

**THE AETIOLOGY OF THE  
INEFFICIENCY SYNDROME  
IN THE INDIAN POWER SECTOR**  
**Main Issues and Conclusions of a Study**

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- i) Working Paper No. 308, *Plight of the Power Sector in India: SEBs and their Saga of Inefficiency* (November 2000), published in two parts in *Economic and Political Weekly*, Vol. 36, Nos. 2 and 3, January 13 and 20, 2001;
- ii) Working Paper No. 312, *Electricity Demand Analysis and Forecasting - The Tradition is Questioned!* (February 2001);
- iii) Working Paper No. 316, *The Political Economy of Public Utilities - A Study of the Indian Power Sector* (June 2001); and
- iv) Working Paper No. 320, *Time and Cost Over-runs of the Power Projects in Kerala* (October 2001).

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## ABSTRACT

The present study is an attempt at a detailed diagnosis of the accumulated inefficiency in the Indian power sector, the consequent reform drives, and the political economy involved in these aspects. The discussion in the wider canvas of the national scenario is substantiated by focusing on the Kerala power sector, taken for illustrative purpose. It is shown that much of the capacity/energy deficit we experience today could be easily avoided with some achievable functional improvement in the power sector. We also estimate, on some very plausible assumptions, the avoidable cost of inefficiency at a few amenable functional levels and find it to represent about one-third of the reported cost of electricity supply in India in 1997-98! Given such scope for cost reduction, the attempts at tariff hikes amount to transferring the inefficiency onto the customers. Based on these observations, we argue that the present system predicament is due to problems that are just internal to the system. This then implies that there do remain sufficient quarters for remedial exercises, meant to remove the problems that stand in the way of the SEBs' improved performance. In other words, what the system badly requires is essence-specific reforms, not structure-specific ones. We hence question the (unfounded) logic of the structural reform in the sector now posited as *the* panacea. We also list out a number of feasible suggestions for the improved performance of the sector, in the context of Kerala.

**JEL Classification:** H1; H4; L94; P16; Q4.

**Key words:** Indian power sector, inefficiency, reform, political economy, equity.

*“Turning and turning in the widening gyre  
 The falcon cannot hear the falconer;  
 Things fall apart; the centre cannot hold;  
 Mere anarchy is loosed upon the world,  
 The blood-dimmed tide is loosed, and everywhere  
 The ceremony of innocence is drowned;  
 The best lack all conviction, while the worst  
 Are full of passionate intensity.*

*Surely some revelation is at hand;  
 Surely the Second Coming is at hand.”*

- W. B. Yeats (*‘The Second Coming’*)

## **1. Introduction**

This paper is the fifth in the series of working papers, arising out of the research study on the power sector in India titled **Plight of the Power Sector in India: Inefficiency, Reform and Political Economy**. A separate and comprehensive study report has also been completed. The purpose of this working paper is to give, in a condensed form, the main issues, findings, and conclusions of the research study. Within the larger canvas of the national scenario, we have given particular attention to Kerala by way of illustration.

Power development is placed in the concurrent list of the Indian Constitution, as a joint responsibility of both the provincial states and the Centre. The total installed capacity (IC) grew at an average annual compound growth rate of 8.65 per cent during the last four decades from

3,223.11 mega watt (MW) in 1957-58 to 89,090 MW in 1997-98. Out of the total IC in 1997-98, 63.3 per cent was owned by the States, 30.7 per cent by the Centre, and 6 per cent was in the private sector. Actual generation increased during these four decades at a rate of 9.45 per cent p. a., from 11,369.14 million units (MU; 1 unit = 1 kWh) in 1957-58 to 4,20,405 MU in 1997-98, and total sales of electricity at a rate of 9.0 per cent p. a., from 9,345 MU to 2,93,479 MU respectively.

This seemingly impressive growth, however, conceals much of the inadequacies of the system; its deficient capacity, lagging far behind the growing demand, has plunged the country into a chronic shortage situation – with an energy deficit of 11.5 per cent and a peak load deficit of 18 per cent by the end of the 8<sup>th</sup> Plan (1996-97). Still worse, the per capita consumption of electricity in India has been one of the lowest in the world. The immediate victims of the widening load-capacity gap have been the quality and reliability of the power supplied; for example, the Kerala system operates under low voltage and low frequency (some times up to 47.5 Hz, instead of 50 Hz) to reduce load further in addition to regular power cuts and load shedding, that have become the rule of the day.

The cumulative effect of a legion of forces of inefficiency has been at work behind this plight of shortages such as inadequate capacity addition, low capacity utilisation, and very high transmission and distribution (T&D) loss. Adding to these infirmities of inadequacies have been the financial failures from a host of other factors – irrational pricing practices and over-manning, sponsored by political pampering of across-the-board subsidies at the cost of efficiency, and an infamously flourishing ‘x-inefficiency culture’. In this background, the capacity-deficient Indian power sector had the rude shock when confronted with the fiscal crisis begotten revelation that the conventional budgetary funds support for capital augmentation programmes had dried up. The

ill-ridden performance of the sector had already left it penniless and penurious. The predicament thus posed had also its ready-made solution prominently decked on its cap – the private sector. But the Indian capital market was too feeble to support the sector and hence, the significance of the foreign sector. Thus has commenced the siege of power sector reforms in India.

In what follows, we attempt to look into the above aspects for a possible explanation of what in their behaviour trajectories have warranted reforms in the power sector in India in general and Kerala in particular. The references to Kerala situation in this paper are largely illustrative in purpose in the wider canvas of the national scenario, and our observations on Kerala apply to most other states, though in varying degrees. The following section provides the background that has provoked our study into the dynamic causes of the accumulated inefficiency in the Indian power sector that are discussed in detail in section 3. Section 4 questions the (unfounded) logic of the structural reform in the sector now posited as *the* panacea, and section 5 lists out a number of feasible suggestions for the improved performance of the sector, in the context of Kerala. The last section sums up the discussion.

## **2. The Background**

### *The Electric Utility as an Integrated System*

As in the case of any other product, supply of electricity also involves three distinct functions of production (generation), transportation to market (transmission) and retail supply (distribution), the only difference being that electricity is non-storable in its usable form and hence must be generated the moment it is demanded for. This in turn requires instantaneous co-ordination and integration of the three vertical functions which is technically facilitated by the continuous, instant flow of electricity from the generator to the end-use equipment at a velocity approaching that of light. Thus an electric utility is distinctly

characterised by the technical necessity and significance of vertical integration.

In addition to this technical condition for centralisation is an economic requirement for the integrated functioning of the electric utility. This emanates from its natural monopoly status, granted by its characteristic cost complementarity that occurs in the presence of economies of scale and scope. The economies of 'non-convexities' (i.e., the economies of overhead costs, Clark 1923) in turn are related to the asset specificity that characterises the electric utility. Asset specificity refers to the relationship-specific investment, for example, in the transmission and distribution sectors, which, once sunk, has little value in alternative uses (i.e., other than the intended one). The large scale transmission (and the associated primary distribution) asset specificity arises in the context of the site specificity of the hydropower plants and the mine-mouth coal plants. The size constraint, in favour of large plants in the generation sector, also involves economies. The consequent vertically integrated natural monopoly position of the electric utility thus ensures productive efficiency in the sense that the cost of supply is minimised by having a single firm supply electricity (under which condition the cost function is said to be sub-additive). Securing such productive efficiency, however, can be disastrous if the monopoly is in the hands of private profiteers with the functional behaviour of setting the output below optimum and the price above marginal cost, causing dead weight loss. Such allocative inefficiency may be avoided in principle in a competitive market of many firms, which, on the other hand, will violate the productive efficiency criterion, favouring a single firm in the industry. Nationalisation of the natural monopoly in the general interests of the society can resolve this dilemma and ensure *both* allocative and productive efficiency *and* equity. This is the economic rationale as well as the welfare justification for the electric utility being in the public sector.



### *Dysfunctionings in the Public Sector*

This in-principle organisational superiority notwithstanding, the public sector in general has remained in practice at the receiving end of a number of dysfunctionings. A justificatory setting has also been in the making here. The market is given a far-flung recognition as providing sufficient signals for efficient performance of the economic agents, despite the fact that the actual situation seldom simulates this perfection. Juxtaposed with such an ideal picture, the non-market behaviour of a State sector easily falls under an impression of inevitable doom of inefficiency. Unfortunately, history has yielded enough corroborating substance to this tendency, turning it out into an almost universal truth, in terms of the infamous dysfunctionings under a number of quasi-socialist systems especially in the Eastern Europe. Added to this have been the costly consequences of pork-barrel politics in the Third World countries of making a fetish of socialist institutional forms sans essence – with unscrupulous corruption ingrained in the whole body politic, moral hazard and the consequent x-inefficiency syndrome have cankered all the functional commitments. In the absence of productivity consciousness, internal resource generation meant for further capacity expansion in the State sector has often drawn blank, requiring heavy State financing. The cumulative effects of all these functional irregularities have reached such a pass as to take the public sector for granted as structurally inefficient. This dynamics of destiny have had enough room for its full play in the Indian power sector too.

### *Electric Utility in India – A Saga of Dysfunctionings*

As in the case of other infrastructure facilities with high capital intensity and long gestation period, that stood to deter any entrepreneurial initiative by a nascent private sector, the responsibility of power development also was originally shouldered by the State in

India. Power is a concurrent subject under the Indian Constitution, its development being a joint responsibility of the central and provincial state governments. However, since 1956 till the 1970s, the subject had almost exclusively been confined to the State sector with an accelerated growth. In the 1980s, on the other hand, the state sector enthusiasm dried up, and the weight of capacity addition shifted from the state to the central sector. And the private sector has been assigned a major role in power generating capacity expansion since the turn of the 1990s. This variable trajectory of investment behaviour illustrates the effects of the iltfare of the power sector in India in terms of the financing capacity for development.

Even though the State Electricity Boards (SEBs), established for the rationalisation of power development at the state level, were statutorily required by the Electricity (Supply) Act of 1948 to function as autonomous corporations, they were in effect regarded as promotional agencies, expected to subserve the social, political and economic policies of the governments. (The central sector utilities, on the other hand, are corporations, like the private ones, under the Companies Act.) The patronising policies of the State resulted in overstaffing, especially at the non-technical, administrative level, involving unwarranted cost increases and in irrational pricing practices for subsidised power sales in the name of industrialisation, agricultural development as well as domestic sector distributional considerations, all tainted with political motives. The State's commitment on rural electrification, as translated through the SEBs on their responsibility also imposed heavy cost burdens. Although the State was required to fully compensate the SEBs for its induced inefficiencies in terms of subsidised power sales and rural electrification duties, the compensation was irregular and inadequate, causing substantial cumulative losses to the Boards.

The government intervention further extended to the very day to day organisational affairs of the SEBs. The socio-political dynamics in

different states resulted in a situation of widespread corrupt practices of nepotism, at the cost of merit, ability and efficiency. Political considerations dictated the appointment and the tenure of office of the top management personnel, and this retarded their commitment and involvement in serious independent policy making. A general lethargic indisposition for accountability, stemming from a steady enervating erosion of competitive management values infected the institutional texture to the bottom. This was also due to the management culture, in the bureaucratic ways of functioning, inherited by the SEBs as they had been carved out of the earlier government departments. In such contexts, self-interest maximisation drives in a favourable climate of information asymmetry and incomplete contracts stood to stimulate moral hazard effects – that is, default and breach of trust in doing one's duty committed, giving rise to a sort of x-inefficiency. The unaccountability culture in its accumulated scale worked along with the direct government intervention behind the dysfunctionings of the SEBs.

It should be stressed that the performance of the SEBs was largely determined for a long time by the assertions and defenses of their statutorily intended promotional role in power development. The SEBs were to subserve the socio-economic policies of the State and hence expected not to view every aspect of developmental activities exclusively from the point of view of profit or return, as highlighted by the Venkataraman Committee of 1964. Thus there was no compulsive requirement, till the late seventies (till the 1978 amendment of the Section 59 of the E(S) Act, 1948), for the SEBs to break even, as also even to provide for full depreciation and/or interest payable on Government loans, both of which could, under the Statute, be provided for only if there were adequate surpluses after meeting all other obligations. Thus there seemed to be no idea, let alone requirement, of the SEBs contributing internal resources to expansion programmes. The SEBs have not yet

come out of that spell of unaccountable, non-commercial performance, and in general continue to have negative internal resources.

