannot remain distant and will be interfered with. (The Central Electricity Authority is a statutory body and was against the Dhabhol project but cleared it under pressure from government). Differences will not be public, and the best public interest will not be served

There is a developing view, especially among electricity regulators, that the present system of independent regulators is not making the significant difference that was expected from it. The laws creating these bodies gave them partial mandates and limited powers of enforcement. The electricity commissions are to promote competition but their functions are largely related to tariff regulation and determination. The selection of Members has been heavily biased towards retiring government servants, many times from

the sector they are to regulate, perpetuating the mind-sets and attitudes developed over a working lifetime. New initiatives are not to be expected, and the law in any case, gives them very little scope to take them. The entities they are regulating are mostly government owned and controlled.

The effectiveness of independent regulation of electricity as an improvement on the administrative form of governance has been hampered in India because of government, ownership. This works in two ways. The government owned enterprises resent and resist the transparent and consultative process by which decisions many times go to their detriment, especially on past decisions taken in their favour by their owners, the concerned governments. Governments-many administrative officials and Ministers also resent Regulatory Commission orders that cause political turmoil or go against what they would like to have done. These resentments have led to a considerable amount of non-compliance by state undertakings and governments of orders of Regulatory Commissions. These have included

- the suspension (quite unlawfully) by the Karnataka government of a tariff order of the KERC;
- the creation of the ERC by the Tamil Nadu government, but kept in a coma by the non-appointment of the Chairman and passing on of tariff determination powers to it;
- the appeals to the Courts against almost every decision of the CERC by the NTPC and Power Grid Corporation, which under government rules could not have been filed without the explicit (or implicit) approval of the owner, namely the central government.

There are many other examples of defiance, challenge and noncompliance of Regulatory Commission orders, without the owner government asking the undertaking owned by it, to comply

This has held up many important reforms that tariff orders would have brought into being. For example, the Electricity Grid Code was ordered by the CERC in the year 2000 and has not been implemented till June 2002. It would have streamlined grid discipline. The availability based tariff (ABT) order of the CERC of 2000 was intended to balance load with despatch, improve the frequency which had reached quite unacceptable ranges of variation, and use commercial methods to bring about Grid discipline. Penal charges for not providing for reactive power would have quickly brought about an improvement in voltage. Frequent grid collapses could have been averted by the ABT and the implementation of the Grid Code. Private investment in inter state transmission has been held up though the law was amended in 1998 to enable it because the Power Grid would not comply with the more transparent rules ordered by the CERC. Every one of these important orders arrived at after research, widespread consultations, open hearings and framed in fully reasoned orders is awaiting judicial decision because of the unwillingness of the state undertakings, tacitly supported by government officials, to comply with them.

In electricity, major new investments in generation and transmission are expected by government to come from public enterprises. At the state level, electricity regulators have publicized the poor quality of data from the SEBs, non-compliance, many times with government support, and governments' inability to reimburse subsidies as committed. The CERC has examined and modified the numerous additional benefits given to central power undertakings by government notifications between 1992 and

1996 at the cost of the SEBs, highlighted the constraints to private transmission investments, announced a Grid Code, introduced commercial mechanisms to improve frequency and voltage. If Regulators were part of the government, it is doubtful if the facts would have been known and dealt with.

How can infrastructure and particularly electricity regulation, become stronger despite our administrative and political apparatus, with speedy, reasoned, transparent and consultative decision-making? Verbal assurances notwithstanding, politicians and administrators are mostly reluctant to expand mandates to make them more complete, giving the Regulators a role in reforms. This would reduce the powers of government, despite ownership being largely with government. Public enterprise management would prefer a cozy relationship with government so that there is no pressure of the independent regulator to keep improving performance. Independent regulation seems to be the only means to break this relationship, but it has been created with weak foundations. Legislatures, Parliament and public opinion alone can correct this.

