

## India's Power Sector Liberalisation: An Overview

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### **Abstract**

*The Indian Power Sector was opened with much fanfare to private participation in 1991 to hasten the increase in generating capacity and to improve the system efficiency as well.*

*However, although several plants are under construction, till early 1999, generation had commenced at private plants totalling less than 2,000 MW. In contrast, some state undertakings have completed their projects even earlier than scheduled.*

*Independent power producers (IPPs) claim that their progress has been hindered by problems such as litigation, financial arrangements, and obtaining clearances and fuel supply agreements. On the other hand, the State Electricity Boards have been burdened by power purchase agreements (PPAs) that favour the IPPs with such clauses as availability payment irrespective of plant utilization, tariffs reflecting high capital costs and returns on equity, etc.*

*The process of inviting private participation in the power sector and the problems experienced seem to have spurred on the restructuring of the power sector, including the formation of Central and State Electricity Regulatory Commissions. However, some important problems have not been addressed. Additions to the generation capacity without corresponding improvement of the transmission and distribution facilities are likely to further undermine the system efficiency. What is more, issues like the reduction of "commercial losses" appear to have been ignored.*

*Most importantly, investment in infrastructure has been a state responsibility because the intrinsically long gestation coupled with the relatively low returns from serving all categories of consumers have rendered such projects commercially unprofitable. Whether or not private participation can take on such tasks is to be seen.*

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A new policy of opening electricity generation to private participation was announced by the Central government in October 1991. Then, in May-June 1992, a high-level team consisting of the Union Cabinet Secretary, Power Secretary and Finance Secretary visited the USA, Europe, and Japan, to invite foreign private sector participation in the power sector. Foreign companies returned the visit to India and found the electricity establishment offering concessions and incentives that were hitherto unheard of in the power sector business.

### **Reasons for inviting private sector participation**

In 1990, the situation facing the energy sector in India was roughly as follows. The central government -- the conventional source for funding power projects -- was believed to have reached its limit as far as funding was concerned. The Indian electricity sector had virtually no surpluses to make available for investment. The World Bank had stated in 1989 that requests from the electricity sector of developing countries added up to \$100 billion per year. In response, only about \$20 billion was available from multilateral sources, leaving a gap of about \$80 billion.<sup>1</sup> Hence, it was suggested that the only possible source of funds was the private sector and, in view of the fact that the Indian capital market did not appear to be able to make a significant contribution, that the foreign private sector should be welcomed.

It was also hoped that there would be a side-benefit regarding the unacceptably low system efficiency of the state electricity boards. This efficiency would be improved through the oft-claimed better management and higher technical performance of the private sector.

### **What has happened**

By August 1995, about 189 offers were received to set up private power generating projects of over 75,000 MW, at an investment of more than Rs 2,76,000 crores<sup>2</sup>. These included 95 projects with an aggregate capacity of 48,137 MW, awarded through Memoranda of Understanding (MOUs) or Letters of Intent, and 32 projects (costing more than Rs 1,000 crores each) with an aggregate capacity of 20,697 MW, awarded by international competitive bidding<sup>3</sup>. Of these, eight were considered for counter-guarantees by the central government. 17 private power projects were accorded the Techno-Economic Clearance (TEC) by the CEA, till March 1996, according to a statement of the Minister of State for Power<sup>4</sup>; these reached a total of 31 by March 1998<sup>5</sup>.

In December 1998, the Power Ministry asked all the IPPs to achieve financial closure by March 1999<sup>6</sup>. Table 1 lists the available information on the status of private power plants.<sup>7, 8, 9</sup>

In fact, very few private projects have actually been commissioned<sup>a</sup>:

- (1) the 235 MW gas-turbine plant at Jegurupadu (owned by GVK Industries, CMS Energy (USA), APSEB, ABB and the Hongkong-based Asia Infrastructure Fund, and constructed by ABB on a turnkey basis)<sup>10</sup>,
- (2) the 515 MW combined-cycle gas-turbine (CCGT) plant at Hazira (of ESSAR Power),
- (3) the 172 MW naphtha-based plant at Vijjeswaram (of the joint sector Andhra Pradesh Gas Power Corporation Ltd.),
- (4) the 160 MW ccgt plant at Baroda (of GIPCL), and
- (5) the 826 MW (740 MW) naphtha-based plant at Dabhol<sup>b</sup> of the Dabhol Power Company, a joint venture of Enron, MSEB, Bechtel and GE Capital<sup>11</sup>.

Several other projects are under way. At the end of March 1998, projects under implementation accounted for a total capacity of about 3,000 MW. Another eight projects with a total capacity of 3,654 MW had been sanctioned financial assistance by institutions, but financial closure has not yet been achieved<sup>12</sup>.