A number of committees, for example, the Venkataraman Committee of 1964, examined the functioning of the SEBs and recommended a net return of 3 per cent on capital base, after providing for operation and maintenance charges, contribution to depreciation and general reserves, and interest on loan. However, the 1978 amendment to the principles of financial performance of SEBs contained in Section 59 of the 1948 Act did not stipulate a specific figure of return to be earned, but merely provided that the Boards should earn a positive return 'after taking credit for any subvention from the state government', and after meeting all expenses properly chargeable to revenues, including operating, maintenance and management expenses, taxes on income and profits, depreciation and interest charges. The amendment also recognised the desirability of the SEBs having part of their capital as equity and allowed any state government to notify the SEB as a body corporate. However, the government wisdom could not digest such desirabilities, lest it should forgo a political cornucopia of populism. And the SEBs remained in the same old spell of unaccountable, non-commercial performance, leaving little internal resources for expansion.

### *The Irreversible Surgery: The Surge of Reforms*

All these developments necessarily had the making of an apparent harbinger of radical mutation. The inflated inability of both the state and the central power sectors to finance further capacity expansion led *ipso facto* to the foregone conclusion of large scale private participation as the sole solution to the worsening power shortage situation. Both the local and global settings were changing in colour in favour of a triumphant return of liberalism, following the fall of socialism. The new private sectorisation drives had an apparently formidable backing of a

now widely justified ‘there-is-no-alternative (TINA)’ logic. It should be stressed that the Thatcherite privatisation drives in the UK and the Reaganomics of deregulation in the US could be projected on a TINA argument only against the backdrop of the unfortunate historical incidence of the infamous dysfunctionings in the quasi-socialist countries in the Eastern Europe, where reactions and revolts favoured a ‘back to market’ transition. And finally, as the Soviet Union crumbled and fell, liberalism came up in the void from the shadow as the only path to the Promised Land.

The international financial institutions headed by the World Bank could make full use of these developments by means of contrived ‘tied aids’ in favour of a liberalised world for private enterprise interests. Though the euphemism of structural adjustment entered into the international parlance in 1980 with the introduction of the World Bank’s structural adjustment loan (SAL) as a new type of credit, in the wake of the Chilean reforms, the Bank’s stress upon the ‘economy-wide programs of reforms’ got much more strengthened along with liberalism. Later on the Bank switched emphasis from SAL to sectoral adjustment loans with narrower policy objectives, though the general policy thrust is similar. For added momentum, the International Monetary Fund (IMF) also rose to the occasion in 1986 with a new Structural Adjustment Facility, intended to provide medium-term BoP assistance to low income countries facing protracted BoP crisis in return for a programme of policy measures dictated by the IMF. It was augmented at the end of 1987 by an Enhanced Structural Adjustment Facility with considerably greater resources.

Most of the countries in Africa, Latin America (Chile, Argentina, Brazil, Uruguay, etc.) and Asia (New Zealand, Malaysia, the Philippines, Thailand, etc.) are ‘progressing’ on such reform path that leads especially to a deregulated privatised electricity industry. Most of the former

Communist Bloc countries have also started large scale restructuring: the Czech Republic, Hungary, Poland, and Croatia, who are also keen to join the European Union (EU). Romania and Slovak Republic have, however, so far desisted from committing themselves to the ultimate goal of electricity privatisation. Among the OECD countries, the UK, Canada, Germany, Spain, and Australia have made 'great strides' towards privatisation, while liberalisation gathers momentum across the US, Ireland, Sweden, Norway, and New Zealand. The only electricity industry in the public sector that still stands impervious to the sweeping waves of the so called reform reagents is the *Electricite de France* in the hands of the French Government.

In this receptive background, India too became a party to the brave new world. The turn was facilitated, as in the case of other developing countries, by the infamous fiscal crisis at the dawn of the 1990s. Confronted with the consequences of the Gulf war in a political flux of frequent changes in Government, India plunged into an apparent balance of payments (BoP) crisis in the second half of 1990-91. As India's credit rating in international capital markets nose-dived, access to external capital borrowing narrowed and substantial capital flight occurred out of the country. In June 1991, despite a severe squeeze on imports, India appeared wavering on the verge of a default on external debt obligations for the first time in her history. However, she survived the crisis, and she emerged unscathed, but with a new flag of ideological allegiance in her hand. She emerged enlightened "that the economy needed substantial reforms if the crisis was to be fully overcome" (Government of India, *Economic Survey, 1991-92*: 11). The fiscal correction that followed the awakening meant still meagre provisions to an already starving power sector, designed on the premise that further investments required in the sector should be financed from internal resources. A system traditionally attuned to unaccountability and hence functionally sick and financially

wreck, the SEBs thus left in the lurch by the Governments to fend for itself, had then only one way open before them – that leading to the private sector. But the domestic private sector remained meek and weak, *ergo*, the door was to be opened to the global agents. And the siege then started – the siege of power sector reforms!

Thus functional inadequacies and financial infirmities of the SEBs, though entirely avoidable, came in handy for a mis-characterisation of the whole sector: the costly disfunctionings were unreasonably identified with economic inefficiency, associated with the standard notion of some market structure devoid of competition. Thus mistaking functional inefficiency for structural/organisational deviations made it easier to put up a foregone conclusion in favour of a need for restructuring the power sector. And there opened up in the Indian power sector a vast vista to the ambitious global capital to emulate Enron-tragedy.<sup>1</sup>

It is this background that has provoked our look into the aetiology of the plight of the Indian power sector in terms of the accumulated inefficiency and the consequent initiatives of reform process as well as the political economy of that plight.

### **3. The Aetiology of the Plight**

#### *Inadequate Capacity Addition and Utilisation*

For one thing, in no Plan period the target in IC could actually be achieved, the cumulative slippage between the target and the achievement remaining well over 20 per cent. The excessive time and cost overruns in most of the public sector power projects stood to worsen the situation arising from the inability of the State to undertake its responsibility for adequate capacity addition in the name of a shrinking coffer.

Poor capacity utilisation has substantially corroded the system performance. Capacity utilisation in terms of energy generated per kW

of IC grew over the last four decades in India at an average annual compound rate of just 0.73 per cent from 3,527.38 kWh/kW in 1957-58 (utilisation of 40.27 per cent) to 4,718.9 kWh/kW (53.87 per cent) in 1997-98. Thus in 1997-98 (even in the face of deficit), only 54 per cent of the existing IC in India was utilised. As many as 11 (out of 19) SEBs had a use factor much less than this all-India average, including Kerala and Tamil Nadu in the South, and only four (as well as the Central Sector with 63 per cent) had a rate higher than 60 per cent. It should be noted that for a hydro-power dominant system, such as in Himachal Pradesh, Meghalaya, Kerala, and, to some extent now, Karnataka, utilisation efficiency should be evaluated with respect to firm power capacity (the always available and dependable capacity corresponding to the minimum stream flow and storage) rather than with respect to IC. Thus taking into account the hydel firm power capacity of 714.5 MW of Kerala in 1997-98, the actual capacity utilisation comes out to be 6,308.46 kWh/kW or about 72 per cent. However, a distressing question here concerns about the overcapitalisation, i.e., the wide gap of 'waste' between the IC and the dependable power of the hydro-plants; the latter being just 42.3 per cent of the hydel IC in Kerala in 1997-98. Considerable timely efforts on firm power augmentation projects are called for here, besides those on the usual IC additions.

### *Huge T & D Loss*

Still much more dismal is the condition of capacity utilisation in terms of energy sold per KW of IC – with a growth rate of only 0.32 per cent p. a., from 2,899.37 KWh/KW (33.10 per cent utilisation) to 3,294.19 KWh/KW (37.61 per cent) over the same period. The growth over the last four decades of energy generated and sold indicates an elasticity of energy sales with respect to energy generated of just 0.84. This highlights high levels of auxiliary consumption and extremely high transmission and distribution (T&D) losses. Over 82 billion units of electricity were



lost in T & D in various States in India in 1997-98. The losses increased from 19.8 per cent in 1992-93 to 23 per cent in 1996-97, and then declined marginally to 21.8 per cent in the next year. These are very high by international standards. In almost all the States the losses remain very high, from 15.2 per cent in Maharashtra to 47.5 per cent in Jammu & Kashmir in 1997-98. T & D losses in Kerala was in a satisfactorily comparable position till some two decades back, the losses having been less than 15 per cent. However, it increased to substantial extent in the following years, averaging about 24 per cent during 1982-83 to 1996-97, with a reported peak at 29 per cent in 1987-88. In the recent years, the loss is reported to be declining to 17 per cent. It should be stressed here that even these high figures are only underestimates, put out by the SEBs in their eagerness to record reduced transit losses. Since a modicum of metering is done only at the consumption end (that too barring agricultural consumption in most of the states), the SEBs find it convenient to put up a comfortable loss rate and dump the remaining part of the unaccountable-for energy in the manipulated figures of generation and auxiliary and agricultural consumption. A detailed investigation, conducted by the Integrated Rural Technology Centre (IRTC), into the distribution losses in a typical rural electrical major section, viz., Kongad of Palakkad distribution circle in Kerala, has found the losses to be of the order of 35 per cent from the point of transformers, about 85 per cent of which could be accounted for by technical losses, with 30 per cent of the energy meters being faulty (quoted in CDS 2001: 57-58). Along with such high technical losses thrive losses through theft and unauthorised drawal; in 1997-98, the anti-theft squad of the KSEB detected cases of theft of energy worth Rs. 1.21 crores, and in 1998-99, worth Rs. 1.04 crores (*Malayala Manorama daily* 23 August 2000).

### *Organisational Inefficiency*

Besides these technical inefficiency constraints of the power sector in India are the institutional and organisational factors. Excessive interference in the affairs of the SEBs by the State governments, in their careerist pursuit of patronising the populist social security concerns, has resulted, for one example, in over-employment in the SEBs, especially and more unwarrantedly, in administration section. The number of employees per MU of energy sold in India in 1990-91 was about 5 (implying a labour productivity of 0.2 MU per employee), while it was 0.2 (or 5 MU per employee or 25 times higher than that in India) in Chile, Norway, and USA, about 0.6 (or 1.7 MU per employee) in New Zealand, Argentina, and UK, and less than 2.5 (or 0.4 MU per employee) in some developing countries such as China, Philippines, and Indonesia (Rao et al. 1998-99: 42-43). Though the ratio declined marginally to 3.6 in 1996-97, still higher than the standards abroad, wide disparity prevails across the States, from 41.4 in Arunachal Pradesh to 1.9 in Gujarat. Kerala had a ratio (3.8) somewhat corresponding to the all-India average, and slightly higher than her neighbours.

Another institutional factor breeding inefficiency has been the lack of professional management with commitment, accountability, inclination and initiative in decision making. A steady enervating erosion of competitive management values has sapped the institutional texture to the bottom, giving rise to all-round x-inefficiency. For one thing, continuity of management by top personnel at the policy making level has been a perpetual loss. In most of the SEBs, the average tenure of Chairmen and Chief Engineers is very limited – for an example, four Chairmen of KSEB in 1973-74 had tenures less than one year, out of which one of them had less than three months (Government of Kerala, 1984: 41). The story still continues and is the same with other SEBs

also. The appointments being mostly on seniority basis, by the time a person reaches the top chair, he would be on the verge of superannuation, that retards his commitment and involvement in serious policy making. Committees after committees have recommended that appointments be made based on selection, and that the selected person with proven ability and integrity should have at least 2 to 5 years further service for superannuation (Government of Kerala, 1984: 41–42; Government of Kerala, 1997: 57–58).

Moreover, the socio-political dynamics in different States have led to a situation of wide-spread corrupt practices of nepotism, all at the cost of merit, ability, and efficiency. A general lethargic indisposition for accountability booms under such umbrellas of patronage. Leibenstein's analysis of internal motivation to efficiency starts from the premise that contracts for labour supply within the firm are incomplete, they do not include a specification of the job, so the efficiency of the labour depends on the motivation to effort, which by all counts is constrained by his preference for less effort, confined in an 'inert area'. This problem is more acute in the public sector of many developing countries, where loose contract, if at all any, guarantees job security till superannuation, whatsoever be the output of his effort. Besides the superior selection procedure, linking the terms of job continuity and remuneration to productivity would certainly yield a sea of change.

### *The Cost of Inefficiency*

And all these inefficiencies come out in inflated proportion in the cost of electricity supply. This in turn implies some feasible sure cures for the maladies in terms of achievable improvements in performance. Thus allowing for some improvements in operational, T & D, and manpower planning efficiencies<sup>2</sup> would reduce the unit cost of supply of all-

SEBs substantially, by 60.77 paise per unit sold, to Rs. 1.67/unit from Rs. 2.28/unit in 1997-98. For Kerala, the unit cost saving is 60.10 paise/unit, giving a unit supply cost of Rs. 1.32/unit instead of the reported Rs. 1.92/unit, and for Delhi, 127.37 paise/unit, the unit supply cost reducing to Rs. 2.24/unit from Rs. 3.51/unit. With a 1:1 debt-equity capital base, the unit electricity supply cost would still go down for all-SEBs to Rs. 1.52/unit sold, and to Kerala, Rs. 1.09/unit (Table 1). The unit cost of inefficiency in the State sector is about 33.2 per cent of the reported unit cost of electricity supply, and in Kerala, about 43.3 per cent, and in Delhi, 36.3 per cent. And this is regardless of the unquantifiable cost of inefficiency at all other levels! Now the pertinent question is: Should the consumer be made to pay for this inefficiency?