### **Policy Directives by governments**

Under the law, a government can give policy directives to the regulatory commission in their jurisdiction. Some states have done so. The central government is required by law to announce a tariff policy. It is about to issue (by August 2002) a tariff policy. What could be the contents of a tariff policy directive from government that does not reduce the regulatory commission to the status of a mere calculating machine? It should not take away discretion from ERCs on rates of return, risk evaluation, rates of depreciation, incentives, and such other elements of tariff regulation. It could however direct that subsidies to a particular class of consumers would continue for a given period at specified levels; propose a development charge for new investments; encourage hydro investments through special preferential treatment; ask for multi-year tariffs; offer grants for studies and then for establishing a good MIS at state levels; put all electricity generated in India irrespective of source (eg nuclear), under regulatory authority; put all fuel prices, but at least domestic coal prices, under the ERC authority. The new Bill to replace the existing electricity laws proposes to impose a cess on wheeling charges for open access. This is undesirable. Instead, the market should be opened to freely enable bulk customers to buy from any source, and with no hindrance except that of grid security. Electricity is a vast industry and not all players can be treated in the MM like manner. Policy should not try to do so.

### **The Electricity Bill, 2002**

This Bill is to replace the three existing central Acts. It is not binding on the state governments, who can pass their own legislation since electricity is a concurrent subject under the Constitution. How far does it go to correct the ills of the present power system?

The emphasis on private investment in generation over the 1990's was misplaced. SEB revenues were falling behind expenditures. So private investors sought sovereign guarantees, and escrows, making the central government liable for state debts, or mortgaging future SEB cash flows to meet present liabilities. Generation and inter-state transmission are cost-plus activities, with a guaranteed return of 16% on equity. Savings on costs due to improved plant load factors or lower operating costs were not passed on to the SEB buyers. Central electricity public sector undertakings have been very profitable. SEB's make huge losses that are rising, at least partly due to escalating

costs of power bought from the cpsu's. Losses in intra-state transmission and distribution are because of technical weaknesses, unbridled thefts by industries and households, subsidies and cross-subsidies to farmers and household consumers. There is little commercial orientation, poor accounting and bad information. State governments make up a part of the losses by charging increasing tariffs to good paying customers, namely, industries, commercial establishments, railways and non-thieving prosperous households. This is making India uncompetitive in an open economy. One result has also been the rise of captive generation estimated (for bulk use) at around 28000 mw in 2001, not counting that generated by small units and households. Quality as frequency and voltage is poor and highly variable across the country. Over half of end consumption is either badly metered or not at all. Billing and collections are unsatisfactory. The Bill deals with some of these aspects. But it does not impose penalties for non-performance. Sadly, the political consensus seems to be that political parties should not stand behind the rationalizing of subsidized tariffs and stopping of thefts.

The Bill has many commendable features. It recognizes electricity trading, encourages captive generation, allows open access to transmission lines, and leaves it to independent regulators to determine tariffs subject to guidelines laid down by the CERC. The CERC and SHKC s must lay down principles for tariff determination including the permissible return at different stages. When tariffs are market determined, this can stop. In the present cost-plus situation any savings must belong to the buyer, unless retention is allowed for a limited period as reward for efficiency.

The Bill perseveres with cross-subsidization, with the Regulators having to levy a surcharge on wheeling electricity to partly pay for the subsidy. This is objectionable and against the principle of open access. Instead, governments could issue policy directives to Regulators asking for a designated proportion of the subsidies being added as a surcharge on tariffs, for a limited period, say three years, within which governments will bring subsidies down to levels that their Budgets can bear. The Bill makes no reference to non-payments and delays in payments by SEB's and other distributors for bulk electricity purchases. It should specifically do so, with penalties on top officers for such delays.

Regulators are also given the power to sanction applications for direct sales by generators to any private bulk consumer. This is a giant step forward in enabling bulk power trading. Even captive generators, merchant generators, cpsu's and SEBs (or successors), can enter this trade. However, the Bill by silently accepting the Orissa-type "single-buyer" model, with generators selling to a TRANSCO and distributors buying from TRANSCO, will effectively prevent competition.

Regulators must decide what to do about existing agreements by States to buy given proportions of cpsu-generated power and other "take-or-pay" contracts. The CERC will have to lay down comprehensive rules for market operations. These must prevent market abuse of the kind that took place in California.

The creation of Regulatory Commissions will not by itself bring about fairness, predictability, a consultative process and transparency. They must have adequate jurisdiction to bring about competition. Search Committees for identifying Members and Chairmen must be independent and not government controlled, and should look for qualified professionals, not merely government employees. Tenures should be of at least five years and any appointment (new or renewal) should be subject to the selection process). Regulators must also be required to hold open consultations on reforms and

restructuring, privatization, examination of power purchase agreements, etc.