In contrast, several Central and State Government undertakings have completed or are completing their projects on time (or even earlier than scheduled). For example, Units V and VI (210 MW each) of the Raichur Thermal Power Station are being commissioned ahead of schedule by the Karnataka Power Corporation Limited (KPCL). The completion of Unit V in a record period of only 28 months<sup>13</sup> has resulted in a saving of Rs 200 crores; with a capital cost of Rs 3.22 crores per MW, it is the lowest cost thermal unit to be constructed in recent years<sup>14</sup>.

Further, in the case of private promoters, projects *without foreign participation* are being completed as scheduled. For example, the chief promoter of the 235 MW Jegurupadu project in Andhra Pradesh, avoided delays by persuading Indian financial institutions to invest even before any counter-guarantee was obtained<sup>15</sup>.

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<sup>a</sup> This information is based on reports in national newspapers till May 1999.

<sup>b</sup> This plant was inaugurated on 25 May, 1999.

**Table 1: Project status (according to the information available in newspapers till March 1999)**

<b>Project (location)</b>	<b>State Developers/major share holders</b>	<b>Capacity (MW)</b>	<b>Status</b>
<u>Thermal Power Projects:</u>			
*Dabhol (LNG)	Maharashtra Dabhol Power Co. (Enron Dev. Corp., Bechtel, GE)	(740 + 1,440)	Power Purchase Agreements (PPAs) signed, with re-negotiation (earlier 695+1320 MW); counter-guarantees for tariff and termination payments obtained; Phase I complete; fuel linkage & financial closure for Phase II obtained;
*Bhadravati (coal)	Maharashtra Ispat (Mittals)	1,072	working for financial closure (FC); obtained counter-guarantee
*Jegurupadu (ccgt)	A.P. GVK Reddy, etc.	235	commissioned & working (counter-guarantee only for termination payment obtained after commissioning), no escrow account as yet opened by APSEB;

\* indicate the projects termed "fast-track"

<b>Project</b>	<b>State Developers/major shareholders</b>	<b>Capacity (MW)</b>	<b>Status</b>
<u>Thermal Power Projects: (continued)</u>			
Vijjeswaram (liquid fuel)	A.P. AP Gas Power Corp.Ltd.	172	commissioned; working
*Godavari (ccgt)	A.P. Spectrum Power	208	construction in final stages, opted for no counter-guarantee;
*Vishakapatnam (coal)	A.P. Hinduja National Power	1,040	discussions on for fuel supply agreement; counter-guarantee obtained (1998); fuel-supply agreement finalized
*Mangalore (coal)	Karnataka Mangalore Thermal Power	1,000	re-negotiation in Nov.'97, and

(Cogentrix, China Light & Power)

TEC obtained, but stuck in litigation (Supreme Court); a separate project for a 300 km transmission line (. Rs 700 crores) is required;

\*Ib Valley                      Orissa                      AES Transpower                      420                      re-negotiated PPA; engineering procurement construction (EPC) contract under finalization;

<b>Project</b>	<b>State</b>	<b>Developers/major shareholders</b>	<b>Capacity (MW)</b>	<b>Status</b>
*Neyveli (coal)	T.N.	CMS Energy	250	counter-guarantee signed; nearing financial closure;
Shalivahana (fuel oil)	A.P.	Shalivahana Power Corp.	34.56	APSEB's permission;
Kondapalli	A.P.	Lanco Group (Hyderabad) & Eastern Generation (UK)	330	financial closure (Dec'98);
Hazira (liquid fuel)	Gujarat	ESSAR Power	515	commissioned & working, but GSEB yet to open letters of credit;
Baroda (liquid fuel)	Gujarat	GIPCL	160	commissioned and working;
Dholpur(naphtha)		RPG Group		
Toranagal (coal)	Karnataka	Jindal Tractabel Power	260	130 MW unit commissioned;
Pillaiperumalnallur (ccgt)	T.N.	Dyna Makowski	330.5	
N.Madras (coal) St.II	T.N.	Videocon Power	1,050	working for financial closure
N.Madras St.III	T.N.	Tri-Sakti	500	working for financial closure

<b>Project</b>	<b>State</b>	<b>Developers/major shareholders</b>	<b>Capacity (MW)</b>	<b>Status</b>
Basin Bridge (diesel)	T.N.	GMR Vasavi Power	220	under implementation

Balagarh (coal)	W.B.	BPCL (RPG group)	500	techno-economic clearance (TEC) expected
Korba	M.P.	Daewoo	1,070	nearing financial closure, but escrow cover to be given
Bina (coal)	M.P.	Aditya Birla Group	578	nearing financial closure, but escrow cover to be given;
Bhilai	M.P.	L&T	574	nearing financial closure, but escrow cover to be given
Srimushnam (lignite)	T.N.	BSES Ltd. (TICAPCO)	250	
Paguthan (ccgt)	Gujarat	GTEC	655	to be completed shortly
<u>Hydro-electric projects:</u>				
Almatti	Karnataka	Chamundi Power Corp.	1,107	clearance awaited;
Baspa Stage II	H.P.	Jai Prakash	300	
Maheshwar HEP	M.P.	S.Kumar's	400	working for financial closure;

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## **Problems encountered**

The stakeholders in the power scenario are the generators -- independent power producers (IPPs) and/or state undertakings, the distributors (at present the State Electricity Boards), the government (central and state) and the consumers (commercial, industrial, and others), as well as households (with and without electricity). Attention will now be focused on the problems noted by the private producers and the electricity establishment in the course of constructing new power plants.