Now compare this with the average revenue (AR) realised from sales of Rs. 1.85/unit in that year. This would yield an additional revenue of about Rs. 9,459 crores over and above the total cost of electricity supply – a commercial profit! Similarly, Kerala could earn a profit of Rs. 121.06 crores and Delhi, Rs. 349.72 crores! To this extent then the reported commercial loss of the SEBs, attributed to the so-called unit-cost-unrecoverable AR, turns out to be nothing but inefficiency-caused loss. If we allow for the expenses capitalised, then the total cost in the accounting sense would still decline and commercial profit increase. And the vociferous arguments and assertions for steep rises in tariff rates, proposed to be required to contain the increasing supply costs in order to save the SEBs from the red, reduces to calculated camouflaging of pampered inefficiency.

**Table 1. Unit Cost Savings From Efficiency Improvement for 1997-98 (Paise/Unit)**

	INDIA		KERALA	
	Ps/unit	%	Ps/unit	%
1. Reported unit cost of power supply in 1997-98	227.89	100.00	192.14	100.00
2. Cost savings obtainable				
(i) in power purchase, from operational efficiency improvement	49.72	21.82	40.32	20.98
(ii) in establishment & administration, from reduction in over-manning	11.05	4.85	19.78	10.29
(iii) in interest payments, from introduction of 1:1 debt-equity ratio	14.85	6.52	23.13	12.04
3. Total cost savings possible	75.62	33.18	83.23	43.32
4. 'Efficient' unit cost of power supply	152.27	66.82	108.91	56.68
5. Average revenue realised in 1997-98	184.50	80.96	124.60	64.85
		(121.17)		(114.41)
6. Unit commercial profit realisable	32.23		15.69	
7. Electricity sold in 1997-98 (MU)	293479		7715.50	
8. Commercial profit realisable (Rs. Million)	94588.25		1210.60	

Note: Figures in brackets are ratio of average revenue to 'efficient' unit cost.

However, this is not meant to justify the present unscientific tariff setting. A rational tariff structuring should, among others, aim to help the SEB earn a reasonable return over and above the total costs, that differ at different voltage levels, once the effect of normal distribution loss factor also is accounted for. However, just tariffing is not sufficient. It should be ensured that the sales revenue these tariffs yield is collected

regularly in time. The receivables from the sale of power in Kerala in 1997-98 represented 41 % of the sales revenue, i.e., about 5 months' sales revenue being locked up with the consumers against the maximum allowable norm of two months' sales revenue; the corresponding figure for all-SEB in 1996-97 was 36 per cent, i.e., about four months' sales revenue. Besides these receivables against electricity supply, there are other sundry debtors also, which, for example, in Kerala amounted to Rs. 326 crores in 1996-97 and Rs. 319 crores in 1997-98, about 47.1 and 32.8 per cent of, or 6 and 4 months', sales revenue respectively. Regular and timely collection of all receivables could increase the liquidity available with the SEBs and arrest the excessive loan-tropism. For instance, if all the SEBs could limit the revenue arrears receivable to nearly two months' sales norm, additional revenue collected of Rs. 4,490 crores would be available with them in 1996-97, which in turn means that they could dispense with additional loans of the order of about Rs. 4,500 crores in that year or be relieved of some of the old loans. In other words, this is the cost of inefficiency in the management of sundry debtors in 1996-97. For 1995-96, this amounts to Rs. 7,567 crores. That every year such huge cost of liquidity restriction is left to be incurred explains the financial accountability of the SEBs.

The picture of the settings of this plight becomes clearer as we come closer from the general to the particular case of Kerala power system.

#### *The Demand Forecast Vs. The Reality*

A scientific planning process is fundamental to any power system operation. Hence the significance of a study into the adequacy of the present planning process in the context of the widening gap between demand and supply. This in turn necessitates to examine the accuracy and rationale of the mechanism of power demand forecasting on one hand, and, given the demand for projections, the adequacy of the capacity

addition planning as well as the operational efficiency, on the other hand.

An objective forecasting mechanism, capturing the full implications of the socio-economic reality, has been conspicuous by its inadequacy in our country. Time trend projection is in general employed for power demand estimation, without caring for any model adequacy diagnostic checking nor accounting for possible non-stationarity in the time series data base, even in the academic circles. In some specific cases, estimated industrial growth rates are utilised, but without examining the general validity of correlation or causation between the variables. In fact, there are a large number of small scale and cottage industries that use practically little electricity, but together contribute significantly to the industrial product. India has for a long time been in the grip of severe power shortage, and the use of time series data on supply-constrained demand for future demand estimation is fundamentally inadequate and inappropriate. Moreover, the low level socio-economic development of India may also invalidate the demand analysis technique in its usual framework of price-income-population correlatives. On the other hand, Kerala with a high standard of living in a substantially developed social environment presents significant scope for electricity demand analysis, but in the chronic situation of power cuts and load shedding, this too loses any sense of reality. Our econometric exercises prove that demand analysis can in no way explain the objective situation in the power sector of Kerala (Pillai 2001).

The actual performance of the sector in fact has been such as to render the very exercise of power demand forecasting futile, except as some routine ritual; the demand forecast has never had anything to do with the capacity expansion planning prepared on a bounded budget as well as with the actual materialised capacity additions in the system in

any state in India. Kerala has been a typical example, with little recognition of the need for a comprehensive development-based perspective planning mechanism that is to ensure smooth system growth in terms of adequate capacity expansion not only of hydropower but also of thermal backing to the system in order both to meet the exigency of monsoon failure and to strengthen the reliability parameters. Even though an optimal merit order operation requires a favourable hydro-thermal mix in generation capacity, the KSEB had for a long time evinced an unwarranted aversion to setting up thermal plants in Kerala, and had even ridiculed and rejected at least two times the central government's offers of thermal plants. As a result of the defective and myopic power development planning, the Kerala system has remained much smaller under a favourable condition of a domestic-sector-dominant consumption profile.

#### *Time and Cost Overruns*

While the planning process for capacity expansion has had only nominal relevance in force, its execution has been failing all expectations. Not a single hydro project in Kerala (starting with the prestigious major project of Idukki), even the micro ones, has been left unhaunted by the spectre of excessive time overruns, involving exorbitant opportunity costs, extracted cleverly by collusions among the contractors, militant labour, KSEB officials and the politicians in power. If these projects had been completed and commissioned regularly in time, it would have saved substantial resources, yielded additional revenue and eased the shortage problem to a good extent. The resources thus saved could have been utilised for further capacity expansion and it would have eased the so-called resources crunch of the government that is unfairly used to woo the private sector.



The total additional sales revenue realisable during the 17 years from 1983-84 to 1999-2000, were these projects commissioned in time, is estimated at Rs. 886.3 crores (Table 2), or Rs. 52 crores per year! It is very distressing to think of such a situation that the cash-strapped KSEB has been forced to forego a revenue of about Rs. 52 crores a year on average due to delays in getting the on-going projects commissioned in time (Pillai and Kannan 2001). Such additional generation that could be effected through timely completion of projects could reduce to a good extent the costly dependence on energy imports.

Timely completion of these projects could avoid the substantial burden of capital cost escalation also (Table 3). Such savings factor highlights the fact that when capital cost is escalated more than what is planned, it results in a loss of its alternative uses. Considering the resources constraint of the Government, if these resources were used more efficiently, then the resultant increased availability of these resources to the Government could be used for taking up more projects. To the extent that such actual cost escalation reflects inefficient resources utilisation, the savings in capital cost, that could have been obtained in the absence of cost overruns, also represents a capital waste involved. For example, suppose that Kakkad hydro-electric project could be commissioned in time in 1986 itself, 8 years after its construction works started. Accounting for the general price inflation during this period, the capital cost of this project by 1986 would be at the most only Rs. 39.66 crores, saving as much as Rs. 113.86 crores, almost enough to construct 3 more similar plants, or to add to the system capacity by another 140 MW at the nominal cost of Kakkad project! Thus the capital waste involved in this case is equivalent to 3 more similar plants or an installed capacity of 140 MW! Timely completion of lower Periyar project could save as much as Rs. 189 crores, enough for a similar project of more than 200 MW capacity! The second highest savings, after Lower Periyar

**Table 2. Extra Energy and Revenue Realisable from Timely Completion of Projects**

Year	Firm Energy (MU)		Generation (MU)		Extra Energy Saleable (MU)	Extra Revenue Realisable (Rs. Crores)
	Actual	Realisable	Actual	Realisable		
1983-84	3725.73	5554.13	3643.4	5431.38	1326.69	46.67
1984-85	3725.73	5554.13	4884.9	7282.02	1797.91	53.83
1985-86	4397.33	5816.13	5357.1	7085.79	1298.12	39.94
1986-87	5053.13	5816.13	4642	5342.70	508.85	24.55
1987-88	5053.13	5816.13	4093.1	4711.07	439.11	24.44
1988-89	5053.13	5816.13	4548	5234.52	521.75	29.58
1989-90	5053.13	5881.13	5075	5906.42	648.62	34.65
1990-91	5554.13	6000.73	5491	5932.32	346.28	18.35
1991-92	5554.13	6562.73	5326	6293.00	756.60	45.40
1992-93	5554.13	6675.73	6189	7438.77	987.34	73.01
1993-94	5607.13	6675.73	5822.3	6932.08	886.60	72.75
1994-95	5607.13	6675.73	6572.3	7824.62	1001.38	86.80
1995-96	5607.53	6751.13	6662	8020.34	1086.20	100.93
1996-97	5619.03	6751.13	5502.9	6611.38	887.38	84.84
1997-98	6118.43	6751.13	5188.7	5725.63	440.70	56.91
1998-99	6249.43	6751.13	7601.6	8212.07	501.95	67.52
1999-2000	6586.43	6751.13	7655.57	7846.84	158.10	26.16
Total					13593.58	886.33

project, could come from Kuttiady extension project to the tune of Rs. 158.3 crores, almost enough for four similar or Kakkad-type projects! Kallada project (the only exception), even with 5 years over-run, has not eaten up resources beyond the limits set by general price inflation.

Timely completion of all other 18 projects (excluding the non-starter Pooyankutty) could yield a mammoth saving in capital cost of Rs. 644.03 crores (or Rs. 35.8 crores per project), almost enough for 16 Kakkad-type projects with 800 MW capacity! Since so much capital resources have gone wasted, this 800 MW (or Rs. 644 crores) represents the capital waste involved in the faulty planning and implementation of power projects in Kerala. That is, the capital waste factor involved is 16 (i.e., 16

**Table 3. Capital Cost Savings**

Projects	Capital Cost (Rs)		Savings in Capital Cost (Rs. Lakhs)	Capital Waste Factor**
	per kWh of Energy Potential			
	Original	Actual		
Idukki II Stage	0.31	0.68	910.20	0.15
Idukki III Stage	0.11	0.40	844.33	1.27
Sabaringiri Augmentation	0.10	0.90	838.42	2.96
Idamalayar	0.73	2.81	4652.58	1.07
Kakkad	0.71	5.86	11386.17	2.87
Kallada	2.23	3.40	-153.26	-
Lower Periyar	1.79	7.16	18940.91	1.16
Malampuzha	5.27	12.13	339.78	1.00
Madupetty	4.56	7.47	142.23	0.42
Malankara	1.20	6.33	3124.06	3.16
Chimony	4.83	6.54*	26.89*	0.07
Peppara	3.41	5.92	184.00	0.37
Pooyankutty	3.88	12.71	NAP	-
Azhutha Diversion	0.51	2.54	1027.80	2.46
Poringalkuth LB Extn	1.22	5.77	3028.05	2.43
Kuttiar Diversion	0.58	2.59	696.27	2.75
Vadakkepuzha Diversion	1.09	4.28	349.72	2.13
Vazhikkadavu Diversion	0.78	6.66	1342.28	5.23
Kuttiady Tail Race	2.65	8.61	744.06	1.36
Kuttiady Extension	4.10	26.40	15825.39	3.98

Note: \* = by 1993; NAP = Not Applicable; \*\* = Equivalent to number of Kakkad-type projects

Kakkad-type projects)! And the KSEB still reeling down in the red, the government lets such waste and mismanagement pass.