With the limited competition in bulk purchase and strong independent regulation that exists, this Bill is a step forward to enable outcomes that are more efficient and market determined. State governments will be forced to rationalize subsidies to levels their Budgets can bear, and to improve efficiencies.

## **2002-Electricity Road Map of the Government of India**

Government has two objectives to be achieved-"cheap" power, meaning reasonably priced power that would be optimally priced for the suppliers, and quality power that would be superior in (stable) voltage and frequency. To achieve this it was necessary to attract multiple players at all stages in the power system, i.e., generation, transmission and distribution. Past experience has demonstrated the failure of guaranteed costs and returns in achieving this result. It was the giving of choice to customers that would lead to competition and thereby to improved quality and more appropriate tariffs. There are many obstacles to be overcome and many will have to be dealt with gradually, with the understanding that there was no single unique solution that would fit all players in the country. But electricity thefts should not be dealt with gradually. They must reduce speedily and ultimately stop altogether. For this to happen, state governments must pass stringent legislation (as some have, for example, Andhra and Karnataka), with severe penalties.

The roadmap that government announced as part of the Accelerated Power Development Programme,<sup>11</sup> was accompanied by the decision to securitize the debts owed by the States to the central psus like NTPC and Power Grid. Essentially, the states were to commit to paying specified interest on the securitized debts, and to milestones for reorganizing their electricity sector. The Centre would make available substantial matching grants for specific expenditures (for example on meters) by the States. The criticism has been that some states would do the securitising but not proceed with the reforms that were essential if a similar debt situation was not to develop in a few years. The roadmap has the following features:

- Free power must be done away with within a given time frame;
- Conditions must be created for competition, and the new Electricity Bill helps this to happen;
- Tariff rationalization must be guided by similar principles at state levels and GOI will issue a Tariff Policy by August 2002, after wide discussion, to guide regulators and players in the sector.
- The Regulator must play the key role in tariff determination and fixation;
- There is need to introduce technology to replace the human element;
- Priority will be given to improve capacity usage, expand existing plants and then to further add capacity through lower cost power projects;
- A fuel policy is also proposed;

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<sup>11</sup> Accelerated Power Development Programme (APDP): Government of India, Ministry of Power-2002

- Transmission planning and implementation will receive priority attention to enable more inter-regional transfers;
- While there will be no government guarantees, PFC will be helped to improve mobilization of resources;
- The role of the PTC will be enlarged in order to increase trading;
- Government would like to see uniformity in tariff determination and to reduce uncertainty, for example, through multi-year tariffs;
- The system of independent regulators is new and is evolving, but those States that do not follow it properly will fall behind those that do;
- GOI will rate SEBs and GOI's matching grants will be contingent on the rating of the State in achieving loss reduction and improving quality. States stand to lose a great deal both in such grants and in cpsu investment and supply in their states if they do not show progress.
- Milestones for success will be assigned at each step in the roadmap, with responsibilities assigned before the commencement. Regional disparities might widen as a result of the programme, but that should act as incentive for the non-performing states to correct themselves.
- Training to change mindsets is a key element in this roadmap and a huge training programme is now under way

### **Developments in Orissa, Karnataka and Delhi<sup>12</sup>**

Reform at the state level is fundamental to improvement in the sector. It calls for a change in the way in which the state electricity systems are managed. There is unanimity that government ownership will not allow such change to take place. The earlier *mantra* for reform was unbundling, corporatizing and privatizing the SEB's. Unbundling and corporatization have been accomplished in many States: Delhi, Rajasthan, Haryana, Uttar Pradesh, Orissa, Andhra, and Karnataka. Little has changed in these States as a result in terms of availability, quality and commercial performance of the power sector. Privatization of the distribution function has been done in Orissa and Delhi. Karnataka has a blueprint ready for privatization.

The **Orissa** privatization is the earliest. It set up a transmission company that would buy all the power required and sell the power to the private distribution companies. It was therefore a monopsony and a monopoly. It was responsible for paying bills and to collect from the distribution companies. The distribution companies found themselves

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<sup>12</sup> Comments made here arise out of discussions at conferences in Bangalore and Delhi which considered the State reform programmes.

unable to improve the T & D losses as fast as the OERC expected them to in their tariff determinations and made extra losses. They also found that they had been misinformed about the actual level of T & D losses at the time that they took over. Transco found itself unable to pay the bills for power purchased. It was not being paid for the power sold. The distribution companies were able to significantly improve metering, but their profit performance has been dismal. One private (foreign) distributor has abandoned his company, which is now run by government through one of its enterprises. The consensus appears to be that the Orissa reforms have been ineffective, to a great extent because of the new Transco being saddled with past liabilities, subsidies not being reimbursed by government, and poor information base.