## **Problems mentioned by private producers**

### **Litigation/renegotiation leading to delays**

For several reasons, for example, high costs, environmental impacts, and perception of financial irregularities, there have been protests against some power plants. Litigation, as also renegotiation of Power Purchase Agreements (PPAs) have caused long delays in project completion, so that construction has not been completed as scheduled. For instance, the Mangalore Power Company's PPA for a 1,000 MW coal-based plant was originally signed in 1993, re-negotiated in November 1997, and has yet to be resolved.

### **Financing problems**

Compared to typical commercial projects, infrastructure projects yield relatively low returns and have long payback periods. Consequently, power plants have been perceived to be commercially less profitable. Such projects were, therefore, undertaken by the public sector. Private promoters face difficulties when trying to obtain funding, as bankers are unlikely to agree to loans with a maturity higher than three years, to match the tenor of their deposit liabilities. Even financial institutions (FIs) find it difficult to extend loans commensurate with the long payback periods of power projects.

Moreover, the State Electricity Board (SEB) is invariably the sole purchaser of the power that a private sector generator generates. That being the case, the private sector "will not take the risk of not being paid"<sup>16</sup> by SEBs in poor financial health. The SEBs are also unlikely to get backing from financial agencies for their commitments to purchase electricity from the private producers. Hence, counter-guarantees from the Central government have been sought.

Some counter-guarantees from the central government were eventually obtained in the case of six of the eight "fast-track" projects. Even with these counter-guarantees, promoters tend to wait for other arrangements such as fuel supply agreements to be finalized.

There are other options that could be considered for dealing with the financial problem, such as<sup>a</sup>:

- (a) an escrow account -- into which the cash inflows of the SEB are deposited and to which an independent power producer (IPP) would have first access in case of defaults by the SEB,
- (b) an agreement by which the IPP could supply electricity directly to buyers, through the existing lines, and
- (c) an irrevocable letter of credit, favouring the IPP on certain conditions being met and issued by a highly rated bank/financial institution, -- guaranteeing payment on behalf of the SEBs.

With regard to escrow accounts, financial institutions are said to be limiting their loans to IPPs at the SEB's "escrowable" capacity. It is recommended that the amount in the escrow account should be 9.25 times the monthly tariff payable by the SEBs, that the escrow account should be charged exclusively in favour of an IPP with a provision to assign the same to lenders of the IPPs, and that the escrow account should be established before financial closure<sup>17</sup>.

However, problems exist even with the escrow mechanism. Several states have signed a large number of PPAs with an aggregate capacity higher than could be supported by way of escrows. For example, in Madhya Pradesh (MP), the SEB has signed PPAs aggregating to about 6,500 MW and of these, nine projects totalling about 4,600 MW have already received the CEA's techno-economic clearance. In contrast, leading financial institutions have assessed the total "escrowable capacity" of Madhya Pradesh at only around 2,561 MW.<sup>18</sup> Similar problems also exist in some other States.

In addition to the over-estimation of escrow capacity, there are two problems:

- (a) distribution regions that guarantee payment through escrow accounts could be "cherry picked" by the independent power producer leaving the SEB with the unremunerative distribution regions to service its other commitments, and
- (b) the existing stakeholders in the cash flows of SEBs object to such agreements. For instance, the State Bank of India (which provides overdraft facilities to the SEBs) is refusing to lift its lien on the receivables of the SEBs. Further, at a top-level meeting in January 1998, banks pointed out that state governments were not paying their dues on bonds issued, but were issuing more and more guarantees!

Other sources of funds are limited. While private power projects in industrialized countries raise funds through

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<sup>a</sup>These have been described in detail by Credit Analysis and Research Limited.

institutional investors (insurance companies, pension funds, etc.), in India these usually invest in some way<sup>a</sup> in government undertakings, limiting the sources for private power projects.

Hence, as compared with the investment requirements of the private power sector estimated at Rs 292,500 crores for the next decade, the maximum borrowing from Indian FIs/banks is pegged at 40% of the outlay or Rs 117,000 crores<sup>19</sup>.

### **Risk sharing**

The many risks perceived by private producers<sup>20</sup> are usually addressed in the PPAs.

*Construction risk:* This is the risk of the project not being completed on time and within the budget. To counter this risk, provisions for liquidation damages to cover the costs of delays are included in the engineering procurement construction (EPC) contract.

