

**PRIVATE SECTOR PARTICIPATION
IN THE POWER SECTOR IN INDIA**

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ABSTRACT

The Indian Government is currently thinking of allowing private sector companies to participate in power sector by inviting them to generate electricity mainly from coal. The main motivation is resource mobilisation from private sector, since the Plan funds are being diverted to rural development away from the power sector. The paper analyses the inherent difficulties and contradictions in the Government's proposal, such as co-existence of high cost private power and low cost public power, the potential goal-conflicts of private & public utilities and the constraints in raising finance. It suggests a different model for making the privatisation proposition feasible.

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The eighth five year plan of the Government of India has forecast an incremental capacity demand of 38,000 MW of electricity, on the conservative side. This is about 60% more than over the present level of demand (in 1990). It needs an investment in power generation of \$44 billion¹ and in associated transmission and distribution, of \$16 billion, bringing it to a total requirement of \$60 billion (\$1.6 million per MW). On the funds allocation side, 50% of the total plan outlay is said to be ear-marked for rural development, thereby sharply reducing the funds available for the Power Sector. In this context, the Government is looking at privatization of the Power Sector more to mop up resources from the private sector for power generation, than improve the performance of the power sector.

Different Models of Privatisation:

In U.K., when electricity came up for privatisation, it meant sale of public utilities to private companies. The objective was largely public revenue and partly efficiency improvement, leading to lower tax effort. Even here, nuclear electricity could not be privatised, due to significant external costs, which the private industry was not willing to pick up. While water was being privatised in Britain, in the face of widespread hostility from the consumers, in France, the demand for privately supplied water came from the consumers themselves and has grown steadily for 50 years. In France, water assets are publicly owned but privately managed, through contracts negotiated individually by private companies with France's 36,000 mayors. Besides, the French water companies

have highly diversified portfolios from running hotels to burying the dead, and have subsidiaries in Africa, North America, East Asia & much of Europe.

Theory of Privatisation:

Enterprise performance is viewed as a function of (i) ownership, (ii) competition in the product market and (iii) other factors such as managerial freedom and the external environment.² Taking the first two factors, organizations can be classified in a 4-way table as below:

		Product Market	
		<u>Monopoly Competition</u>	
Ownership	Public	A	B
	Private	C	D

Privatisation means a transition from A to C, with an implied assumption of a further transition from C to D. D is also superior to B, because while it is not clear whether competition between state-owned industries could be effective, competition between privately owned companies is, very clearly, a reality.³ However, mere privatisation, from A to C, is actually worse, and to mitigate the ill effects of private monopoly, invites regulation. The crucial question, from an efficiency point of view then is, whether the transition from C to D is possible. For the electricity industry it is highly doubtful, because of the presence of entry barriers such as economies of scale and high investment requirement.⁴ Therefore, of the two desirables, D is unachievable and B is a slippery concept. That leaves us with A and C as necessary evils, with the profiteering sting of C removed by regulation, as stated before. In either case, allocative efficiency is sought to be achieved by imposing marginal cost pricing. Financial survival is taken care of by allowing the firm a fair rate of return for C and by providing budgetary support for A. X-efficiency (striving for minimum cost) is ensured by standard costing and target-based incentives⁵ for A, while in the case of C, it is sought to be achieved through regulation which in turn uses standard costing and other efficiency norms in allowing tariff increases.

Privatisation in Practice:

Evidence of the connection between ownership and efficiency is mixed.⁶ Privatisation, however, tends to lower entry barriers, at least over a period of time, and the threat of free entry itself is expected to improve performance. Yet, studies of private utilities in the U.S. have shown markedly varying levels of efficiency among firms. In U.K., with privatisation, there is a duopoly, and according to the Economist a collusive price rise of just 1 p, up from the present 2.7 p could yield an extra profit between 100m-150m.⁷ Other factors, equally, have begun to knock at the image of privatisation, in U.K. The sight of private sector top managers rushing to double their salaries; the

recent setbacks for privatised firms like Jaguar, Rolls Royce and British Aerospace have jolted some of the rosier assumptions about privatisation as an industrial cure all.⁸ Above all it has not lead to competition, which, given the industry structure is not surprising.

In India, however, the term privatisation is not synonymous with de-nationalization, but a selective lifting of the No-entry sign for the private sector. Entry is permitted in coal, gas and mini hydro sources for electricity generation. As regards transmission and distribution, the Government doesn't seem to have not made up its mind, as is evident from its silence on this topic, in its press note [see Table 1].

Present Status of the Private Sector in India:

At present 4 private utilities, account for less than 3000 MW of generation with one of them also responsible for distribution in a specified area. All the private companies are reporting good profits.