It is in this light then that we should examine the so called financial ‘inability’ of the SEBs (and the governments) to finance power development in general. The basic argument put up in defence of inviting private sector participation in power development has come out of the resources crunch experienced by the governments. However, this defence is turned out to be flimsy in the face of the fact that there is over capitalisation in actual practice in the case of each project the government has undertaken; the government could, through efficient performance, save substantial resources, which could in turn be used for taking up additional projects. Behind this inability works the political economy of corruption.

#### *Higher Outages, Overcapitalisation, and Higher T&D Loss*

However, such time overruns have been generally accepted as a convenient camouflage for large scale corruption at the high up. Thus both the processes of planning and execution have had a track record of inadequacy and functional failure, and the very same behavioural characteristic has extended to the operational field also. Though hydro plants are generally expected to be much less prone to forced outages than thermal plants, those in Kerala stand an exception and have registered higher forced outage rates and loss of load probability.<sup>3</sup> Even if the plants are available, their service is subject to firm power capacity constraints, given normal monsoon. The technocratic tendency for unrealistic assumptions, as already pointed out, have however led to an undesirable situation of over-capitalisation in terms of wide divergence between installed capacity and firm power capacity in Kerala – another flagrant failure of planning. Then the worse occurs in the transit; a good

proportion of the energy sent out from the inadequate firm power capacity gets lost behind the meter – again in corrupt collusion with the Board officials. Our study shows that reducing T&D loss to 15 % from the presently reported 18 % could have saved about Rs. 34 crores in additional sales revenue to the KSEB in 1997-98 and as much as Rs. 72 crores in 1998-99! Similar calculations for the previous years (from 1982-83 to 1998-99) yields a cumulative possible saving in energy of the order of 8000 MU and in revenue of Rs. 525 crores (Table 4). In

**Table 4. Savings Realisable from T and D Loss Reduction**

	Loss Factor	Available Energy (MU)	Total Sales (MU)		Savings Realisable	
			with 15% Loss	Actual	Energy (MU)	Revenue (Rs. Crores)
1982-83	0.228	4544.6	3862.91	3507.90	355.01	9.00
1983-84	0.258	3766.25	3201.313	2793.00	408.31	14.36
1984-85	0.25	4938.9	4198.065	3705.00	493.07	14.76
1985-86	0.249	5558.82	4724.997	4172.00	553.00	17.02
1986-87	0.274	5126.59	4357.602	3716.00	641.60	30.96
1987-88	0.2895	5077.74	4316.079	3626.60	689.48	38.38
1988-89	0.2402	5748.8	4886.48	4387.00	499.48	28.32
1989-90	0.22	6208.75	5277.438	4859.07	418.37	22.35
1990-91	0.2157	6768.83	5753.506	5332.00	421.51	22.34
1991-92	0.2177	7155.8	6082.43	5596.00	486.43	29.19
1992-93	0.21	7406.54	6295.559	5838.50	457.06	33.80
1993-94	0.201	7825.17	6651.395	6234.16	417.23	34.24
1994-95	0.2008	8794.35	7475.198	7027.69	447.51	38.79
1995-96	0.2005	9278.2	7886.47	7414.62	471.85	43.84
1996-97	0.1996	8776.28	7459.838	7020.77	439.07	41.98
1997-98	0.1787	9395.1	7985.835	7715.49	270.34	33.68
1998-99	0.1775	11167.18	9492.103	8959.61	532.49	71.63
<b>Total</b>					<b>8001.81</b>	<b>524.64</b>

other words, the inefficiency of the Kerala's power system primarily in terms of deficient transmission capacity and inefficient operation has been eating away about 470 MU of energy worth Rs. 31 crores (at current prices) every year during the last 17 years. The energy thus lost in excess of the notional 15 per cent in fact represents a capacity of about 90 MW at 60 per cent load factor. It simply means that if the system were efficient enough to maintain the energy loss at its maximum reasonable level of 15 per cent per annum, it could help the system dispense with the need for adding about 90 MW to the total installed capacity, saving highly in investment and working expenses. That this saving was in addition to the potential increase in revenue by 31 crores per year highlights the immensity of the problem of the transmission loss in Kerala.

#### *The Political Economy of Populism and Corruption*

Crowning all these dysfunctionings is the political economy of populism and corruption. The power sector, rightly expected to subserve the social, political, and economic policies of the State, was in effect abused to become the translatory channel for the populist policies of the political party in power in the various provincial states in the pursuit of votes. For one thing, subsidised power sales in the name of industrialisation, agricultural development, and welfare considerations (for the domestic consumers) have been draining the Board substantially. The fact that in general the non-electrified households and fragmented farms belong to the poorest of the society questions the justification of the welfare content of such across-the-board subsidy to the powerful groups. Moreover, the appeasement strategy on the part of the supervisor (government) in favour of the influential section of the principal (the public in general) had a downstream extension also towards the bureaucracy of the agent (the public utility), appearing more prominently in overmanning, unwarrantedly in establishment and administration

(E&A), in a populist bid of employment generation. The consequent increase in E&A costs stands in turn to inflate the supply costs of electricity and penalises directly the customers and further indirectly the poor tax payers.

Along with the force of vote-premium aligns high-powered corruption. One avenue here is the collusion between the Board officials and erring customers, enjoying political patronage, for uninterrupted theft of power flagrantly practised, for example, in the very capital city of the country. The Board in effect abets them in the crime by crediting, without verifying the authenticity of its own procedures, the power thus lost, to the farm sector, where consumption is mostly unmetered. We have found that about 30 to 40 per cent of what is usually reported as agricultural power consumption in fact represents power lost in such illegal 'sale' (Kannan and Pillai 2001a). Then assuming, quite reasonably, that the actual agricultural consumption is only 65 per cent of the reported one, the energy thieved away in connivance with all the SEBs in 1997-98 amounted at least to 31073 MU, equivalent to Rs. 5733 crores, at a sales rate of Rs. 1.85 per unit! This, though an underestimate, gives in effect an *annual* cost of corruption at only one (i.e., sale) end in the Indian power sector. And with the assumption of an actual 15 per cent T&D loss in 1997-98 (including technical and inefficiency loss due to inadequate transmission capacity), the total cost of corruption at the sales end in the Indian power sector comes out to be a staggering Rs. 10705 crores!<sup>4</sup> In the case of Kerala power sector, where agricultural power consumption is mostly metered and accounts for only about 4 per cent, such illegal 'sale' of power is included directly in the T&D loss. Assuming an actual 15 per cent T&D loss in 1997-98 in Kerala against the reported 17.9 per cent, we find that the cost of such corruption amounts to Rs. 33.7 crores.<sup>5</sup>

A more sophisticated way of 'theft' is to get the officials to allow huge energy bills to mount up and then to write them off as 'bad debts'.<sup>6</sup> In our study mentioned earlier we have seen that the revenue arrears outstanding against different consumers for all SEBs in 1996-97 was Rs. 11,535 crores, accounting for over four months' sales revenue, against the maximum allowable norm of two months' sales revenue. The excess of outstandings over the admissible norm may then be taken as an approximate measure of the cost of corruption involved at this end of energy 'theft' in the form of deliberate non-payment by customers of electricity charges in connivance with the officials. This amounted in 1996-97 to Rs. 4220 crores, equivalent, as we have estimated earlier, to the additional revenue at hand if all the SEBs could limit their revenue arrears to two months' sales norm, and in 1995-96, to Rs. 7364 crores! In Kerala, corruption on this front cost Rs. 175 crores in 1995-96, and Rs. 198 crores and Rs. 252 crores in the next two years! The 'bad debts' written off during these three years by the KSEB were Rs. 11.8 crores, Rs. 12.5 crores, and Rs. 14.8 crores respectively.

Another fertile field in this respect opens up out of the 'wide spectrum collusion', among the contractors, trade unions, bureaucracy of the utility, and the government, for large scale corruption involved in allowing for time overruns of projects and sanctioning the associated cost escalations. Recurring unrestricted labour militancy is recognised in general as the single factor that puts the heaviest burden on the pace of the construction works of power projects in Kerala, largely dictated by party-political rivalry rather than genuine labour demands, as for example, in the construction of Idukki hydro-electric project, to begin with. The time overruns out of the striking militancy upon one or another pecuniary pretext essentially go into the contractors' demand for cost escalation, that is soon endorsed by the Board and sanctioned by the government.<sup>7</sup> Such rent-sharing is a widely recognised official practice



in the power-irrigation sectors. The glaring laxity on the part of the government in fulfilling its committed responsibility for enforcing its authority on the contractors and workers to bind them within the contractual terms they agreed to take up to honour is a clear indication of its corrupt collusion. In Kerala, the time and cost overruns have afflicted only the State power projects; the public sector NTPC thermal and the private sector hydro projects in the State having been completed well within their scheduled times. In this light, then, the cost escalation sanctioned for each late-run project may rightly be taken to represent the cost of corruption involved in construction contract sales in the power sector of the State. Accounting for the general price inflation during the normal construction period, this amounts to Rs. 644 crores or Rs. 36 crores per project!<sup>8</sup> Unbelievably, it represents on an average about 60 per cent of the actual project cost! In some cases it is well above 75 per cent. This is all shared among the four parties involved, at the cost of the helpless majority in the 'principal' set of tax payers.

Government involvement in large corruption has now become an accepted fact of much less social concern for responsible response/reaction. It is a common practice that in the power and irrigation sectors, construction contracts and purchase orders are conferred at a price.<sup>9</sup> Purchase of materials and machinery, especially power generating equipment, involve large scale corruption, the scope of which has widened since 1992 (post liberalisation period) with the stipulation for bilateral credit options that necessarily involves purchases from foreign equipment suppliers, as bilateral credit is inevitably tied.<sup>10</sup> By the 'side contract' of collusion, the Board bureaucracy may share in the price along with its supervisor, the particular ministry in the government, or gain other favours of larger budgets.

There have come up a number of allegations of corruption involving ministers<sup>11</sup> and bureaucracy in the Kerala power sector. Some

of them have recently been convicted also. For example, a former Minister along with his power secretary and some top officials of the KSEB were convicted in a case involving award of construction contract.<sup>12</sup> There have been allegations of corruption against other power minister(s) in recent times too; for example, on the contract with the Bharat Heavy Electricals Ltd. (BHEL) in the case of Kozhikode and Kasargode diesel power plants, and with a Canadian firm (SNC Lavalin International Inc.) in the case of an extension scheme (Kuttiady hydro-power project). The infamous Kannur-Ennore episode is another apt case in point here.<sup>13</sup> Again, an Enquiry Commission in Kerala has indicted another former power minister and his officials in the case relating to financial irregularities, involving a loss to the KSEB of Rs. 75 crores in the award of contracts in the case of the Brahmapuram diesel power plant; a vigilance probe is in progress into this case.<sup>14</sup> At national level, the infamous Jain hawala revelations have indicted a large number of Central government officials, about half of them being from the power sector – the NHPC (Dulhasti project) and the NTPC (many bilaterally funded projects) actively involved.<sup>15</sup>

Such high powered corruption costs in turn go to manifest themselves in inflated capital costs of power projects,<sup>16</sup> allegedly materialised since the entry of Enron. The Dabhol power project of Enron has cost about US\$ 2830 million (US\$ 1.4 million per MW) as compared with a cost of US\$ 1200 million (US\$ 0.64 million per MW) for a similar plant, the 1875 MW Teesside project of Enron in England, (Mehta 2000: 98) i.e., more than twice! This works out to be Rs. 4.48 crores per MW, much higher than the NTPC's 645 MW gas-based Kawas project (implemented in November 1993 at Rs. 2.32 crores a MW), which comes in effect to Rs. 3.56 crores per MW only at an assumed inflation rate of 10 per cent by March 1997 (Morris 1996: fn.2). The calculations of the Central Electricity Authority (CEA) have put the

total capital costs of an Enron-type plant at Rs. 1.91 crores a MW (December 1997 completed costs). However, the Ministry of Power (MoP) has, since the Enron entry, been justifying higher capital costs of power projects in India; for instance, while the CEA has estimated the cost of the Bakreshwar thermal plant at Rs. 2.91 crores per MW, the MoP has put it at Rs. 4.36 crores per MW.<sup>17</sup> The ministry has, moreover, put out a list of projects with final costs of Rs. 4 crores to Rs. 5 crores per MW, and has thus sought to justify clearing private sector projects costing Rs. 3.28 crores to Rs. 5.09 crores a MW (*The Economic Times* (editorial) 22 March 1994).