*Market risk:* The market risk includes demand risk and price risk. A demand risk is avoided by the "take or pay" stipulation of the PPAs, according to which the SEB agrees to pay the IPP the "availability" rate regardless of the number of Kwh actually obtained. Similarly, the price risk is avoided by the tariff structure in which all costs of producing power -- fixed (interest, depreciation, O & M, insurance, taxes) and variable (fuel), plus a return on equity (ROE) are assured.

*Fuel-supply risk:* This is the risk of not obtaining a timely supply of the appropriate fuel. To counter this risk, IPPs either sign long-term contracts with the public sector supplier (for example, gas from GAIL) or acquire a captive source (for example, a captive coal mine). For, liquid fuel transportation sometimes presents a problem, because oil suppliers do not guarantee transportation between the port/refinery and the power plant, necessitating a contract with the Railways.<sup>21</sup>

*Exchange fluctuation risk:* The problem of losing at times when the rupee falls is avoided either by demanding payment in dollar terms or by ensuring foreign payments into an international escrow account.

### **Obtaining clearances**

There are numerous clearances -- statutory and non-statutory -- to be obtained for starting a power project.<sup>22</sup> The statutory clearances include cost estimate clearance, techno-economic clearance (TEC) from CEA, water-availability clearance from the CWC/State government, pollution clearance from the SPCB/CPCB, forest and environment clearance and rehabilitation and resettlement clearance from the MoEF and

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<sup>a</sup>The IDBI has been financing purchase of indigenous equipment by various SEBs through its bills rediscounting scheme.

the SEB/state government clearance. The non-statutory clearances include land availability from the State government, fuel linkages from the Departments of Coal and Petroleum and Natural Gas, transportation of fuel from the Departments of Coal/Petroleum and Natural Gas, and the Ministries of Railways, and Shipping and Surface Transport, and financing from CEA/DOP/Department of Economic Affairs/FIs. All these can result in considerable delays and thereby cost escalation.

However, from August 1996, power projects with investment of # Rs 1,000 crores have been exempted from CEA and environmental clearances. The earlier limit was Rs 400 crores, but it has been suggested that this limit be raised to Rs 4,000 crores. Several "fast-track" projects were however, above this limit.

### **Obtaining fuel linkage agreements**

Fuel linkage agreements (including licences for importing fuels - coal, naphtha, diesel and LNG or higher grade Indian coal) have, at times, been difficult to obtain. In addition, the rules pertaining to the use of some fuels have not been clear or have been changed. This indecision has delayed several projects. Furthermore, the charges that have to be paid by the IPPs have been regarded by them as being too high, as they include charges for commitment, import-handling, service, and so on (as shown in Annexure 1).

### **Environmental problems**

Some requirements of the Ministry of Environment have been unacceptable to the IPPs. For instance, after 9 years of generation, a 100% ash utilization for coal plants was required. Power companies were also expected to develop ash products and market them<sup>23</sup>.

### **Problems faced by the SEBs**

#### **Unacceptable PPA terms - not viable for the SEBs**

According to the terms specified in some of the purchase power agreements (PPAs), the country would have to pay an exorbitant price for foreign participation. Several harmful features are listed below.<sup>24</sup>

*Assured high PLF:* Plants were to be assured of electricity sales at PLFs of \$ 68.5%, these high PLFs being buttressed by power purchase agreements. This commitment implies that during the daily off-peak hours and the monsoon season, the existing plants would have to be backed down, resulting in uneconomic plant dispatch (that is, lower cost-per-unit power would be replaced by higher cost power). Considering that several existing thermal plants that can operate at higher than 68.5% are backed down in periods of good reservoir

inflows in the southern region, the situation would only be worsened<sup>25</sup>.

Further, if the real ailment of the power sector is a shortage of peaking power rather than energy, then the addition of base-load power stations is not likely to provide a solution<sup>26</sup>.

*High Return on Equity:* A relatively high (11%) rate of return (ROE) was promised to the investor, at a capacity utilization of 68.5%. This return would be increased if the utilization exceeded this level. More importantly, these returns were to be guaranteed by the central government if the State Electricity Boards were unable to pay.