**Delhi** has sought to overcome the weakness of the Orissa model by giving a clean slate to the newly private distribution companies. It has asked bidders to bid for the loss levels that they will bring T & D losses to. It has guaranteed to make up the difference for a given period. In Delhi, it would appear that the 'single buyer' model was unavoidable in the early stages when there were so few interested parties and smaller supply circles with many more supply companies would be fragile businesses. However it should be considered at some point, by inviting parties to bid, who had other services/products, with which they entered households in the locality, for example, newspaper distributors, cable TV operators, etc. The Delhi government has guaranteed a reimbursement of losses for the first ten years of operation, on a reducing level. Essentially, the DVB privatization gives the new investor a fighting chance of success by making efficiency improvement a part of the bidding process. It is always possible that a private party might take advantage of guarantees. This has to be monitored and guarded against.

In the case of the Karnataka model for privatization, the mindset of the employees has to change if reform is to be effective. In Orissa the new buyers had poor information and were unsuccessful in making sufficient improvement to the T & D losses. Karnataka may be repeating this model. The single buyer model should be merely transitory and the distribution companies must soon buy directly from state owned generators, IPP's, captive units, and from outside the state, with the responsibility to pay the bills. The reform measures are not clear as to who will be responsible for the load dispatch and related functions. A neutral SLDC must be created without delay. The KERC must quickly hear, issue and enforce a Grid Code for the State that is in consonance with the national grid code. Government must actually reimburse the subsidy payments when due and not indulge in paper transfers. The model calls for government guarantees of 'distribution margins' for ten years. The amounts should be subject to scrutiny and ratification by KERC. Legislation to deal with electricity thefts and collusion in them must be passed without delay and the law enforcement authorities instructed to provide full cooperation. The law must be amended to enable maximization of generation capacity by allowing captive power plants without any hindrance (as was done in 1985-88 in Karnataka and then given up), subject to being connected to the Grid so that surpluses are available to the system at prices that will not exceed those paid for bought out power. The Regulator, on sound economic principles, must set wheeling charges for captive power. All generators must have open access to the transmission system, subject to the grid capacity and other rules laid down by the KERC and SLDC. All electricity sales to bulk buyers must be permitted without interference or approval. The KERC must set out rules for such transactions in order to ensure that there is no collusive fixing of prices. The Transmission Company should have enough resources to rapidly develop adequate transmission facilities. This is yet another reason for not burdening the transmission company with monopoly purchase and sales, with the added

possibility of huge unpaid bills, time-bound manner, to be monitored by the KERC, to reduce these avoidable losses. Government must make the committed subsidy payments, not interfere in tariff decisions, provide money for investment in transmission, and leave the Regulator free to regulate supply if the distribution company does not meet committed targets.

## **CONCLUSION**

This paper commenced with the ambition of examining the political economy of power. It has demonstrated the complications in this huge and vital sector, because of the baggage of history, with the jostling of many interests (individual or institutional, self-motivated or ideologically so, honestly or dishonestly arrived), the conflicting roles of the various players, and the problems because it is a concurrent subject. This last makes the ultimate customer subject primarily the responsibility of the state governments, while the Centre is concerned with more macro issues such as the effects of power supply difficulties on economic growth and well-being.

It has discussed the various issues in the sector and the present state of the reforms programme. It sees some room for hope because of the greater understanding that seems to have developed among policy-makers, but a great deal more has to happen before we will see significant change.

Many suggestions have been made in this paper for the transformation of the electricity sector. They relate primarily to developing a management and commercial mindset in the sector, introducing competition among suppliers, choice for at least bulk consumers, freedom of entry and exit, stringent application of the law against thefts, introducing electricity trading, market structures and processes, handing over all discretionary authority to independent regulators who must be appointed and helped with staff and funds to be truly so, using technology to the extent available, separating rural supplies from the rest, instead of cross-subsidies, letting government take over subsidization and paying from increased taxes if necessary, developing an integrated energy and fuels policy for the country, and aiming to limit regulators in number so that they do not get into conflict with each other. (12760)