The projects in Kerala too have become heavily loaded with inflated capital costs, as shown above. The very high capital costs allowed to SNC Lavalin by the government through a MoU only in the case of both Kuttiady extension (phase 1) and the Pallivasal-Panniar-Sengulam modernisation schemes should now be compared with the capital costs quoted in an international tender bidding for Kuttiady extension phase 2 project. Among the four companies left in the fray, the lowest bid has come from a consortium of two Indian companies L&T – BHEL) at Rs. 164 crores, while the highest from the SNC Lavalin at Rs. 324.4 crores! (*Malayala Manorama daily* 7 February 2001). It should be noted that the Board's own estimated capital cost for the project, recognised by the government itself, is Rs. 220.5 crores, i.e., Rs. 2.21 crores per MW! The 1991 project report of the KSEB has estimated the cost of machinery at Rs. 170 crores, while BHEL has promised, in its letter to the chief engineer on 2 February 1998, to supply the items at Rs. 51.5 crores! In terms of machinery cost itself thus there is a gain of Rs. 118.5 crores, more than worth another two sets of machinery, in addition to the obvious benefits of encouraging indigenous production and supply.

In addition to major contracts and concessions, liberalisation has opened up another avenue of corruption, that is, privatisation. This has been the single largest route of payments that has pushed the transition economies (the countries of the former Soviet Union) to the highest level of corruption in the world. China too is not an exception in this respect of its reform drives.<sup>18</sup> Privatisation, i.e., transfer of control rights, is expected to reduce corruption, but the privatisation transaction itself can be corrupt in the same way as in the award of concessions and contracts. The prospective buyers may vie and pay for getting included on the list of pre-qualified bidders as well as for restricting the number of other bidders.

Privatisation of electricity sector in the Indian context is obviously ominous of disaster. The assets of SEBs are highly under-valued; the gloomy presentation of a sick SEB would further cut into its value. Howsoever professedly meticulous the assets valuation rule(s), privatisation would thus amount to a cheap sell-out; for example, the recent case of Bharat Aluminium Company (Balco), a profit-making public sector enterprise. The very high corruption potential would just add to this woe. The whole assets, accumulated by two generations of tax payers over a period of half-a-century, would thus be lost for a one-time paltry payment to the then government to squander.

The drive for power sector reform in India has been opening up a vast field for corruption in which the international lenders too have been eager to claim their stakes. Such experience comes with its rude shock from Orissa itself where the World Bank has been a major party to misappropriate and squander a good part of its structural adjustment loan to the state in the name of consultancy fee, service charges, and so on. The Government has been forced to opt for foreign firms, instead of capable indigenous firms, as consultants in the reform programme, in violation of guidelines. Crores of rupees have been drained away into

the consultants' coffers, of course with a part of it re-channelled into some domestic pockets also. The same is the case in almost all the States, whether or not the Government in power is keen on implementing any reforms at all. In Kerala too, when the previous government stood dead against the so-called power sector reforms, there was much heated allegations of corruption in respect of appointing a Canadian firm (SNC Lavalin) as consultants on 'power sector reform-related policy matters'.

#### **4. Is the Irreversible Surgery of Structural Reform *the* Panacea ?**

Both the Task Force on Power Sector Reforms (1997) and the Expert Committee to Review the Tariff Structure of the KSEB (1998) have "strongly cautioned that hasty decisions in this respect would lead to irreversible actions which could lead to many unforeseen problems. Besides, it does not help to resolve the problems faced by the Board of inadequate tariffs, internal resources and liquidity." (Government of Kerala 1998:6). Apart from this 'disastrous irreversibility' premise, the very logic of the power sector reform process stands helplessly vulnerable to multiple points of weaknesses, much of this facet, however, remaining outside the plane of informed debate. Here we take up some of them.

##### *The Bogey of Resources Crunch*

As explained above, private sector participation had been solicited on account of the fiscal crisis begotten funds scarcity. But this very fiscal crisis, obvious to any open eyes, has been due to the Government's inability to raise the revenue receipts and/or to reduce revenue expenditures. Instead, the axe has fallen on the capital expenditures, at the cost of development; and these savings, in a reverse logic of necessity, have begun to contribute to the revenue account<sup>19</sup> – such is the public finance management of our Governments! Still worse, it is the developmental expenditures in both the accounts<sup>20</sup> that have suffered

the most, again in a perverse logic. This stands to ridicule all the blab of financial discipline raised in the face of the so-called fiscal crisis. The crisis, under the tutelage of the World Bank, awakened the Government to the prescription of identifying fiscal stability of the economy with very low level of fiscal deficit. This in turn implied strict measures of financial discipline through severe expenditure cuts. But the guillotine descended on the wrong heads – of developmental/capital expenditures, while profligacy stood to fatten the non-developmental/revenue expenditures, leaving the fiscal deficit, the alleged prime mover of crisis, without any perceptible change, even in the face of increasing capital account surplus, achieved through capital expenditure cuts! If so, if it was not for translating any effect on to the crisis-breeding deficit, then one naturally tends to doubt the genuineness of all the fuss and justification of all the initiatives. Indeed, there seems to have been some snag in it. And it is to be seen in the effects of a combination of three forces – the two indigenous factors of the political economy of corruption and of hypocrisy in company with the exogenous World Bank hegemony.

The much-coloured ‘fiscal crisis’ of balance of payments shortage of 1990-91 came in handy for the World Bank to dictate conditions of ‘economy-wide structural adjustments’ or ‘reforms’ in return for soft loans provided for tidying over the shortage problem (ballooned into a ‘crisis’). The prescriptive measure of fiscal deficit reduction had a built-in effect of increasing external dependency and thus submission. Here the World Bank rose to the occasion and exhorted, besides imposing the structural adjustment loans, that the Government relieve itself of the financial crunch by reducing its role to a facilitator only, instead of being as hitherto a provider. Selling out public sector assets, accordingly, yielded two birds at a stroke – relief from public sector management

burden and substantial funds. The offer of soft loans and the option of public sector divestment were powerful enough to lure the political economy of corruption, while the populist sentiments pampered by the religion of hypocrisy, and governmental profligacy<sup>21</sup> dared not to touch revenue expenditures. And the price was paid from the capital/developmental account. The logical culmination of such a situation was the cultivated perception that the Government was left with no money. Now the responsibility for developmental investments naturally devolved upon the private sector, making the World Bank approach easier. But the domestic private sector remaining not so strong, the door was to be opened to the foreign capital. This dynamics should have served as a frame of reference in any informed debate on interpretations and implications of the so-called reforms move in India. Unfortunately, however, this has not been so, so far.

The funds scarcity proposition is still weaker on another potential score also. Sadly enough, very few eyes have been open to the folly of the 'fiscal deficit = instability' equation setting economics of the World Bank. This might be true in a Keynesian set up of an advanced economy where aggregate demand and effective demand coincide, leaving an inflammable situation for additional finance unaccompanied by additional output. On the other hand, in a less developed economy of poor majority with low purchasing power, which in turn means over-production or equivalently, under-utilisation of capacity, pump-priming serves only to boost the economy. However, the main thrust of our point here is that despite the World Bank compulsion, deficit financing still continues in India as before, but now only for revenue expenditures; this is in addition to fiscal incentives through tax reductions. At the same time, large cuts in capital expenditures also are effected; and this situation has been capable of fuelling inflationary flames in the World Bank economics sense, though inflation in India remains (at least in the

official claims) in the manageable reach only. Such a particular situation of an insensitive inflationary mechanism<sup>22</sup> in force in India, however, has been sadly missed by many intellectual eyes and the government too. Thus the government, if found itself still comfortable with deficit spending, should have, as is truly expected, drawn rein on revenue expenditures, and effected that fiscal financing for developmental purposes, which would necessarily have averted the dependency problem, and along with it the painful chaos of present 'reforms'.

*The Inefficiency Is Imposed, Not Innate*

However, this would be only a partial solution. The real resolution should have emanated from the Electricity Board itself with an active spur from the government. The Board should have been functionally efficient and financially sufficient to meet all its requirements. There is no inviolable destiny or curse that public sector be inefficient. A large number of living examples do shatter this myth (though it still reigns supreme over a large terrain of social consciousness). Kerala herself has enjoyed a golden era in respect of FACT under an able management. In power sector, Maharashtra SEB had been consistently performing efficiently for a long time till the entry of Enron. In the Central sector, the NTPC has won laurels for its top performance<sup>23</sup>. The NTPC, accounting for about 25 per cent of India's total power generation with an IC of about 20 per cent, is the World's sixth largest thermal power generator and second most efficient, according to a survey by Datamonitor of the UK (based on 1998 performance data). Given a conducive environment for a committed management, the Electricity Board could have fared better true to its guiding principles of a commercial-cum-service organisation, as interpreted by almost all the Committees. But the socio-political populist compulsions of the governments could not honour and ensure



its statutory status of an autonomous corporation (as required by the Electricity (Supply) Act of 1948), and they found in it a cornucopia for their immediate gains through subsidised tariff, heavy rural electrification, and employment generation, all un- or under-compensated, on one hand, and corruption on the other. Had the government compensated the Board for all the populist favours then and there, at least its balance sheet would not have run into the red. And all these have never been unknown to any one, and Committees after Committees have echoed in vain the same tone.

### *The Ins and the Outs of the Reform*

However, the government could by no means simply forgo this easy but powerful vehicle that it was using for translating populist baits into its own immediate gains and the forced conversion of the Board into a government department prevailed.<sup>24</sup> It is the weight of this compound of corruption and hypocrisy that in fact restrains some of the state governments, with ideological assertions coloured in populism, from openly supporting the reform moves.

A legitimate question might crop up now: Why did some governments then decide to forgo this cornucopia? The answer must be clear in terms of the political economy of corruption on a large scale of favouritism and kickbacks in reaching agreements with private parties, besides the lure of soft loans from different agencies, made possible in the wake of the reforms.<sup>25</sup> Kickback rule has become an integral part of private sector participation in power sector explicitly ever since the Enron effect.<sup>26</sup> The tendency has been to allow the kickbacks to be included in the capital cost such that exorbitant marginal capacity cost is thrust upon the system,<sup>27</sup> as already explained. The proposal for introducing marginal cost pricing regime should be necessarily debated in this light: Should the society be burdened with such inflated marginal

capital costs in the guise of 'efficient' prices? And as we know, this corruption-push is only one frequency band in the wide spectrum of the cost-inflation. It is not fair for a 'welfare State' to yield to the tendency to put all its inefficiency upon the public, branding it as socially efficient costs, though it might be in line with its religion of hypocrisy. This will unfortunately lead to an undesirable exclusion of the entire poor from access to light, that even the 50 years of populism could not bring to them. In fact, one of the serious concerns raised in the context of reform exercises is regarding the rural access to electricity, which the 1948 E(S) Act stood to guarantee. It is a well known fact, confirmed by many a survey, that the unelectrified households in general belong to the poor of the society – an ironical reflection of the government commitment. Given the highly skewed income/assets distribution set-up in our country, then, the so called reforms with its intended functional structure of market orientation (manipulated by private interests of profit- and rent-seeking of all hues that now never coincide with social interests – gone are the reconciling days of Adam Smith!) would stand to darken the still dark alleys of the poor section. While the government is too eager to shirk its fundamental social responsibility of subsidising the poor, under the chastisement of the World Bank and its indigenous pedants, all these parties involved very conveniently forget that 'subsidy' is not a Third World phenomenon only.

Another important aspect thus apparently winked at should also be highlighted. The much taunted investment incapacity of the SEBs has been the prime leverage in justification for the private sector participation (PSP) in the power sector. However, the SEBs being the major (if not sole) purchaser of power from the IPPs, the fear of payment default tends to strike at the very root of the PSP program, and this in turn necessitates that the SEBs be financially healthy to provide an

escrow cover for the purchase. This circularity argument just nullifies the very PSP logic; if the SEB can afford to buy power from the IPPs (that too at higher prices<sup>28</sup>), then why cannot it afford to have its own generation facilities (at lower costs)? It should also be stressed here that a whole decade has gone to waste by waiting for public sector participation in power capacity addition program: the IC during the last decade grew at an annual average rate of 4.5 per cent only, while the growth rate in the 1970s as well as in the 1980s was 7.5 per cent and 8.2 per cent respectively.