*High capital costs of private plants:* The capital costs of some projects (as per their PPAs) were much higher than those known to be incurred both abroad and in India<sup>a</sup> where international competitive bidding did not take place. For example, the capital cost of Phase I of the Enron (Dabhol Power Company) LNG-based plant was Rs 4.23 crore/MW<sup>b</sup> or \$1,366/KW (. Rs 2,942.6 crores<sup>27</sup> for 695 MW). In comparison, in the USA, a basic 300 MW coal-based steam-electric plant (about 30% more expensive than an LNG-based<sup>c</sup> plant) required about \$1,100/KW in 1990 prices, which works out to about Rs 3.4 crores/MW @ Rs 31/\$<sup>28</sup>, and NTPC's 645 MW gas-based Kawas project<sup>d</sup> (commissioned in September 1993) at Rs 2.4 crore per MW<sup>29, 30</sup>. In addition, there were payments in the deal for equipment/consultancy/recurring expenses to affiliates of the owner-firms. All this led to critical comments and some re-negotiation. The Enron project (Phase I) cost was reduced, as was the Cogentrix 1,000 MW project cost (from Rs 4,387 crore to Rs 3,950 crore)<sup>31</sup>. However, a part of the reduction in costs is claimed by critics to be cosmetic<sup>32</sup>: for instance, the Enron-LNG facility appears under operating rather than capital cost, and customs duty reductions have been reflected as capital cost reduction.

In cases where the prices of equipment are falling<sup>a</sup>, adherence to the PPA prices would be uneconomical for the power purchaser (the SEB).

<sup>a</sup>The National Working Group on Power Sector had in a detailed September/ October 1994 study shown that the capital costs of both combined-cycle gas-turbine and coal-based plants are lower with indigenous technology.

<sup>b</sup>This included items such as "pre-operative" expenses of Rs 547.26 crores or Rs 0.787 crores/MW which inflated the capital cost.

<sup>c</sup>A combined-cycle plant involving a gas-turbine driven by natural gas would cost roughly about \$ 600-700/kW and a similar plant driven by LNG would cost perhaps about \$75/Kw more for the LNG-handling equipment. Thus, a LNG-based combined-cycle plant should be about 30% cheaper than a coal-based steam-electric plant.

<sup>d</sup>This project was executed on a turnkey basis by Alstom of France.

<sup>a</sup>This has been experienced in the international market.

*High tariffs:* In addition to the capital component, the variable costs chargeable during the life of the projects are expected to rise, allowing the escalation of the costs of various components -- fees (such as Management Fee, Testing Fee, and Commissioning Fee), insurance charges, "tax incremental charges", etc., to be passed on to the purchaser.

*Unfavourable financing:* The rates of interest payable on dollar and rupee debt have been fixed as on the date of financial closure. Up to this stage (that is, financial closure and securing of counter-guarantees), the perceived lender risks and the corresponding rates of interest are relatively high. However, as the project progresses, the risk falls and the debt could be refinanced (that is, interest rates can be lowered through re-negotiation). Despite this, the utility is still bound by the fixed rates.

### **Further problems**

#### *Technical losses and improvement of the T&D system*

Increasing the generation capacity is necessary but not sufficient for supplying electricity to consumers; the transmission and distribution system has to be extended and maintained to ensure the efficient evacuation of power from the generation sites. *Without improved T&D facilities, the technical inefficiencies will continue.*

A separate trading enterprise for T&D (for example, GRIDCO in Orissa) that needs to collect a certain ROI would entail much higher tariff-rates which some consumers may be unable to bear.

#### *Commercial losses on the T&D system*

*The losses incurred along the distribution system due to theft of electricity have not been addressed by introducing more generators into the system. In fact, the SEBs' financial position would worsen if electricity purchased at higher prices (the costs-plus-return formula) were not paid for by the users.*

### *Privatisation of the T&D system*

Private participation in the transmission and distribution of the electricity system has also presented problems. The evaluation of assets in cases of transfer to new owners has to be carefully worked out.<sup>33</sup> For joint-venture undertakings between an SEB and a private firm/consortia of firms, the SEB is liable to lose control.<sup>34</sup> In addition, the SEBs sometimes define the requirements for transmissions contracts<sup>a</sup> such that there are very few companies capable of fulfilling the criteria as defined, so that negotiation is even more difficult.<sup>35, 36</sup>

### *Non-subsidized electricity*

The consumers (mainly domestic and agricultural) currently provided electricity at subsidized rates would be unable to handle "user-cost recovery", that is, to pay cost-reflective tariffs. Further, if only these consumers are left to the SEBs, their financial position would be far worse than at present.

### *Fuel imports*

In spite of the availability of indigenous sources of electricity (-- hydro-power, coal, biomass), foreign power producers tend to opt for imported fuel. The larger the number of foreign power producers in the field, the greater will be the country's dependence on imported fuel for power generation, worsening its debt levels still further.

## **Recent institutional developments**

The problems experienced seem to have triggered discussions on the power system as a whole and have spurred on the restructuring and regulation process. This is being described below.