TABLE 1
Features of the Press Note by the Ministry of Energy on Privatization

Incentives	Proposed	Existing
Debt-equity ratio (upto)	4:1	2:1
Return on equity (ROE)	15%	12% for fertiliser industry. 3% for State Electricity Boards, 10% for National Thermal Power Corporation
Interest capitalisation	Full actual	Upto 1% over Central Bank rate
License period	30 years	20 years
MRTP clearance	exempted	necessary
Organization structure	Generating company or joint sector	
Captive units	Can sell power to State Electricity Boards	Cannot sell
Clearance	Speedy	slow
Foreign participation	single window clearance	closed door

* Monopolies and Restrictive Trade Practices

Conditions:

1. a) At least 60% of outlay must come from non-financial institutions , i.e non-governmental finance.
- b) At least 11% must be through promoters' contribution

2. The private sector will sell power to the State Electricity Board (SEB) through a two part tariff to be fixed with reference to (efficient) operational norms and an optimal plant load factor (PLF).
3. The private sector plants will operate under grid discipline.

Scope for Private Sector

Since electricity is in the concurrent list, i.e. under the control of both the federal and state governments, private sector has to win the approval both from the Central Government and the concerned State Government. Some State Governments freeze the location for private sector projects. For thermal plants, 'coal linkage', i.e., linking the supply from a particular coal mine, has to be accorded by the centre. For gas-based stations, even though the current economic cost is low since gas is being flared, the future cost may not be as low, and at present, the high administered price of gas comes in the way of financial viability. Besides there is opinion that value added to gas is more in petrochemicals and fertilizers than in electricity and as such, gas should not be wasted. Anticipating future shortage of natural gas, a combined cycle plant is suggested with future provision for using gassified coal. Gas turbine stations are cheaper in terms of capital costs, their gestations are short, and their efficiency is much higher. Also they are environmentally friendly and they can provide a quick start up facility for large coal-based thermal stations. These advantages have to be balanced against the opportunity cost of gas in the long term when it will have alternative uses in fertilizer production. As regards mini hydro, project reports indicate that unit costs comparable with captive diesel generation costs and as such, tend to be viable only as peak power, and there is only limited interest in them from the private sector. For States with energy surplus but peak demand deficit, economics of pumped storage should be explored, as these would provide better utilization of thermal units during night, when their power could be used to pump water back to hydro catchment areas. However, at present, the major scope for private power generation seems to be restricted to the coal based thermal option.

In Privatisation, two issues arise.

1. Whether the required amount of resource can be mobilized from the market? and
2. How to resolve the inherent conflicts between private power companies and State Electricity Boards?

These are explored in some detail below.

1. Resource Mobilization:

The funds required for generation alone in the VIIIth Plan (1991-96) is to the order of \$44 billion. A possible source mix for meeting this requirement may be as follows:

	\$billion	(%)
Government	29	66
Public Financial Institutions	6	13.6
Foreign loan/equity	3	6.8
Domestic equity/debenture	6	13.6
	<u>44</u>	<u>100</u>

Thus about \$ 6 billion has to come from the private sector capital market, for the power sector alone. Against this, the total capital mobilization in the Indian capital market in 89-90 was to the order of \$ 3 billion.

A related question is whether the 15% ROE is attractive enough. Though the announcement has not made it clear, it is presumed that this 15% is post tax. Also it is applicable only for fresh investments and not for old assets. Then it has to be compared with 12% post tax return allowed for the fertilizer industry. However, for electricity, the uncertainty in demand is much less than for fertilizer. The industry hopes to get de- facto a higher ROE by linking tariff with productivity. However this is not without attendant problems as will be discussed later. Also thermal power projects have a gestation period of 4 to 5 years. During this period, money doubles in safer deposits. Again, out of the surplus, the Act requires various reserves to be kept aside restricting the scope of giving off the entire surplus as dividends. However, these problems have to be contrasted with the extremely good financial performance of the existing power companies,⁹ proving that though they are somewhat unattractive in the short run, they are very attractive in the long run.

In summary, while the long-run profitability is good, short run profitability is not and its not clear whether \$ 6 billion can be raised over 3 to 4 years from the private sector.

2. Conflict between private power companies and SEBs:

When setting up a new power plant, there is no priori reason that between private and public power, one should be more costly than the other. But certainly there are a number of reasons making make the financial cost of private power much more than that

of public power. These high financial costs, albeit distorted, will create conflict between the private utility and the State Electricity Boards, because the latter are forced to buy the 'costly' power of the former, thereby worsening its already poor financial position. The conflict will be further accentuated by a productivity-based plant-load-factor (PLF) - linked tariff for the private utilities. These two issues are now examined in detail.