### *The Pandora's Box*

That the power sector has problems galore as the Pandora's box of reforms is opened goes without saying. The terms and conditions of power purchase agreement (PPA) for the IPP's 'must run' base load plants adversely affects the merit order operation of the power system, thus causing systemic inefficiency. The higher capital costs and the consequent higher tariff rates result in exclusion of the majority of the poor from the 'market'. Moreover, the inescapable problems involved in the irreversible restructuring/dismantling of a complex organisation, as far as the experience of the Orissa experiment proves, might lead one to doubt whether these problems are not an exorbitant cost to compensate the original problems that the restructuring was supposed to tackle. Quite disheartening are the reports, on the power sector management health (or even its survival itself), from Orissa, where the World Bank model has fulfilled its full mission in terms of achieving unbundling and privatisation. Both the State and the Central governments have been injecting heavy doses of finance in frantic attempts to rescue the system from imminent collapse, while the international Chief Surgeon has just backed out after the initial incisions, requiring the domestic surgeons to do what they can to complete the operation! While the governments are

too eager to let out any signals of a wrong turn during the course of such a drastic surgery, one would wonder why these governments could not apply a little of this wisdom and sincerity during the previous phase.

### *Privatisation of Distribution Sector*

Orissa is the only reforming State where distribution sector (also) is privatised; and the move is on in this direction in other reforming States of Karnataka, AP, and Haryana also. It is generally recognised that distribution is the weakest link in the whole structure of power supply system. The massive leakage from this inefficient outlet in the form of subsidised sales and distribution loss, including technical loss and theft, illegal drawal, etc., under protective patronage, have been steadily sapping the SEBs, thus taking them to a no-return point of forced reforms. Plugging such leakage thus constitutes the urgent remedy for all the problems. And a general perception in the informed circle endorses immediate privatisation of the distribution sector projected as the only way out (for example, see Morris 2000). Tackling such leakage in many rural/suburban areas involves “a law and order dimension as well” (Government of India 1996: 59), and a populist government, so far in the habit of winking at (if not abetting) such criminal errancy, finds it difficult to come out on the front. The Government saves its face by leaving everything to the private sector. Thus the private distribution company in Orissa, “the AES of USA is having to employ goon gangs to install meters,” and to collect the dues (*The Hindu Business Line*, March 31, 2000). See how easy the problem is solved! A blatant sell-out of governmental obligations!<sup>29</sup>

It should be stressed here that as nationalisation of natural monopoly ensures *both* productive as well as allocative efficiency *and* equity, a vertically integrated monopoly organisation of electric utility in the public sector remains a foregone conclusion. In fact, unbundling

and privatisation irrevocably violate this techno-economic criterion unless and until it is proved that competition, initiated through unbundling and privatisation, is a real substitute for the nationalised natural monopoly, that stands to ensure *both* efficiency *and* equity gains. However, the arguments in favour of privatisation focus solely on aspects of allocative efficiency to justify the move. For example, there are strong arguments that technological advancements (such as combined cycle gas turbine (CCGT) plants of smaller size and shorter gestation periods) render the natural monopoly in generation sector irrelevant and hence competition for allocative efficiency is possible in that sector – both competition *for* market (initially in setting up plants, *given* a corruption-free franchise bidding mechanism) and competition *in* market (later on during operation, *given* a highly efficient ‘*tatonnement*’ agency) are postulated to be possible. The distribution sector, though purely a local monopoly, also is proposed to be compatible with competition *for* market. However, the invariable location specificity of plants other than CCGT ones and the asset specificity in the transmission-distribution sector still leave the system predominantly a natural monopoly and its nationalisation does ensure increased gains in both equity and efficiency.<sup>30</sup> It is at the cost of these gains *and* with higher (transaction) costs of co-ordination and regulation that the hypothesised competition is being sought.

It is not that there is no alternative to such suicidal sell-out. There have been some informed suggestions on setting up co-operatives at local levels and entrusting them or the local bodies themselves with distribution responsibilities. For example, the Task Force constituted by the State Planning Board on policy issues relating to power sector and power sector reforms cites the good examples of Hukkeri Co-operative in Karnataka and Trissur Municipality in Kerala. The former is one among the 38 co-operatives in the country set up as conceived by

the Rural Electrification Corporation. Power is supplied to these co-operatives at tariffs below the standard bulk rates such as to enable them to operate with a surplus. In Trissur Municipality area, a licensee under the control of the Municipality is engaged in electricity distribution in a very satisfactory manner. A number of countries have such alternative arrangements functioning efficiently.<sup>31</sup>

### *On the Grave Implications*

The detailed discussion unfolds the fact that the present system predicament is due to problems that are just internal to the system. To this extent, then, there do remain sufficient quarters for remedial exercises, meant to remove the impediments to the SEBs' improved performance. That is, what the system today requires is essence-specific (internal) reforms, not structural mutation as unfortunately made out now, and acknowledged even in the informed circles, quite surprisingly. On the other hand, the strict insistence on and the straight involvement in hasty policy changes in favour of the liberalist exercises of the governments are easily understandable. The political economy is witnessing extensive openings for corruption to scale new heights in the implementation of liberalisation-privatisation drives. The State's function is conveniently confined to its teleological mission of administering its coercive authority in the defence of property rights that facilitate market mechanism. The welfare concerns and the development commitments of the State, undertaken in emulation of and as a counter to socialism, have dried up along with its fall in the resultant vacuum of a competitive alternative. As governments conveniently relieve themselves of the socialistic involvement, the tax income extracted from the public in the name of the State's services now becomes available to them for expanding their own budget on the face of an apparently indifferent public. And unfortunately, the informed circle remains indifferent to the crime, instead

of instituting itself as a counter-force on a civic platform of checks and balances. Public praxis should be concerted on such platforms and directed to displace the capitalist teleology of the State with a new socialist ontology for the public interest. Viable measures are still available for a resurrection of an alternative. For example, power sector could well be rehabilitated at minimum cost within its structure of public sector itself, instead of being subjected to the most painful surgery of irreversible restructuring, as the above discussion amply evidences.

Hence below we enlist a number of feasible suggestions in the context of the power sector in Kerala which are more or less applicable to other SEBs also.

## **5. Some Practical Remedial Prescriptions**

All our analyses have revealed that the problems haunting the Indian power sector are only internal to the system, and hence there do remain sufficient quarters for remedial exercises, meant to remove the problems that stand in the way of the SEBs' improved performance. These may be classified into short-term measures of crisis management and long-term steps of power sector development, as follows. Notwithstanding the specificity of the Kerala case, given largely as illustrative in purpose, the prescriptions in general apply in the larger Indian context as well.

### **A. *Short-term remedies***

At present, the Kerala state has a total installed capacity of 2391.2 MW, of which the KSEB accounts for a capacity of 1979.1 MW (including two diesel plants and a wind farm). However, the firm power capacity of the hydro (and wind) power system is only 753.85 MW, enough to meet a demand for 18 to 20 MU a day, against an actual (constrained) daily consumption of about 40 MU (including T & D

loss). The contribution of the two high-cost diesel power plants of the KSEB is only 1 to 2 MU. The remaining is accounted for by energy purchase – often more than 30 per cent of the gross available power. The excessive dependence on energy purchase and the consequent cost burden could be reduced in a number of ways of operational efficiency and commitment on the part of both the KSEB and the government.

These are:

1. Take immediate and necessary steps to complete and commission at the earliest all the projects entangled in time overruns. These are minor projects like Malampuzha, Malankara, Chimony and Kuttiady Tail Race, and the diversion schemes of Kuttiar, Vadakkepuzha and Vazhikkadavu, works on which were started in the late 1980s. Once completed, they will add to the system 165 MU of energy potential. The mini hydel project, Chimony, works on which were suspended following a High Court stay order obtained by the contractor of the electrical works in 1993, should also be saved at the earliest by moving the court for vacating the stay order. This, in our view, might be an instance of ransoming the larger public interest for some personal motives.
2. Start construction works on the already approved projects like Athirappally, Kuttiady additional extension, Neriamangalam extension and others as well as the 14 micro hydel schemes under the Chinese collaboration, with a total installed capacity of nearly 400 MW. Caution should be exercised against any room for possible time and cost overruns; the construction contracts should be so structured as to provide for making the contractors liable for stringent penalties in case of non-performance such as time overrun. The LDF government (1996-2001) was reported to have made some steps in this direction in the case of the Athirappally



project by initiating to institute in the contract penalty provisions for delay – something of the first kind in the history of the KSEB. This should be strictly adhered to and extended to all other projects. The savings in time and other resources will also be enormous. This ready-to-start project should therefore be implemented forthwith along with the above-mentioned expansion projects.

3. Uprating, renovation and modernisation of all the old projects, especially Pallivasal, Sengulam, Poringalkuthu, Neriamangalam and Sabarigiri, that have been under consideration for a long time should immediately be taken up and pushed through for completion at the earliest. Similarly, uprating and extension of small plants (Kuttiady, etc.) to utilise surplussing water during rainy season will also increase energy availability. Measures should be taken to clear the silts accumulated in these reservoirs that limit their capacity (e.g., Idukki, Pallivasal, etc.) and to prevent further silting (afforestation, etc.).
4. The KSEB has at present two diesel plants (at Brahmapuram and Kozhikode) which are in general utilised incredibly far below capacity (often in the range of only 10 to 40 per cent) on account of the much higher cost of generation. Nonetheless, the Board is fast setting up another diesel plant at Kasaragode, which is going to have the same fate of underutilisation. It is high time that the KSEB refrained from such imprudent practices of wasteful planning and mismanagement at least in view of scarce resources.
5. Purchases from the NTPC's Kayamkulam thermal project, running on naphtha, is a high-cost burden at low plant load factor (PLF) owing to its 'state project' status. Converting it into a regional

one is in general recommended as it could go a long way to increasing the PLF and thus reducing the purchase price substantially. The government is reported to have taken up this matter for negotiation with NTPC and the neighbouring systems. However, an enhanced share of power from the Central pool and its regular and constant delivery should also be ensured. At the same time, if the proposed access of Kerala to the LNG grid is materialised in the near future, the project could well advisedly be retained within the state.

**B. *Medium/Long-Term Measures***

1. The only resource for power generation generously available to Kerala is hydraulic energy. About 40 per cent of the estimated 4500 MW of hydro potential of the state has already been tapped. The development of the remaining sites is however beset with clearance difficulties out of environmental concerns. Those projects which do not face objections on environmental grounds, for instance, Mananthavady and Kerala Bhavani, that remain locked up in objections in terms of inter-state disputes, should be taken up for clearance. And both the government and the KSEB should refrain from such unwise wild goose chase as that incurring wasteful expenditures on environmentally sensitive projects like Pooyankutty.
2. Having no known sources of fossil fuels, Kerala state is to depend on imported fuels for thermal power development, which is also constrained by non-availability of suitable sites for major thermal plants, especially of coal, thanks to fragile nature of coastline and high density of population, confining the choices to plants based on cleaner fuels. Kerala should strive for an early access to LNG grid and LNG-based power plants. The state government

should lobby for the early implementation of the proposed LNG terminal at Kochi and the laying of pipelines to Kayamkulam in the South to benefit the NTPC project there and to Malabar in the North.

3. In addition, the following solutions merit attention for the improved performance of the state power system:

*Improved technical efficiency:*

1. Though hydro-plants are in general less prone to forced outages (FO), some of the plants in Kerala are afflicted by very high FOs (e.g., Panniar, etc.). Regular and timely planned maintenance along with full and proper repairs well within time will ensure higher availability. KSEB is to revamp its standards, system and organisation for proper maintenance of its plants.
2. The 'wasteful' gap between installed capacity and firm power or dependable capacity in Kerala is now about 43 per cent. This gap should be bridged (for full capacity utilisation) by enhancing the firm power capacity through augmenting water supply to the existing reservoirs. In planning and implementing future projects, care should be taken to avoid such over-capitalisation; augmentation schemes should be planned and executed simultaneously with the parent project. This could save considerable resources.
3. Check the tide of time and cost overruns. The government should see to it that the future projects are completed in time, without time and cost overrun. Future construction contracts should be so structured as to stipulate the condition that legally binds the contractor to compensate the Board for any delay.

*Improved T & D Efficiency:*

1. The long term objective should be to reduce the T & D loss to 10 per cent. This could be achieved by enhancing transmission capacity, replacing defective meters, effectively checking theft of energy and regular maintenance of the network. Anti-theft squad should be earmarked compulsory 'quota' and strictly policed over to prevent collusion; administer incentive schemes also.

*Efficiency in Management*

1. Computerised scientific inventory control should be introduced on the basis of a thorough study of the existing system, which is highly haphazard in management of all aspects.
2. Energy audit is another area that calls for urgent attention. Though the need for it has been felt for a long time, no step, whatsoever, has been taken so far at all. Energy audit presupposes an energy accounting, and thus can effectively check unaccounted-for transit losses. A scientific and comprehensive energy accounting and audit need to be instituted at each and every node in the feeder network in the whole power system so that the non-technical leakages are identified and plugged.
3. The KSEB is to gear up itself to undertake cost efficient measures. Cost of energy supply can be substantially reduced on a number of fronts. Burden of power purchase cost can be lessened by improved operational efficiency – higher availability (reduce forced outage rates), larger inflow (more augmentation schemes), minimum T & D loss and auxiliary consumption, etc. About 20 % reduction in per unit cost can be expected on this count.