## **Regulatory commissions**

The Indian Electricity Act of 1910 and the Electricity (Supply) Act of 1948 were amended in 1996 to enable the setting up of state and central level electricity regulatory commissions<sup>37</sup>. Each state and union territory was to set up an independent State Electricity Regulatory Commission (SERC) to deal with tariff fixation, that is, to determine the tariff for wholesale or retail sale of electricity and for the use of transmission facilities. Some states have established their regulatory commissions, while others are in the process of

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<sup>a</sup>For example, the minimum qualifying criteria listed in the request for qualification for the Mangalore Evacuation Project stated that the lead promoter "demonstrate successful development in the past of EHV systems (operating at not less than 380kV) of not less than 2,000 ckm and at least 10 EHV sub-stations (operating at not less than 380 kV)".

doing so.<sup>38</sup>

At the centre, a Central Electricity Regulatory Commission (CERC) has been formed to deal with all state-level appeals and inter-state flows<sup>39</sup>. From 1st April 1999, the Central Electricity Authority (CEA) has entrusted the CERC with the task of regulating power tariffs of central government power utilities, inter-state generating companies and inter-state transmission tariffs<sup>40</sup>. An important objective of the CERC is to improve operations in the power sector, by measures such as increased efficiency, big investments in the T&D systems, time-of-the-day pricing, and power flow from surplus to deficit regions.<sup>41</sup> Further, the Central Government or the CERC can grant a transmission licence to anyone to construct, maintain, and operate any inter-state transmission system under the direction, control, and supervision of the Central Transmission Utility.<sup>42</sup>

### **Restructuring of the SEBs**

The Power Ministry has circulated detailed guidelines on power sector reforms to SEBs. The SEBs are expected to "unbundle" their activities, trifurcating them between generation, transmission and distribution<sup>a</sup>. The process of reforms should take place in a phased manner: independent divisions should be created and then "corporatized". The amendment to the Electricity Acts also provided for private investment in transmission and the CERC has sent guidelines to the SEBs regarding their granting licences to private sector undertakings for the transmission of power<sup>43</sup>.

### **Regional Electricity Boards (REBs)**

Regional Electricity Boards (REBs) have been given (in November 1996) the authority to decide on plant despatch, that is, to decide which plants should be operated to meet demand and those that would have to back down in case of a fall in demand, on the basis of the merit order operation clause. To strengthen grid management and enforce grid discipline, the REBs have been granted legal status.<sup>44</sup> However, doubts have been expressed regarding the efficiency of coordination between the REBs, the SERCs, the CERC and the CEA.<sup>45</sup>

### **Foreign equity participation**

Foreign equity participation up to 100% has been extended for electricity generation, transmission, and distribution (except for atomic reactors).

### **Fiscal measures**

The tax holiday, granted to the power sector, has been extended up to the year 2003.<sup>46</sup>

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<sup>a</sup>This trifurcation has already been effected in the state of Orissa, while in Haryana, the Haryana ERC has granted a license to Haryana Vidyut Prasaran Nigam for transmission and distribution.

## **Mega-power policy**

This policy -- formulated in October 1998 for large power projects at strategic locations -- is applicable to the construction and operation of hydro-electric power plants of at least 500 MW and thermal plants of at least 1,000 MW.

The project promoters are insulated from the lack of credit-worthiness of the SEBs because electricity can be sold either directly to a "cluster" of large consumers or to the Power Trading Corporation (PTC) which can withdraw funds from the State's central share (Central Plan Allocation, etc.) if the SEB defaults on its payments. There will also be benefits for these mega power projects: customs duty on the import of capital equipment has been waived, and some sales tax/octroi concessions have been provided<sup>47</sup>.

However, the reaction to the mega-policy has not been very favourable. Representatives of SEBs oppose the idea of the mega projects bypassing the SEBs and attracting large customers.<sup>48</sup> IPPs feel that this policy will be a hindrance to smaller projects<sup>49</sup>, and would prefer that the concessions extended to mega projects be extended to all IPPs<sup>50</sup>.

## **New financial arrangements**

### *Additional institutions*

For the purpose of financing the power sector, new arrangements have been made in recent times. These include setting up of the Infrastructure Development Finance Company Ltd., broadening the scope of the public sector Power Finance Corporation (PFC), allowing an active role for the PFC in negotiating loans from international banks and foreign capital markets, constitution of a Power Development Fund by the Power Ministry for speedy implementation and execution of power projects as also to finance feasibility studies for setting up power plants, mooting a Power Trading Company (PTC) to purchase power from power-surplus regions and sell it to power-deficient regions, launching of "Infrastructure Bonds" to channel household savings to the power sector, and involving provident funds as a potentially important source of funding.

### *Sources of finance still limited*

According to the Asian Development Bank, in November 1996, Asia required \$100 billion a year in capital to develop new power generation plants, of which only 5 - 10% could be met by development banks<sup>51</sup>. Hence, internal generation of funds is still required.

## **Conclusions**

### **IPPs have not yet made major contributions**

Quite contrary to the confident expectations in 1991-92, the private sector has hardly contributed thus far to bridging the power demand-supply gap. Only a few IPPs have actually commenced generation, perhaps due to the problems experienced.

However, if all the projects under consideration do come on stream, the share of private producers will increase substantially.