2.1 Will the SEBs buy the high cost private power?:

Private sector power is expected to cost much more than SEB power, despite the so-called improved efficiency of the former, due to many reasons:

i) Depreciation: The Electricity Supply Act which presently governs the SEBs, allows a depreciation of 90% on assets over 25 years, amounting to 3.6% per year. The World Bank allows power sector assets to be depreciated over 15 years. The Income Tax Act for the Industries allows 33%, but this would never apply to the Power Sector. In the Power Sector, the long life of the assets and the price increase of these assets every year impose conflicting demands on depreciation. The Central Electricity Generating Board, U.K., takes this factor into account by inflation accounting: depreciation at any particular year is calculated as the difference between the current replacement cost and the accumulated depreciation divided by the remaining number of years. In the present case, any change from the Act will increase depreciation and hence the financial cost of power in the initial years, and reduce it in later years¹⁰ ~~THAT~~.

ii) Capital Structure and ROE: The debt:equity of 4:1 is allowed for the Private Sector with an ROE of 15%,¹¹ as against 1:0 for SEBs and an ROI of 3%. This will again increase the private power cost vis-a-vis the SEB power. Interestingly, though the NTPC, a public power utility, is allowed debt:equity of 1:1, its ROE is only 10%.

iii) Economies of Scale: The Private Sector will also not have the economies of scale inherent in putting up 1000-2000 MW plants in one place and the pit-head generation advantage which the NTPC and some Electricity Boards have, since finance will restrict them to 230 to 500 MW size, and they will not be given pit-head locations.

iv) Generation Mix: The private sector has to stick with the high cost source like coal or gas whereas the SEBs have the low cost old hydro sets many of which have been fully depreciated but are still in good condition, bringing down the average cost of power.

As against these, the ameliorating factors for the private sector are that they can buy a more efficient plant due to the latest technology, do more informed buying, and can operate their plants more efficiently, but these do not outweigh the aforementioned odds against them. The question then is whether SEBs will buy this high cost power from private sector, ensuring them a 15% or more return, while they themselves are not

permitted to raise the tariff that will allow them even the statutory 3% return on their low cost - albeit 'inefficient' - assets.

2.2 Will the SEBs guarantee the PLF to the private companies?:

The second source of conflict lies in the productivity or PLF- based tariff, to sell private sector power to the SEBs. The PLF is a measure of overall capacity utilization. In other industries, where products can be inventoried, this reflects the capacity utilization of the supplying equipment, except under recessionary conditions. However, in the case of electricity, inventorying prospects are highly restricted to the extent of thermal energy that can be banked in the hydro system.¹²

Ignoring this limited banking facility, it is clear that the overall capacity utilisation is a joint function of the demand, represented by the load factor, and the supply, represented by the availability factor. It is seen that while the availability factor is within the control of the management in the power company, the load factor, which is determined by the portfolio of loads like industry load, agricultural pumpset load, etc., is beyond the control of the management, and has to be taken as given exogenously.

Now the 2 part tariff can be set in two ways. The fixed cost which is capacity cost consisting of depreciation of equipment, operation and maintenance, interest charge and rate of return on the rate base, can be given as a fixed amount per year to the generating company and the variable cost, viz., the energy cost of burning coal in the boiler can be given according to the amount of kwh of electricity sold to the SEB. In this scheme a small incentive can be built in to maximise output, but the ROE is delinked from the PLF since the rate of return is covered in the fixed cost.

In the second method, the tariff is linked to the PLF. In this case, the fixed cost is divided by the no. of units that would be generatable in a year as per the PLF norm laid down, and the fixed cost is thus unitised and added to the variable cost to give an average total cost. In this scheme, the advantage to the producing companies is that they would earn more than the stipulated 15% if they exceed the PLF norm and less vice versa. The catch is that they depend critically on the SEBs to give them the guaranteed PLF and more.

It is highly unlikely that the SEBs will give them the profit maximising PLF. Here the SEBs are protected by the clause that the private plants have to obey the grid discipline. Grid discipline means, that the generating stations are ranked by the average variable cost of operation and this merit order determines which power stations are called upon to provide electricity and when. In order to minimise total operating cost, that plant which has the minimum average variable cost will operate to the maximum extent.