4. Over-manning (too many 'general' and 'long' posts) in establishment & administration (E & A) along with a shortage of technically skilled personnel is a bane of any power system, and sadly this is the case of the KSEB. Trimming over-manning in establishment & administration can reduce per unit supply cost by about 10 %.
5. At the same time, it should be ensured that there is adequate supply of services of technically skilled personnel such that repair and maintenance works are minded and mended in time. There must also be a mechanism to uprate and up to date the technical skill of the personnel.
6. Allowing 1:1 debt-equity ratio can check accumulation of unpaid interest charges (due to government) and make the balance sheet look healthy in this respect (on the stipulation that a reasonable return is ensured on the equity). This can bring about a reduction of about 12 % in the unit cost of supply through reduced interest charges.

These measures, if properly applied, can be shown to bring a commercial profit of Rs. 121 crores (in 1997-98) to the KSEB, instead of a commercial loss of Rs. 521 crores, at the ruling average revenue. Given the vast scope for cost minimisation, clamours for tariff increases lose their justification.

7. Still, along with such cost-effective measures, there is an urgent need to apply scientific tariff structuring on the basis of such efficient costs. It should also be ensured that lifeline tariffing with prompt government compensation mechanism also is structured in such a way that the additional costs from such equity-based subsidisation never interfere with operational efficiency.

8. Just tariffing is not sufficient. It should be ensured that the sales revenue these tariffs yield is collected regularly in time so that it could be used for further capacity expansion without going in for additional loans, after simply writing off a fraction of the arrears every year as bad debts. This necessitates universal spot billing, and strict inspection for possible collusion of the KSEB officials with the errant customers. For this, the 'collection centres' should be strictly made accountable for their monthly 'quota' through both coercive and incentive stipulations. Similarly, there has been an uninterrupted practice of non-payment of energy bills by almost all the government institutions; this practice should be strictly stopped and all the dues collected in time.

*Organisational efficiency:*

1. This is in fact central to the improved functioning of the KSEB. Necessary steps are to be taken to convert the Board into an autonomous corporation as under the Electricity (Supply) Act, 1948. However, such a mere restructuring by nomenclature is not enough. The fundamental requirement is autonomy; governmental intervention should be done away with fully in its day to day affairs, including appointments. At the same time, the Board should subserve the welfare policies of the state (rural electrification and subsidised power to weaker sections) for which the government should compensate it promptly. An independent regulatory authority should be formed to co-ordinate, direct and watch all the functionings in a transparent manner, with checks and balances on a platform of public hearing. This will help dispel the impression being created by sectional interests that the proposed regulatory body is intended to be only a tariff-fixing/raising machinery. Ensuring the efficient functioning of

the board should be the objective of the regulatory body. In such an ensured efficiency environment, cost increases, if any, can be justified only on account of factors external to the functioning of the board.

2. Continuity of management by top personnel at the policy making level is another important factor. Appointments at higher levels be made based on selection, and the selected official with proven ability and integrity should have at least 2 to 5 years further service for superannuation. Besides, incentive-based measures be taken for professionalisation of management.
3. It goes without saying that there is an urgent need to stem the rot in work culture (X-inefficiency) through superior selection procedures, linking the terms of job continuity and remuneration to productivity and accountability clauses and periodical evaluation of the performance. To achieve these, a package of incentives for performance and disincentives for non-performance be instituted.

<b>An overview of the Prescriptions</b> (in the context of the Kerala power system)	
Measures	Expected gains
<b>A. <i>Short Term</i></b>	
1. Complete the projects already under construction (minor and mini hydro-power projects and diversion schemes)	Additional energy potential of 165 MU = reduced power purchase cost <i>and</i> increased sales revenue.
2. Start construction of the already approved projects.	Additional capacity of 400 MW = reduced power purchase cost <i>and</i> increased sales revenue.
3. Up-rating, renovation, and modernisation of old projects.	Cost reduction and sales revenue increase.
4. No more diesel plants.	Resources savings and cost reduction.
<b>B. <i>Medium/Long Term</i></b>	
1. Take up only feasible projects other than environmentally sensitive ones	Resources savings and timely capacity addition.
2. Lobby for the early implementation of the proposed LNG terminal at Kochi to benefit NTPC and other thermal projects in the state.	Substantial cost reduction, as naphtha is replaced by LNG.
3. Check time and cost over-runs.	Substantial resources savings (e.g., about Rs. 644 crores from 18 hydro projects constructed/ under construction so far), <i>and</i> additional sales revenue (e.g., Rs. 52 crores per year, were these projects completed in time).



<b>An overview of the Prescriptions</b> (in the context of the Kerala power system)	
Measures	Expected gains
<p>4. Improve technical efficiency</p> <p>(a) revamp standards, system, and organisation for proper maintenance of the plants to increase technical availability.</p> <p>(b) Take up more augmentation schemes to increase firm power capacity in line with installed capacity.</p>	<p>Increased generation reduces power purchase and thus supply cost; e.g., with 50 % PLF of hydro plants, 70 % PLF of thermal plants, 0.64 % (as reported) auxiliary consumption and 15 % T&amp;D loss, the import cost savings in 1999-2000 would be 32 Paise per unit sold (14 % of unit supply cost) and in 1997-98, nearly 50 paise per unit (26 %).</p>
<p>5. Improve T&amp;D efficiency.</p>	<p>Reduced power import and thus supply cost; e.g., with 15 % T&amp;D loss in 1999-2000, power purchase cost reduces by 6.2 Paise per unit sold and with 10 % loss, by 18 Paise per unit sold.</p>
<p>6. Improve management efficiency:</p> <p>(a) Computerised scientific inventory control</p> <p>(b) Energy accounting and auditing</p> <p>(c) Professional management.</p> <p>(d) Trim over-manning in establishment and administration (E&amp;A).</p>	<p>Cost reduction.</p> <p>Reducing over-manning (i.e., to the standard 2 employees per MU sold) would reduce E&amp;A (and thus supply) cost (as in 1997-98) by 20 Paise per unit sold (about 10 %).</p>

<b>An overview of the Prescriptions</b> (in the context of the Kerala power system)	
Measures	Expected gains
(e) Allow 1:1 debt-equity ratio.	This would reduce interest charges and thus unit supply cost (as in 1997-98) by 23 Paise/unit sold (about 12 %), and by 33 Paise/unit, as in 1999-2000, (about 14 %).
7. Scientific tariff structuring.	Inefficiency not transferred onto customers.
8. Regular and prompt collection of revenue	No resources crunch; e.g., the receivables against electricity supply in 1997-98 was 41 % of the sales revenue, and other sundry debtors, 33 %.
9. Improve organisational efficiency:	The core problem of inefficiency is solved.
(a) Superior selection procedures	
(b) Continuity of management by top personnel	
(c) Strengthenin professionalism of management	
(d) Higher work culture	
(e) Productivity- and accountability-linked job continuity and remuneration	

## 6. SUMMING UP

Administering such efficiency improvement measures in the technical, organisational and financial management could certainly win the system a comfortable footing on its own. And this could in turn dispense with the need for the irreversible and disastrous restructuring that is not only incapable of solving the real problems, but fraught with dangerous implications threatening the very social coherence. One of the disastrous consequences of private sectorisation comes from the fact that a private enterprise system necessarily works on exclusion principle. The vast scope for lodging all sorts of large scale rent seeking costs in over-capitalisation results in inflated supply costs that can exclude a sizeable proportion of consumers with limited purchasing power. Higher incidence of exclusion would be one of the deleterious social costs of private sectorisation in a poor country like ours, leading to increasing or excessive inequality, both individual and regional, and is likely to result in a loss of community and social coherence.

This frightening fact now prompts us to consider the implications of equity-efficiency trade off involved in initiating measures of performance improvement in the power sector. Though in theory nationalisation of a public utility ensures both efficiency *and* equity, in practice both have suffered in the context of power supply in India. Government interference in the name of ensuring social welfare has put considerable constraints on efficiency that in turn have, in accumulation, begun to threaten the very equity issues, and made government *non-intervention* a necessary condition for the system's survival. However, equity considerations perforce entail State intervention *a la* rural electrification and subsidised/free power supply to the poor. Hence the significance of the need for qualifying the demand for government withdrawal from the power sector affairs: as already mentioned,

government should actively intervene so as to engage the public utility in cross subsidisation and rural electrification for equity purposes, and it should adequately compensate the utility then and there. At the same time, it should desist from rent-seeking pursuits of populism, it has been practising over time, that really cost the society substantially. Equity involvement by the State is indispensable in a poor country like ours, where the majority poor are left with no option, a broad band of which is but available for the few rich. For example, a rich household has the capability for the personal services of inverter or gen-set, which the poor are not at all entitled to; similarly, a big industry can have arrangements for cogeneration/captive power, which a small fry cannot even think of. In such a context, the State is duty bound to provide the poor with cheaper power in an effort to uplift their condition. It is here the role of the State is called for.

However, the beneficial significance of the private sector participation in power generation should have a say in designing the development plans. Entry of the private power producers (PPPs) should be facilitated in a transparent competitive environment to ensure the selection of least-cost options by the watchful regulatory authority, who should further structure the provisions for the conduct of the chosen PPPs. On the other hand, no private interests should have any hold on the sales end; that is, by no means the distribution sector be privatised. Collective interests could be safeguarded and fulfilled for common objectives of development with equity only by the vehicle of public sector provisions. The present dispensation of distribution of power can be restructured in a more direct administration of collective responsibility at local levels through co-operatives and municipalities. This will in fact enhance and sustain the significance of decentralisation of democratic power, with the direct involvement of the local consumers in distribution activities. And such direct involvement alone can rid the society of feelings of alienation that lie at the heart of moral hazard

effects and the consequent x-inefficiency. It is in facilitating this that a State realises its meaning. By shirking its social responsibilities, a State ceases to exist in essence. What is required in this light is a strong political will to stand up to and tackle the problems that are only internal.

*“The Committee firmly believes that, given the national and especially the political will to surmount the difficulties that lie ahead, the country has ample managerial, technical and physical resources to accomplish the task of ridding the nation of the endemic power shortages which have plagued it for the last two decades. What is even more important, these resources applied to the twin tasks of conservation and development of new energy sources could do what a few nations today seem capable of doing - surviving the energy crisis that is engulfing the world.”*

- Report of the (Rajadhyaksha) Committee on Power (1980: 5)

## Notes

- 1 See Kannan and Pillai (2001b: boxes 2 and 3) for details on the Enron-tragedy.
- 2 With a reasonable assumption of a plant load factor (PLF) of 70 per cent (that may imply a utilisation of 87.5 per cent at 80 per cent availability) for the thermal plants in the state sector, a PLF of 47.5 per cent (that may imply a utilisation of nearly 80 per cent at 60 per cent availability, considering the firm power capacity) for the hydro plants, 7 per cent (for Kerala, 0.61 per cent) auxiliary consumption and 15 per cent T&D loss. See Kannan and Pillai (2001a).
- 3 For a detailed technical discussion on the reliability of Kerala power supply system, see Pillai (1999).
- 4 Note that the *total* commercial loss in the sale of 293479 MU at a cost-tariff deviation of 43.4 paise per unit in that year comes out to be Rs. 12740 crores only, against this revenue loss on account of corruption of Rs. 10705 crores.
- 5 Though theft of power has been made a cognisable offence since 1986 under the amended Electricity Act, 1910, collusion stands to nullify its effect. All the SEBs do have anti-theft squads that conduct regular but superficial homilies of checks and detect some pilferage cases of lesser fry, just to justify the survival of the squads. In 1997-98, the anti-theft squad of the KSEB detected cases of theft of energy worth Rs. 1.21 crores, in 1998-99, worth Rs. 1.04 crores and in 1999-2000, worth only Rs. 80.42 lakhs. This steep fall in detection trend, despite an officially recognised rise in theft losses, points to the need for vigilance over the vigilante squad itself! The Board as well as the government keeps the eyes closed and ejects some regular warnings and orders (just to justify their own presence!) such as the one recently put out again in vain by which each of the squads at centres of Thiruvananthapuram, Kochi and Kozhikode is required to detect cases of theft of at least 50 lakhs units a year (*Malayala Manorama daily* 23 August 2000).
- 6 For example, Mehta (2000:10) cites a case from Maharashtra. The Mula Pravara Cooperative Society is reported to have

outstanding dues of power bills to the Maharashtra State Electricity Board (MSEB) to the tune of about Rs. 250 crores, accumulated over a decade. The scion of the society had defected to the Shiv Sena and was a minister in the Shiv-Sena- BJP government last time. The MSEB still accounts for this amount as 'receivables' and writes off a fraction each year as bad debts.