### **Public sector undertakings retain their importance**

Public sector undertakings have continued to remain the main players in the field, particularly as they have been constructing generating plants on, and even ahead of, schedule. For example, Karnataka Power Corporation Ltd.'s Raichur TPS Units V and VI and National Thermal Power Corporation's Kayamkulam TPS are being completed ahead of schedule.

### **Excessive focus on supply rather than development and efficiency**

The growth-oriented supply-side consumption directed paradigm seems to have dominated the decision-making in the energy-sector, to the exclusion of end-use efficiencies.

A development-focused end-use oriented service-directed paradigm, promoted among others by the International Energy Initiative<sup>52</sup>, shifts the emphasis from increased consumption to increased energy services. It explores the possibility of lowering the investment required -- either by decreasing the energy-intensity (energy required per unit of GDP) and/or by decreasing the unit cost of installed capacity (say, Rs crore/MW).

The former can be lowered through improved efficiency in electricity use (i.e. demand-side measures)<sup>53</sup>, while the latter by reducing the electricity costs per unit (less expensive generation options, reducing T & D losses and/or generation at the consumption sites through non-conventional decentralized technologies). Apart from the improvement of end-use efficiencies, the efficient production and transmission of conventional energy and the harnessing of non-conventional decentralized sources of energy could be quicker and could reduce the financial requirements of the power sector. One must endeavour to arrive at a mix of technologies -- centralized generation, decentralized generation, and efficiency improvement, to bridge the demand-supply gap at the lowest possible cost.

### **Efficiency and costs of supply**

If the cost of supplying electricity through private producers was expected to be lower than that of state-run

plants (due to higher efficiency, etc.) this cost-reduction has not occurred.

The proposed electricity tariffs (including fuel escalation, etc.) at private plants appear to be higher than those of similar plants at state undertakings (for example, electricity from coal-based thermal plants). Hence, even if these plants are technically more efficient, this benefit may not reach the consumer.

### **System losses**

Adding the costs of transmission and distribution (including system improvement and maintenance) to the generation costs at private plants would result in even higher tariffs. Further, if system improvements were not brought about, the technical losses currently suffered by the SEBs would hamper private distributors too.

Thus it would be useful to concentrate on improving the efficiency and thereby the financial position of state undertakings.

It is not clear whether or not "commercial losses" or theft can be reduced by private suppliers; obviously if these losses were avoided, their operational efficiency would be higher than that of the SEBs. However, there is no reason to conclude that in dealing with as many dispersed connections as the SEBs, private suppliers will be more successful at eliminating theft. Further, it does not seem likely that restructuring of the SEBs, that is, assigning the activities of generation, transmission and distribution to separate organizations can improve this situation, except that the brunt of such losses would be borne by the distributors alone.

### **Surplus energy/capacity**

In some regions of the country, with the completion of projects under construction, there has come to be (except perhaps during periods of peak demand) an excess of electricity availability over that required by customers at the tariff payable.<sup>54</sup> This surplus may not have occurred if electricity connections were extended to all homes, and if rural areas were supplied throughout the day. However, with these consumers unlikely to be paying the PPA tariffs for electricity, commissioning of new private power plants could lead to a surplus.

The electricity surplus is also due to the present industrial recession, coupled with the shift of several industrial units to captive generation because of their earlier experience of inadequate/unreliable grid supply. However, an upswing in the industrial cycle could expand the electricity requirement, so that the current surplus position may not be sustained.

### **Development needs may be undermined**

Some customers -- lower-income households and small farms -- may be unable to afford electricity at its marginal cost. Thus far, electricity has been subsidized by the State for such consumers. However, it seems likely that profit-maximizing private power producers/distributors will jettison public benefits and economically weak consumers (connected and yet-to-be-connected). Correspondingly, the SEBs' financial position would worsen further if they lost only their higher-paying (industrial and commercial sector) consumers to private power suppliers.

### **The fundamental problem of private power projects**

The importance of the state in the power generation sector has not lessened in spite of the entry of the private sector. In fact, the delays in the projects of the IPPs reveal that the IPPs need the intervention of the state in innumerable ways even though the constant demand is for the state to vacate the power sector and leave it to the market. This contradiction is primarily because of the intrinsic long gestation and payback and low interest rate of these projects.

Commercial ventures are associated with a much shorter payback period and a much higher interest rate which justify the risks involved.

### **Public debate and informed discussion**

Thanks to controversial power projects, there has been public debate and informed discussion. However, there should be greater transparency in decision-making, greater public participation (particularly from civil society) and greater spread of information.

## **Annexure 1: Arrangements for fuel linkages**

Independent power producers have to specify fuel-linkages, because these often involve imported fuel. Currently, fuel linkage agreements have to be made on the basis of the Techno-Economic Clearance. The latter is not awarded till the Environmental Clearance is obtained, which in turn is dependent on the type of fuel to be used. Further, certain payments have to be made to compensate for the import facilities.