At the National Thermal Power Corporation (NTPC) for example, the average cost at normative levels of generations works out to 1.7 cents per kwh. Of this 1.1 cent

accounts for the fixed costs and 0.6 cents for the fuel (coal & oil) costs. Even this low rate is not good enough for the SEB, during off peak demand because the fixed costs for SEB are sunk costs and the variable costs of even its inefficient plants will be less than this 1.7 cents per unit which it has to pay to NTPC, while backing down its own generation. This is what the grid discipline will also say if NTPC power is taken at 1.7 cents/unit and not at 0.6 cents/unit (from the point of view of the SEB). This is the drawback of linking tariff with productivity. Another difficulty for the SEB is that its generation staff will lose productivity-based incentives if it backs down when it can produce. The point is, when there is shortfall all the power can be bought at the high price, but when there is surplus, for example during night, there will be reluctance to buy. This reluctance will increase with the price of bought out power, the ratio of peak to off peak load in the system over the year and the limitations on banking thermal energy. The price of private sector power may be upwards of 5 cents per kwh.

The private sector is fully conscious of this problem of getting the PLF guaranteed and yet they are keen on this for one reason. An ROE of more than 15% cannot be reasonably asked and linking it with an average PLF is the only way to secure a higher de-facto return. One way to partly gain control of PLF is for them to distribute electricity themselves, directly to the ultimate consumers. The private sector has been asking for this, but with the proviso that social burdens like rural loads would have to be paid for by the Government through grants. The fact that SEBs are bad debtors is another reason why the private sector seeks transmission and distribution rights. However, the SEBs are unlikely to agree to the private sector proposal to wheel power through their networks to serve the ultimate consumers.

Also there are some draconian provisions in the existing Act putting the licensee private company at the mercy of SEB. If the licensee does not expand at the behest of the SEB, the latter can acquire the licensee company after giving due notice. These provisions have to be revised. At present, the plant of a private company is called a controlled station whose operations are controlled by the SEB.

Suggested new model:

Separate the source into high cost and low cost source. Separate the load into high price and low price segments. Match the high cost source to high cost load and keep it in the private sector. Similarly match the low cost source to low cost load and keep it with the SEBs.

To operationalise this, progressively sell off all the coal thermal sets from SEB to private sector. With this high cost source, allow the private sector to supply to industry and commercial establishments, and allow them tariff based on fair rate of return. This then leaves the SEBs with the low cost hydro power which they can then sell to the domestic, rural and agriculture sector at lower prices. This way the private sector will be

left with a market good and the SEB will be left with a social good, and since it is left with a low cost source, it will not require any further subsidy.

Conclusion:

It is unlikely that the scheme, as announced, will succeed in mobilising the resources from the private sector due to the latter's apprehensions and the conflict of interest with the SEBs. Nor is the proposal likely to bring any gains in efficiency, because the market structure would still be predominantly duopolistic, and the size of investment required prevents emergence of competition. Even in U.K. they have been unable to bring in competition. In view of the above, we suggested a different model of privatisation, linking the high cost thermal to industry and the low cost hydro to public uses and supply to the poor.

The idea needs to be fleshed out further to ensure feasibility, like matching the ratio of high price and low price loads with the ratio of high cost and low cost sources; wheeling of private power through SEBs networks, valuation of thermal plant assets for sale, carrying the employees along through the change etc. If successful it will give birth to the adoption of the concept: Market goods in the private sector and public and social goods in the Public Sector.

References:

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- ³Stephen Little Child, Director General, Electricity's Interview, IEE Review, Oct.1990. pp.343-345.
- ⁴D.N. Ghosh, 'Incoherent privatisation, Indian Style', Economic and Political weekly, Bombay, May 1991, PP.1313- 16.
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- ⁶A.Kay and D.J. Thompson, "Privatisation: A Policy in Search of a Rationale" The Economic Journal March 1986.
- ⁷"Electricity Privatisation: The Generation Game" The Economist Sept.1, 1990. p.55.
- ⁸Rules for behemoths: Britain's Privatised Utilities are being regulated badly. Discuss."The Economist Oct.19,1991. P.20.
- ⁹The good performance - inspite of the lower return of 12%, - is perhaps because of accumulated reserves which also earn a reasonable return, and more significantly because of the low PLF norm, which at present they are able to exceed.
- ¹⁰While the plant's life is around 30 years, even now the private sector tariff is made based on depreciation assuming 15 years' life. The tariff should then reduce after the plants have been fully depreciated. It is not clear whether this reduction is enforced for private power.
- ¹¹ With a higher debt - equity ratio, the same post tax profit, will yield a higher ROE.
- ¹² You back down the hydro plant instead of the thermal plant, and thereby 'inventory' the thermal electricity into the hydro system, since by design it has built-in excess capacity to meet peak load without itself losing any hydro out-put since the storage of water in the hydro is constant over a year and if not now the hydro energy can be produced later. This facility is called banking.