- 7 A high Level Committee even went to the extent of recommending to the government of Kerala long back to enact appropriate legislation prohibiting strikes under any circumstances in all power projects under construction', especially citing a 'classical' example of three strikes by the construction workers of a project (Idamalayar hydro-power project, works on which started in 1970 but completed only in 1987) that extended over a total period of three years and one month, causing a loss of Rs. 33.65 crores to the KSEB (Government of Kerala 1984: 57-61).
- 8 Excluding the hydro projects of Kallada and Pooyankutty, and the two diesel power plants. If we stick to the strict assumption that the original project cost estimate allow for possible inflation during construction period, such that the estimate be as on the completion date, then the corruption charges involved would be very much higher.
- 9 The Santhanam Committee in its Report on Prevention of Corruption remarked long back: 'We were told by a large number of witnesses that in all contracts of construction, purchases, sales, and other regular business on behalf of the Government, a regular percentage is paid by the parties to the transaction, and this shared in agreed proportions among the various officials concerned. We were told that in the constructions of the Public Works Department, seven to eleven per cent was usually paid in this manner and this was shared by persons of the rank of Executive Engineer and below down to the Ministry, and occasionally even the Superintending Engineer might have a share.' (Government of India 1964: 10)
- 10 This has been at the tragic cost of the domestic producers of power generating equipment, especially Bharat Heavy Electricals Ltd. (BHEL), which, being up to mark technologically and much cheaper, has gained good markets in some of the developing

countries. Till the late seventies, the BHEL had won nearly all international tenders floated in India for power equipment (Mehta 2000: 15). However, its share in the capacity addition in thermal sets in India has recently come down to the order of 50 to 60 per cent: 'BHEL itself has repeatedly stated that the single most important handicap it faces in India is its inability to arrange for kickbacks' (Morris 1996: fn. 15, 29).

- 11 The Santhanam Committee noted that 'There is a widespread impression that failure of integrity is not uncommon among Ministers and that some Ministers who have held office during the last 16 years have enriched themselves illegitimately..' (Government of India 1964:101).
  
- 12 This was the first time that a court convicted a minister for corruption in Kerala. The starting point was the detection of a leak in the power tunnel of the Idamalayar hydro-power project (that took 17 years for completion by 1987 with a cost escalation of 387 per cent). Under pressure from the opposition parties in the State Assembly, the then Congress-led Ministry instituted, on 21 December 1985, an enquiry commission (The Justice Sukumaran Enquiry Commission) to examine the allegations of corruption involving the then power minister, power secretary, high officials of the KSEB, and the contractors. The Commission, on the basis of detailed enquiry, indicted all of them on charges of corruption involving huge losses to the exchequer. After a due process of judicial trial, they all were convicted also. Subsequently, there have been allegations, followed by enquiry commissions, relating to the award of contracts in the construction of other power projects also (for example, Brahmapuram diesel power plant near Kochi). It should be added that the same minister along with the officials were convicted in another case also – the Graphite case that concerns illegal diversion for resale of NTPC power to six companies in Karnataka including the Bangalore-based industry, Graphite India Ltd., when Kerala was reeling under unprecedented power shortage during the mid-eighties. These private companies are alleged (in the FIR) to have profited to the tune of Rs. 70 lakhs by way of getting the cheaper Kerala power.



- 13 The MoU for a 513 MW combined cycle power project at Kannur at an estimated cost of Rs. 1500 crores was signed in February 1995 by the KSEB and the KPP Nambiar and Associates. It was one of the nine mega projects cleared by the High Power Committee (at the Centre) in 1995, when a Congress-led Government was in power in Kerala. The power purchase agreement (PPA) was signed on March 14, next year, and by the end of 1997, the Kannur project was accorded techno-economic clearance (TEC) by the CEA. But the project was an ill-starter. The new left Government in Kerala could not tolerate the Enron co-sponsorship of the project and hence rejected the State clearance to the project. However, after some dilly dallying, the Government agreed to clear the project (the Chairman of the company being a close relative of the Chief Minister!) provided it found a new co-developer acceptable to the State Government. Thus a new Kannur Project was then recommended by the State Government with the El Paso Energy International of the US as the co-promoter. Kannur power project was one of the three projects in the power sector (including the NTPC-Birla sponsored 1886 MW Ennore power project in Tamil Nadu with 100 per cent foreign (US) participation) identified by the Union Government to be presented at the Indo-US summit in Washington to attract US investment to India during the recent visit by the Indian Prime Minister there. But the State Electricity Minister called the joint secretary in the Union Power Department, on the eve of the PM's visit to the US and said, "We have decided in favour of Ennore and not Kannur" (*The New Indian Express daily*, September 20, 2000). The Kannur project is pictured as the most recent victim of inner party factional frictions as well as unrequited kickback demands (*The New Indian Express*, September 28, 2000). The Chairman of the company himself has recently come out and reported to the Press of the kickback demands for Rs. 75 crores by the son of a political bigwig controlling the government. The El Paso co-sponsorship of the project also has been recently rejected by the government.
- 14 The Brahmapuram project, the first thermal power plant of the KSEB (and the second diesel power plant in the country, the first being the Yelahanka project in Karnataka) of 100 MW capacity was implemented with French assistance of Rs. 160 crores loan

under the Indo-French protocol. The Justice V. Bhaskaran Nambiar Enquiry Commission has found that the purchase contract with a French company SEMT Pilistik for five generators (each of 20 MW) without calling for international tenders as per guidelines resulted in a gain to the French company (and a loss to the KSEB) to the tune of Rs, 71 crores, that the contract with Geo Tech for land reclamation and levelling led to a loss of Rs. 2.96 crores, and that the contract with Tata Project for generator erection works involved a loss of Rs. 1.38 crores. The files in the government and the Board, examined by the Commission, were clear proofs for the high powered collusion that had gone out of their way to favour the contractors (*various dailies* 12 April 1999).

- 15 In this context, Morris (1996: fn. 29) writes: ‘From other sources we know that for a small favour of a year or so’s extension, a former chairman of the NTPC had to arrange for a contribution of a crore of rupees to the Congress [party] kitty. Thus even the task-oriented enterprises within the PS [public sector] necessarily have to accommodate corruption. (The state of affairs in enterprises that have veered too far from their primary task can well be imagined.)’
- 16 Rose-Ackerman (1999:28-29) quotes a number of cases of corruption-inflated project costs: for example, Itaipu dam on the Brazilian border. In the 1970s, two German companies reportedly paid bribes of 20 per cent of the value of construction contracts for a steel mill in Indonesia to a state government official. In Germany, in the mid 1990s, bribes played a major role in awarding contracts to build Terminal 2 at Frankfurt Airport; according to the public prosecutor, corruption led to an increase in the air fares of about 20 to 30 per cent. In Italy, the costs of several major public construction projects reportedly fell steeply after the anti-corruption investigations of the early 1990s. Overall successful bids on public tenders were reported to be 40 to 50 per cent lower in 1997 than five years back.
- 17 Another possible explanation for this divergence is that while the CEA has been giving original cost estimates, the MoP has been reporting the final estimated costs, after allowing for overruns. But as we have already argued, overruns are often deliberate and conceal corrupt collusion.

- 18 According to Quinglian (2000), what has occurred in China since 1978 as a result of what she calls 'the marketisation of power' has been nothing but a 'socialist free lunch' by which the politically powerful in China have used their still awesome administrative and personal power to plunder the former state-owned economy and 'laugh all the way to the bank'!
- 19 Thus the revenue account has always been in the red, the deficit often shooting up at stupendous rates, for example, in 1993-94, the Central revenue account deficit grew by more than 83 per cent over the previous year, and in 1997-98, by more than 30 per cent. On the other hand, the capital account has been made to register surplus since 1990-91, by cutting capital expenditure drastically relative to receipts; in 1993-94, the Central capital account surplus increased about four-fold over the previous year, and in 1997-98, about 2.25 times !
- 20 In the revenue account, the developmental expenditures fell from about 55 per cent in 1980-81 to about 49 per cent in the late nineties, and in the capital account, from about 39 per cent to around 30 per cent respectively.
- 21 Over the high-pitched clamour for financial austerity, loom large the ever-increasing 'jumbo-size' Cabinets and the attendant lackeys both at the Centre and in the States, squandering public money at will. In fact, the introduction and institution of Panchayat Raj governance serves only to decentralise such official profligacy and corruption with wider nets. Added to this is the populist extravaganza such as, for example, the recent freebies (free telephone facilities) from the Telecom Minister to all his Department employees ! And still the Government has no money for the most important power sector investments !
- 22 It should be noted here that inflation in India in general seems to have been to a good extent Government-sponsored, through administrative price hikes and their spread effects (Pillai, 1995). The almost non-significance of Keynesian or Monetarist inflation in Indian economy, thus, needs a careful analysis.
- 23 "The NTPC was founded in 1976, and was pioneer in India in developing well conceived and documented systems and procedures for construction of power plants in record time and

thereafter operating the plant at record PLF. It is therefore not surprising that NTPC annually added almost 1030 MW of new capacity in the first decade (1980-92) of its operation at a difficult period of the economy. It also had the distinction of achieving record annual new capacity additions of 2410 MW in 1987-88 and an average of more than 2000 MW new capacity additions in two consecutive years thereafter.” (*Business Standard*, September 22, 2000)

- 24 Again it should not be misconstrued that a Government department per se is fated to be inefficient. It is the inefficiency, in terms of lethargy, incompetence, non-commitment and what not, of the powers that be that is reflected through the department.
- 25 There have been allegations of corruption against the previous leftist Government in appointing a Canadian firm as consultants in power sector matters in Kerala, in return for a Canadian loan. The same firm was given the contract for Kuttiady extension works which the firm subcontracted to some other local contractors! The works, started in 1996 and expected to be completed within 3 years are still on, the power station still remaining shut down! The Government, however, allowed time extension and also sanctioned the demanded cost overruns to the Canadian contractor! The Canadian consultants were also given extension with hefty payments in fees! Again, the KSEB awarded the maintenance works of Panniar and Sengulam projects to the same Canadian company, ignoring the recommendation of a panel (headed by E. Balanandan) that it should not be given to this firm (*The New Indian Express*, 24 September 2000).
- 26 Morris remarks in a footnote: “We cannot ignore the role of corruption and kickbacks in the preference for foreign projects. Nearly all high level government officials in informal discussions agree that kickbacks in foreign contracts have become the norm. Only the percentage involved varies...” (Morris 1996:1210).
- 27 The recent kickback controversy kicked up in connection with the ministerial shelving away of a private (Kannur) power project in Kerala itself is a powerful example of the corruption potential of this area. The situation appears even more dangerously grim when one finds that this has come from a (self-styled) leftist Government.

- 28 The high capital cost includes, besides the back-door payments, high returns, to the tune of 16 per cent, on capital also. There have been criticisms from the SEB-circle itself that while the IPPs and even the Central sector generating projects are allowed 16 per cent on equity (in addition to highly attractive incentives), the SEBs are severely constrained by the Governments even in matters of earning the stipulated 3 per cent return. K.P. Rao Committee recommends that the SEB be allowed 16 per cent return to provide “a level playing ground” for it (Government of Kerala 1998:30). It is an irony that while the IPPs are allowed entry on the plea that it (this situation) vis-à-vis SEB increase competition and hence efficiency, the SEB still remains constrained as a Government department, without having a free, level playing field!
- 29 In this regard, one would be reminded of a recent Supreme Court verdict in another context (Dr. Rajkumar kidnap case) that if a Government cannot tackle a problem with a firm political will and iron hand, wherever and whenever required, cannot be a Government de jure and should bow out of office.
- 30 Remember, in a country like India, rich with hydro-power potential, a judicious hydro-thermal plant mix in generation capacity, along with considerations of high-cost gas power vis-à-vis cheap and clean hydro-power can ensure this for a long time.
- 31 It is reported that the National Rural Electric Cooperatives Association (NRECA) of USA is engaged in helping to form small cooperatives of consumers in villages and to transfer rights of distribution and transmission of electricity to them. This experiment has been a big success in Bangladesh and Costa Rica in recent times, and previously in the US also. In Bangladesh, the NRECA has helped to form 50 cooperatives serving 2.6 million metres. It has registered collection of nearly 97 per cent of billing. The growth rate also is impressive – some 1000 connections are added every day! (*Business Standard*, April 21, 2000).

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