*Costs:* The charges for fuel-linkages included commitment charges of Rs 16 lakhs per MW, import-handling charge of 3.5% of the c.i.f. value of the quantity of fuel imported, service charges of 4% of landed costs of fuels for providing storage and handling services at port/inland terminals and for incurring stock-loss, inventory-carrying costs, etc., liquidated damages up to 5% of the fuel cost to be received from the oil companies on the shortfall quantity of fuel supplied, and guarantee charge of 8% premium in view of accepting liquidated/consequential damages<sup>55</sup>.

Later, in September 1997, all these charges were reduced. The commitment charges were reduced to Rs 9 lakhs per MW. Of this, Rs 5 lakhs would be payable by demand drafts in two equal instalments, while the rest would be secured with irrevocable renewable bank guarantees; the payment of Rs 5 lakhs would be refunded with 18% interest over a period of 10 years through rebates on fuel purchase. Correspondingly, the other charges were reduced: the import-handling charge was reduced to 1.5% of the c.i.f. value, the service charges were reduced to 3.75% for naphtha-based and 3.5% for fuel-oil-based plants, and the guarantee charge lowered to 5%. The liquidated damages payable by the oil companies were improved to as much as 17% of the project cost.

In specific case, agreements had to be reached between several parties. For instance, in the case of the 1,000 MW coal-fired plant of Hinduja National Power Corporation Ltd., the promoters are insisting on guaranteed low-ash coal supply at the site; this required agreements between them and both Coal India, and the Railways Ministry.

Fuel-specific details include:

### *(1) Liquid -fuels:*

The Liquid-fuel policy had permitted IPPs to use heavy petroleum stock (HPS), low sulphur heavy stock (LSHS), heavy furnace oil (HFO), and natural gas as primary fuels for power projects, but disallowed high speed diesel (HSD).

### *(2) Naphtha:*

(a) In August 1996, the Commerce Ministry refused licences for the imports of naphtha for power plants.

(b) Later guidelines (completed in December 1996) on the basis

of which fuel linkages came to be awarded were drawn up. Here, the relevant state's peaking power shortage was taken as the chief criterion for allowing the use of naphtha.

(3) *LNG*:

(a) In 1996, the Petroleum Ministry directed that a new undertaking -- the LNG Corporation of India -- be formed to set up facilities for the import of LNG. Meanwhile Enron signed a letter of intent for a partnership with GAIL to supply LNG annually to its own Dabhol plant and to Gujarat.

(b) LNG has the advantage of being a "clean" fuel, but its transportation costs are considerable.

(c) With the global slow-down in the demand for LNG, most major producers have been desperately searching for new customers and critics<sup>56</sup> of the LNG-based power policy feel that India has needlessly succumbed to international pressure without scrutinising the feasibility of option for such an LNG-based programme.

(d) As a wide range of prices prevail in the world market, the eventual deal depends on the bargaining power of the buyer.

(4) *Petro-coke*:

There has been indecision regarding this type of fuel. (The 500 MW Reliance project has been delayed and IOC has decided to shift to a different fuel)<sup>57</sup>.

(5) *Coal*:

Coal India Ltd. has been made to supply the required grade of coal to fast-track power projects<sup>58</sup> (the Hinduja's 1,040 MW Vishakapatnam plant and the Nippon-Denro-EDF-GE promoted Bhadravati plant), although the price has not been specified<sup>a</sup>.

There have been contentious conditions in the Fuel Supply Agreement (FSA) of 1997:-

a) The developer is required to bear the risks of fuel supply, but the developers insist that these risks should be borne by the fuel supplier and transporter.

b) The developer is required to enter into tripartite agreements with the fuel supplier and transporter, particularly when they are monopoly companies; the Railway authorities do not wish to undertake the risks and pay demurrage in cases of defaults.

c) Fuel suppliers should be allowed to sell fuel to a third party if an IPP fails to honour its fuel offtake commitments; in such a case, the power company will have to pay a penalty for the difference, if any, between the contract price and the

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<sup>a</sup>The cost of setting up washeries can be passed on to the power generators, but these could in turn, pass the price-escalation to the electricity purchasers.

actual price paid. This is unacceptable to the IPPs, but government officials contend that if a power generator can demand compensation in lieu of the shortages in supply, the fuel supplier should be compensated for any shortage in fuel offtake.

## **Annexure 2: Current financial requirements**

According to current ('98) guidelines<sup>59</sup>, the following criteria must be met when private power promoters obtain funds for a project:-

- (a) the promoter's share in a private sector power project must be at least 11% of the total outlay,
- (b) the company is allowed a debt:equity ratio of 4:1,
- (c) up to 40% of the total outlay can be raised from Indian financial institutions and banks, and
- (d) no single FI/bank can lend more than 25% of its net worth to an individual company or project, and not more than 15% of its total outstanding loan and guarantee portfolio to a single industry.

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